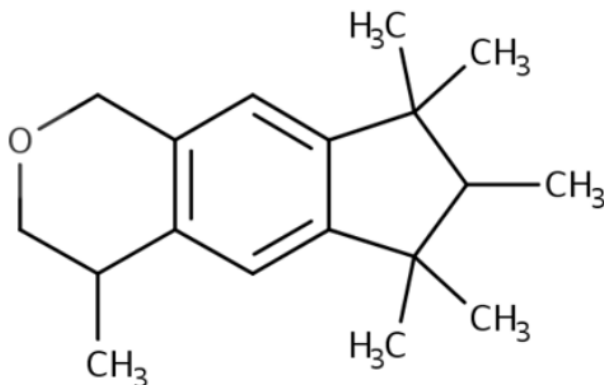

**Draft Data Quality Evaluation and Data Extraction Information for
Environmental Fate and Transport for
1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[γ]-2-benzopyran (HHCB)**

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 1222-05-5



March 2026

This supplemental file contains information regarding the data extraction and evaluation results for data sources that were considered for the *Draft Risk Evaluation for 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta [g]-2-benzopyran (HHCB)* and that underwent systematic review. EPA used the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances* (also referred to as the '2021 Draft Systematic Review Protocol'). The systematic review steps are further described in the *Draft Systematic Review Protocol for 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta [g]-2-benzopyran (HHCB)*. EPA conducted data extractions and data quality evaluations based on author-reported descriptions and results; additional analyses (e.g., statistical analyses) potentially conducted by EPA are not contained in this supplemental file. Additionally, the overall quality determination (OQD) for each reference represents the data as a whole for each study and not for individual metric domains within a study.

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1971706	Wombacher, W. D., Hornbuckle, K. C. (2009). Synthetic Musk Fragrances in a Conventional Drinking Water Treatment Plant with Lime Softening. <i>Journal of Environmental Engineering</i> 135(11):1192-1198.	373
5427884	Wu, C. Y., Bai, L., Gu, F., Wei, W., Guo, L. X., Wen, D. M. (2018). Elimination of typical polycyclic musks in a full-scale membrane bioreactor combined with anaerobic-anoxic-oxic process in municipal wastewater treatment plant. <i>Water Science and Technology</i> 78(7):1459-1465.	375
2188577	Xie, Z., Ebinghaus, R., Temme, C., Heemken, O., Ruck, W. (2007). Air-sea exchange fluxes of synthetic polycyclic musks in the North Sea and the Arctic. <i>Environmental Science & Technology</i> 41(16):5654-5659.	377
2346027	Yager, T. J. B., Furlong, E. T., Kolpin, D. W., Kinney, C. A., Zaugg, S. D., Burkhardt, M. R. (2014). Dissipation of contaminants of emerging concern in biosolids applied to nonirrigated farmland in eastern Colorado. <i>Journal of the American Water Resources Association</i> 50(2):343-357.	379
5427892	Yang, J. J., Metcalfe, C. D. (2006). Fate of synthetic musks in a domestic wastewater treatment plant and in an agricultural field amended with biosolids. <i>Science of the Total Environment</i> 363(1-3):149-165.	382
5431424	Zeng, X., Sheng, G., Gui, H., Chen, D., Shao, W., Fu, J. (2007). Preliminary study on the occurrence and distribution of polycyclic musks in a wastewater treatment plant in Guandong, China. <i>Chemosphere</i> 69(8):1305-1311.	384
5427894	Zhang, X., Yao, Y., Zeng, X., Qian, G., Guo, Y., Wu, M., Sheng, G., Fu, J. (2008). Synthetic musks in the aquatic environment and personal care products in Shanghai, China. <i>Chemosphere</i> 72(10):1553-1558.	386
2571422	Zhou, H., Huang, X., Gao, M., Wang, X., Wen, X. (2009). Distribution and elimination of polycyclic musks in three sewage treatment plants of Beijing, China. <i>Journal of Environmental Sciences</i> 21(5):561-567.	388
5427939	Zouhar, L., Vavrova, M., Mravcova, L., Kubickova, K., Vecerek, V. (2012). Evaluation of wastewater contamination by musk compounds. <i>Fresenius Environmental Bulletin</i> 21(11A):3352-3356.	390
Other Properties		
List of Abbreviations and Acronyms for Data Quality Evaluation and Extraction Tables		392

Study Citation:	SUNY, (2018). Theoretical and Kinetic Properties of OH Radical-Initiated Oxidation of Galaxolide in the Atmosphere. Journal of Physical Chemistry A 122(47):9151-9159.
OECD Harmonized Template:	Photolysis in Air
HERO ID:	5428252

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; calculation; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NA; NA; NA
Radiolabel, Source, State, Purity	NA; NA; NA; NA
Duration and Test Temperature	Not applicable; 298 K
Light Source, Intensity, and additional light details	Not applicable; Not applicable; Not applicable
Source Wavelength Lower and Upper	Not applicable; Not applicable
Test Details and Control	Quantum calculations carried out by Gaussian 09 package. Geometrical parameters of reactants, transition states, intermediates, and products optimized at the MPWB1K method. Rate constants computed by CVT theory with SCT correction.; Not applicable
Initial Concentration, Reference Compound	Not applicable Not applicable; Not Reported
Substance Wavelength Lower and Upper	Not applicable; Not applicable
Direct Quantum Yield Results, Direct Half Life by Loss Lower and Upper	Not Reported; Not Reported; Not Reported
Indirect Type Results, Indirect Rate Constant Lower and Upper	OH radical; Not Reported; 2.71E-11 cm ³ / molecule-sec
Method Details Results and Products Details Results	CVT/SCT rate constants calculated at 180 - 370 K fitted into the Arrhenius form and calculated at 298 K.; Potential product structures by OH radical addition onto benzene ring and hydrogen abstraction from CH ₂ , CH, or methyl groups, or from benzene ring, drawn in paper. Hydrogen abstraction from alkyl groups most thermodynamically favorable.
Parameter Value and Parameter Results	10.90 hours; OH-initiated atmospheric lifetime
Reference Substance Results, Percent Degradation Results and Standard Deviation Results	Cyclopentene and 3,4-dihydro-2H-pyran to calculate geometries and vibrational frequencies: maximum relative deviation < 3.0% (geometric parameters) and 3.2% (vibrational frequencies); Not Reported; Not Reported
Results Remarks, Sample time Results, Results Details	Calculated by $t = 1 / k_{total} [OH]$, where $k_{total} = 2.71E-11 \text{ cm}^3/\text{molecule s}$, $[OH] = 24\text{h average concentration of } 9.4E5 \text{ molecules/cm}^3$; Not applicable; Rate constant for addition reactions: $7.89E-12 \text{ cm}^3/\text{molecule-sec}$; rate constant for hydrogen abstraction reactions: $1.92E-11 \text{ cm}^3/\text{molecule-sec}$

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	N/A	Not applicable.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	Not applicable.

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Study Citation:	SUNY, (2018). Theoretical and Kinetic Properties of OH Radical-Initiated Oxidation of Galaxolide in the Atmosphere. Journal of Physical Chemistry A 122(47):9151-9159.			
OECD Harmonized Template:	Photolysis in Air			
HERO ID:	5428252			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	N/A	Not applicable.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The theoretical determinations were suitable for the test substance.
	Metric 6:	Testing Conditions	N/A	The metric is not applicable to the study type.
	Metric 7:	Testing Consistency	N/A	The metric is not applicable to the study type.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to the study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	N/A	The metric is not applicable to the study type.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to the study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	N/A	The metric is not applicable to this study type.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculation programs were reported and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			High	

Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].
OECD Harmonized Template:	Photolysis in Air
HERO ID:	5113355

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	no; experimental; other: not reported			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Duration and Test Temperature	not reported; not reported			
Light Source, Intensity, and additional light details	black irradiation lamps; not reported; Not Reported			
Source Wavelength Lower and Upper	not reported; not reported			
Test Details and Control	Not Reported; not reported			
Initial Concentration, Reference Compound	Not Reported Not Reported; not reported			
Substance Wavelength Lower and Upper	Not Reported; Not Reported			
Direct Quantum Yield Results, Direct Half Life by Loss Lower and Upper	not reported; Not Reported; 3.7 hours			
Indirect Type Results, Indirect Rate	not reported; Not Reported; Not Reported			
Constant Lower and Upper				
Method Details Results and Products	Not Reported; Not Reported			
Details Results				
Parameter Value and Parameter Results	Not Reported; Not Reported			
Reference Substance Results, Percent Degradation Results and Standard	not reported; Not Reported; Not Reported			
Deviation Results				
Results Remarks, Sample time Results, Results Details	Not Reported; not reported; Not Reported			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2:	Test Substance Purity	Low	The source and purity of the test substance were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Control details were not included; however, the lack of data was not likely to have a substantial impact on study results.
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Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].			
OECD Harmonized Template:	Photolysis in Air			
HERO ID:	5113355			
Domain		EVALUATION		Comments
	Metric	Rating		
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	Medium	The test method details were not reported.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions may have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.

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Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].
OECD Harmonized Template:	Photolysis in Air
HERO ID:	5113355

		EVALUATION	
Domain	Metric	Rating	Comments
	Metric 18:	QSAR Models	N/A The metric is not applicable to this study type.

Overall Quality Determination	Medium
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Study Citation:	Buerge, I. J., Buser, H. R., Müller, M. D., Poiger, T. (2003). Behavior of the polycyclic musks HHCB and AHTN in lakes, two potential anthropogenic markers for domestic wastewater in surface waters. Environmental Science & Technology 37(24):5636-5644.
OECD Harmonized Template:	Photolysis in Water
HERO ID:	5431387

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; EPA OTS 796.3700 (Direct Photolysis Rate in Water by Sunlight): Not reported
Solvent, Reactivity, Storage, Stability	Benzyl benzoate, methanol; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Givaudan, Geneva, Switzerland; NR; approx. 50% Notes: D6-HHCB used as internal standard obtained from p. Schmid, Swiss Federal Laboratories for Materials Testing and Research, EMPA, Dübendorf, Switzerland
Duration and Test Temperature	21 days; 20±1°C
Light Source, Intensity, and additional light details	Actinic lamps: 4 tubular low-pressure mercury-vapor fluorescent lamps; Not reported; TL 40W/05, comparable to 24 h-averaged sunlight at 50° N in July under clear sky
Source Wavelength Lower and Upper	300 nm; 365 nm
Test Details and Control	Test substance added to distilled water with 0.8 - 2.4 mg/L methanol. Test solution 20 mL aliquot in 25 mL quartz glass tube, capped with glass stopped.; Dark controls, same test solution conditions kept in the dark for up to 48 d
Initial Concentration and Reference Compound	1 µg/L; Dark controls
Substance Wavelength Lower and Upper	Not reported; Not reported
Direct Quantum Yield Results, Direct Half Life by Loss Lower and Upper	Not reported; Not Reported; 135 hours
Indirect Rate Constant Lower and Upper	Not Reported; 0.12/day
Method Details Results and Products	Samples extracted with 1 mL hexane , and dried over anhydrous sodium sulfate. Analyzed by GC-MS under electron impact ionization and full-scan or selected ion monitoring mode; LOD 2 ng/L; Not reported
Details Results	Not Reported; Not Reported
Parameter Value and Parameter Results	Dark controls; k = < 0.0001/d, test substance not eliminated by non-photolytic processes.; Not reported; Not reported
Reference Compound, Reference	
Substance Results, Percent Degradation Results and Standard Deviation Results	
Results Remarks, Sample time Results, Results Details	First order rate constant.; Dark controls; Valid controls, no degradation was reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name and structures provided.
	Metric 2:	Test Substance Purity	High	The test substance source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A dark control was included and showed negligible test substance loss.
	Metric 4:	Test Substance Stability	Medium	Test substance preparation was reported but not storage conditions.
Domain 3: Test Conditions				

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Study Citation:	Buerge, I. J., Buser, H. R., Müller, M. D., Poiger, T. (2003). Behavior of the polycyclic musks HHCB and AHTN in lakes, two potential anthropogenic markers for domestic wastewater in surface waters. Environmental Science & Technology 37(24):5636-5644.			
OECD Harmonized Template:	Photolysis in Water			
HERO ID:	5431387			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate light conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and were frequent enough to be able to calculate rate constants.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups was discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency was not reported, limited raw data reported, the analytical method and limit of detection were reported and appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculations were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Buerge, I. J., Buser, H. R., Müller, M. D., Poiger, T. (2003). Behavior of the polycyclic musks HHCB and AHTN in lakes, two potential anthropogenic markers for domestic wastewater in surface waters. Environmental Science & Technology 37(24):5636-5644.
OECD Harmonized Template:	Photolysis in Water
HERO ID:	5431387

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; EPA OTS 796.3700 (Direct Photolysis Rate in Water by Sunlight): Not reported
Solvent, Reactivity, Storage, Stability	Benzyl benzoate, methanol; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Givaudan, Geneva, Switzerland; NR; approx. 50% Notes: D6-HHCB used as internal standard obtained from p. Schmid, Swiss Federal Laboratories for Materials Testing and Research, EMPA, Dübendorf, Switzerland
Duration and Test Temperature	21 days; 20±1°C
Light Source, Intensity, and additional light details	Actinic lamps: 4 tubular low-pressure mercury-vapor fluorescent lamps; Not reported; TL 40W/05, comparable to 24 h-averaged sunlight at 50° N in July under clear sky
Source Wavelength Lower and Upper	300 nm; 365 nm
Test Details and Control	Test substance added to lake water collected from Zurichsee and Wädenswil (collected at 0.1 m on February 5 and March 5, 2002) with 0.8 - 2.4 mg/L methanol. Test solution 20 mL aliquot in 25 mL quartz glass tube, capped with glass stopped.; Dark controls, same test solution conditions kept in the dark for up to 48 d
Initial Concentration and Reference Compound	1 µg/L; Dark controls
Substance Wavelength Lower and Upper	Not reported; Not reported
Direct Quantum Yield Results, Direct Half Life by Loss Lower and Upper	Not reported; Not Reported; 109 hours
Indirect Rate Constant Lower and Upper	Not Reported; 0.15/day
Method Details Results and Products	Samples extracted with 1 mL hexane, and dried over anhydrous sodium sulfate. Analyzed by GC-MS under electron impact ionization and full-scan or selected ion monitoring mode; LOD 2 ng/L; Not reported
Parameter Value and Parameter Results	Not Reported; Not Reported
Reference Compound, Reference	Dark controls; k = < 0.002/d, test substance not eliminated by non-photolytic processes.; Not reported; Not reported
Substance Results, Percent Degradation Results and Standard Deviation Results	
Results Remarks, Sample time Results, Results Details	First order rate constant.; Dark controls; Photodegradation of HHCB yielded half-lives of 109 and 135 h in lake and distilled water, respectively (kp = 0.15 and 0.12 d ⁻¹ , respectively).

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The test substance source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A dark control was included and showed negligible test substance loss.
	Metric 4:	Test Substance Stability	Medium	Test substance preparation was reported but not storage conditions.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.

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Study Citation:		Buerge, I. J., Buser, H. R., Müller, M. D., Poiger, T. (2003). Behavior of the polycyclic musks HHCB and AHTN in lakes, two potential anthropogenic markers for domestic wastewater in surface waters. Environmental Science & Technology 37(24):5636-5644.		
OECD Harmonized Template:		Photolysis in Water		
HERO ID:		5431387		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	Appropriate light conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and were frequent enough to be able to calculate rate constants.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups was discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency was not reported, limited raw data reported, the analytical method and limit of detection were reported and appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculations were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	8404084

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	none; other; experimental; other: Not specified: river die-away test
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Blank and Control	Not reported; Not reported
Oxygen and Inoculum	not specified; not specified: Not reported
Duration, Parameter, System, and Sampling Frequency	Not reported; Not reported: Not reported; Not reported
pH Adjusted and pH	Not reported; Not reported
Concentration	Not reported -
Composition and Test Temperature	Not reported; Not reported
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	Not reported; Not reported; Not reported; Not reported
Results Details Method, Results per Degradation Parameter, and	Not reported; half-life based on disappearance of test material; %biodegradation; Not reported
Direct Quantum Yield Results	
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	Half-life = 100 hours; 60%/28 days; Not reported; Not reported; Not reported
Results Remarks and Results Details	Not reported; Not reported
Results Mean Total Recovery and Results per Recovery	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 4:	Test Substance Stability	Medium	Detail regarding this metric not reported in this secondary source.
Domain 3: Test Conditions				

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Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	8404084			
Domain	Metric	EVALUATION		Comments
		Rating		
	Metric 5:	Test Method Suitability	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 6:	Testing Conditions	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 7:	Testing Consistency	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 8:	System Type and Design	Medium	Detail regarding this metric not reported in this secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Medium	Detail regarding this metric were not reported in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 12:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Detail regarding this metric not reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.

Overall Quality Determination**Medium**

* Related References: Primary source was not cited.

Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	8404084			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, EndPoint, Type, Guideline	none; other; experimental; other: Not specified: field study			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Blank and Control	Not reported; Not reported			
Oxygen and Inoculum	not specified; natural soil: unfrozen sludge amended soils			
Duration, Parameter, System, and Sampling Frequency	Not reported; Not reported: Not reported; Not reported			
pH Adjusted and pH	Not reported; Not reported			
Concentration	Not reported -			
Composition and Test Temperature	Not reported; Not reported			
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	Not reported; Not reported; Not reported; Not reported			
Results Details Method, Results per Degradation Parameter, and	Not reported; half-life based on disappearance of test material; Not reported			
Direct Quantum Yield Results				
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	Half-life = 140-145 days; Not reported; Not reported; Not reported			
Results Remarks and Results Details	test material residue in soil after 1 year was between 10-14% initial; Not reported			
Results Mean Total Recovery and Results per Recovery	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 4:	Test Substance Stability	Medium	Detail regarding this metric not reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 6:	Testing Conditions	Medium	Detail regarding this metric not reported in this secondary source.
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Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	8404084			
Domain	Metric	EVALUATION		Comments
	Metric 7:	Testing Consistency	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 8:	System Type and Design	Medium	Detail regarding this metric not reported in this secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Medium	Detail regarding this metric were not reported in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 12:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Detail regarding this metric not reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.

Overall Quality Determination**Medium**

* Related References: Primary source was not cited.

Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	8404084			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, EndPoint, Type, Guideline	none; other; experimental; other: Not specified: batch study			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	radio-labelled HHCB; NR; NR; NR			
Blank and Control	Not reported; Not reported			
Oxygen and Inoculum	not specified; activated sludge (adaptation not specified): Not reported			
Duration, Parameter, System, and Sampling Frequency	Not reported; Not reported: Not reported; Not reported			
pH Adjusted and pH	Not reported; Not reported			
Concentration	Not reported -			
Composition and Test Temperature	Not reported; Not reported			
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	Not reported; Not reported; Not reported; Not reported			
Results Details Method, Results per Degradation Parameter, and	Not reported; half-life based on disappearance of test material; Not reported			
Direct Quantum Yield Results				
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	Half-life = 10-15 hours; Not reported; Not reported; Not reported			
Results Remarks and Results Details	polar metabolites noted but not identified or quantified in this report; Not reported			
Results Mean Total Recovery and Results per Recovery	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 4:	Test Substance Stability	Medium	Detail regarding this metric not reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 6:	Testing Conditions	Medium	Detail regarding this metric not reported in this secondary source.
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Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	8404084			
Domain	Metric	EVALUATION		Comments
	Metric 7:	Testing Consistency	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 8:	System Type and Design	Medium	Detail regarding this metric not reported in this secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Medium	Detail regarding this metric were limited in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 12:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Detail regarding this metric not reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.

Overall Quality Determination**Medium**

* Related References: Primary source was not cited.

Study Citation:	Fernandez-Fontaina, E., Carballa, M., Omil, F., Lema, J. M. (2014). Modelling cometabolic biotransformation of organic micropollutants in nitrifying reactors. Water Research 65:371-383.
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	5431360

EXTRACTION

Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, EndPoint, Type, Guideline	none; other; experimental; other: non-guideline: cometabolism by nitrifying bacteria
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Blank and Control	not specified; not specified
Oxygen and Inoculum	aerobic; activated sludge, adapted: highly enriched nitrifying activated sludge
Duration, Parameter, System, and Sampling Frequency	Kinetic assay A: 635-639 days; kinetic assay B: 1150-1161 days; test material: Nitrifying activated sludge (NAS) reactor; A pulse of 100 mg/L of micropollutants was added to the reactor; sample taken 5 min after adding the pulse of micropollutants for each of the sampling periods (A1, A2, A3, A4, B1, B2, B3); 7 sampling campaigns were employed, consisting of feed, mixed liquor, and effluent samples (both solid and liquid phases sampled).
pH Adjusted and pH Concentration	not reported; Kinetic assay A: 7.2; Kinetic assay B: 7.1; sampling period A1-4 pH range 6.9-7.9, B1-3 pH range 6.4-7.6 10 - 40 µg/L
Composition and Test Temperature	A solution of ammonium chloride and sodium bicarbonate were fed into the reactor and operated for 3 yrs under stable conditions for complete transformation of ammonium to nitrate; 25°C
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	not reported; not reported; Reactors covered with aluminum foil to prevent photodegradation; Biotransformation, sorption/desorption and volatilization process evaluation using a dynamic two-phase model. Pseudo-first order kinetic and cometabolic models were employed. Kinetic parameters (sorption kinetic constant, biotransformation kinetic constant, transformation capacities, affinity constant) were calculated from experimental data using a Runge-Kutta numerical method implemented in Matlab (nonlinear multidimensional optimization algorithm).
Results Details Method, Results per Degradation Parameter, and Direct Quantum Yield Results	Solid-phase extraction Ultrasonic solvent extraction; GC-MS-MS, LC-MS-MS; biotransformation; not reported
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	transformation capacity (TC) = 565 µg/g N, half-saturation constant (KSC) 1.6 µg/L; Not Reported; variable depending on sampling campaign; not specified
Results Remarks and Results Details	Experimental biodegradation rates (µg/d) from sampling periods A1, A2, A3, A4, B1, B2, and B3 were = 134.9, 159.5, 197.4, 318.6, 114.8, 112.6, and 114.0, respectively; Predicted biotransformation rates (µg/d) for the Cometabolic model from sampling periods A1, A2, A3, A4, B1, B2, and B3 were = 144.9, 184.7, 222.3, 386.8, 118.2, 111.6, and 113.1, respectively; Predicted biotransformation rates (µg/d) for the Pseudo first-order model from sampling periods A1, A2, A3, A4, B1, B2, and B3 were = 140.7, 175.5, 206.6, 323.7, 117.8, 110.8, and 112.1, respectively.; Biotransformation kinetic constant k(biol) = 20.9 (Kinetic assay A) and 32.9 (Kinetic assay B) L/d VSS d.
Results Mean Total Recovery and Results per Recovery	not reported; not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified.

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Study Citation:	Fernandez-Fontaina, E., Carballa, M., Omil, F., Lema, J. M. (2014). Modelling cometabolic biotransformation of organic micropollutants in nitrifying reactors. Water Research 65:371-383.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	5431360			
Domain		Metric	EVALUATION Rating	Comments
	Metric 2:	Test Substance Purity	Medium	The test substance source was not reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	Medium	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Medium	The test organism, species, or inoculum source were reported, but are not routinely used for similar study types; however, the deviation was not likely to have a substantial impact on study results.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty in the measurements between study groups were reported in the study (variable %deviations between experimental and predicted)
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limited detail regarding analytical methods.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculations were clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The study results were reasonable.
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Study Citation:	Fernandez-Fontaina, E., Carballa, M., Omil, F., Lema, J. M. (2014). Modelling cometabolic biotransformation of organic micropollutants in nitrifying reactors. Water Research 65:371-383.
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	5431360

		EVALUATION	
Domain	Metric	Rating	Comments
	Metric 18:	High	The models had defined, unambiguous endpoints.

Overall Quality Determination	High
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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	5349388

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-0; HHCB
Confidentiality, EndPoint, Type, Guideline	no; ready biodegradability; experimental; OECD Guideline 301 B (Ready Biodegradability: CO2 Evolution Test)
Solvent, Reactivity, Storage, Stability	isopropyl myristate; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; 32.2% isopropyl myristate, two identified HHCB isomers totaled 51.8% (26.4% and 25.4%) Notes: carbon 80.56% w/w
Blank and Control	not reported; none
Oxygen and Inoculum	aerobic; activated sludge, adapted
Duration, Parameter, System, and Sampling Frequency	28 days; Not Reported: sealed vessel; not reported
pH Adjusted and pH	Not Reported; not reported
Concentration	Not Reported
Composition and Test Temperature	not reported; not reported
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	not reported; not reported; not reported; Not Reported
Results Details Method, Results per Degradation Parameter, and	not reported; %CO2; Not Reported
Direct Quantum Yield Results	
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	0%; Not Reported; 28 days; benzyl alcohol
Results Remarks and Results Details	Not Reported; Not Reported
Results Mean Total Recovery and Results per Recovery	not reported; not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN
Metric 2:	Test Substance Purity	Medium	The test substance source was not reported; however, the omissions or identified impurities were not likely to have a substantial impact on the study results.
Domain 2: Test Design			
Metric 3:	Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have a substantial impact on study results.
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.

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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	5349388			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Limited details were reported but may be retrievable from the cited article.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported and is routinely used for similar study types and appropriate for the study method or route.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	Medium	Sampling details were not reported but may be retrievable from the cited primary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	The metric is not applicable to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were expected.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

* Related References: cites: King, J.M.H. (1994). Assessment of the Inherent Biodegradability of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyran IPM in the Sealed Vessel Test using acclimatised effluent. Unilever BD/END/03; not in HERO

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.		
OECD Harmonized Template:	Biodegradation in Water		
HERO ID:	5349388		
EXTRACTION			
Parameter	Data		
CASRN and Test Material	1222-05-0; HHCB		
Confidentiality, EndPoint, Type, Guideline	no; ready biodegradability; experimental; OECD Guideline 301 B (Ready Biodegradability: CO2 Evolution Test)		
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR		
Radiolabel, Source, State, Purity	NR; NR; NR; NR		
Blank and Control	not reported; included		
Oxygen and Inoculum	aerobic; other:: undefined sewage effluent		
Duration, Parameter, System, and Sampling Frequency	28 days; Not Reported: sealed vessel; not reported		
pH Adjusted and pH	Not Reported; not reported		
Concentration	10 - 20 mg/L		
Composition and Test Temperature	not reported; not reported		
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	not reported; not reported; not reported; Not Reported		
Results Details Method, Results per Degradation Parameter, and	not reported; %CO2; Not Reported		
Direct Quantum Yield Results			
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	0%; Not Reported; 28 days; sodium benzoate		
Results Remarks and Results Details	Not Reported; Not Reported		
Results Mean Total Recovery and Results per Recovery	not reported; not reported		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN
Metric 2:	Test Substance Purity	Medium	The test substance source was not reported; however, the omissions or identified impurities were not likely to have a substantial impact on the study results.
Domain 2: Test Design			
Metric 3:	Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have a substantial impact on study results.
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions			
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Study Citation:		RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.		
OECD Harmonized Template:		Biodegradation in Water		
HERO ID:		5349388		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Limited details were reported but may be retrievable from the cited article.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported and is routinely used for similar study types and appropriate for the study method or route.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	Medium	Sampling details were not reported but may be retrievable from the cited primary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	The metric is not applicable to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were expected.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

* Related References: cites: HERO ID: 8785336; Jenkins, W.R. (1991b). Abbalide: Assessment of its biodegradability, Modified Sturm Test. Report to RIFM, Life Science research Report 90/BAK003/1361.

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	5349388			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-0; HHCB			
Confidentiality, EndPoint, Type, Guideline	no; other; experimental; other: degradation by pure culture fungi			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	uniformly radio-labeled; NR; NR; NR			
Blank and Control	not reported; not reported			
Oxygen and Inoculum	aerobic; other:: pure cultures of Phanerochaete chrysosporium (two strains) and species isolated from spontaneously air-infected cultures.			
Duration, Parameter, System, and Sampling Frequency	6 weeks; radiochem measure: closed vessel; not reported			
pH Adjusted and pH	yes; 4.5			
Concentration	50 - 100 mg/L			
Composition and Test Temperature	mats on growth medium; 30°C			
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	not reported; not reported; not reported; Not Reported			
Results Details Method, Results per Degradation Parameter, and Direct Quantum Yield Results	not reported; %CO2; Not Reported			
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	0%; Not Reported; 6 weeks; sodium benzoate			
Results Remarks and Results Details	No radio-labeled volatile organics or carbon dioxide were produced. For the various strains, amounts of radioactivity (5-30-50-77%) was associated with metabolites.; Not Reported			
Results Mean Total Recovery and Results per Recovery	98 - 105%; 90 - 103%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN
	Metric 2:	Test Substance Purity	Medium	The test substance source was not reported; however, the omissions or identified impurities were not likely to have a substantial impact on the study results.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Some concurrent control group details were not included; however, the lack of data was not likely to have a substantial impact on study results.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	5349388			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Limited details were reported but may be retrievable from the cited article.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	The test organism, species, or inoculum source are not routinely used for similar study types or were not appropriate for the evaluation of the specific outcome(s) of interest or route.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Deficiencies in the outcome assessment methodology of the assessment or reporting were likely to have a substantial impact on results.
	Metric 12:	Test Substance Purity	Medium	Sampling details were not reported but may be retrievable from the cited primary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	The metric is not applicable to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**Uninformative**

* Related References: cites: HERO ID: 8784896; Envirogen, Inc. (1997). Biodegradation Studies of HHCB. Study # 96-215, Princeton Research Center, New Jersey. For IFF New Jersey, 23 April 1997.

Study Citation:	Schaefer, E. C. (2005). 14C-HHCB: Dieaway of a semi-volatile organic compound in river water.
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	7607852

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; Not Reported; Experimental; other: Die Away of Radiolabeled Semi-Organic Compounds in Activated Sludge or River Water
Solvent, Reactivity, Storage, Stability	Ethanol; NR; Frozen; NR
Radiolabel, Source, State, Purity	14C-HHCB; 48.9 Ci/mmol (0.115 mCi/mg) specific activity; NR; Lot no. 030909; Liquid; >98% (radiochemical purity)
Blank and Control	Abiotic control identical to test system but amended with 1 g/L mercuric chloride; Not reported
Oxygen and Inoculum	not specified; activated sludge (adaptation not specified): River water from Choptank River, Denton, Maryland; activated sludge from Denton Wastewater Treatment Facility, Denton, Maryland
Duration, Parameter, System, and Sampling Frequency	28 days; test mat.: Amber glass 1 gal. test vessels containing 2 L river water supplemented with 10 mg/L activated sludge solids. Test substance applied in alkyl ethoxylated sulfate solvent C14/15 E2.2; 0, 5, and 24 hr, 2, 3, 4, 5, 6, 7, 14, 21, and 28 d
pH Adjusted and pH	Not Reported; 6.7 (river); 7.1 (sludge)
Concentration	5 µg/L
Composition and Test Temperature	River water and activated sludge; 20±3°C
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	Not reported; Not reported; Not Reported; Not Reported
Results Details Method, Results per Degradation Parameter, and Direct Quantum Yield Results	Radio thin layer chromatography (solvent extracts); combustion analysis (solids); Liquid scintillation counting (river water); % parent radioactivity recovered; Not Reported
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	7.83% (extracts); 1.16% (aqueous), 0.38% (solids), 15.945 (volatilized); Not reported; 28 days; 24 hr: 90.34% parent in extract, 0.70% aqueous, 0.33% in solids, 0.77% volatilized
Results Remarks and Results Details	5 hr: 91.23% (extracts), 0.46% (aqueous), 0.48% (solids)2 d: 62.85% (extracts), 24.99% (extracts, metabolite), 1.96% (aqueous), 0.46% (solids), 1.60% (volatilized)7 d: 27.73% (extracts), 56.09% (extracts, metabolite), 0.60% (aqueous), 0.51% (solids), 7.39% (volatilized)28 d: 7.83% (extracts), 61.58% (extracts, metabolite), 1.16% (aqueous), 0.38% (solids), 15.94% (volatilized); Fitted to decay equations by non-linear regression.2 compartment model with initial first-order loss followed by second first-order loss $Y=(A \cdot e^{-(k_1 \cdot t)}) + (B \cdot e^{-(k_2 \cdot t)})$ $A=\%$ parent degraded at $k_1=76.1 \pm 18.9\%$ $B=\%$ parent degraded at $k_2=18.5 \pm 19.3\%$ $k_1=0.0009 \pm 0.002$ /hr $k_2=0.001 \pm 0.002$ /hr $r^2=0.996$
Results Mean Total Recovery and Results per Recovery	Not reported; 92.17%/5 hr, 91.86%/2d, 92.32%/7d, 86.89%/28d (biotic)

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The purity but not source of the test substance was reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Abiotic controls were included and results were in an acceptable range.

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Study Citation:		Schaefer, E. C. (2005). 14C-HHCB: Dieaway of a semi-volatile organic compound in river water.		
OECD Harmonized Template:		Biodegradation in Water		
HERO ID:		7607852		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	High	Test substance storage and preparation in solvent and surfactant were reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate testing conditions, including temperature and pH, were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across all replicates and samples.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported and is commonly used in similar studies.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining biodegradation.
	Metric 12:	Test Substance Purity	Medium	Sampling methods were described generally and frequency was appropriate. Sample extraction methods were not reported.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	No notable sources of uncertainty were identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical methods were reported; limits of detection and percent recovery for extracts were not reported. Raw data was reported but summaries for each sample time point was not.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were described and the 2-compartment model was appropriately chosen as the model of best fit, however, what the two compartments were was not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable based on the method but were not compared to previous studies. The metabolite/s were not identified. The kinetic model used was not adequately described.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		High		

Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	5113355

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	no; ready biodegradability; experimental; other: Modified Sturm test
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Blank and Control	not reported; not reported
Oxygen and Inoculum	not reported; other:: sewage effluent
Duration, Parameter, System, and Sampling Frequency	28 days; not specified: not reported; not reported
pH Adjusted and pH	Not Reported; not reported
Concentration	Not Reported
Composition and Test Temperature	Not Reported; not reported
CEC, Water Aeration Dilution, Continuous Darkness, and Other Design	Not Reported; Not Reported; Not Reported; Not Reported
Results Details Method, Results per Degradation Parameter, and	not reported; % degraded; Not Reported
Direct Quantum Yield Results	
Results Value, Results Standard Deviation, Results Sample Time, and Results Reference Substance Compartments	0; Not Reported; 28 days; Not Reported
Results Remarks and Results Details	not readily biodegradable.; Not Reported
Results Mean Total Recovery and Results per Recovery	Not Reported; Not Reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Low	The source and purity of the test substance were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Some concurrent control group details were not included; however, it is assumed method protocol was used.

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Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].			
OECD Harmonized Template:	Biodegradation in Water			
HERO ID:	5113355			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported and is routinely used for similar study types and appropriate for the study method or route.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Medium	Details regarding sampling methods of the outcome(s) were not reported; however, it is assumed method protocol was used.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Statistical analysis or kinetic calculations were not conducted or were not described clearly.
Domain 8: Other				
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Study Citation:	U.S. EPA, (2008). Screening-level hazard characterization of high production volume chemicals: Sponsored chemical 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyran (HHCB) (CAS No. 1222-05-5) [9th CI Name: Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-].
OECD Harmonized Template:	Biodegradation in Water
HERO ID:	5113355

		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 17: Verification or Plausibility of Results	Medium	The study results were reasonable.	
	Metric 18: QSAR Models	N/A	The metric is not applicable to this study type.	

Overall Quality Determination	Medium
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Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).			
OECD Harmonized Template:	Biodegradation in Sediment			
HERO ID:	8784611			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	Not Reported; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-gamma-2-benzopyran			
Confidentiality, EndPoint, Type, Guideline	None; other; experimental; other: aerobic biodegradation in soils			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	12%; 14C- uniformly ring labeled; specific activity: 41.41 mCi/mmol; redacted; NR; radiochemical purity 98.2% Notes: HHCB			
Oxygen and Inoculum	aerobic; natural sediment: river sediment from Delaware River in central New Jersey			
Duration, Parameter, System, and Sampling Frequency	365-382 days; radiochem. measure; Sealable, air-tight flasks; 22-23°C; not reported			
Results Sample Time, Compartment, Sludge Compartment, Water Compartment, CEC, and pH	periodically; sediment; no; 80% water holding capacity; not reported; 6.7			
Control Dark, Control, and Blank Concentration	not reported; not reported; not reported			
Analytical Method, Analytical Details, and Results Per Degredation Parameter	10 ug/g			
Results Remarks	TLC/scintillation counter; non-radioactive HHCB standard; radiochem. meas			
Halflife, Standard Deviation Results, Reference Substance Results, and Reference Substance Compartment Results	Not Reported			
Results Details	significantly <1 year; not reported; not reported; Not Reported			
Mean Total Recovery Results and Results Per Recovery	Not Reported			
Results Value, Direct Quantum Yield Results, and Transformation Products	80%; not reported			
	81%; 18 ug; not reported			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The purity of the test substance was reported
Domain 2: Test Design	Metric 3:	Study Controls	Uninformative	The study did not include or report crucial control groups that consequently made the study unusable.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
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Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).			
OECD Harmonized Template:	Biodegradation in Sediment			
HERO ID:	8784611			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were reported deviations or omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions were likely to have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty in the measurements were reported in the study and accounted for in data evaluation with minor omissions.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**Uninformative**

Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.
OECD Harmonized Template:	Biodegradation in Soil
HERO ID:	10365931

EXTRACTION				
Parameter		Data		
CASRN and Test Material		1222–05–5; HHCB		
Confidentiality, EndPoint, Type, Guideline		No; other, simulation test; Experimental; OECD Guideline 307 (Aerobic and Anaerobic Transformation in Soil)		
Solvent, Reactivity, Storage, Stability		Not Reported; Not Reported; Not Reported; Not Reported		
Radiolabel, Source, State, Purity		Not Reported; Not Reported; Not Reported; Not Reported		
Oxygen, pH, and CEC		Not Reported; Not Reported; Not Reported		
Test Type, Test Temperature, and Test Details		laboratory; 20°C; Not Reported		
Soil Type, Clay Silts and Organic Carbon, and Bulk Density		Not Reported; Not Reported; Not Reported		
Soil Classification, Microbial Biomass, and Humidity		Not Reported; Not Reported: Not Reported		
Duration, Parameter, System, and Sampling Frequency		NR; Not Reported; German guideline in methods analogous to the OECD 307; Not Reported		
Control and Blank		Not Reported; abiotic controls		
Concentration		Not Reported		
Analytical Method, Analytical Details, and Results Per Degredation Parameter		Not Reported; Used specific analytical techniques to quantify biodegradation rate; Soil and Sediment (half-life/DT50)		
Results Remarks		Not Reported		
Results Value, Standard Deviation Results, Sample Time Results, Reference Substance Results, and Referencs Substance Compartment Results		280-476 days (sludge amended soils); Not Reported; Not Reported; Not Reported; Not Reported		
Results Details		Not Reported		
Mean Total Recovery Results and Results Per Recovery		Not Reported; Not Reported		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	High	A concurrent negative control, or blank group, toxicity control, and positive control were included.
	Metric 4:	Test Substance Stability	Low	Limited details reported in secondary source.

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Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.			
OECD Harmonized Template:	Biodegradation in Soil			
HERO ID:	10365931			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	Low	Limited details reported in secondary source.
	Metric 6:	Testing Conditions	Low	Limited details reported in secondary source.
	Metric 7:	Testing Consistency	Low	Limited details reported in secondary source.
	Metric 8:	System Type and Design	Low	Limited details reported in secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	Limited details reported in secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Significant loss was unaccounted in the study report (not attributed to abiotic or biotic degradation nor volatilization).
	Metric 12:	Test Substance Purity	Low	Limited details reported in secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Missing experimental details and raw data to interpret loss of compound.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limited details reported in secondary source with potential issues from poor mass balance.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Limited details reported in secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			Low	

* Related References: Citing Litz et al. (2007), HERO ID 10088314

Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.
OECD Harmonized Template:	Biodegradation in Soil
HERO ID:	10365931

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222–05–5; HHCB			
Confidentiality, EndPoint, Type, Guideline	No; other; Experimental; other: measurements of test substance in outdoor lysimeter			
Solvent, Reactivity, Storage, Stability	Not Reported; Not Reported; Not Reported; Not Reported			
Radiolabel, Source, State, Purity	Not Reported; Not Reported; Not Reported; Not Reported			
Oxygen, pH, and CEC	Not Reported; Not Reported; Not Reported			
Test Type, Test Temperature, and Test Details	laboratory; Reported as average annual temperature of testing location; measured spiked media versus unspiked media			
Soil Type, Clay Silts and Organic Carbon, and Bulk Density	Not Reported; Not Reported; Not Reported			
Soil Classification, Microbial Biomass, and Humidity	Not Reported; Not Reported: Not Reported			
Duration, Parameter, System, and Sampling Frequency	NR; Not Reported; multiple soil and sludge combinations; Not Reported			
Control and Blank	Not Reported; Not Reported			
Concentration	Not Reported			
Analytical Method, Analytical Details, and Results Per Degredation Parameter	Not Reported; Not Reported; Soil and Sediment (half-life/DT50)			
Results Remarks	Losses due to biodegradation not quantified and no metabolites assessed			
Results Value, Standard Deviation Results, Sample Time Results, Reference Substance Results, and References Substance Compartment Results	35-116 days (for spiked sludge amended soils) 107-116 days (for unspiked sludge amended soils); Not Reported; Not Reported; Not Reported; Not Reported			
Results Details	Not Reported			
Mean Total Recovery Results and Results Per Recovery	Not Reported; Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	Low	Limited details reported in secondary source.
	Metric 4:	Test Substance Stability	Low	Limited details reported in secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Low	Limited details reported in secondary source.
	Metric 6:	Testing Conditions	Low	Limited details reported in secondary source.
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Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.			
OECD Harmonized Template:	Biodegradation in Soil			
HERO ID:	10365931			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 7:	Testing Consistency	Low	Limited details reported in secondary source.
	Metric 8:	System Type and Design	Low	Limited details reported in secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	Limited details reported in secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Biodegradation not directly quantified.
	Metric 12:	Test Substance Purity	Low	Limited details reported in secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Missing experimental details and raw data to interpret loss of compound.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limited details reported in secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Limited details reported in secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			Low	

* Related References: Citing DiFrancesco et al. (2004), HERO ID 7693975.

Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).			
OECD Harmonized Template:	Biodegradation in Soil			
HERO ID:	8784611			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	Not Reported; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-gamma-2-benzopyran			
Confidentiality, EndPoint, Type, Guideline	None; other; experimental; other: Aerobic Biodegradation in Soil			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	12%; 14C- uniformly ring labeled; specific activity: 41.41 mCi/mmol; redacted; NR; radiochemical purity 98.2% Notes: HHCB			
Oxygen, pH, and CEC	aerobic; 6.6; not reported			
Test Type, Test Temperature, and Test Details	laboratory; 22-23°C; amended with nutrients (nitrogen and phosphorus salts); flushed headspace measured for volatile organics and CO2			
Soil Type, Clay Silts and Organic Carbon, and Bulk Density	other; not reported; not reported			
Soil Classification, Microbial Biomass, and Humidity	agricultural soil; soil from farm in central New Jersey: 80% holding capacity			
Duration, Parameter, System, and Sampling Frequency	365-382 days; test mat; Sealable, air-tight flasks; final: ~1 year			
Control and Blank	not reported; not reported			
Concentration	10 ug/g			
Analytical Method, Analytical Details, and Results Per Degredation Parameter	TLC/scintillation counter; non-radioactive HHCB standard; % remaining			
Results Remarks	half-life of significantly less than 1 year			
Results Value, Standard Deviation Results, Sample Time Results, Reference Substance Results, and Referencs Substance Compartment Results	35%; not reported; ~1 year; not reported; Not Reported			
Results Details	Not Reported			
Mean Total Recovery Results and Results Per Recovery	52%; not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Uninformative	The study did not include or report crucial control groups that consequently made the study unusable.
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Study Citation:		IFF, (1998). Fate of HHCB in soil microcosms (sanitized).		
OECD Harmonized Template:		Biodegradation in Soil		
HERO ID:		8784611		
Domain	Metric	EVALUATION Rating	Comments	
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were reported deviations or omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	This metric is not applicable to the study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test inoculum source was reported.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Deficiencies in the outcome assessment methodology of the assessment or reporting were likely to have a substantial impact on results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions were likely to have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty in the measurements were reported in the study and accounted for in data evaluation with minor omissions.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to the study type.

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Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).
OECD Harmonized	Biodegradation in Soil
Template:	
HERO ID:	8784611

		EVALUATION	
Domain	Metric	Rating	Comments
Overall Quality Determination		Uninformative	

Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).		
OECD Harmonized Template:	Biodegradation in Soil		
HERO ID:	8784611		
EXTRACTION			
Parameter	Data		
CASRN and Test Material	Not Reported; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-gamma-2-benzopyran		
Confidentiality, EndPoint, Type, Guideline	None; other; experimental; other: Aerobic Biodegradation in Soil		
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR		
Radiolabel, Source, State, Purity	12%; 14C- uniformly ring labeled; specific activity: 41.41 mCi/mmol; redacted; NR; radiochemical purity 98.2% Notes: HHCB		
Oxygen, pH, and CEC	aerobic; 7; not reported		
Test Type, Test Temperature, and Test Details	laboratory; 22-23°C; amended with nutrients (nitrogen and phosphorus salts); flushed headspace measured for volatile organics and CO2		
Soil Type, Clay Silts and Organic Carbon, and Bulk Density	other; not reported; not reported		
Soil Classification, Microbial Biomass, and Humidity	sludge-amended soil; soil from farm in southern New Jersey with routinely applied sludge: 80% holding capacity		
Duration, Parameter, System, and Sampling Frequency	365-382 days; test mat; Sealable, air-tight flasks; final		
Control and Blank	not reported; not reported		
Concentration	10 ug/g		
Analytical Method, Analytical Details, and Results Per Degredation Parameter	TLC/scintillation counter; non-radioactive HHCB standard; % remaining		
Results Remarks	half-life of significantly less than 1 year		
Results Value, Standard Deviation Results, Sample Time Results, Reference Substance Results, and References Substance Compartment Results	9%; not reported; ~1 year; not reported; Not Reported		
Results Details	additional 20% radiolabel recovered by alkaline hydrolysis indicating more polar, oxidized products		
Mean Total Recovery Results and Results Per Recovery	73%; not reported		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
Metric 3:	Study Controls	Uninformative	The study did not include or report crucial control groups that consequently made the study unusable.
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to have a substantial impact on study results.
Domain 3: Test Conditions			
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Study Citation:		IFF, (1998). Fate of HHCB in soil microcosms (sanitized).		
OECD Harmonized Template:		Biodegradation in Soil		
HERO ID:		8784611		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were reported deviations or omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	This metric is not applicable to the study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test inoculum source was reported.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions were likely to have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The transformation product concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to the study type.

Overall Quality Determination**Uninformative**

Study Citation:	IFF, (1998). Fate of HHCB in soil microcosms (sanitized).		
OECD Harmonized Template:	Biodegradation in Soil		
HERO ID:	8784611		
EXTRACTION			
Parameter	Data		
CASRN and Test Material	Not Reported; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-gamma-2-benzopyran		
Confidentiality, EndPoint, Type, Guideline	None; other; experimental; other: Aerobic Biodegradation in Soil		
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR		
Radiolabel, Source, State, Purity	12%; 14C- uniformly ring labeled; specific activity: 41.41 mCi/mmol; redacted; NR; radiochemical purity 98.2% Notes: HHCB		
Oxygen, pH, and CEC	aerobic; 6.5; not reported		
Test Type, Test Temperature, and Test Details	laboratory; 22-23°C; amended with nutrients (nitrogen and phosphorus salts); flushed headspace measured for volatile organics and CO2		
Soil Type, Clay Silts and Organic Carbon, and Bulk Density	other; not reported; not reported		
Soil Classification, Microbial Biomass, and Humidity	forest soil; soil from oak forest in central New Jersey: 80% holding capacity		
Duration, Parameter, System, and Sampling Frequency	365-382 days; test mat; Sealable, air-tight flasks; final: ~1 year		
Control and Blank	not reported; not reported		
Concentration	10 ug/g		
Analytical Method, Analytical Details, and Results Per Degredation Parameter	TLC/scintillation counter; non-radioactive HHCB standard; % remaining		
Results Remarks	half-life of significantly less than 1 year		
Results Value, Standard Deviation Results, Sample Time Results, Reference Substance Results, and References Substance Compartment Results	7%; not reported; ~1 year; not reported; Not Reported		
Results Details	Not Reported		
Mean Total Recovery Results and Results Per Recovery	104%; not reported		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
Metric 3:	Study Controls	Uninformative	The study did not include or report crucial control groups that consequently made the study unusable.
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to have a substantial impact on study results.
Domain 3: Test Conditions			
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Study Citation:		IFF, (1998). Fate of HHCB in soil microcosms (sanitized).		
OECD Harmonized Template:		Biodegradation in Soil		
HERO ID:		8784611		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were reported deviations or omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	N/A	This metric is not applicable to the study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test inoculum source was reported.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions were likely to have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty in the measurements were reported in the study and accounted for in data evaluation with minor omissions.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to the study type.

Overall Quality Determination**Uninformative**

Study Citation:	Artola-Garicano, E., Sinnige, T. L., Van Holsteijn, I., Vaes, W. H. J., Hermens, J. L. M. (2003). Bioconcentration and acute toxicity of polycyclic musks in two benthic organisms (<i>Chironomus riparius</i> and <i>Lumbriculus variegatus</i>). <i>Environmental Toxicology and Chemistry</i> 22(5):1086-1092.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5352378

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	12L copper-free Utrecht tap water spiked with isopropanol containing the test compound (1 g/L); NR; NR; NR
Radiolabel, Source, State, Purity	NA; International Flavors and Fragrances (Hilversum, The Netherlands); NR; 98% Notes: Stock solution stirred for 24 hours for complete dissolution.
Test Organism and Test Organism Details	Fourth-instar midge larvae, <i>Chironomus riparius</i> ; 600 mg of larvae per test vessel
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 19± 2°C; 6.0 - 6.5; Not applicable
Media Type, TOC, and Salinity	not specified; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	50 - 97% saturation; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; nominal constant concentration
Test Type, Test Temperature, and Test Condition	flow-through; 19± 2°C; System equilibrated 2 d prior to test start
Comments	
Duration, Parameter, and Sampling Frequency	12 days; Not Reported; 0, 6, 23, 51, 76, 121, 174, and 243 hours
Concentration	12 µg/L
Analytical Method and Analytical Details	GC-MS, selected ion monitoring mode; LOD water 0.05 ug/L; LOD organism 0.01 mg/kg wet wt; Water samples extracted with cyclohexane and stored at 4 - 8°C. Organism samples were flushed with deionized water, blotted dry, weighed, and stored at -20°C before extraction. Organisms were extracted in cyclohexane with an ultrasonic probe.;
Rate Constant and Results per Recovery	Not reported; Organism: 98-102% Water: 94 - 104%
Statistics, Basis, and Calculation Basis	Not reported; whole organism, wet wt.; steady state
Results Value and Results Details	log BCF: 1.93±0.21; Steady state reached after 4 d.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The test substance source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	A concurrent negative control was not included.
	Metric 4:	Test Substance Stability	High	The test substance preparation was reported and appropriate for the study.
Domain 3: Test Conditions				

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Study Citation:		Artola-Garicano, E., Sinnige, T. L., Van Holsteijn, I., Vaes, W. H. J., Hermens, J. L. M. (2003). Bioconcentration and acute toxicity of polycyclic musks in two benthic organisms (<i>Chironomus riparius</i> and <i>Lumbriculus variegatus</i>). <i>Environmental Toxicology and Chemistry</i> 22(5):1086-1092.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		5352378		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The water parameters of significance were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the flow-through system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism weight and source were reported and organism is used for similar study types.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in health outcomes or organism attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations in the organism were reported, analytical methods were appropriate and sensitive enough for quantification. Lipid normalized BCF was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Artola-Garicano, E., Sinnige, T. L., Van Holsteijn, I., Vaes, W. H. J., Hermens, J. L. M. (2003). Bioconcentration and acute toxicity of polycyclic musks in two benthic organisms (<i>Chironomus riparius</i> and <i>Lumbriculus variegatus</i>). <i>Environmental Toxicology and Chemistry</i> 22(5):1086-1092.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5352378

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	12L copper-free Utrecht tap water spiked with isopropanol containing the test compound (1 g/L); NR; NR; NR
Radiolabel, Source, State, Purity	NA; International Flavors and Fragrances (Hilversum, The Netherlands); NR; 98% Notes: Stock solution stirred for 24 hours for complete dissolution.
Test Organism and Test Organism Details	<i>Lumbriculus variegatus</i> ; 2600 mg of worm per test vessel
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 19± 2°C; 6.0 - 6.5; Not applicable
Media Type, TOC, and Salinity	not specified; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	50 - 97% saturation; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; nominal constant concentration
Test Type, Test Temperature, and Test Condition	flow-through; 19± 2°C; System equilibrated 2 d prior to test start
Comments	
Duration, Parameter, and Sampling Frequency	12 days; other; 0, 0.5, 1, 2, 4, 8, 24, 49, 73.5, 145, 194, 239, and 290 hours
Concentration	12 µg/L
Analytical Method and Analytical Details	GC-MS, selected ion monitoring mode; LOD water 0.05 ug/L; LOD organism 0.01 mg/kg wet wt; Water samples extracted with cyclohexane and stored at 4 - 8°C. Organism samples were flushed with deionized water, blotted dry, weighed, and stored at -20°C before extraction. Organisms were extracted in cyclohexane with an ultrasonic probe.;
Rate Constant and Results per Recovery	Not reported; Organism: 98-102%Water: 94 - 104%
Statistics, Basis, and Calculation Basis	Not reported; whole organism, wet wt.; steady state
Results Value and Results Details	log BCF: 3.43±0.02; Steady state reached after 8 d.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The test substance source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	A concurrent negative control was not included.
	Metric 4:	Test Substance Stability	High	The test substance preparation was reported and appropriate for the study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The water parameters of significance were reported.

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Study Citation:		Artola-Garicano, E., Sinnige, T. L., Van Holsteijn, I., Vaes, W. H. J., Hermens, J. L. M. (2003). Bioconcentration and acute toxicity of polycyclic musks in two benthic organisms (<i>Chironomus riparius</i> and <i>Lumbriculus variegatus</i>). Environmental Toxicology and Chemistry 22(5):1086-1092.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		5352378		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the flow-through system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism weight and source were reported and organism is used for similar study types.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in health outcomes or organism attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations in the organism were reported, analytical methods were appropriate and sensitive enough for quantification. Lipid normalized BCF was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	8404084

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	none; experimental; OECD Guideline 305 E (Bioaccumulation: Flow-through Fish Test) - [before 14 June 1996]
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	radio labelled HHCB; NR; NR; NR
Test Organism and Test Organism Details	Bluegill sunfish (<i>Lepomis macrochirus</i>); not reported
Lipid Content, Test Temperature, pH, and Depuration Time	not reported; not reported; not reported; 28 days
Media Type, TOC, and Salinity	not reported; not reported; not reported
Dissolved Oxygen, Conductivity, and Hardness	not reported; not reported; not reported
Exposure Route, Elimination, and Nominal Measurements	not reported; not reported; not reported
Test Type, Test Temperature, and Test Condition	flow-through; not reported; concentrations in fish reached plateau after 3-7 days of exposure
Comments	
Duration, Parameter, and Sampling Frequency	28 days; DT50; not reported
Concentration	not reported -
Analytical Method and Analytical Details	not reported; not reported;
Rate Constant and Results per Recovery	uptake rate constant not be calculated from concentrations in fish due to rapid attainment of plateau; not reported
Statistics, Basis, and Calculation Basis	not reported; not specified; steady state
Results Value and Results Details	half-life = 2 - 3 days; first order kinetics; BCF (whole body) = 1584
Metabolites, Reference, and Results Reference Substance	not reported; not reported; not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 4:	Test Substance Stability	Medium	Detail regarding this metric not reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	Detail regarding this metric not reported in this secondary source; however, OECD TG cited.

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Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	8404084			
Domain		Metric	EVALUATION Rating	Comments
	Metric 6:	Testing Conditions	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 7:	Testing Consistency	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 8:	System Type and Design	High	Equilibrium was reported.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study.
	Metric 10:	Sampling Methods	Medium	Detail regarding this metric were limited in this secondary source.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 12:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Detail regarding this metric not reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			Medium	

* Related References: Primary source was not cited.

Study Citation:	Fromme, H., Otto, T., Pilz, K. (2001). Polycyclic musk fragrances in different environmental compartments in Berlin (Germany). Water Research 35(1):121-128.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428446

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water samples stored in 1 L amber bottles, kept cool; sediment samples stored in glass jars at 4°C; organisms stored in food quality polyethylene freezer bags and stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three study areas of Berlin around the Spree and Dahme, Havel, and area with Teltowkanal, Griebnitzsee, and Kleiner Wannsee rivers.; NA; NA Notes: Reference standard obtained from Promochem GmbH, Germany, as a technical product of 50% HHCB (two enantiomers and other isomers in minor concentration)
Test Organism and Test Organism Details	Eel, A. anguilla; Not reported
Lipid Content, Test Temperature, pH, and Depuration Time	Average fat content 22% (max: 51%); Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured: 0.07 - 1.59 ug/L (water); 0.22 - 0.92 mg/kg (sediment)
Test Type, Test Temperature, and Test Condition	field study; Not reported; Organism and environmental field samples collected from several sites of the rivers of Berlin to determine potential bioaccumulation.
Comments	Not reported; Not Reported; Not reported
Duration, Parameter, and Sampling Frequency	0.07 - 1.59 µg/L
Concentration	GC/Ion Trap MS; Detection limits: 30 ug/kg (organism), 0.020 ug/L (water), 0.030 ug/kg (sediment); Organism samples mixed with anhydrous sodium sulfate and sea sand, Soxhlet extracted with cyclohexane/ethyl acetate, cleaned by gel permeation chromatography; water and sediment samples extracted by SDE into cyclohexane;
Analytical Method and Analytical Details	Not applicable; 89% (organism), 87-101% (water), 83-96% (sediment)
Rate Constant and Results per Recovery	Spearman rank correlation r=0.74 between water and organism concentrations; Muscle tissue, wet wt., lipid-normalized; steady state
Statistics, Basis, and Calculation Basis	BCF=3504; BCF (non-lipid normalized): 862 (range: 201-1561)
Results Value and Results Details	Not reported; Blind sample per series (three samples); Extracts did not exceed 2% of the values for obtained in the initial extractions
Metabolites, Reference, and Results Reference Substance	

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was reported by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported, the source of the analytical standard was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	High	Blanks and reference material were included in analysis.

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Study Citation:	Fromme, H., Otto, T., Pilz, K. (2001). Polycyclic musk fragrances in different environmental compartments in Berlin (Germany). Water Research 35(1):121-128.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428446			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test substance was suitable for the test method.
	Metric 6:	Testing Conditions	Medium	No environmental conditions were reported.
	Metric 7:	Testing Consistency	High	All samples were collected and processed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	The organism species and source were reported, no other characteristics were included.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were considered in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, limits of detection were reported, a lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and performed appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Fromme, H., Otto, T., Pilz, K., Neugebauer, F. (1999). Levels of synthetic musks; Bromocyclene and PCBs in eel (<i>Anguilla anguilla</i>) and PCBs in sediment samples from some waters of Berlin/Germany. <i>Chemosphere</i> 39(10):1723-1735.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	2162536			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	122-05-5; HHCB			
Confidentiality, Type, and Guideline	none; experimental; other: monitoring study			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Test Organism and Test Organism Details	European eel (<i>Anguilla anguilla</i>); caught in the Berlin waters; whole eel filet stored in polyethylene freezer bags at -20°C prior to analysis			
Lipid Content, Test Temperature, pH, and Depuration Time	2-41%fat; Not Reported; Not Reported; Not Reported			
Media Type, TOC, and Salinity	natural water / sediment; Not Reported; Not Reported			
Dissolved Oxygen, Conductivity, and Hardness	Not Reported; Not Reported; Not Reported			
Exposure Route, Elimination, and Nominal Measurements	Not Reported; Not Reported; measured			
Test Type, Test Temperature, and Test Condition Comments	field study; Not Reported; Not Reported			
Duration, Parameter, and Sampling Frequency	Not Reported; Not Reported; Biota samples collected in Berlin (Spree and Dahme rivers, Havel river, and an area with a high proportion wastewater) in 1996 (n=122) were analyzed for polycyclic musks; surface sediment samples collected in 1996 from river beds			
Concentration	Not Reported			
Analytical Method and Analytical Details	Capillary GC with Ion trap MS; Soxhlet extraction; whole eel filet (homogenized muscle tissue) and sediments were mixed with labelled PCB standard;			
Rate Constant and Results per Recovery	Not Reported; mean recovery (n= 5) 89%			
Statistics, Basis, and Calculation Basis	Not Reported; Not Reported; Not Reported			
Results Value and Results Details	highest mean concentration in biota = 592 µg/kg fresh weight, median = 141 µg/kg fresh weight (range: 15-4,131); sediment concentrations were not reported			
Metabolites, Reference, and Results Reference Substance	Not Reported; Not Reported; Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	High	Test material source and purity were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Low	Study controls were not reported.
	Metric 4:	Test Substance Stability	Low	Test substance stability was not reported.
Domain 3: Test Conditions				
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Study Citation:	Fromme, H., Otto, T., Pilz, K., Neugebauer, F. (1999). Levels of synthetic musks; Bromocyclene and PCBs in eel (<i>Anguilla anguilla</i>) and PCBs in sediment samples from some waters of Berlin/Germany. <i>Chemosphere</i> 39(10):1723-1735.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	2162536			
Domain		Metric	EVALUATION Rating	Comments
	Metric 5:	Test Method Suitability	Medium	The test method was suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	High	Testing conditions were consistent.
	Metric 8:	System Type and Design	Low	Equilibrium was not reported.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	Medium	The test organism was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Uninformative	Concentrations in single media presented.
	Metric 12:	Test Substance Purity	Medium	The sampling method was appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Confounding variables were not reported.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Uninformative	Concentrations in single media presented.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	This metric does not apply to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Uninformative	Partitioning could not be evaluated from the data presented for the target chemical.
	Metric 18:	QSAR Models	N/A	This metric does not apply to this study type.

Overall Quality Determination**Uninformative**

Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5431403

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Sewage treatment plant of Schleswig-Holstein, Germany.; NA; NA
Test Organism and Test Organism Details	Tench, Tinca tinca; n=4; 27.0 - 34.5 cm length; 404 - 904 g weight; 4 females
Lipid Content, Test Temperature, pH, and Depuration Time	0.6 - 1.3%; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	mixture of sewage, soil and natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; Organism and water samples collected from a pond receiving the effluent of a sewage treatment plant.
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; Not Reported; June 24, 1997 (organism); June 24 and July 29, 1997 (water)
Concentration	3700 - 4200 ng/L
Analytical Method and Analytical Details	GC with Finnigan Magnum Ion Trap mass spectrometer (organism); GC with alkali flame ionization detector (water) in scan mode; Organism samples cold-extracted with water/acetone/petroleum ether, fat extracts purified by gel permeation chromatography and normal-phase HPLC; water samples extracted by semipermeable membrane devices, details reported elsewhere;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt., lipid normalized; steady state
Results Value and Results Details	56,300; BAF (lipid-normalized). Organism concentrations: 150 - 160 ug/g lipid; 770 - 2,200 ng/g wet wt. BAF(wet weight)=510
Metabolites, Reference, and Results Reference Substance	Not reported; Laboratory and field blanks (water samples); At or below detection limit

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1:	Test Substance Identity	High The test substance was identified by name.
	Metric 2:	Test Substance Purity	High The field sample source was reported.
Domain 2: Test Design			
	Metric 3:	Study Controls	High Laboratory and field blanks were included and detected the test substance at or below the detection limit.

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Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5431403			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	Medium	Sample storage conditions were not reported, extraction information was described in depth elsewhere for water sample preparation.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Environmental sample conditions were not reported, but this is not expected to significantly impact the study results.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	The test organism species, sex, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcomes assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data was reported, lipid content and lipid normalized BAFs were reported; extraction efficiency and limits of detection were not reported, these may have been reported elsewhere.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified, BAF calculation was not well described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5431403

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Sewage treatment plant of Schleswig-Holstein, Germany.; NA; NA
Test Organism and Test Organism Details	Eel, <i>Anguilla anguilla</i> ; n=11; 38 - 54 cm length; 126 - 262 g weight
Lipid Content, Test Temperature, pH, and Depuration Time	15.7 - 18.1%; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	mixture of sewage, soil and natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; Organism and water samples collected from a pond receiving the effluent of a sewage treatment plant.
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; Not Reported; June 24, 1997 (organism); June 24 and July 29, 1997 (water)
Concentration	3700 - 4200 ng/L
Analytical Method and Analytical Details	GC with Finnigan Magnum Ion Trap mass spectrometer (organism); GC with alkali flame ionization detector (water) in scan mode; Organism samples cold-extracted with water/acetone/petroleum ether, fat extracts purified by gel permeation chromatography and normal-phase HPLC; water samples extracted by semipermeable membrane devices, details reported elsewhere.;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt., lipid normalized; steady state
Results Value and Results Details	1,700; BAF (lipid-normalized). Organism concentrations: 4.6 - 4.8 ug/g lipid; 760 - 830 ng/g wet wt. BAF(wet weight)=290
Metabolites, Reference, and Results Reference Substance	Not reported; Laboratory and field blanks (water samples); At or below detection limit

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The field sample source was reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Laboratory and field blanks were included and detected the test substance at or below the detection limit.
	Metric 4: Test Substance Stability	Medium	Sample storage conditions were not reported, extraction information was described in depth elsewhere for water sample preparation.

Domain 3: Test Conditions

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Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5431403			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Environmental sample conditions were not reported, but this is not expected to significantly impact the study results.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	The test organism species, sex, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcomes assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data was reported, lipid content and lipid normalized BAFs were reported; extraction efficiency and limits of detection were not reported, these may have been reported elsewhere.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified, BAF calculation was not well described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5431403

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Sewage treatment plant of Schleswig-Holstein, Germany.; NA; NA
Test Organism and Test Organism Details	Zebra mussel, Dreissena polymorpha; n=50
Lipid Content, Test Temperature, pH, and Depuration Time	1.40%; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	mixture of sewage, soil and natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; Organisms collected from uncontaminated lake (Lake Gartow) and exposed in a polypropylene net to a pond receiving the effluent of a sewage treatment plant.
Duration, Parameter, and Sampling Frequency	7 weeks; Not Reported; June 24, 1997 (organism); June 24 and July 29, 1997 (water)
Concentration	3700 - 4200 ng/L
Analytical Method and Analytical Details	GC with Finnigan Magnum Ion Trap mass spectrometer (organism); GC with alkali flame ionization detector (water) in scan mode; Organism samples cold-extracted with water/acetone/petroleum ether, fat extracts purified by gel permeation chromatography and normal-phase HPLC; water samples extracted by semipermeable membrane devices, details reported elsewhere;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt., lipid normalized; steady state
Results Value and Results Details	44,400; BAF (lipid-normalized). Organism concentrations: 120 ug/g lipid; 1,700 ng/g wet wt. BAF(wet weight)= 620
Metabolites, Reference, and Results Reference Substance	Not reported; Laboratory and field blanks (water samples); At or below detection limit

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	High
Domain 2: Test Design	Metric 3:	Study Controls	High
	Metric 4:	Test Substance Stability	Medium
Domain 3: Test Conditions			

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Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5431403			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Environmental sample conditions were not reported, but this is not expected to significantly impact the study results.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	The test organism species, sex, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcomes assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data was reported, lipid content and lipid normalized BAFs were reported; extraction efficiency and limits of detection were not reported, these may have been reported elsewhere.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified, BAF calculation was not well described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5431403

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Sewage treatment plant of Schleswig-Holstein, Germany.; NA; NA
Test Organism and Test Organism Details	Rudd, Scardinus erythrophthalmus; n=15; 16.5 - 24.5 cm length; 64 - 192 g weight; 4 females, 11 males
Lipid Content, Test Temperature, pH, and Depuration Time	0.6 - 1.1%; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	mixture of sewage, soil and natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; Organism and water samples collected from a pond receiving the effluent of a sewage treatment plant.
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; Not Reported; June 24, 1997 (organism); June 24 and July 29, 1997 (water)
Concentration	3700 - 4200 ng/L
Analytical Method and Analytical Details	GC with Finnigan Magnum Ion Trap mass spectrometer (organism); GC with alkali flame ionization detector (water) in scan mode; Organism samples cold-extracted with water/acetone/petroleum ether, fat extracts purified by gel permeation chromatography and normal-phase HPLC; water samples extracted by semipermeable membrane devices, details reported elsewhere;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt., lipid normalized; steady state
Results Value and Results Details	2,600; BAF(lipid-normalized). Organism concentrations: 6.2 - 7.5 ug/g lipid; 43 - 63 ng/g wet wt. BAF(wet weight)=20.
Metabolites, Reference, and Results Reference Substance	Not reported; Laboratory and field blanks (water samples); At or below detection limit

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The field sample source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Laboratory and field blanks were included and detected the test substance at or below the detection limit.
	Metric 4:	Test Substance Stability	Medium	Sample storage conditions were not reported, extraction information was described in depth elsewhere for water sample preparation.
Domain 3: Test Conditions				

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Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5431403			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Environmental sample conditions were not reported, but this is not expected to significantly impact the study results.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	The test organism species, sex, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcomes assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data was reported, lipid content and lipid normalized BAFs were reported; extraction efficiency and limits of detection were not reported, these may have been reported elsewhere.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified, BAF calculation was not well described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5431403

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Sewage treatment plant of Schleswig-Holstein, Germany.; NA; NA
Test Organism and Test Organism Details	Crucian carp, Carassius carassius; n=7; 30.5 - 38.5 cm length; 633 - 1,760 g weight; 4 females, 3 males
Lipid Content, Test Temperature, pH, and Depuration Time	1.1 - 3.5%; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	mixture of sewage, soil and natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; Organism and water samples collected from a pond receiving the effluent of a sewage treatment plant.
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; Not Reported; June 24, 1997 (organism); June 24 and July 29, 1997 (water)
Concentration	3700 - 4200 ng/L
Analytical Method and Analytical Details	GC with Finnigan Magnum Ion Trap mass spectrometer (organism); GC with alkali flame ionization detector (water) in scan mode; Organism samples cold-extracted with water/acetone/petroleum ether, fat extracts purified by gel permeation chromatography and normal-phase HPLC; water samples extracted by semipermeable membrane devices, details reported elsewhere;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt., lipid normalized; steady state
Results Value and Results Details	24,300; BAF (lipid-normalized). Organism concentrations: 39 - 91 ug/g lipid; 440 - 3,600 ng/g wet wt. BAF(wet weight)=580
Metabolites, Reference, and Results Reference Substance	Not reported; Laboratory and field blanks (water samples); At or below detection limit

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The field sample source was reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Laboratory and field blanks were included and detected the test substance at or below the detection limit.
	Metric 4: Test Substance Stability	Medium	Sample storage conditions were not reported, extraction information was described in depth elsewhere for water sample preparation.
Domain 3: Test Conditions			

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Study Citation:	Gatermann, R., Biselli, S., Hühnerfuss, H., Rimkus, G. G., Hecker, M., Karbe, L. (2002). Synthetic musks in the environment. Part 1: Species-dependent bioaccumulation of polycyclic and nitro musk fragrances in freshwater fish and mussels. Archives of Environmental Contamination and Toxicology 42(4):437-446.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5431403			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Environmental sample conditions were not reported, but this is not expected to significantly impact the study results.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	The test organism species, sex, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcomes assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data was reported, lipid content and lipid normalized BAFs were reported; extraction efficiency and limits of detection were not reported, these may have been reported elsewhere.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified, BAF calculation was not well described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349141

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported;			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard			
Test Organism and Test Organism Details	Silver carp, Hypophthalmichthys molitrix; n=5			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable			
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported			
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported			
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected surface water concentrations			
Test Type, Test Temperature, and Test Condition	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagu Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River			
Comments	Not applicable; Not Reported; December 29 to 30, 2008			
Duration, Parameter, and Sampling Frequency	3.5 - 32 ng/L			
Concentration	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Water samples extracted with C-18 discs; fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 1.0-1.2 ng/L (water); 1.0-1.2 ng/g (fish);			
Analytical Method and Analytical Details	Not applicable; Not reported			
Rate Constant and Results per Recovery	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) $p < 0.05$; lipid normalized, muscle sample; steady state			
Statistics, Basis, and Calculation Basis	BAF: 39400; In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.			
Results Value and Results Details	Not reported; Not reported; Not reported			
Metabolites, Reference, and Results Reference Substance				
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Controls not required for field studies.
	Metric 4:	Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions				

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION Rating	Comments
	Metric 5:	Test Method Suitability	High	The field study is suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349141

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported;
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard
Test Organism and Test Organism Details	Silver carp, Hypophthalmichthys molitrix; n=5
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected sediment concentrations
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagou Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River
Duration, Parameter, and Sampling Frequency	Not applicable; Not Reported; December 29 to 30, 2008
Concentration	1.5 - 32.3 ng/g
Analytical Method and Analytical Details	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 0.25-0.33 ng/g (sediment); 1.0-1.2 ng/g (fish);
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) $p < 0.05$; lipid normalized, muscle sample; steady state
Results Value and Results Details	BASF: 1.5; In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design	Metric 3: Study Controls	N/A	Controls not required for field studies.
	Metric 4: Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The field study is suitable for the test substance.

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349141

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported;
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard
Test Organism and Test Organism Details	crucian carp (Carassius auratus); n=7
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected surface water concentrations
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagu Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River
Duration, Parameter, and Sampling Frequency	Not applicable; other; December 29 to 30, 2008
Concentration	3.5 - 32 ng/L
Analytical Method and Analytical Details	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Water samples extracted with C-18 discs; fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 1.0-1.2 ng/L (water); 1.0-1.2 ng/g (fish);
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) $p < 0.05$; lipid normalized, muscle sample; steady state
Results Value and Results Details	BAF: 52370; Crucian carp (muscle). In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design	Metric 3: Study Controls	N/A	Controls not required for field studies.
	Metric 4: Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The field study is suitable for the test substance.

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.		
OECD Harmonized Template:	Aquatic Bioconcentration		
HERO ID:	5349141		
EXTRACTION			
Parameter	Data		
CASRN and Test Material	1222-05-5; HHCB		
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported;		
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR		
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard		
Test Organism and Test Organism Details	Crucian carp, Carassius auratus; n=7		
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable		
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported		
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported		
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected sediment concentrations		
Test Type, Test Temperature, and Test Condition	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagu Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River		
Comments			
Duration, Parameter, and Sampling Frequency	Not applicable; other; December 29 to 30, 2008		
Concentration	1.5 - 32.3 ng/g		
Analytical Method and Analytical Details	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 0.25-0.33 ng/g (sediment); 1.0-1.2 ng/g (fish);		
Rate Constant and Results per Recovery	Not applicable; Not reported		
Statistics, Basis, and Calculation Basis	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) p < 0.05; lipid normalized, muscle sample; steady state		
Results Value and Results Details	Biota-sediment accumulation factor (BASF): 1.6 - 2.6 (average: 2.4); In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.		
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported		
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design			
Metric 3:	Study Controls	N/A	Controls not required for field studies.
Metric 4:	Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The field study is suitable for the test substance.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349141

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported;
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard
Test Organism and Test Organism Details	Common carp, Cyprinus carpio; n=5
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected surface water concentrations
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagu Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River
Duration, Parameter, and Sampling Frequency	Not applicable; other; December 29 to 30, 2008
Concentration	3.5 - 32 ng/L
Analytical Method and Analytical Details	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Water samples extracted with C-18 discs; fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 1.0-1.2 ng/L (water); 1.0-1.2 ng/g (fish);
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) $p < 0.05$; lipid normalized, muscle sample; steady state
Results Value and Results Details	BAF: 66030; In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design	Metric 3: Study Controls	N/A	Controls not required for field studies.
	Metric 4: Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The field study is suitable for the test substance.

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349141

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Field Study; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrestorfer (Augsburg, Germany); NR; NR Notes: Internal standard
Test Organism and Test Organism Details	Common carp, Cyprinus carpio; n=5
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water and sediment; Not reported; Detected sediment concentrations
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; 23 surface water samples and 13 sediment samples collected from 23 sites along the Haihe River, Dagu Drainage River, and Chentaizi Drainage River; fish collected from 4 fish ponds near the Chentaizi Drainage River
Duration, Parameter, and Sampling Frequency	Not applicable; Not Reported; December 29 to 30, 2008
Concentration	1.5 - 32.3 ng/g
Analytical Method and Analytical Details	GC-MS with electron ionization and quadrupole mass detector (selected ion monitoring mode); Fish samples extracted with an accelerated solvent extraction system and cleaned up with gel permeation chromatography.LOD: 0.25-0.33 ng/g (sediment); 1.0-1.2 ng/g (fish);
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	U Kruskal-Wallis test (difference in sediment and water concentrations and the BAFs) $p < 0.05$; lipid normalized, muscle sample; steady state
Results Value and Results Details	BASF: 2.5; In all fish samples: 2.9 - 5.3 ng/g dry wt and 107.9 - 823.3 ng/g lipid wt.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	N/A	Rating of this parameter not applicable to field studies.
Domain 2: Test Design	Metric 3: Study Controls	N/A	Controls not required for field studies.
	Metric 4: Test Substance Stability	Medium	Field sample storage details were not reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The field study is suitable for the test substance.

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 84(11):1630-1635.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349141			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 6:	Testing Conditions	Medium	No environmental conditions of the samples collected were reported. No fish sample characteristics (weight, lipid content) were reported but may be included in the supplemental material.
	Metric 7:	Testing Consistency	N/A	Not applicable to field studies.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species and source were reported, additional organism characteristics may be reported in the supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	the outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Lipid normalized BAF was reported and ranges of target chemical detection in samples were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428338

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, and Guideline	None; Experimental; other: Bioaccumulation in fish
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB
Test Organism and Test Organism Details	crucian carp (<i>Carassius auratus</i>); 5 fish from Haihe River
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)
Media Type, TOC, and Salinity	natural water: freshwater; not applicable (field study); not applicable (field study)
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured
Test Type, Test Temperature, and Test Condition	field study; not applicable (field study); not applicable (field study)
Comments	
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; BAF; not applicable (field study)
Concentration	3.5 - 32 ng/L
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC-MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;
Rate Constant and Results per Recovery	not applicable (field study); LODs were 1.0–1.2 ng/L for surface water and 1.0–1.2 ng/g for fish.
Statistics, Basis, and Calculation Basis	$p < 0.05$; muscle lipid weights; other
Results Value and Results Details	52,370 lipid basis (mean); All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.

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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428338

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	None; Experimental; other: Bioaccumulation in fish			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB			
Test Organism and Test Organism Details	common carp (Cyprinus carpio); 1 fish from Haihe River			
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)			
Media Type, TOC, and Salinity	natural water: freshwater; not applicable (field study); not applicable (field study)			
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)			
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured			
Test Type, Test Temperature, and Test Condition	field study; not applicable (field study); not applicable (field study)			
Comments				
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; BAF; not applicable (field study)			
Concentration	3.5 - 32 ng/L			
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC–MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;			
Rate Constant and Results per Recovery	not applicable (field study); LODs were 1.0–1.2 ng/L for surface water and 1.0–1.2 ng/g for fish.			
Statistics, Basis, and Calculation Basis	p < 0.05; muscle lipid weights; other			
Results Value and Results Details	66,030 lipid basis (mean); All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.			
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	None; Experimental; other: Bioaccumulation in fish			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB			
Test Organism and Test Organism Details	silver carp (<i>Hypophthalmichthys molitrix</i>); 1 fish from Haihe River			
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)			
Media Type, TOC, and Salinity	natural water: freshwater; not applicable (field study); not applicable (field study)			
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)			
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured			
Test Type, Test Temperature, and Test Condition	field study; not applicable (field study); not applicable (field study)			
Comments				
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; BAF; not applicable (field study)			
Concentration	3.5 - 32 ng/L			
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC–MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;			
Rate Constant and Results per Recovery	not applicable (field study); LODs were 1.0–1.2 ng/L for surface water and 1.0–1.2 ng/g for fish.			
Statistics, Basis, and Calculation Basis	p < 0.05; muscle lipid weights; other			
Results Value and Results Details	39,400 lipid basis (mean); All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.			
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	None; Experimental; other: biota-sediment accumulation factor (BSAF) in fish			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB			
Test Organism and Test Organism Details	crucian carp (Carassius auratus); 5 fish from Haihe River			
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)			
Media Type, TOC, and Salinity	natural sediment: freshwater; not applicable (field study); not applicable (field study)			
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)			
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured			
Test Type, Test Temperature, and Test Condition	field study; not applicable (field study); not applicable (field study)			
Comments				
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; biota-sediment accumulation factor (BSAF); not applicable (field study)			
Concentration	1.5 - 32.3 ng/g			
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC–MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;			
Rate Constant and Results per Recovery	not applicable (field study); LODs were 0.25–0.33 ng/g for sediments and 1.0–1.2 ng/g for fish.			
Statistics, Basis, and Calculation Basis	p < 0.05; muscle lipid weights; other			
Results Value and Results Details	1.6-2.4 (mean 2.0); All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.			
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428338

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	None; Experimental; other: biota-sediment accumulation factor (BSAF) in fish			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB			
Test Organism and Test Organism Details	common carp (Cyprinus carpio); 1 fish from Haihe River			
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)			
Media Type, TOC, and Salinity	natural sediment: freshwater; not applicable (field study); not applicable (field study)			
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)			
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured			
Test Type, Test Temperature, and Test Condition	field study; not applicable (field study); not applicable (field study)			
Comments				
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; biota-sediment accumulation factor (BSAF); not applicable (field study)			
Concentration	1.5 - 32.3 ng/g			
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC-MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;			
Rate Constant and Results per Recovery	not applicable (field study); LODs were 0.25–0.33 ng/g for sediments and 1.0–1.2 ng/g for fish.			
Statistics, Basis, and Calculation Basis	p < 0.05; muscle lipid weights; other			
Results Value and Results Details	2.5; All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.			
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
EVALUATION				
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428338

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	None; Experimental; other: biota-sediment accumulation factor (BSAF) in fish			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	C13 labeled HCB used as internal standard; Augsburg, Germany; NR; NR Notes: HHCB			
Test Organism and Test Organism Details	silver carp (<i>Hypophthalmichthys molitrix</i>); 1 fish from Haihe River			
Lipid Content, Test Temperature, pH, and Depuration Time	reported in supplemental material; not applicable (field study); not applicable (field study); not applicable (field study)			
Media Type, TOC, and Salinity	natural sediment: freshwater; not applicable (field study); not applicable (field study)			
Dissolved Oxygen, Conductivity, and Hardness	not applicable (field study); not applicable (field study); not applicable (field study)			
Exposure Route, Elimination, and Nominal Measurements	fish muscle; not applicable (field study); Measured			
Test Type, Test Temperature, and Test Condition Comments	field study; not applicable (field study); not applicable (field study)			
Duration, Parameter, and Sampling Frequency	December 29-30, 2008.; biota-sediment accumulation factor (BSAF); not applicable (field study)			
Concentration	1.5 - 32.3 ng/g			
Analytical Method and Analytical Details	accelerated solvent extraction (ASE) with GC/MS analysis; Extracted with accelerated solvent extraction (ASE); cleaned up with Gel Permeation Chromatography (GPC); GC–MS analysis/electron ionization + quadrupole mass detector; further details described in supplementary materials.;			
Rate Constant and Results per Recovery	not applicable (field study); LODs were 0.25–0.33 ng/g for sediments and 1.0–1.2 ng/g for fish.			
Statistics, Basis, and Calculation Basis	p < 0.05; muscle lipid weights; other			
Results Value and Results Details	1.5; All fish samples 2.9–5.3 ng/g dry weight and 107.9–823.3 ng/g lipid weight; Details described in supplementary materials.			
Metabolites, Reference, and Results Reference Substance	not applicable (field study); not applicable (field study); Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source or purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this study type.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
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Study Citation:	Hu, Z., Shi, Y., Cai, Y. (2011). Reprint of: Concentrations, distribution, and bioaccumulation of synthetic musks in the Haihe River of China. Chemosphere 85(2):262-267.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428338			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable, limited amount of data.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	10365931

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, and Guideline	No; calculation; other: In Vitro—In Vivo Extrapolation (IVIVE) Model using in vitro intrinsic clearance rate determined using Trout Liver S9 Fractions (RT-S9)			
Solvent, Reactivity, Storage, Stability	Not Reported; Not Reported; Not Reported; Not Reported			
Radiolabel, Source, State, Purity	Not Reported; Not Reported; Not Reported; Not Reported Notes: Limited details reported in secondary source			
Test Organism and Test Organism Details	S9 invitro assay; 1 mg/mL S9 protein concentration			
Lipid Content, Test Temperature, pH, and Depuration Time	Not Reported; Not Reported; Not Reported; Not Reported			
Media Type, TOC, and Salinity	Not Reported; Not Reported; Not Reported			
Dissolved Oxygen, Conductivity, and Hardness	Not Reported; Not Reported; Not Reported			
Exposure Route, Elimination, and Nominal Measurements	Not Reported; Not Reported; Not Reported			
Test Type, Test Temperature, and Test Condition	Not Reported; Not Reported; Not Reported			
Comments				
Duration, Parameter, and Sampling Frequency	Limited details reported in secondary source; Not Reported; NR			
Concentration	0.05 - 5 µM			
Analytical Method and Analytical Details	Not Reported; Not Reported;			
Rate Constant and Results per Recovery	0.12-0.8 mL/h/mg/protein; Not Reported			
Statistics, Basis, and Calculation Basis	Not Reported; Not Reported; Predicted BCF			
Results Value and Results Details	339-833 (fraction unbound=1), 2,825-6,272 (fu calculated) and 8,075 (assuming a biotransformation rate of zero); Not Reported			
Metabolites, Reference, and Results Reference Substance	Not Reported; Not Reported; Not Reported			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Low	Limited details were reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Low	Limited details were reported in this secondary source.
	Metric 4:	Test Substance Stability	Low	Limited details were reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Low	Limited details were reported in this secondary source.

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Study Citation:		IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		10365931		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	Low	Limited details were reported in this secondary source.
	Metric 7:	Testing Consistency	Low	Limited details were reported in this secondary source.
	Metric 8:	System Type and Design	Low	Limited details were reported in this secondary source.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	Limited details were reported in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Limited details were reported in this secondary source.
	Metric 12:	Test Substance Purity	Low	Limited details were reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Limited details were reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limited details were reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Limited details were reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable; however, limited details were reported in this secondary source.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination		Low		

* Related References: Citing Laue et al. (2020), HERO ID 8305627

Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	10365931

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, and Guideline	No; calculation; other: In Vitro-In Vivo Extrapolation (IVIVE) Model using in vitro intrinsic clearance rate			
Solvent, Reactivity, Storage, Stability	Not Reported; Not Reported; Not Reported; Not Reported			
Radiolabel, Source, State, Purity	Not Reported; Not Reported; Not Reported; Not Reported Notes: Limited details reported in secondary source			
Test Organism and Test Organism Details	hepatocyte invitro assay; hepatocyte concentration = 0.5x10 ⁶ cells/mL			
Lipid Content, Test Temperature, pH, and Depuration Time	Not Reported; Not Reported; Not Reported; Not Reported			
Media Type, TOC, and Salinity	Not Reported; Not Reported; Not Reported			
Dissolved Oxygen, Conductivity, and Hardness	Not Reported; Not Reported; Not Reported			
Exposure Route, Elimination, and Nominal Measurements	Not Reported; Not Reported; Not Reported			
Test Type, Test Temperature, and Test Condition	Not Reported; Not Reported; Not Reported			
Comments				
Duration, Parameter, and Sampling Frequency	Limited details reported in secondary source; Not Reported; NR			
Concentration	0.66 - µM			
Analytical Method and Analytical Details	Not Reported; Not Reported;			
Rate Constant and Results per Recovery	0.21 mL/h 10 ⁶ cells; Not Reported			
Statistics, Basis, and Calculation Basis	Not Reported; Not Reported; Predicted BCF			
Results Value and Results Details	363 (fraction unbound=1); 1,648 (fu calculated); 8,075 (assuming a biotransformation rate of zero); Not Reported			
Metabolites, Reference, and Results Reference Substance	Not Reported; Not Reported; Not Reported			
Domain		EVALUATION		
Metric		Rating		Comments
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High		The test substance was identified definitively.
Metric 2:	Test Substance Purity	Low		Limited details were reported in this secondary source.
Domain 2: Test Design				
Metric 3:	Study Controls	Low		Limited details were reported in this secondary source.
Metric 4:	Test Substance Stability	Low		Limited details were reported in this secondary source.
Domain 3: Test Conditions				
Metric 5:	Test Method Suitability	Low		Limited details were reported in this secondary source.
Metric 6:	Testing Conditions	Low		Limited details were reported in this secondary source.
Metric 7:	Testing Consistency	Low		Limited details were reported in this secondary source.
Metric 8:	System Type and Design	Low		Limited details were reported in this secondary source.

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Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222–05–5, with cover letter dated 9/2/2020.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	10365931			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	Limited details were reported in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Limited details were reported in this secondary source.
	Metric 12:	Test Substance Purity	Low	Limited details were reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Limited details were reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limited details were reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Limited details were reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable; however, limited details were reported in this secondary source.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			Low	

* Related References: Citing Weeks et al. (2020), HERO ID 7273702

Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222-05-5, with cover letter dated 9/2/2020.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	10365931

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, and Guideline	No; experimental; OECD Guideline 305 (Bioconcentration: Flow-through Fish Test) - [before 2 Oct 2012]			
Solvent, Reactivity, Storage, Stability	Not Reported; Not Reported; Not Reported; Not Reported			
Radiolabel, Source, State, Purity	Not Reported; Not Reported; Not Reported; Not Reported Notes: Limited details reported in secondary source			
Test Organism and Test Organism Details	zebrafish; Not Reported			
Lipid Content, Test Temperature, pH, and Depuration Time	Not Reported; Not Reported; Not Reported; depuration half-lives <3 days			
Media Type, TOC, and Salinity	Not Reported; Not Reported; Not Reported			
Dissolved Oxygen, Conductivity, and Hardness	Not Reported; Not Reported; Not Reported			
Exposure Route, Elimination, and Nominal Measurements	Not Reported; Not Reported; Not Reported			
Test Type, Test Temperature, and Test Condition	Not Reported; Not Reported; Not Reported			
Comments				
Duration, Parameter, and Sampling Frequency	Limited details reported in secondary source; BCF; NR			
Concentration	Not Reported			
Analytical Method and Analytical Details	Not Reported; Not Reported;			
Rate Constant and Results per Recovery	Not Reported; Not Reported			
Statistics, Basis, and Calculation Basis	Not Reported; Not Reported; whole fish wet weight			
Results Value and Results Details	624; kinetic BCF			
Metabolites, Reference, and Results Reference Substance	Not Reported; Not Reported; Not Reported			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Low	Limited details were reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Low	Limited details were reported in this secondary source.
	Metric 4:	Test Substance Stability	Low	Limited details were reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Low	Limited details were reported in this secondary source.
	Metric 6:	Testing Conditions	Low	Limited details were reported in this secondary source.
	Metric 7:	Testing Consistency	Low	Limited details were reported in this secondary source.
	Metric 8:	System Type and Design	Low	Limited details were reported in this secondary source.

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Study Citation:	IFF, (2020). Report on bioaccumulation and tropic magnification potential in the aquatic environment of 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzopyran (HHCB), CAS RN 1222–05–5, with cover letter dated 9/2/2020.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	10365931			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	Low	Limited details were reported in this secondary source.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	Limited details were reported in this secondary source.
	Metric 12:	Test Substance Purity	Low	Limited details were reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Limited details were reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limited details were reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Limited details were reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable; however, limited details were reported in this secondary source.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			Low	

* Related References: Citing Butte and Ewald (1999), SETAC poster

Study Citation:	Lee, I,nS, Kim, U.,nJ, Oh, J., Choi, M., Hwang, D. W. (2014). Comprehensive monitoring of synthetic musk compounds from freshwater to coastal environments in Korea: With consideration of ecological concerns and bioaccumulation. Science of the Total Environment 470:1502-1508.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	2395179

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Field monitoring of contaminants in freshwater, sediment and biota of Nakdong River
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Contaminant in marine environment; NR; Not Reported Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-(g)-2-benzopyran
Test Organism and Test Organism Details	Marine coastal bivalves; Mussels (<i>Mytilus coruscus</i> and <i>Mytilus edulis</i>), oysters (<i>Crassostrea gigas</i>) found on buoys were collected with rake
Lipid Content, Test Temperature, pH, and Depuration Time	lipid content was measured gravimetrically; Not reported; Not reported; Not reported
Media Type, TOC, and Salinity	natural water: marine; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	natural environment; natural; measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; coastal environment
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; other: Freshwater and sediment were collected from 22 sites at Nakdong River basin in June 2009
Concentration	Not Reported
Analytical Method and Analytical Details	Instrumental analysis conditions in supporting information; analysis is of organic carbon content in coastal sediment was performed using a CHN elemental analyzer; Not reported;
Rate Constant and Results per Recovery	Not reported; Not reported
Statistics, Basis, and Calculation Basis	Not reported; normalized lipid fraction; steady state
Results Value and Results Details	0.23-2.66; BSAF; BSAF was calculated as the ratio of a lipid-normalized HHCB concentration in bivalve to its organic carbon-normalized HHCB concentration in sediment
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Medium	Source and purity of analytical standard not reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	This metric does not apply to field studies.
	Metric 4:	Test Substance Stability	N/A	This metric does not apply to field studies.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.

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Study Citation:	Lee, I.,nS, Kim, U.,nJ, Oh, J., Choi, M., Hwang, D. W. (2014). Comprehensive monitoring of synthetic musk compounds from freshwater to coastal environments in Korea: With consideration of ecological concerns and bioaccumulation. Science of the Total Environment 470:1502-1508.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	2395179			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	Adequate sediment, water, and test organism characteristics were reported.
	Metric 7:	Testing Consistency	High	Sampling and analytical methods were consistent across all groups.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods were reported and appropriate for the study type.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Most values reported in the study were less than 1.7; one value for HHCB was 2.66 at the site with the highest HHCB concentration; this was rationalized by citing the wide range of BCF reported in the literature for HHCB from water as the main source of biota contamination.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Analytical detail was omitted; supporting information was cited, but unavailable. Results reported as a range from all monitoring efforts; specific concentrations were reported as ranges.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical and calculation details were omitted; however, these details were not likely to have a substantial impact on the study result interpretation.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Lefebvre, C., Kimpe, L. E., Metcalfe, C. D., Trudeau, V. L., Blais, J. M. (2017). Bioconcentration of polycyclic musks in fathead minnows caged in a wastewater effluent plume. Environmental Pollution 231(Pt 2):1593-1600.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	4172003

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported; Bioaccumulation from WWTP discharge plume
Solvent, Reactivity, Storage, Stability	NA; NR; Fish samples stored at -80°C prior to preparation; NR
Radiolabel, Source, State, Purity	NA; Upstream and downstream of the Gold Bar WWTP discharge point into the North Saskatchewan River, Canada; NA; NA Notes: Analytical standard: 98% purity, obtained from Ultra Scientific, N. Kingstown, RI, USA
Test Organism and Test Organism Details	Fathead Minnows; mean weight 1.76±0.09 g
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not reported
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not reported; 0.39±0.18, ND, 381±20, 170±50, 123±21, and 102±12 ng/L at 1.25 and 1.10 km upstream and 0.15, 1, 2.5, and 9.9 km downstream of the discharge point
Test Type, Test Temperature, and Test Condition Comments	field study; Not reported; Fish harvested from watershed of the North Saskatchewan River were held in cages in the North Saskatchewan River, 1.25 and 1.10 km upstream of the discharge point of the Gold Bar WWTP, and 0.15, 1, 2.5, and 9.9 km downstream of the discharge point.
Duration, Parameter, and Sampling Frequency	over 4 weeks (September 13 to October 13, 2011); Not Reported; Once, at end of study
Concentration	0.39 - 381 ng/L
Analytical Method and Analytical Details	Gas chromatography with election ionization and mass spectrometry; limit of detection 6.2 ng/g ww; Whole fish homogenates extracted by pressurized liquid extraction with 1:5 ethyl acetate/n-hexane, evaporated and filtered through Chromafix SPE cartridge, sonicated, further cleaned up with neutral alumina; water concentrations estimated from SPMDs;
Rate Constant and Results per Recovery	Not applicable; 74±3%
Statistics, Basis, and Calculation Basis	one-way ANOVA used to determine significant differences in test substance concentrations across sites, p>0.05; Whole body, wet wt.; steady state
Results Value and Results Details	BCF=22000, NA, 18600, 24500, 7820, 6670 at 1.25 and 1.10 km upstream and 0.15, 1, 2.5, and 9.9 km downstream of the discharge point; Not detected in water 1.10 km upstream. Other upstream detection implies source other than WWTP. Significantly increased concentrations in fish were observed downstream compared to upstream.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The chemical of interest was identified by name.
	Metric 2:	Test Substance Purity	High	The field sample source was reported; the source and purity of the analytical standard was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Analytical blanks were included and values were blank corrected.

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Study Citation:	Lefebvre, C., Kimpe, L. E., Metcalfe, C. D., Trudeau, V. L., Blais, J. M. (2017). Bioconcentration of polycyclic musks in fathead minnows caged in a wastewater effluent plume. Environmental Pollution 231(Pt 2):1593-1600.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	4172003			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	High	Sample preparation and storage was reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The field study was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No environmental conditions were reported.
	Metric 7:	Testing Consistency	High	Field study set up was consistent across samples and study groups.
	Metric 8:	System Type and Design	Medium	Field studies are assumed to be in dynamic equilibrium, but authors suggested that higher than expected BCFs may indicate equilibrium had not been met.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species, source, and starting weights were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods were appropriate and collected at an acceptable frequency.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	No significant sources of uncertainty were identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; recovery and limit of detection was reported. Lipid content and lipid normalized BCFs were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical analysis was described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable based on the method; BCFs were higher than previously reported values but supported known relationships to log Kow. It was proposed that uptake had probably not reached equilibrium with elimination, which may have caused higher values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	NCBI, (2020). PubChem Compound Summary for CID 91497: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta [g]-2-benzopyran (HHCB) Galaxolide.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	7681884			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, and Guideline	no; experimental; other: not specified			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Test Organism and Test Organism Details	bluegill sunfish; Lepomis macrochirus			
Lipid Content, Test Temperature, pH, and Depuration Time	not reported; not reported; not reported; not reported			
Media Type, TOC, and Salinity	not reported; not reported; not reported			
Dissolved Oxygen, Conductivity, and Hardness	not reported; not reported; not reported			
Exposure Route, Elimination, and Nominal Measurements	whole fish; Not Reported; Not Reported			
Test Type, Test Temperature, and Test Condition	Not Reported; not reported; Not Reported			
Comments				
Duration, Parameter, and Sampling Frequency	28 days; BCF; not reported			
Concentration	1 - 10 mg/L			
Analytical Method and Analytical Details	not reported; not reported;			
Rate Constant and Results per Recovery	not reported; not reported			
Statistics, Basis, and Calculation Basis	Not Reported; whole body; Not Reported			
Results Value and Results Details	1584; Not Reported			
Metabolites, Reference, and Results Reference Substance	Not Reported; Not Reported; Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The test substance purity was low or not reported; however, the omissions or identified impurities were not likely to have a substantial impact on the study results.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Concurrent control group details were not included; however, the lack of data was not likely to have a substantial impact on study results.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
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Study Citation:	NCBI, (2020). PubChem Compound Summary for CID 91497: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta [g]-2-benzopyran (HHCB) Galax-olide.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	7681884			
Domain		Metric	EVALUATION Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	Some test conditions across samples or study groups were not reported but may be retrievable in the cited reference.
	Metric 8:	System Type and Design	Medium	Equilibrium was not established or reported but this was not likely to have a substantial impact on study results.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Medium	The test organism or species is routinely used for similar study types; however, one or more additional characteristics of the organisms were not reported, but these omissions were not likely to have a substantial impact on study results.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	Medium	Limited details were provided; however, details may be available in the cited reference.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed but may be available in the cited reference.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported; however, this omission was not likely to have a substantial impact on study results.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The lipid content or lipid normalized BCF was not reported for BCF studies, but these deficiencies or omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**Medium**

* Related References: Cites: HERO ID: 5349126: Balk F, Ford RA; Toxicol Lett 111: 57-79 (1999).

Study Citation:	Peng, F. J., Kiggen, F., Pan, C. G., Bracewell, S. A., Ying, G. G., Salvito, D., Selck, H., Van den Brink, P. J. (2019). Fate and effects of sediment-associated polycyclic musk HHCB in subtropical freshwater microcosms. <i>Ecotoxicology and Environmental Safety</i> 169:902-910.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428151

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	Acetone (2.2 %); NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Test Organism and Test Organism Details	Branchiura sowerbyi; n=30; starting weight 16.8 - 18.5 mg
Lipid Content, Test Temperature, pH, and Depuration Time	9.16±0.35 % wet wt.; 27±1°C; 7-Jun; Not reported
Media Type, TOC, and Salinity	natural sediment: freshwater; 20.6% organic matter (sediment); 0.067% TOC (water); Not reported
Dissolved Oxygen, Conductivity, and Hardness	ca. 7 mg/L; 90 - 110 uS/cm; Not reported
Exposure Route, Elimination, and Nominal Measurements	Sediment; Not reported; Nominal
Test Type, Test Temperature, and Test Condition Comments	static; 27±1°C; Microcosms with 4 cm spiked natural sediment collected from uncontaminated reservoir in Guangzhou, South China, and 14 cm aerated tap water
Duration, Parameter, and Sampling Frequency	28 days; Not Reported; 0 and 28 d
Concentration	30 - 300 ug/g dw
Analytical Method and Analytical Details	Agilent 6890 gas chromatograph with Agilent 5975B mass spectrometer with electron impact ionization source; Water samples SPE extracted with HLB cartridges; sediment samples extracted with an accelerated solvent extraction system; organism samples extracted using QuEChERS method; LOQ < 0.002 ug/L, < 0.002 ug/g (details reported in supplemental information).;
Rate Constant and Results per Recovery	Not applicable; 100 - 110%
Statistics, Basis, and Calculation Basis	Described elsewhere; Whole body, wet wt.; steady state
Results Value and Results Details	BSAF: 0.29 - 0.66; Water concentration: 1.36±0.16 - 4.73±0.25 ug/L; sediment concentrations did not significantly decrease over time; organism concentrations 98.2, 241, 350, and 431 ug/g ww for exposures of 30, 100, 200, and 300 ug/g dw sediment respectively
Metabolites, Reference, and Results Reference Substance	Not reported; Water control, acetone control; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The test substance source and purity were not reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Acetone and water controls were included and results were assumed to be in the appropriate range.
	Metric 4: Test Substance Stability	Medium	Test substance preparation was reported in a previous paper.

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Study Citation:	Peng, F. J., Kiggen, F., Pan, C. G., Bracewell, S. A., Ying, G. G., Salvito, D., Selck, H., Van den Brink, P. J. (2019). Fate and effects of sediment-associated polycyclic musk HHCB in subtropical freshwater microcosms. Ecotoxicology and Environmental Safety 169:902-910.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428151			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5: Test Method Suitability	High		The test method was appropriate for the test substance.
	Metric 6: Testing Conditions	High		pH, temperature, conductivity and sediment characteristics were reported.
	Metric 7: Testing Consistency	High		Test conditions were consistent across study groups.
	Metric 8: System Type and Design	High		Equilibrium was established and the system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9: Outcome Assessment Methodology	N/A		The metric is not applicable to the study type.
	Metric 10: Sampling Methods	High		Test organism species and starting weight were reported.
Domain 5: Outcome Assessment				
	Metric 11: Test Substance Identity	High		The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12: Test Substance Purity	High		The study used sampling methods that both addressed the outcomes of interest and employed widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13: Confounding Variables	High		Variability and uncertainty were accounted for in data evaluation.
	Metric 14: Health Outcomes Unrelated to Exposure	High		No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15: Data Reporting	Medium		Target chemical concentrations, extraction efficiency, adequate limits of detection were reported; lipid content was reported but it was not clear if the BSAF was lipid normalized.
	Metric 16: Statistical Methods and Kinetic Calculations	Medium		Statistical methods and calculations were described elsewhere.
Domain 8: Other				
	Metric 17: Verification or Plausibility of Results	High		The results were reasonable and in agreement with other studies.
	Metric 18: QSAR Models	N/A		The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Peng, F. J., Kiggen, F., Pan, C. G., Bracewell, S. A., Ying, G. G., Salvito, D., Selck, H., Van den Brink, P. J. (2019). Fate and effects of sediment-associated polycyclic musk HHCB in subtropical freshwater microcosms. <i>Ecotoxicology and Environmental Safety</i> 169:902-910.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428151

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	Acetone (2.2 %); NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Test Organism and Test Organism Details	Limnodrilus hoffmeisteri; n=240; starting weight 1.9 - 2.4 mg
Lipid Content, Test Temperature, pH, and Depuration Time	1.62±0.22 % wet wt.; 27±1°C; 7-Jun; Not reported
Media Type, TOC, and Salinity	natural sediment: freshwater; 20.6% organic matter (sediment); 0.067% TOC (water); Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; 90 - 110 uS/cm; Not reported
Exposure Route, Elimination, and Nominal Measurements	Sediment; Not reported; Nominal
Test Type, Test Temperature, and Test Condition Comments	static; 27±1°C; Microcosms with 4 cm spiked natural sediment collected from uncontaminated reservoir in Guangzhou, South China, and 14 cm aerated tap water
Duration, Parameter, and Sampling Frequency	28 days; Not Reported; 0 and 28 d
Concentration	30 - 300 ug/g dw
Analytical Method and Analytical Details	Agilent 6890 gas chromatograph with Agilent 5975B mass spectrometer with electron impact ionization source; Water samples SPE extracted with HLB cartridges; sediment samples extracted with an accelerated solvent extraction system; organism samples extracted using QuEChERS method; LOQ < 0.002 ug/L, < 0.002 ug/g;
Rate Constant and Results per Recovery	Not applicable; 100 - 110%
Statistics, Basis, and Calculation Basis	Described elsewhere; Whole body, wet wt.; steady state
Results Value and Results Details	BSAF (biota-sediment accumulation factor): 0.94 - 2.11; Water concentration: 1.36±0.16 - 4.73±0.25 ug/L; sediment concentrations did not significantly decrease over time; organism concentrations 56.4, 135, 217, and 279 ug/g ww for exposures of 30, 100, 200, and 300 ug/g dw sediment respectively
Metabolites, Reference, and Results Reference Substance	Not reported; Water control, acetone control; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Acetone and water controls were included and results were assumed to be in the appropriate range.
	Metric 4:	Test Substance Stability	Medium	Test substance preparation was reported in a previous paper.
Domain 3: Test Conditions				

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Study Citation:		Peng, F. J., Kiggen, F., Pan, C. G., Bracewell, S. A., Ying, G. G., Salvito, D., Selck, H., Van den Brink, P. J. (2019). Fate and effects of sediment-associated polycyclic musk HHCB in subtropical freshwater microcosms. <i>Ecotoxicology and Environmental Safety</i> 169:902-910.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		5428151		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was appropriate for the test substance.
	Metric 6:	Testing Conditions	High	pH, temperature, conductivity and sediment characteristics were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and starting weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that both addressed the outcomes of interest and employed widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations, extraction efficiency, adequate limits of detection were reported; lipid content was reported but it was not clear if the BSAF was lipid normalized.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods and calculations were described elsewhere.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and in agreement with other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Peng, F. J., Ying, G., Pan, C., Selck, H., Salvito, D., Van Den Brink, P. J. (2018). Bioaccumulation and biotransformation of triclosan and galaxolide in the freshwater oligochaete limnodrilus hoffmeisteri in a water/sediment microcosm. Environmental Science & Technology 52(15):8390-8398.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428144

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NA; International Flavors & Fragrances; NR; Contained ~10% HHCB-lactone Notes: HHCB , 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta(g)-2-benzopyran
Test Organism and Test Organism Details	L. hoffmeisteri; n=30, larval stage, length 20.48±3.17 mm, width 0.375±0.032 mm, and wet wt. 0.0021±0.0006 g; obtained from aquarium market, Guangzhou, South China
Lipid Content, Test Temperature, pH, and Depuration Time	2.26% wet wt.; 27±1°C; 6.6; Overnight
Media Type, TOC, and Salinity	natural sediment; 20.6% organic matter content; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Sediment; Not applicable; Nominal
Test Type, Test Temperature, and Test Condition	semi-static; 27±1°C; 15 g wet sediment spiked with the test substance added to a 50 mL centrifuge tube with 30 mL aerated milli-Q water and test organisms, and tubes were covered with parafilm. Sediment composition 0.49% sand, 40.82% silt, and 58.69% clay, and 57% water.
Comments	
Duration, Parameter, and Sampling Frequency	14 days; Not Reported; 0, 1, 3, 7, 10, and 14 d
Concentration	3.1 ug/g dw
Analytical Method and Analytical Details	GC-MS, in selected-ion-monitoring mode under electron impact ionization; Water samples extracted by SPE; Sediment extracted 3x by ultrasonic extraction in acetone/dichloromethane with purification by SPE; worm tissues homogenized in acetonitrile and extracted 3x by ultrasonic extraction;
Rate Constant and Results per Recovery	Not reported; 60-110%. Details reported in supplemental information.
Statistics, Basis, and Calculation Basis	SPSS Statistics version 23.0.0; normality and variance homogeneity checked with Shapiro-Wilk test and Levene's test, p < 0.05; Lipid normalized, wet wt.; kinetic
Results Value and Results Details	BASF (biota-sediment accumulation factor)=1.84 - 2.50; Steady state reached at day 10
Metabolites, Reference, and Results Reference Substance	Biotransformation products reported in supplemental information; Unexposed organism; natural sediment; acetone control; water control; Below detection limits; negligible

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	High	The test substance was identified by name.
	Metric 2:	High	The source and impurity content of the test substance was reported.
Domain 2: Test Design	Metric 3:	High	Background concentrations in organisms and sediment samples were measured and reported; both were at appropriate levels (not detected and negligible).

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Study Citation:	Peng, F. J., Ying, G., Pan, C., Selck, H., Salvito, D., Van Den Brink, P. J. (2018). Bioaccumulation and biotransformation of triclosan and galaxolide in the freshwater oligochaete limnodrilus hoffmeisteri in a water/sediment microcosm. Environmental Science & Technology 52(15):8390-8398.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428144			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	Medium	Minimal details on test substance preparation reported, stability and storage conditions not reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate test conditions were monitored and reported (temperature, pH, sediment characteristics).
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system was capable of maintaining substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species, age, and weight were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted methods.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in the measurements was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism attrition or health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, extraction efficiency was reported, BSAF were lipid normalized.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	American eel, <i>Anguilla rostrata</i> ; n=1, organism length 22 - 25 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Whole body, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid weight basis): 31,600; Concentrations in organism: 125 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	High
			The test substance was identified by name.
			The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design			
	Metric 3:	Study Controls	Medium
			Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	White perch, Morone americana; n=9, organism lengths 10 - 22 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid weight basis): 303 - 7,060; BAF (wet wt., not lipid normalized): 21 - 333. Concentrations in liver: 6.27 - 27.9 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	Channel catfish, <i>Ictalurus punctatus</i> ; n=4, organism lengths 28 - 63 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid wt basis) : 1,880, 1,510, 5,300, and < LOQ; BAF (wet wt., not lipid normalized): 18 - 371. Concentrations in liver: < 1 - 39.0 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported			
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR			
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).			
Test Organism and Test Organism Details	Smallmouth bass, Micropterus dolomieu; n=9, organism lengths 17 - 36 cm			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study			
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported			
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported			
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.			
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York			
Comments				
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)			
Concentration	Not Reported			
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;			
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)			
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state			
Results Value and Results Details	BAF: <LOQ, 1,510, 829, 1,270, 446, 12,900; BAF (wet wt., not lipid normalized): 31 - 106. Concentrations in liver: < 1 - 31.9 ng/g lipid wt. No correlation with length or body weight observed.			
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		EVALUATION		Comments
	Metric	Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	White catfish, Ameiurus catus; n=2, organism lengths 37 - 54 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid weight basis): 261 and 1,470; BAF (wet wt., not lipid normalized): 18 - 371. Concentrations in liver: 6.56 and 5.79 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	Largemouth bass, Micropterus salmoides; n=2, organism lengths 27 - 43 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid weight basis): 434 and 2,080; BAF (wet wt., not lipid normalized): 30 - 146. Concentrations in liver: 10.9 and 8.22 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		EVALUATION		Comments
Metric		Rating		
Domain 3: Test Conditions				
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.	
Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.	
Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.	
Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.	
Domain 4: Test Organisms				
Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.	
Metric 10:	Sampling Methods	High	Test organism species and size were reported.	
Domain 5: Outcome Assessment				
Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.	
Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.	
Domain 6: Confounding/Variable Control				
Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.	
Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.	
Domain 7: Data Presentation and Analysis				
Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.	
Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.	
Domain 8: Other				
Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.	
Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.	
Overall Quality Determination		High		

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	Brown bullhead, Ameiurus nebulosus; n=3, organism lengths 19 - 25 cm
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Organ, wet wt. lipid normalized; steady state
Results Value and Results Details	BAF: < LOQ, < LOQ, 12,900; Concentrations in organisms: < 1, < 1, and 51.1 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		EVALUATION		Comments
	Metric	Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428036

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in separate amber glass bottles at -20°C; Organism samples stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Three sites along the upper Hudson River: Troy, Albany, and Catskill, New York; NA; NR Notes: Standard purity: 51%; Source: Dr. Ehrenstorfer GmbH (Augsburg, Germany).
Test Organism and Test Organism Details	Zebra mussels, Dreissena polymorpha; n=3
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; NA, field study
Media Type, TOC, and Salinity	natural water / sediment: freshwater; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Not reported; Not reported; Water: 3.95 - 25.1 ng/L; sediment: 72.8 - 388 ng/g dry wt.
Test Type, Test Temperature, and Test Condition	field study; Not reported; Samples collected from upper Hudson River near Troy, Albany, and Catskill, New York
Comments	
Duration, Parameter, and Sampling Frequency	May (environmental samples) and July 2006 (organism and environmental samples); Not Reported; Two sampling periods (water and sediment); one sampling period (organism)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent Technologies GC-MS in ion monitoring mode; LOQ: 1 ng/L (water), 5 ng/g dry wt(sediment), 1 ng/g wet wt (organism); Water extracted (2x) with hexane and dichloromethane, concentrated by rotary evaporation; sediment Soxhlet extracted with hexane:DCM, concentrated by rotovap; tissue Soxhlet extracted with DCM:hexane, lipids separated, extract cleaned through cartridge;
Rate Constant and Results per Recovery	Not reported; 85-98% (analytical procedure recovery) 65 - 90% (spiked d3-AHTN recovery during sample extraction)
Statistics, Basis, and Calculation Basis	Not reported; Wet wt. lipid normalized; steady state
Results Value and Results Details	BAF (lipid weight basis): 2,610, 2,730, 3,070, and 4,890; Concentrations in organism: 10.3, 10.8, 12.1, and 19.3 ng/g lipid wt. No correlation with length or body weight observed.
Metabolites, Reference, and Results Reference Substance	Not reported; Field and procedural blanks; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the field samples was reported, the source of the analytical standards was reported as well.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Procedural and field blanks were included, results were not explicitly reported but were assumed to be at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Reiner, J. L., Kannan, K. (2011). Polycyclic Musks in Water, Sediment, and Fishes from the Upper Hudson River, New York, USA. Water, Air, and Soil Pollution 214(1-4):335-342.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428036			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Characteristics of the environmental samples were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	High	Test organism species and size were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the measurements was accounted for through procedural recovery runs.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were suitable and limits of detection were reported, lipid normalized BCF was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported and seemingly not applied, BAF calculations were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable and comparable to other reported values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5349388

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	no; experimental; OECD Guideline 305 E (Bioaccumulation: Flow-through Fish Test) - [before 14 June 1996]
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	14C-HHCB; NR; NR; radio-chemically pure Notes: three isomer groups; solubilizer (DMF, Tween 80) used
Test Organism and Test Organism Details	bluegill sunfish (<i>Lepomis macrochirus</i>); 1.2-1.4 g initial weight
Lipid Content, Test Temperature, pH, and Depuration Time	not reported; not reported; not reported; 28 days
Media Type, TOC, and Salinity	not specified; not reported; not reported
Dissolved Oxygen, Conductivity, and Hardness	not reported; not reported; not reported
Exposure Route, Elimination, and Nominal Measurements	whole fish; 28 days; measured
Test Type, Test Temperature, and Test Condition	flow-through; not reported; Not Reported
Comments	
Duration, Parameter, and Sampling Frequency	56 days; BCF; not reported
Concentration	0.91 ± 0.10 ug/L
Analytical Method and Analytical Details	TLC/HPLC; detection limit 1.2-1.7 ppb;
Rate Constant and Results per Recovery	uptake 352 L/kg/day; elimination 0.215/day; not reported
Statistics, Basis, and Calculation Basis	Not Reported; whole fish; Not Reported
Results Value and Results Details	1584 L/kg for HHCB; 1624 L/kg for total radioactivity; plateau total radioactivity concentration in edible, non-edible, and whole fish was 0.45, 1.98 and 1.49 mg/kg, respectively; depuration total radioactivity residue was 0.015, 0.031 and 0.023 for edible, non-edible, and whole fish, respectively
Metabolites, Reference, and Results Reference Substance	unknown polar metabolite: 10-19% in water; 9-16% in edible; 11-24% in non-edible; not reported; Not Reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN.
	Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported; however, the omissions were not likely to have a substantial impact on the study results.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The metric is not applicable to the study type.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				

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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5349388			
Domain		Metric	EVALUATION Rating	Comments
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	The test organism or species is routinely used for similar study types; however, one or more additional characteristics of the organisms were not reported, but these omissions were not likely to have a substantial impact on study results.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty in the measurements and statistical techniques were not specifically addressed but were not likely to have a substantial impact on the results.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported; however, this omission was not likely to have a substantial impact on study results.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The lipid content or lipid normalized BCF was not reported for BCF studies, but these deficiencies or omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were expected.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.

Overall Quality Determination**High**

* Related References: cites: HERO ID: 5352386: Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system. Report to RIFM, RCC Umweltchemie AG Project 381418.

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.		
OECD Harmonized Template:	Aquatic Bioconcentration		
HERO ID:	5349388		
EXTRACTION			
Parameter	Data		
CASRN and Test Material	1222-05-5; HHCB		
Confidentiality, Type, and Guideline	no; experimental; OECD Guideline 305 E (Bioaccumulation: Flow-through Fish Test) - [before 14 June 1996]		
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR		
Radiolabel, Source, State, Purity	14C-HHCB; NR; NR; radio-chemically pure Notes: three isomer groups; solubilizer (DMF, Tween 80) used		
Test Organism and Test Organism Details	bluegill sunfish (Lepomis macrochirus); 1.2-1.4 g initial weight		
Lipid Content, Test Temperature, pH, and Depuration Time	not reported; not reported; not reported; 28 days		
Media Type, TOC, and Salinity	not specified; not reported; not reported		
Dissolved Oxygen, Conductivity, and Hardness	not reported; not reported; not reported		
Exposure Route, Elimination, and Nominal Measurements	whole fish; 28 days; measured		
Test Type, Test Temperature, and Test Condition	flow-through; not reported; Not Reported		
Comments	56 days; BCF; not reported		
Duration, Parameter, and Sampling Frequency	8.84 ± 0.89 ug/L		
Concentration	TLC/HPLC; detection limit 1.2-1.7 ppb;		
Analytical Method and Analytical Details	uptake 421 L/kg/day; elimination 0.261/day; not reported		
Rate Constant and Results per Recovery	Not Reported; whole fish; Not Reported		
Statistics, Basis, and Calculation Basis	1584 L/kg for HHCB; 1624 L/kg for total radioactivity; plateau total radioactivity concentration in edible, non-edible, and whole fish was 4.82, 22.16 and 14.26 mg/kg, respectively; depuration total radioactivity residue was 0.109, 0.221 and 0.105 for edible, non-edible, and whole fish, respectively		
Results Value and Results Details	unknown polar metabolite: 10-19% in water; 9-16% in edible; 11-24% in non-edible; not reported; Not Reported		
Metabolites, Reference, and Results Reference Substance			
EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN.
Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported; however, the omissions were not likely to have a substantial impact on the study results.
Domain 2: Test Design			
Metric 3:	Study Controls	N/A	The metric is not applicable to the study type.
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
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Study Citation:		RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		5349388		
		EVALUATION		
Domain		Metric	Rating	Comments
	Metric 6:	Testing Conditions	Medium	There were omissions in testing conditions; however, sufficient data were reported to determine that the omissions were not likely to have a substantial impact on study results. some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	Medium	
	Metric 8:	System Type and Design	High	
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	The test organism or species is routinely used for similar study types; however, one or more additional characteristics of the organisms were not reported, but these omissions were not likely to have a substantial impact on study results.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty in the measurements and statistical techniques were not specifically addressed but were not likely to have a substantial impact on the results.
	Metric 14:	Health Outcomes Unrelated to Exposure	Medium	Attrition or health outcomes were not reported; however, this omission was not likely to have a substantial impact on study results.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The lipid content or lipid normalized BCF was not reported for BCF studies, but these deficiencies or omissions were not likely to have a substantial impact on study results. Kinetic calculations were not clearly described.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were expected.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.

Overall Quality Determination**High**

* Related References: cites: HERO ID: 5352386: Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system. Report to RIFM, RCC Umweltchemie AG Project 381418.

Study Citation:	Schneider, S. Z., Zhang, L., Martin, K. H., Aufderheide, J. A. (2021). HHCB: A dietary exposure bioaccumulation test with the bluegill sunfish (<i>Lepomis macrochirus</i>). Final report.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	7607948

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; OECD Guideline 305 (Bioaccumulation in Fish: Aqueous and Dietary Exposure) -I: Aqueous Exposure Bioconcentration Fish Test
Solvent, Reactivity, Storage, Stability	NR; NR; -20°C; NR
Radiolabel, Source, State, Purity	3-14C; Moravek; Liquid; 99.30% Notes: 1,3,4,6,7,8-hexahydro-4,6,6,8,8-hexamethylcyclopenta[g]-2-benzopyran; specific activity 58.7 mCi/mmol
Test Organism and Test Organism Details	Bluegill (<i>Lepomis macrochirus</i>); Osage Catfisheries, Inc, Osage Beach, Missouri; 4.9-5.7 cm length; 1.51-2.60 g weight
Lipid Content, Test Temperature, pH, and Depuration Time	4.82±0.76% in whole fish; 17.6±1.58% in food; 21.9-22.2°C; 8.0-8.2; 28 days
Media Type, TOC, and Salinity	natural water; <1; not applicable
Dissolved Oxygen, Conductivity, and Hardness	7.8-8.6 mg/L (≥90% of saturation); 341-350 uS/cm; 132-140 mg/L as CaCO3
Exposure Route, Elimination, and Nominal Measurements	dietary; 28 d; Measured
Test Type, Test Temperature, and Test Condition Comments	flow-through; 21.9-22.2°C; natural sunlight was simulated using fluorescent light bulbs; 16/8 hrs light/dark
Duration, Parameter, and Sampling Frequency	42 days; BMF; day 14 of uptake; days 1, 3, 7, 14, 28 of depuration.
Concentration	548 ug/g
Analytical Method and Analytical Details	LLC using liquid scintillation counting (LSC); Tissue and food samples were weighed and combusted in a sample oxidizer prior to LSC analysis. Liquid scintillation analyzers were used to determine disintegrations per minute (dpm).;
Rate Constant and Results per Recovery	depuration rate constant -0.1468; Not Reported
Statistics, Basis, and Calculation Basis	95% confidence intervals or standard deviations when possible, were estimated using methods outlined in the OECD Guideline 305.; whole fish; kinetic, corrected for growth
Results Value and Results Details	0.082; lipid corrected biomagnification factor; the time to reach 95% steady state was 20 days and the half-life was 5 days
Metabolites, Reference, and Results Reference Substance	Not reported; hexachlorobenzene at 41 ug/g; BMF=0.611 lipid corrected

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1:	Test Substance Identity	High The test substance was identified by name.
	Metric 2:	Test Substance Purity	High The source or purity of the test substance was reported.
Domain 2: Test Design			
	Metric 3:	Study Controls	High Concurrent controls were included.

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Study Citation:	Schneider, S. Z., Zhang, L., Martin, K. H., Aufderheide, J. A. (2021). HHCB: A dietary exposure bioaccumulation test with the bluegill sunfish (<i>Lepomis macrochirus</i>). Final report.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	7607948			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples or study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported and is routinely used for similar study types and appropriate for the study method or route.
	Metric 10:	Sampling Methods	High	Test organism information was reported, including species length and starting body weight.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques and between study groups were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	There were multiple study groups, and there were no differences among the study groups in organism attrition or health outcomes that influenced the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.

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Study Citation:	Schneider, S. Z., Zhang, L., Martin, K. H., Aufderheide, J. A. (2021). HHCB: A dietary exposure bioaccumulation test with the bluegill sunfish (Lepomis macrochirus). Final report.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	7607948

		EVALUATION	
Domain	Metric	Rating	Comments
	Metric 18: QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination	High
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Study Citation:	Schreurs, R. H., Legler, J., Artola-Garicano, E., Sinnige, T. L., Lanser, P. H., Seinen, W., Van der Burg, B. (2004). In vitro and in vivo antiestrogenic effects of polycyclic musks in zebrafish. Environmental Science & Technology 38(4):997-1002.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	1301210

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; International Flavours and Fragrances, IFF, Hilversum, Netherlands; NR; NR Notes: NR
Test Organism and Test Organism Details	Zebrafish; Not reported
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 26-27°C; Not reported; Not reported
Media Type, TOC, and Salinity	other; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	HHCB in DMSO was added to the water in measured concentrations of 25.8µg/L or 258µg/L; Not reported; 25.8µg/L or 258µg/L
Test Type, Test Temperature, and Test Condition	semi-static; 26-27°C; Controls without zebrafish were tested.
Comments	
Duration, Parameter, and Sampling Frequency	4 days; other; water samples taken daily
Concentration	greater than or equal to 25.8 - less than or equal to 258 µg/L
Analytical Method and Analytical Details	GC-MS; Carlo Erva 5300 GC with split/split-less injector.;
Rate Constant and Results per Recovery	Not reported; 100%
Statistics, Basis, and Calculation Basis	Not reported; not specified; steady state
Results Value and Results Details	Fish concentrations after 4 days in lower dose (25.8µg/L): 18.9 mg/kg fish weight. Higher dose (258µg/L): 135 mg/kg fish weight.; Internal fish concentrations were approximately 600 times higher than the nominal doses. Internal concentrations remained roughly constant after 24h.
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified using common nomenclature.
	Metric 2:	Test Substance Purity	High	The test substance purity was not reported but the omission is unlikely to have a substantial impact on the study results.
Domain 2: Test Design	Metric 3:	Study Controls	High	Blank controls were used in this study.
	Metric 4:	Test Substance Stability	High	The test substance preparation was reported and appropriate.
Domain 3: Test Conditions				

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Study Citation:		Schreurs, R. H., Legler, J., Artola-Garicano, E., Sinnige, T. L., Lanser, P. H., Seinen, W., Van der Burg, B. (2004). In vitro and in vivo antiestrogenic effects of polycyclic musks in zebrafish. Environmental Science & Technology 38(4):997-1002.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		1301210		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance and the target chemical was tested below its aqueous solubility.
	Metric 6:	Testing Conditions	High	The test conditions were reported and appropriate.
	Metric 7:	Testing Consistency	High	Test conditions were consistent for both study groups.
	Metric 8:	System Type and Design	High	The system design was described appropriately.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Some of the test organism details were not reported but their omission is unlikely to have a substantial impact on the study results.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods were reported and appropriate for the study type.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	No confounding variables were noted in the study. Loss by volatilization and adherence to glass were accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	There were no reported differences between the study groups regarding the organism attrition or health.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The lipid content or lipid-normalized BCFs were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods or kinetic calculations were not clearly reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5352386

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; OECD Guideline 305 E (Bioaccumulation: Flow-through Fish Test) - [before 14 June 1996]
Solvent, Reactivity, Storage, Stability	NR; Stable; approx. 4°C in the dark (unlabeled); -20°C in the dark (labelled); stable
Radiolabel, Source, State, Purity	no; 21.3 mCi/mmol or 82.42 µCi/mg; RIFM; Liquid; 99.15% unlabeled; 99.5% labelled
Test Organism and Test Organism Details	bluegill sunfish (<i>Lepomis macrochirus</i>); Supplied by Osage Catfisheries Inc, Missouri, USA; acclimated for at least 1 week
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 20.6-21.2°C; 7.9-8.1; 28 days
Media Type, TOC, and Salinity	other; Not reported; not applicable
Dissolved Oxygen, Conductivity, and Hardness	7.0-8.5 mg/L; 734.0 uS/cm; 41.2
Exposure Route, Elimination, and Nominal Measurements	water; 28 d; Measured
Test Type, Test Temperature, and Test Condition	flow-through; 20.6-21.2°C; 16 hours daily of illumination; flow-through of 300 L/day
Comments	
Duration, Parameter, and Sampling Frequency	56 days; BCF; day 3, 7, 14, 21, 28, 31, 35, 38, 42, 56
Concentration	0.76 - 1.15 µg/L
Analytical Method and Analytical Details	Radioactivity was determined by liquid scintillation counters equipped with DPM and luminescence options; Thin-layer chromatography was used to characterize parent compound and metabolite patterns in exposure water and extracts of fish; HPLC was also used; All samples were determined at least in duplicate. TLC was performed on precoated normal-phase plates or on reversed-phase RP18 plates. HPLC was used as additional confirming method.;
Rate Constant and Results per Recovery	172/day for edibles; 494/day for non-edibles; 352/day for whole fish; 86.5±3.5% of radioactivity was identified as parent compound; 13.5±3.5% was an unidentified metabolite
Statistics, Basis, and Calculation Basis	Not Reported; fresh weight; other
Results Value and Results Details	498 for edibles; 2175 for non-edibles; 1635 for whole fish; depuration rate constants were 0.683/d for edibles (T1/2=2 days); 0.797/d for non-edibles (T1/2=3.1 days); 0.437/d for whole fish (T1/2=3.2 days); the average BCF at low and high concentrations combined is 522+/134 for edibles; 2341±235 for non-edibles; 1624±16 for whole fish
Metabolites, Reference, and Results Reference Substance	a polar metabolite was found but not identified; unlabeled HHCB; Not Reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2: Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Concurrent blanks were included.

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Study Citation:	Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5352386			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	High	The test substance stability, homogeneity, preparation, and storage conditions were reported and were appropriate for the study.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples or study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	High	The test organism was obtained from a reliable or commercial source and is routinely used for similar study types.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques and between study groups were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	There were multiple study groups, and there were no differences among the study groups in organism attrition or health outcomes that influenced the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical and transformation product concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

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Study Citation:	Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system.		
OECD Harmonized Template:	Aquatic Bioconcentration		
HERO ID:	5352386		
Domain	Metric	EVALUATION Rating	Comments
Overall Quality Determination		High	

Study Citation:	Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5352386

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; OECD Guideline 305 E (Bioaccumulation: Flow-through Fish Test) - [before 14 June 1996]
Solvent, Reactivity, Storage, Stability	NR; Stable; approx. 4°C in the dark (unlabeled); -20°C in the dark (labelled); stable
Radiolabel, Source, State, Purity	no; 21.3 mCi/mmol or 82.42 µCi/mg; RIFM; Liquid; 99.15% unlabeled; 99.5% labelled
Test Organism and Test Organism Details	bluegill sunfish (Lepomis macrochirus); Supplied by Osage Catfisheries Inc, Missouri, USA; acclimated for at least 1 week
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 20.4-21.6°C; 7.8-8.1; 28 days
Media Type, TOC, and Salinity	other; Not reported; not applicable
Dissolved Oxygen, Conductivity, and Hardness	6.9-8.4 mg/L; 734.0 uS/cm; 41.2
Exposure Route, Elimination, and Nominal Measurements	water; 28 d; Measured
Test Type, Test Temperature, and Test Condition	flow-through; 20.4-21.6°C; 16 hours daily of illumination; flow-through of 300 L/day
Comments	
Duration, Parameter, and Sampling Frequency	56 days; BCF; day 3, 7, 14, 21, 28, 31, 35, 38, 42, 56
Concentration	7.03 - 10.75 µg/L
Analytical Method and Analytical Details	Radioactivity was determined by liquid scintillation counters equipped with DPM and luminescence options; Thin-layer chromatography was used to characterize parent compound and metabolite patterns in exposure water and extracts of fish; HPLC was also used; All samples were determined at least in duplicate. TLC was performed on precoated normal-phase plates or on reversed-phase RP18 plates. HPLC was used as additional confirming method.;
Rate Constant and Results per Recovery	188/day for edibles; 842/day for non-edibles; 421/day for whole fish; 86.5±3.5% of radioactivity was identified as parent compound; 13.5±3.5% was an unidentified metabolite
Statistics, Basis, and Calculation Basis	Not Reported; fresh weight; other
Results Value and Results Details	546 for edibles; 2507 for non-edibles; 1613 for whole fish; depuration rate constants were 0.666/d for edibles (T1/2=2 days); 0.662/d for non-edibles (T1/2=2.1 days); 0.748/d for whole fish (T1/2=2.7 days); the average BCF at low and high concentrations combined is 522+/134 for edibles; 2341±235 for non-edibles; 1624±16 for whole fish
Metabolites, Reference, and Results Reference Substance	a polar metabolite was found but not identified; unlabeled HHCB; Not Reported

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2:	Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Concurrent blanks were included.
	Metric 4:	Test Substance Stability	High	The test substance stability, homogeneity, preparation, and storage conditions were reported and were appropriate for the study.

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Study Citation:	Van Dijk, A. (1996). Accumulation and elimination of 14C-HHCB by Bluegill Sunfish in a dynamic flow-through system.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5352386			
Domain		EVALUATION		Comments
		Metric	Rating	
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples or study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was reported.
	Metric 10:	Sampling Methods	High	The test organism was obtained from a reliable or commercial source and is routinely used for similar study types.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques and between study groups were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	There were multiple study groups, and there were no differences among the study groups in organism attrition or health outcomes that influenced the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical and transformation product concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Wang, Q., Kelly, B. C. (2018). Assessing bioaccumulation behaviour of hydrophobic organic contaminants in a tropical urban catchment. Journal of Hazardous Materials 358:366-375.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5428002

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Plankton samples stored in amber bottles; snail and fish samples transferred to laboratory in ice boxes, fish muscle tissues and whole snails stored in glass jars at -20°C; NR
Radiolabel, Source, State, Purity	NA; Open water body in urbanized area in Singapore; NA; NA Notes: Analytical standard obtained from Dr. Ehrenstorfer GmbH (Augsburg, Germany)
Test Organism and Test Organism Details	Peacock bass, Tilapia, Apple snail, and Plankton; n=7, 8, 9, and 26, respectively
Lipid Content, Test Temperature, pH, and Depuration Time	Peacock bass (0.46-1%), Apple snail (0.33-0.55%), and Plankton (0.04-0.55%); Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water and sediment, calculated based on water; Not reported; Sediment (n=16): 45.456 ng/g d.w.; water (n=183) 15.3365 ng/L
Test Type, Test Temperature, and Test Condition	field study; Not reported; Not Reported
Comments	
Duration, Parameter, and Sampling Frequency	Not reported; Not Reported; Aug 2014, Nov 2014, Oct 2015, Apr 2016 (plankton); Sept 2014, Oct 2014, Mar 2015, and Sept 2015 (snails); Apr 2015, Sept 2015, Oct 2015, Apr 2016 (fish)
Concentration	Not Reported
Analytical Method and Analytical Details	Agilent 7890A GC with 7000B triple quadrupole mass spectrometer, operated in multiple reaction monitoring mode; Organism samples homogenated with anhydrous Na ₂ SO ₄ , added to hexane:DCM mixture and internal standard, and extracted 3x by sonication and concentrated by rotary evaporator, lipids removed by GPC column;
Rate Constant and Results per Recovery	Not applicable; Not reported
Statistics, Basis, and Calculation Basis	conducted using XLSTAT, Version 2015.6.01.25601, Addinsoft TM; Not Reported; steady state
Results Value and Results Details	BAF: 97 - 4940 L/kg wet wt.; Peacock bass: 1459.10 ng/g l.w.Tilapia: 669.85 ng/g l.w.Apple snails: 725.26 ng/g l.w.Plankton: 3913.92 ng/g l.w.Water concentrations for BAF determination based on the truly dissolved concentration= $C_{obs} * (1 / [1 + DOC * 0.08 * Kow])$
Metabolites, Reference, and Results Reference Substance	Not reported; Internal standard; Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1:	Test Substance Identity	High The test substance was identified by name.
	Metric 2:	Test Substance Purity	High The source of the samples was reported and the source of the analytical standard was reported.
Domain 2: Test Design			

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Study Citation:	Wang, Q., Kelly, B. C. (2018). Assessing bioaccumulation behaviour of hydrophobic organic contaminants in a tropical urban catchment. Journal of Hazardous Materials 358:366-375.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5428002			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 3:	Study Controls	Medium	Field and procedural blanks were included but the results were not reported; this is not expected to significantly impact the results.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Sediment and water sample parameters not reported.
	Metric 7:	Testing Consistency	High	Samples were collected and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Minimal information on sampled organisms was reported, details may be included in the supplemental information.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	Sampling methods addressed the outcome of interest, limited sampling approaches reported for water and sediment samples.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was accounted for through statistical methods between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency was not reported but may be included in the supplemental information. BAF values were not numerically reported for individual species (only graphically), lipid normalized BAF values were not reported despite being an endpoint of interest.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were conducted by appropriate software.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were supported by previous findings.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

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Study Citation:	Wang, Q., Kelly, B. C. (2018). Assessing bioaccumulation behaviour of hydrophobic organic contaminants in a tropical urban catchment. Journal of Hazardous Materials 358:366-375.		
OECD Harmonized Template:	Aquatic Bioconcentration		
HERO ID:	5428002		
		EVALUATION	
Domain	Metric	Rating	Comments
Overall Quality Determination		High	

Study Citation:	Yao, L., Lv, Y. Z., Zhang, L. J., Liu, W. R., Zhao, J. L., Yang, Y. Y., Jia, Y. W., Liu, Y. S., He, L. Y., Ying, G. G. (2019). Bioaccumulation and risks of 24 personal care products in plasma of wild fish from the Yangtze River, China. Science of the Total Environment 665:810-819.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5427897

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water samples collected in pre-cleaned amber bottles, with 5% methanol added and pH adjusted to 3.0, stored at 4°C. Fish collected by fishing nets or electroshocking, kept alive in aeration buckets, collected plasma stored at -80°C; NR
Radiolabel, Source, State, Purity	NA; Four sampling sites in Yangtze River Basin, near Yichang, Wuhan, Nanjing, and Zhenjiang.; NR; NA Notes: Details on internal standards reported in supplementary material.
Test Organism and Test Organism Details	Cyprinus carpio; Squalius cephalus; Carassius carassius; Parabramis pekinensis; Ameiurus nebulosus; Lutjanus erythropterus; Ctenopharyngodon idella; Clarias fuscus; n=12, 2, 7, 10, 1, 1, 1, and 2, respectively
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not reported; Not reported
Test Type, Test Temperature, and Test Condition	field study; Not reported; Not reported
Comments	
Duration, Parameter, and Sampling Frequency	July 2013 (wet season), November 2013 (dry season); Not Reported; One sampling per season
Concentration	Not reported
Analytical Method and Analytical Details	UPLC-MS/MS and GC-MS MDL: 6.59 ng/mL (with enzyme), 2.01 ng/mL (without enzyme) ng/L; Water extracted by SPE, test substance eluted with solvent; Plasma processed to detect unconjugated and conjugated forms, enzyme hydrolysis processing conducted, proteins and phospholipids were separated out, test substance extracted into acetonitrile;
Rate Constant and Results per Recovery	Not applicable; 92 - 105% (with enzyme process), 97 - 140% (without enzyme process)
Statistics, Basis, and Calculation Basis	Kruskal-Wallis test, $p > 0.05$; no significant interspecies differences between fish species, no relationship with fish body weight observed.; log BAF, plasma; steady state
Results Value and Results Details	BAF=4.06 (3.43 - 4.81); Mean (range).
Metabolites, Reference, and Results Reference Substance	Not reported; Procedure blank; Not detected

EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported; internal standard information may be reported in supplemental information.
Domain 2: Test Design				

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Study Citation:	Yao, L., Lv, Y. Z., Zhang, L. J., Liu, W. R., Zhao, J. L., Yang, Y. Y., Jia, Y. W., Liu, Y. S., He, L. Y., Ying, G. G. (2019). Bioaccumulation and risks of 24 personal care products in plasma of wild fish from the Yangtze River, China. Science of the Total Environment 665:810-819.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5427897			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 3:	Study Controls	High	A procedure blank, a solvent blank, and an independent check standard were included and tested valid.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Water sample concentrations and parameters were not reported.
	Metric 7:	Testing Consistency	High	Samples were collected and processed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Test organism species was reported, however organism details may be reported in supplemental information.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling method that address the outcomes of interest and used appropriate approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variation between measurements and species was accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	Not differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Water concentrations and species specific BAFs were not reported; Percent recovery and detection limits were reported, analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Yao, L., Zhao, J. L., Liu, Y. S., Zhang, Q. Q., Jiang, Y. X., Liu, S., Liu, W. R., Yang, Y. Y., Ying, G. G. (2018). Personal care products in wild fish in two main Chinese rivers: Bioaccumulation potential and human health risks. Science of the Total Environment 621:1093-1102.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5427899

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; nR; Water samples stored in amber bottles with 50 mL methanol and adjusted pH to 3, stored at 4°C; Sediment samples stored in amber bottles with sodium azide, freeze dried and stored at 4°C; Alive fish sampled, tissues stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Sampled from Danshi River, Shima River, Dongjiang River, Yangtze River; NR; NA
Test Organism and Test Organism Details	Tilapia aurea, Ophicephalus argus, Cirrhinus molitorella, Mugil cephalus, Cyprinus carpio, Hypophthalmichthys molitric, Carassius auratus, Parabramis pekinensis, Ameiurus nebulosus, Lutjanus erythropterus, Ctenopharynodon idellus, and Clarias fuscus; 74 fish liver tissues extracted
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured: max 133 ng/L (water), max 57.7 ng/g (sediment)
Test Type, Test Temperature, and Test Condition	field study; Not reported; Not reported
Comments	
Duration, Parameter, and Sampling Frequency	Sampling occurred July 2012 (wet season) and November 2012 (dry season); Not Reported; Not reported
Concentration	Not Reported
Analytical Method and Analytical Details	UPLC-MS/MS in multiple reaction monitoring mode; GC-MC in selective ion monitoring mode; Water extracted with SPE; Sediment extracted by accelerated solvent extractor; fish tissues extracted by QuEChERS (quick, easy, cheap, effective, rugged, and safe) method;
Rate Constant and Results per Recovery	Not reported; Not reported
Statistics, Basis, and Calculation Basis	Nonparametric Kruskal-Wallis tests, $p < 0.05$; descriptive statistics and linear regression performed with Microsoft Excel 2013 and SPSS 16.0; Organ, wet wt; steady state
Results Value and Results Details	Average log BAF est. (from figure) 3.8 (tilapia), 4.2 (common carp), 4.1 (Bream), 5.5 (Crucian), and 4.2 (Chub); significantly higher compared to muscle tissue; Reported log BAF significantly different from other fish sampled (values NR). Mean concentrations for all fish sampled (ng/g ww): 293 (Yangtze River, wet season), 471 (Pearl River, wet season), 80.9 (Yangtze River, dry season), 498 (Pearl River, dry season)
Metabolites, Reference, and Results Reference Substance	Not reported; Reference site, Xizhijiang River, less influenced by human activity; Not detected in fish samples

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported, internal standard details were not reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	High	A reference site was included and tested valid.

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Study Citation:	Yao, L., Zhao, J. L., Liu, Y. S., Zhang, Q. Q., Jiang, Y. X., Liu, S., Liu, W. R., Yang, Y. Y., Ying, G. G. (2018). Personal care products in wild fish in two main Chinese rivers: Bioaccumulation potential and human health risks. Science of the Total Environment 621:1093-1102.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5427899			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	High	Sample storage and preparation for analysis was reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No environmental sample conditions were reported, they may be reported in supplemental material.
	Metric 7:	Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8:	System Type and Design	High	Environmental samples are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Limited organism details provided, may be reported in supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The sampling methodology addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical measures.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency and limits of detection were not reported, species specified BAF values were not reported for every sampled species, and mainly reported graphically; environmental concentrations only reported graphically.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Yao, L., Zhao, J. L., Liu, Y. S., Zhang, Q. Q., Jiang, Y. X., Liu, S., Liu, W. R., Yang, Y. Y., Ying, G. G. (2018). Personal care products in wild fish in two main Chinese rivers: Bioaccumulation potential and human health risks. Science of the Total Environment 621:1093-1102.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5427899

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported
Solvent, Reactivity, Storage, Stability	NA; nR; Water samples stored in amber bottles with 50 mL methanol and adjusted pH to 3, stored at 4°C; Sediment samples stored in amber bottles with sodium azide, freeze dried and stored at 4°C; Alive fish sampled, tissues stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Sampled from Danshi River, Shima River, Dongjiang River, Yangtze River; NR; NA
Test Organism and Test Organism Details	Tilapia aurea, Ophicephalus argus, Cirrhinus molitorella, Mugil cephalus, Cyprinus carpio, Hypophthalmichthys molitric, Carassius auratus, Parabramis pekinensis, Ameiurus nebulosus, Lutjanus erythropterus, Ctenopharynodon idellus, and Clarias fuscus; 81 fish muscle tissues extracted
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Media Type, TOC, and Salinity	natural water / sediment; Not reported; Not reported
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; Measured: max 133 ng/L (water), max 57.7 ng/g (sediment)
Test Type, Test Temperature, and Test Condition	field study; Not reported; Not reported
Comments	
Duration, Parameter, and Sampling Frequency	Sampling occurred July 2012 (wet season) and November 2012 (dry season); Not Reported; Not reported
Concentration	Not Reported
Analytical Method and Analytical Details	UPLC-MS/MS in multiple reaction monitoring mode; GC-MC in selective ion monitoring mode; Water extracted with SPE; Sediment extracted by accelerated solvent extractor; fish tissues extracted by QuEChERS (quick, easy, cheap, effective, rugged, and safe) method;
Rate Constant and Results per Recovery	Not reported; Not reported
Statistics, Basis, and Calculation Basis	Nonparametric Kruskal-Wallis tests, $p < 0.05$; descriptive statistics and linear regression performed with Microsoft Excel 2013 and SPSS 16.0; Organ, wet wt; steady state
Results Value and Results Details	Average log BAF est. 2.7 (tilapia), 3.5 (common carp), 3.5 (Bream), 3.8(Crucian), and 3.4 (Chub); significantly lower compared to liver tissue; Reported log BAF significantly different from other fish sampled (values NR). Mean concentrations for all fish sampled: 29.5 - 51.4 ng/g ww (wet season), 19.8 - 43.8 ng/g ww (dry season)
Metabolites, Reference, and Results Reference Substance	Not reported; Reference site, Xizhijiang River, less influenced by human activity; Not detected in fish samples

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported, internal standard details were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A reference site was included and tested valid.
	Metric 4:	Test Substance Stability	High	Sample storage and preparation for analysis was reported and appropriate.
Domain 3: Test Conditions				

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Study Citation:	Yao, L., Zhao, J. L., Liu, Y. S., Zhang, Q. Q., Jiang, Y. X., Liu, S., Liu, W. R., Yang, Y. Y., Ying, G. G. (2018). Personal care products in wild fish in two main Chinese rivers: Bioaccumulation potential and human health risks. Science of the Total Environment 621:1093-1102.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	5427899			
Domain		Metric	EVALUATION Rating	Comments
	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No environmental sample conditions were reported, they may be reported in supplemental material.
	Metric 7:	Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8:	System Type and Design	High	Environmental samples are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Limited organism details provided, may be reported in supplemental material.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The sampling methodology addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical measures.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency and limits of detection were not reported, species specified BAF values were not reported for every sampled species, and mainly reported graphically; environmental concentrations only reported graphically.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistically methods described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Zhang, H., Kelly, B. C. (2018). Sorption and bioaccumulation behavior of multi-class hydrophobic organic contaminants in a tropical marine food web. Chemosphere 199:44-53.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	5427902

Parameter		EXTRACTION	
CASRN and Test Material	1222-05-5; HHCB		
Confidentiality, Type, and Guideline	None; Experimental; other: Guideline not reported		
Solvent, Reactivity, Storage, Stability	NA; NR; Seawater collected in amber glass bottles at 4°C; sediment stored in glass jars at -20°C; fish samples wrapped in aluminum and transported in icebox to lab where tissues were excised and stored in glass jars at -20°C; NR		
Radiolabel, Source, State, Purity	NA; Singapore Strait; NA; NA Notes: Stable-isotope carbon-13 and deuterium labelled compounds were used as internal standards		
Test Organism and Test Organism Details	Muraenesox sp., Arius venosus and Hexanematchthys sagor, Chiloscylidium indicum, Dasyatis lata, Lutjanus johnii, and Pomadasys aurita; n= 14, 11, 3, 1, 3, and 5 respectively		
Lipid Content, Test Temperature, pH, and Depuration Time	see table S2 in Appendix A supplementary data; 30°C (average); Not reported; Not applicable		
Media Type, TOC, and Salinity	natural water / sediment: marine; Not reported; 30 ppt (average)		
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported		
Exposure Route, Elimination, and Nominal Measurements	Water; Not applicable; see table S7 and S8 Appendix A supplementary data		
Test Type, Test Temperature, and Test Condition	field study; 30°C (average); Not Reported		
Comments			
Duration, Parameter, and Sampling Frequency	Sampling occurred 2011 - 2012; Not Reported; Not reported		
Concentration	Not reported -		
Analytical Method and Analytical Details	GC-ESI-MS/MS and LC-ESI/MS/MS; NR, reported in supplemental information;		
Rate Constant and Results per Recovery	Not reported; Not reported		
Statistics, Basis, and Calculation Basis	Trophic magnification: log-linear regression between log 10 concentration in biota and trophic level; Lipid normalized, organ wt.; steady state		
Results Value and Results Details	log BAF: 4.33 - 4.89; BSAF (biota-sediment accumulation factor): 2.6 - 11.0 OC wt/lipid wt; Trophic magnification factor: 1.17		
Metabolites, Reference, and Results Reference Substance	Not reported; Not reported; Not reported		
		EVALUATION	
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	Medium
Domain 2: Test Design	Metric 3:	Study Controls	N/A
	Metric 4:	Test Substance Stability	Medium
Domain 3: Test Conditions			

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Study Citation:		Zhang, H., Kelly, B. C. (2018). Sorption and bioaccumulation behavior of multi-class hydrophobic organic contaminants in a tropical marine food web. Chemosphere 199:44-53.		
OECD Harmonized Template:		Aquatic Bioconcentration		
HERO ID:		5427902		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Some general environmental sample conditions were reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis was consistent across samples.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10:	Sampling Methods	Medium	Organism species were reported, other characteristics were not reported but may be in supplemental information.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methodology addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No reported differences in organism health or attrition.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations in the environment or tissue samples were not reported, species specific BAF values were not reported, extraction efficiency was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods used for trophic magnification determination were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Zhang, X., Xu, Q., Man, S., Zeng, X., Yu, Y., Pang, Y., Sheng, G., Fu, J. (2013). Tissue concentrations, bioaccumulation, and biomagnification of synthetic musks in freshwater fish from Taihu Lake, China. Environmental Science and Pollution Research 20(1):311-322.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	2189417
EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, and Guideline	None; Experimental; other: Concentrations of synthetic musk in various fish species collected from Taihu Lake, China and corresponding biota-sedimentaccumulation factors and trophic magnification factors (TMF)
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Promochem, Germany; NR; 75% (gas chromatography grade) Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[gamma]-2-benzopyran
Test Organism and Test Organism Details	24 fish species of various trophic level in a freshwater ecosystem: 24 fish species of various trophic level (TL) in a freshwater ecosystem. Herbivorous fish: White amur bream (<i>Parabramis pekinensis</i>) TL 3.40, Bluntnose black bream (<i>Megalobrama amblycephala</i>) TL 2.32, Grass carp (<i>Ctenopharyngodon idellus</i>) TL 1.06; Omnivorous fish: Garfish (<i>Hyporhamphus intermedius</i>) TL 2.45, Chinese lizard gudgeon (<i>Saurogobio dabryi</i>) TL 2.71, Sharpbelly (<i>Hemiculter leucisculus</i>) TL 2.52, Largefin bitterling (<i>Acheilognathus macropterus</i>) TL 2.02, Toxabramis swinhonis TL 2.51, Crucian carp (<i>Carassius carassius</i>) TL 3.01, Yellow catfish (<i>Pelteobagrus fulvidraco</i>) TL 3.14, Common carp (<i>Cyprinus carpio</i>) TL 2.79, Bighead carp (<i>Hypophthalmichthys nobilis</i>) TL 2.51, Silver carp (<i>Hypophthalmichthys molitrix</i>) TL 2.59; Carnivorous fish: Tapertail anchovy (<i>Coilia ectenes taihuensis</i>) TL 3.35, <i>Acheilognathus rhombeus</i> TL 3.04, Mongolian redbfin (<i>Chanodichthys mongolicus</i>) TL 2.8, <i>Paracanthobrama guichenoti</i> TL 2.64, Topmouth culter (<i>Culter alburnus</i>) TL 3.35, Redfin culter (<i>Cultrichthys erythropterus</i>) TL 3.47, Spotted steed (<i>Hemibarbus maculatus</i>) TL 3.35, Amur catfish (<i>Silurus asotus</i>) TL 3.45, Humpback (<i>Chanodichthys dabryi</i>) TL 1.97, Clearhead icefish (<i>Protosalanx hyalocranius</i>) TL 2.61, Icefish (<i>Neosalanx taihuensis</i> Chen) TL 2.62; Fish were collected from Meiliang Bay, Gonghu Lake, and Suzhou in Taihu Lake September 2009; nine sediment samples were collected from nine sites August 2009
Lipid Content, Test Temperature, pH, and Depuration Time	Range of Mean values for 24 species: 0.5-8.7%; Lipid content range in Herbivorous fish: 0.5-3.3, Omnivorous fish 0.5-9.9, Carnivorous fish 0.5-7.9; Not reported; Not reported; Not reported
Media Type, TOC, and Salinity	natural water / sediment: freshwater; organic carbon content in sediments (foc) ranged from 1.79-4.46%; Freshwater lake
Dissolved Oxygen, Conductivity, and Hardness	Not reported; Not reported; Not reported
Exposure Route, Elimination, and Nominal Measurements	field study; field study; measured
Test Type, Test Temperature, and Test Condition	field study; Not reported; Concentrations in fish ranged from <LOD to 52.9 ng/g, mean 7.5 ng/g, median 5.4 ng/g; concentrations in sediments
Comments	ranged from 0.08 - 3.58 ng/g dw
Duration, Parameter, and Sampling Frequency	Not reported; other; sampling performed in Sept and Aug 2009
Concentration	7.5 ng/g lw
Analytical Method and Analytical Details	GC-MS with electron ionization; LOD = 0.02 - 0.04 ng/g dry weight for sediments; 0.4 - 1.0 ng/g lipid weight for fish samples;
Rate Constant and Results per Recovery	Not reported; 72.3±21.0% average
Statistics, Basis, and Calculation Basis	analytical method R-squared >0.99; data analysis: Mann-Whitney U test, Kruskal-Wallis H test, analysis of covariance; Pearsons correlation used to examine trophic levels and HHCB concentrations; normalized lipid fraction; steady state
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Study Citation:	Zhang, X., Xu, Q., Man, S., Zeng, X., Yu, Y., Pang, Y., Sheng, G., Fu, J. (2013). Tissue concentrations, bioaccumulation, and biomagnification of synthetic musks in freshwater fish from Taihu Lake, China. Environmental Science and Pollution Research 20(1):311-322.
OECD Harmonized Template:	Aquatic Bioconcentration
HERO ID:	2189417

		EVALUATION	
Domain	Metric	Rating	Comments
Results Value and Results Details	TTMF = 1.12; BSAF range for all species = 0-0.48. Mean BSAF values for Herbivorous fish: White amur bream (<i>Parabramis pekinensis</i>) = 0.48, Blutnose black bream (<i>Megalobrama amblycephala</i>) = 0.22, Grass carp (<i>Ctenopharyngodon idellus</i>) = 0.32. Mean BSAF values for Omnivorous fish: Garfish (<i>Hyporhamphus intermedius</i>) = 0.03, Chinese lizard gudgeon (<i>Saurogobio dabryi</i>) = 0.09, Sharpbelly (<i>Hemiculter leucisculus</i>) = 0.26, Largefin bitterling (<i>Acheilognathus macropterus</i>) = 0, (Toxabramis swinhonis) = 0.11, Crucian carp (<i>Carassius carassius</i>) = 0.14, Yellow catfish (<i>Pelteobagrus fulvidraco</i>) = 0.46, Common carp (<i>Cyprinus carpio</i>) = 0.07, Bighead carp (<i>Hypophthalmichthys nobilis</i>) = 0.22, Silver carp (<i>Hypophthalmichthys molitrix</i>) = 0.48. Mean BSAF values for Carnivorous fish: Tapertail anchovy (<i>Coilia ectenes taihuensis</i>) = 0.35, (<i>Acheilognathus rhombeus</i>) = 0.11, Mongolian redfin (<i>Chanodichthys mongolicus</i>) = 0.26, (<i>Paracanthobrama guichenoti</i>) = 0.43, Topmouth culter (<i>Culter alburnus</i>) = 0.40, Redfin culter (<i>Cultrichthys erythropterus</i>) = 0.24, Spotted steed (<i>Hemibarbus maculatus</i>) = 0.29, Amur catfish (<i>Silurus asotus</i>) = 0.06, Humpback (<i>Chanodichthys dabryi</i>) = 0.33, Clearhead icefish (<i>Protosalanx hyalocranius</i>) = 0, Icefish (<i>Neosalanx taihuensis</i> Chen) = 0.06; TMF trophic magnification factor; BSAF biota-sediment accumulation factor. BSAF TL (trophic level normalized BSAF). When Clearhead icefish were not considered the was a positive relationship between the accumulation factor and trophic level; BSAF TL for HHCB was calculated for yellow catfish = 0.70, based on correlation with HHCB/AHTN concentration ratios at species level.		
Metabolites, Reference, and Results Substance	Not reported;	Not reported;	Not reported;

		EVALUATION	
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified definitively.
	Metric 2: Test Substance Purity	High	Source and purity of analytical standard reported.
Domain 2: Test Design			
	Metric 3: Study Controls	N/A	Field studies do not require concurrent control groups.
	Metric 4: Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 6: Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 7: Testing Consistency	High	The testing was consistent across samples.
	Metric 8: System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 4: Test Organisms			
	Metric 9: Outcome Assessment Methodology	N/A	The metric is not applicable to the study type.
	Metric 10: Sampling Methods	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 5: Outcome Assessment			
	Metric 11: Test Substance Identity	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 12: Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.

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Study Citation:	Zhang, X., Xu, Q., Man, S., Zeng, X., Yu, Y., Pang, Y., Sheng, G., Fu, J. (2013). Tissue concentrations, bioaccumulation, and biomagnification of synthetic musks in freshwater fish from Taihu Lake, China. Environmental Science and Pollution Research 20(1):311-322.			
OECD Harmonized Template:	Aquatic Bioconcentration			
HERO ID:	2189417			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 6: Confounding/Variable Control				
	Metric 13: Confounding Variables	High		Study noted that experimental values were below theoretical values based on partitioning; lower values likely due to transformation and elimination.
	Metric 14: Health Outcomes Unrelated to Exposure	N/A		This metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15: Data Reporting	High		This metric met the criteria for high confidence as expected for this type of study.
	Metric 16: Statistical Methods and Kinetic Calculations	High		This metric met the criteria for high confidence as expected for this type of study.
Domain 8: Other				
	Metric 17: Verification or Plausibility of Results	High		This metric met the criteria for high confidence as expected for this type of study.
	Metric 18: QSAR Models	N/A		The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Calderón-Preciado, D., Matamoros, V., Bayona, J. M. (2011). Occurrence and potential crop uptake of emerging contaminants and related compounds in an agricultural irrigation network. Science of the Total Environment 412-413:14-19.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	2919589

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; other: Field study and modeling; concentrations in irrigated crops were estimated from irrigation water (Prat de Llobregat, NE Spain) concentrations via separate plant uptake models for neutral and ionic compounds
Solvent, Reactivity, Storage, Stability	NR; NR; Samples were refrigerated during transport and stored at 4°C until analysis; total sample holding time was less than 72 h.; NR
Radiolabel, Source, State, Purity	NR; Field samples; Sigma-Aldrich (Bornem, Belgium); NR; NR Notes: Monitoring study
Test Organism and Test Organism Details	other; irrigated plant crops
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; Not applicable
Moisture, TOC, and Test Conditions Comments	Not applicable; Not reported; BCF: soil-to-plant biotransfer factor for aboveground plant parts ($\mu\text{g/g}$ plant dry weight over $\mu\text{g/g}$ soil dry weight); Samples collected from agricultural irrigation network of the municipalities of Sant Vicenç dels Horts, Santa Coloma de Cervelló, Sant Boi de Llobregat, El Prat de Llobregat, and Sant Joan Despí in the province of Barcelona in northeastern Spain
Nominal Measured and Time Plateau	Measured; the plant uptake was assessed from concentrations in irrigation waters; Galaxolide was detected in 8/8 field samples at concentrations ranging from 0.140 ± 0.043 to 0.437 ± 0.459
Duration, Parameter, and Sampling Frequency	Not applicable; other; Sampling conducted during summer 2008 and summer 2009
Analytical Method and Analytical Details	Filtered water samples underwent solid-phase extraction using Strata X cartridge. Samples were analyzed in GC-MS (Thermo Fisher) with electron impact mode.; Not specified for HHCB; LOD and LOQ ranged from 0.002 to 0.28 and from 0.003 to $0.47 \mu\text{g L}^{-1}$, respectively. Recoveries ranged from 90 to 107%.
Results Value, Result Type, and Results Standard Deviation	$\log \text{BCF} = -2.030$; [Crop concentration ($431.8 \mu\text{g/kg dw}$) = soil concentration ($4.027 \mu\text{g/kg dw}$) x BCF]; BCF; Not Reported
Calculation Basis and Basis	other; other
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not reported; $\log \text{BCF} = -0.578 \times \log + 1.588$; empirical relationship between soil concentration and the amount of chemical found in aboveground plant parts.; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Medium	The analytical standard source was reported; purity was not reported.
Domain 2: Test Design	Metric 3:	Study Controls	Low	Controls were not included.
	Metric 4:	Test Substance Stability	High	The field sample preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.

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Study Citation:	Calderón-Preciado, D., Matamoros, V., Bayona, J. M. (2011). Occurrence and potential crop uptake of emerging contaminants and related compounds in an agricultural irrigation network. Science of the Total Environment 412-413:14-19.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	2919589			
Domain		Metric	EVALUATION Rating	Comments
	Metric 6:	Testing Conditions	Medium	There were omissions in sample site conditions, water, soil and crop characteristics omitted.
	Metric 7:	Testing Consistency	N/A	This metric is not applicable to this study type.
	Metric 8:	System Type and Design	High	Equilibrium is assumed in a field study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Low	Limited detail reported on crops monitored.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty not identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical concentrations, extraction efficiency and percent recovery were not specified for the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	Statistical methods were not described for the datasets; model calculations were clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			Medium	

Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	8404084

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	none; bioconcentration in benthic organisms; experimental; other: not specified
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Test Organism and Test Organism Details	midge larvae (<i>Chironomus riparius</i>) and worm (<i>Lumbriculus variegatus</i>); not reported
Lipid Content, Test Temperature, pH, and Depuration Time	not reported; not reported; not reported; not reported
Moisture, TOC, and Test Conditions Comments	not reported; not reported; organisms were not fed during exposure
Nominal Measured and Time Plateau	not reported; not reported
Duration, Parameter, and Sampling Frequency	exposure: 12 days; not reported; not reported
Analytical Method and Analytical Details	not reported; not reported;
Results Value, Result Type, and Results Standard Deviation	1.93-2.14 (midge larvae); 3.43 (worm); BCF; not reported
Calculation Basis and Basis	not reported; not reported
Elimination, Metabolites, Kinetic Parameter, and Statistics	not reported; not reported; not reported; not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 4:	Test Substance Stability	Medium	Detail regarding this metric not reported in this secondary source.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 6:	Testing Conditions	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 7:	Testing Consistency	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 8:	System Type and Design	Medium	Detail regarding this metric not reported in this secondary source.

Domain 4: Test Organisms

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Study Citation:	ECB, (2008). 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta- γ -2-benzopyran, (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylin-deno[5,6-c]pyran - HHCB) summary risk assessment report.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	8404084			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to the study.
	Metric 10:	Sampling Methods	Medium	Detail regarding this metric were limited in this secondary source.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 12:	Test Substance Purity	Medium	Detail regarding this metric not reported in this secondary source.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Detail regarding this metric not reported in this secondary source.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Detail regarding this metric not reported in this secondary source.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Due to limited information, evaluation of the reasonableness of the study results was not possible.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination		Medium		

* Related References: Primary source was not cited.

Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428388

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Field study; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Organisms frozen; soil samples stored in baked-glass jars; biosolids and swine manure samples frozen; NR
Radiolabel, Source, State, Purity	NA; Three agricultural fields in the Midwestern United States; NA; NA
Test Organism and Test Organism Details	Earthworm; Not reported
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; 24 hours
Moisture, TOC, and Test Conditions Comments	Not reported; Not reported; Soil and organism samples collected from non-irrigated soybean field which had not been amended with human or livestock waste for the past 7 years
Nominal Measured and Time Plateau	633 and ND ug/kg d.w. in minimally affected soil; Not applicable
Duration, Parameter, and Sampling Frequency	Collected June 6 and September 29, 2005; Not Reported; Twice
Analytical Method and Analytical Details	GC/MS with electron impact ionization in full-scan mode; Earthworm, soil, and biosolids/swine manure samples extracted by two different accelerated solvent extraction methods (details in supplemental information).;
Results Value, Result Type, and Results Standard Deviation	0.10 and not present; BAF; Not Reported
Calculation Basis and Basis	steady state; not specified
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not Reported; Not reported; Not applicable; n = 3 replicate analyses; Spearman's Rank Correlation $P > 0.35$ and $P > 0.54$ log Kow and water solubility not significant indicators of BAFs

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3: Study Controls	Medium	Field blanks or other controls were not explicitly included, but may be in supplemental information.
	Metric 4: Test Substance Stability	Medium	Sample preparation and storage conditions were reported, minimal details on sample analytical preparation reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Limited to no characteristics of environmental samples were reported.

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Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428388			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently across study groups.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Medium	The organism common name and source was reported, no other characteristics were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Target chemical concentrations were reported and the analytical method was appropriate; the study does not report limits of detection, extraction efficiency, or organism lipid content.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428388

Parameter		EXTRACTION		
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Field study; other: Not reported			
Solvent, Reactivity, Storage, Stability	NA; NR; Organisms frozen; soil samples stored in baked-glass jars; biosolids and swine manure samples frozen; NR			
Radiolabel, Source, State, Purity	NA; Three agricultural fields in the Midwestern United States; NA; NA			
Test Organism and Test Organism Details	Earthworm; Not reported			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; 24 hours			
Moisture, TOC, and Test Conditions Comments	Not reported; Not reported; Soil and organism samples collected from no-till, non-irrigated soybean field amended with biosolids from WWTP sludge, applied at a rate of 1.8 Mg/1000 m ²			
Nominal Measured and Time Plateau	1,050 and 2,770 ug/kg-d.w. in biosolid amended soil; Not applicable			
Duration, Parameter, and Sampling Frequency	Collected May 19 and September 21, 2005 (31 and 156 days post-application); Not Reported; Twice			
Analytical Method and Analytical Details	GC/MS with electron impact ionization in full-scan mode; Earthworm, soil, and biosolids/swine manure samples extracted by two different accelerated solvent extraction methods.;			
Results Value, Result Type, and Results Standard Deviation	3.1 and 0.05; BAF; Not Reported			
Calculation Basis and Basis	steady state; not specified			
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not Reported; Not reported; Not applicable; n = 3 replicate analyses; Spearman's Rank Correlation P > 0.35 and P > 0.54 log Kow and water solubility not significant indicators of BAFs			
EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Field blanks or other controls were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	Sample preparation and storage conditions were reported, minimal details on sample analytical preparation reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no characteristics of environmental samples were reported.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently across study groups.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
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Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428388			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Medium	The organism common name and source was reported, no other characteristics were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Target chemical concentrations were reported and the analytical method was appropriate; the study does not report limits of detection, extraction efficiency, or organism lipid content.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428388

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Field study; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Organisms frozen; soil samples stored in baked-glass jars; biosolids and swine manure samples frozen; NR
Radiolabel, Source, State, Purity	NA; Three agricultural fields in the Midwestern United States; NA; NA
Test Organism and Test Organism Details	Earthworm; Not reported
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; Not reported; Not reported; 24 hours
Moisture, TOC, and Test Conditions Comments	Not reported; Not reported; Soil and organism samples collected from non-irrigated cornfield amended with liquid swine manure for the first time, at a rate of 3300 L/1000 m ²
Nominal Measured and Time Plateau	ND in both samples of manure amended soil; Not applicable
Duration, Parameter, and Sampling Frequency	Collected May 31 and September 15, 2005 (30 and 139 days post application); Not Reported; Twice
Analytical Method and Analytical Details	GC/MS with electron impact ionization in full-scan mode; Earthworm, soil, and biosolids/swine manure samples extracted by two different accelerated solvent extraction methods.;
Results Value, Result Type, and Results Standard Deviation	ND and below LOD; BAF; Not Reported
Calculation Basis and Basis	steady state; not specified
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not Reported; Not reported; Not applicable; n = 3 replicate analyses; Spearman's Rank Correlation P > 0.35 and P > 0.54 log Kow and water solubility not significant indicators of BAFs

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Field blanks or other controls were not explicitly included.
	Metric 4: Test Substance Stability	Medium	Sample preparation and storage conditions were reported, minimal details on sample analytical preparation reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Limited to no characteristics of environmental samples were reported.
	Metric 7: Testing Consistency	High	Samples were collected, processed, and analyzed consistently across study groups.
	Metric 8: System Type and Design	High	Field studies are assumed to be at equilibrium.

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Study Citation:	Kinney, C. A., Furlong, E. T., Kolpin, D. W., Burkhardt, M. R., Zaugg, S. D., Werner, S. L., Bossio, J. P., Benotti, M. J. (2008). Bioaccumulation of pharmaceuticals and other anthropogenic waste indicators in earthworms from agricultural soil amended with biosolid or swine manure. Environmental Science & Technology 42(6):1863-1870.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428388			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Medium	The organism common name and source was reported, no other characteristics were reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and the study used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were reported.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Target chemical concentrations were reported and the analytical method was appropriate; the study does not report limits of detection, extraction efficiency, or organism lipid content.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428259

EXTRACTION				
Parameter		Data		
CASRN and Test Material		1222-05-5; Galaxolide		
Confidentiality, EndPoint, Type, Guideline		None; bioaccumulation: terrestrial; Experimental; other: Not reported		
Solvent, Reactivity, Storage, Stability		Acetone; NR; NR; NR		
Radiolabel, Source, State, Purity		NR; Dr. Ehrenstorfer, Augsburg, Germany; NR; ≥95%		
Test Organism and Test Organism Details		Daucus carota ssp. Sativus, cvs Napoli, cvs Amager, cvs Rothild, and cvs Nutri-Red; n = 5-6 per pot for each carrot type		
Lipid Content, Test Temperature, pH, and Depuration Time		0.65 - 1.77 mg/g f.w. (total); 14°C (germination), 20 and 14°C (day and night, 16 h day length); 5.5; Not applicable		
Moisture, TOC, and Test Conditions Comments		70% soil water holding capacity, approx. 11%; 0.90%; Test substance applied as a single spike, acetone allowed to evaporate for 3 d before addition of test organism		
Nominal Measured and Time Plateau		10 mg/kg d.w.; Not applicable		
Duration, Parameter, and Sampling Frequency		119 days; Not Reported; During 2 mo. period, depending on ripeness (plants); 0, 49, and 119 d of plant cultivation (soil)		
Analytical Method and Analytical Details		GC-MS in selected ion monitoring mode; LOQ 0.02 ug/g d.w. (carrot root), 0.001 ug/g d.w. (soil); Dried plant samples ground and extracted by QuEChERS method in ethyl acetate/acetone, cleaned up by Supelclean ENVI-Carb; Soil extracted by ultrasonic probe in acetone and ethyl acetate, supernatants combined. Recovery: 102% (carrot), 115% (soil);		
Results Value, Result Type, and Results Standard Deviation		0.86 (total plant); 0.89 (roots), 0.76 (leaves); BCF; Not Reported		
Calculation Basis and Basis		steady state; other		
Elimination, Metabolites, Kinetic Parameter, and Statistics		Not applicable; Not reported; Not applicable; Not reported		
EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was reported by name and CASRN.
	Metric 2:	Test Substance Purity	High	The source and purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	High	The test substance was not detected in control plants cultivated in unspiked soil.
	Metric 4:	Test Substance Stability	Medium	The test substance preparation was reported; storage conditions and homogeneity in the soil were not reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Test conditions (temperature, pH, moisture, TOC were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.

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Study Citation:	Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428259			
Domain	Metric	EVALUATION		Comments
	Metric 8:	System Type and Design	High	Equilibrium was established, and the system was demonstrated to maintain substance concentrations.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	Test organism species was reported, plants were cultivated from seed, analytical sample weight (2 g) was reported.
Domain 5: Outcome Assessment	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control	Metric 13:	Confounding Variables	High	Variability and uncertainty was accounted for via statistical techniques between analysis and correction for extraction efficiency.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	The study reported delayed development in exposed plants compared to controls, but plants compensated for this during their cultivation period. This was supported by previous studies and is not expected to impact study results.
Domain 7: Data Presentation and Analysis	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, extraction efficiency and limits of detection were reported, the analytical method was appropriate, and lipid content was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not explicitly reported.
Domain 8: Other	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428259			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; other: Not reported			
Solvent, Reactivity, Storage, Stability	Acetone; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; Dr. Ehrenstorfer, Augsburg, Germany; NR; ≥95%			
Test Organism and Test Organism Details	Hordeum vulgare, cv Edel; n = 10			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (germination), 20 and 14°C (day and night, 16 h day length); 5.5; Not applicable			
Moisture, TOC, and Test Conditions Comments	70% soil water holding capacity, approx.. 11%; 0.90%; Test substance applied as a single spike, acetone allowed to evaporate for 3 d before addition of test organism			
Nominal Measured and Time Plateau	10 mg/kg d.w.; Not applicable			
Duration, Parameter, and Sampling Frequency	119 days; Not Reported; During 2 mo. period, depending on ripeness (plants); 0, 49, and 119 d of plant cultivation (soil)			
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOQ 0.001 ug/g d.w. (soil); Dried plant samples ground and extracted by QuEChERS method in ethyl acetate/acetone, cleaned up by Supelclean ENVI-Carb; Soil extracted by ultrasonic probe in acetone and ethyl acetate, supernatants combined. Recovery: 115% (soil);			
Results Value, Result Type, and Results Standard Deviation	0.83 (roots); BCF; Not Reported			
Calculation Basis and Basis	steady state; other			
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not reported; Not applicable; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was reported by name and CASRN.	
	Metric 2: Test Substance Purity	High	The source and purity of the test substance was reported.	
Domain 2: Test Design	Metric 3: Study Controls	Medium	Control was not included for this species but this is not likely to impact study results.	
	Metric 4: Test Substance Stability	Medium	The test substance preparation was reported; storage conditions and homogeneity in the soil were not reported.	
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.	
	Metric 6: Testing Conditions	High	Test conditions (temperature, pH, moisture, TOC were reported.	
	Metric 7: Testing Consistency	High	Test conditions were consistent across study groups.	
	Metric 8: System Type and Design	High	Equilibrium was established, and the system was demonstrated to maintain substance concentrations.	
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Study Citation:	Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428259			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	Test organism species was reported, plants were cultivated from seed, analytical sample weight (2 g) was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty was accounted for via statistical techniques between analysis and correction for extraction efficiency.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	The study reported delayed development in exposed plants compared to controls, but plants compensated for this during their cultivation period. This was supported by previous studies and is not expected to impact study results.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations were reported and the analytical method was appropriate; lipid content and extraction efficiency was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not explicitly reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428259			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; other: Not reported			
Solvent, Reactivity, Storage, Stability	Acetone; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; Dr. Ehrenstorfer, Augsburg, Germany; NR; ≥95%			
Test Organism and Test Organism Details	Festuca pratense, cv Fure; n = 20			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (germination), 20 and 14°C (day and night, 16 h day length); 5.5; Not applicable			
Moisture, TOC, and Test Conditions Comments	70% soil water holding capacity, approx.. 11%; 0.90%; Test substance applied as a single spike, acetone allowed to evaporate for 3 d before addition of test organism			
Nominal Measured and Time Plateau	10 mg/kg d.w.; Not applicable			
Duration, Parameter, and Sampling Frequency	119 days; Not Reported; During 2 mo. period, depending on ripeness (plants); 0, 49, and 119 d of plant cultivation (soil)			
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOQ 0.02 ug/g d.w. (Meadow leaf), 0.001 ug/g d.w. (soil); Dried plant samples ground and extracted by QuEChERS method in ethyl acetate/acetone, cleaned up by Supelclean ENVI-Carb; Soil extracted by ultrasonic probe in acetone and ethyl acetate, supernatants combined. Recovery: 63% (meadow leaf), 115% (soil);			
Results Value, Result Type, and Results Standard Deviation	1.82; BCF; Not Reported			
Calculation Basis and Basis	steady state; other			
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not reported; Not applicable; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was reported by name and CASRN.	
Metric 2:	Test Substance Purity	High	The source and purity of the test substance was reported.	
Domain 2: Test Design				
Metric 3:	Study Controls	High	The test substance was not detected in control plants cultivated in unspiked soil.	
Metric 4:	Test Substance Stability	Medium	The test substance preparation was reported; storage conditions and homogeneity in the soil were not reported.	
Domain 3: Test Conditions				
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.	
Metric 6:	Testing Conditions	High	Test conditions (temperature, pH, moisture, TOC were reported.	
Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.	
Metric 8:	System Type and Design	High	Equilibrium was established, and the system was demonstrated to maintain substance concentrations.	

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Study Citation:		Macherius, A., Eggen, T., Lorenz, W. G., Reemtsma, T., Winkler, U., Moeder, M. (2012). Uptake of galaxolide, tonalide, and triclosan by carrot, barley, and meadow fescue plants. Journal of Agricultural and Food Chemistry 60(32):7785-7791.		
OECD Harmonized Template:		Terrestrial Bioconcentration		
HERO ID:		5428259		
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	Test organism species was reported, plants were cultivated from seed, analytical sample weight (2 g) was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty was accounted for via statistical techniques between analysis and correction for extraction efficiency.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	The study reported delayed development in exposed plants compared to controls, but plants compensated for this during their cultivation period. This was supported by previous studies and is not expected to impact study results.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations were reported, extraction efficiency and limits of detection were reported, the analytical method was appropriate; lipid content was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not explicitly reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Rivier, P. A., Havranek, I., Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428051

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA
Test Organism and Test Organism Details	Adult earthworms, Aporectodea caliginosa; n = 2 (per pot), 18 - 73 mg dw
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 6.6 (sludge); Not applicable
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H ₂ O / kg dw soil); soil organic matter 4.4%; 2 kg soil mixed with sludge at 20 t sludge/ha. %C-total = 25.2; %N-total = 3.5; C/N = 7.2
Nominal Measured and Time Plateau	3.4 ug/g dw in sludge; 48.8 (day 0), 11.5 (day 95) ng/g dry wt soil; Not applicable
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);
Results Value, Result Type, and Results Standard Deviation	68; Transfer factor (TF); Not Reported
Calculation Basis and Basis	steady state; whole body d.w.
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design			
Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.

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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Rivier, P. A., Havranek, I., vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428051

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA
Test Organism and Test Organism Details	Adult earthworms, Aporrectodea caliginosa; n = 2, 18 - 73 mg dw
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 7.2 (sludge); Not applicable
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H2O / kg dw soil); soil organic matter 4.4%; 2 kg soil mixed with sludge at 20 t sludge/ha. %C-total = 24.1; %N-total = 3.1; C/N = 7.8
Nominal Measured and Time Plateau	8.4 ug/g dw in sludge; 119.0 (day 0), 11.0 (day 95) ng/g dry wt soil; Not applicable
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);
Results Value, Result Type, and Results Standard Deviation	196; Transfer factor (TF); Not Reported
Calculation Basis and Basis	steady state; whole body d.w.
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.
Domain 4: Test Organisms				

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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)			
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR			
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA			
Test Organism and Test Organism Details	Adult earthworms, Aporrectodea caliginosa; n = 2, 18 - 73 mg dw			
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 6.8 (sludge); Not applicable			
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H2O / kg dw soil); soil organic matter 4.4%; 2 kg soil mixed with sludge at 20 t sludge/ha. %C-total = 24.7; %N-total = 3.3; C/N = 7.5.			
Nominal Measured and Time Plateau	4.6 ug/g dw in sludge; 65.6 (day 0), 16.7 (day 95) ng/g dry wt soil; Not applicable			
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once			
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);			
Results Value, Result Type, and Results Standard Deviation	26; Transfer factor (TF); Not Reported			
Calculation Basis and Basis	steady state; whole body d.w.			
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.
Domain 4: Test Organisms				
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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

Study Citation:	Rivier, P. A., Havranek, I., vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428051

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA
Test Organism and Test Organism Details	Adult earthworms, Aporrectodea caliginosa; n = 2, 18 - 73 mg dw
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 6.6 (sludge); Not applicable
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H ₂ O / kg dw soil); soil organic matter 4.4%; 10 kg soil mixed with sludge at 20 or 60 t sludge/ha, sown with barley, Hordeum vulgare L., cv. Heder, 25 plants per pot. %C-total = 25.2 %N-total = 3.5; C/N = 7.2
Nominal Measured and Time Plateau	3.4 ug/g dw in sludge; 48.8 (day 0), 5.4 (day 95) ng/g dry wt soil at first application rate; 140.4 (day 0), 17.0 (day 95) ng/g dry wt soil at second application rate; Not applicable
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);
Results Value, Result Type, and Results Standard Deviation	24, 26 (first application rate, second application rate); Transfer factor (TF); Not Reported
Calculation Basis and Basis	steady state; whole body d.w.
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.

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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Rivier, P. A., Havranek, I., vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428051

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA
Test Organism and Test Organism Details	Adult earthworms, Aporrectodea caliginosa; n = 2, 18 - 73 mg dw
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 7.2 (sludge); Not applicable
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H ₂ O / kg dw soil); soil organic matter 4.4%; 10 kg soil mixed with sludge at 20 t sludge/ha, sown with barley, Hordeum vulgare L., cv. Heder, 25 plants per pot. %C-total = 24.1 %N-total = 3.1; C/N = 7.8.
Nominal Measured and Time Plateau	8.4 ug/g dw in sludge; 119.0 (day 0), 8.3 (day 95) ng/g dry wt soil at first application rate; 345.4 (day 0), 35.3 (day 95) ng/g dry wt soil at second application rate; Not applicable
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);
Results Value, Result Type, and Results Standard Deviation	52, 44 (first application rate, second application rate); Transfer factor (TF); Not Reported
Calculation Basis and Basis	steady state; whole body d.w.
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.

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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Rivier, P. A., Havranek, I., vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.
OECD Harmonized Template:	Terrestrial Bioconcentration
HERO ID:	5428051

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, EndPoint, Type, Guideline	None; bioaccumulation: terrestrial; Experimental; OECD Guideline 317 (Bioaccumulation in Terrestrial Oligochaetes)
Solvent, Reactivity, Storage, Stability	Sewage sludge; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Three municipal WWTPs in southern Norway; NR; NA
Test Organism and Test Organism Details	Adult earthworms, Aporrectodea caliginosa; n = 2, 18 - 73 mg dw
Lipid Content, Test Temperature, pH, and Depuration Time	Not reported; 14°C (average, soil); 5.1 (soil), 6.8 (sludge); Not applicable
Moisture, TOC, and Test Conditions Comments	70% of maximum water holding capacity (max = 438 mL H ₂ O / kg dw soil); soil organic matter 4.4%; 10 kg soil mixed with sludge at 20 t sludge/ha, sown with barley, Hordeum vulgare L., cv. Heder, 25 plants per pot. %C-total = 24.7 %N-total = 3.3; C/N = 7.5.
Nominal Measured and Time Plateau	4.6 ug/g dw in sludge; 65.6 (day 0), 8.3 (day 95) ng/g dry wt soil at first application rate; 189.6 (day 0), 15.7 (day 95) ng/g dry wt soil at second application rate; Not applicable
Duration, Parameter, and Sampling Frequency	96 days; Not Reported; Once
Analytical Method and Analytical Details	GC-MS/MS; LOQ: 0.02 ng/g (soil), 1.4-5.6 ng/g (organism); Extraction using modified QuEChERS method with 1:1 acetone:hexane; recovery: 73% (soil), 94% (organism);
Results Value, Result Type, and Results Standard Deviation	13, 55 (first application rate, second application rate); Transfer factor (TF); Not Reported
Calculation Basis and Basis	steady state; whole body d.w.
Elimination, Metabolites, Kinetic Parameter, and Statistics	Not applicable; Not applicable; Not applicable; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the sludge samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent control was included and results were acceptable.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sludge preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate soil and sludge conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and volatilization was assumed to not be a significant loss pathway.

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Study Citation:	Rivier, P. A., Havranek, I.,vo, Coutris, C., Norli, H. R., Joner, E. J. (2019). Transfer of organic pollutants from sewage sludge to earthworms and barley under field conditions. Chemosphere 222:954-960.			
OECD Harmonized Template:	Terrestrial Bioconcentration			
HERO ID:	5428051			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	High	The test organism species and age was reported.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty in measurements were accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	High	No differences in organism health or attrition were observed.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, limits of detection were reported, analytical methods were appropriate for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately, calculation of transfer factor followed OECD guidelines.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Böhm, L., Düring, R. A. (2010). Partitioning of polycyclic musk compounds in soil and aquatic environment - Experimental determination of KDOC. Journal of Soils and Sediments 10(4):708-713.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5918834

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Experimental determination of K(DOC)
Solvent, Reactivity, Storage, Stability	1 mg/L in 2-propanol; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrenstorfer GmbH (Augsburg, Germany, as a mixture) and LGC Promochem GmbH (Wesel, Germany); NR; 76%
Sampling Frequency, Sampling Details, and Number of Replicates	Once; Samples collected from headspace by SPME; 3
pH, Test Temperature, Buffer, and Test Details	7.12 - 7.89; 20°C; Not reported; 20 mL headspace glasses filled with 10 mL 60 - 600 mg/L DOC humic acid solutions (concentrations relevant to sorption in sewage treatment plants) and spiked with 1.5 ug/L test substance.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; 60, 200, 350, and 600 mg/L DOC; 64-688 µS/cm
Bulk Density and Matrix Details	Not reported; Aldrich humic acid (3 g/L)
Media, Recovery, and Statistics	NA; Not reported; Not reported
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; Shaken in horizontal shaker at 300 rpm for 2 hr, analyzed after 13 hr; Not reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Water instead of humic acid solution; Not reported; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not Reported; Not Reported; Not Reported; Not Reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Log K(DOC); 3.47
Partition Coefficient Phase and Partition Coefficient Results	other; [test substance total]/[test substance in humic acid] = K_DOC[DOC] + 1y = 2757x + 1 where y = [total test substance]/[test substance in humic acid solution], x = DOC; R^2 = 0.9702
Mass Balance	Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The test substance source and purity were reported
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Water-only controls were included, the results of which were not reported.
	Metric 4:	Test Substance Stability	Medium	Test substance preparation was reported, storage was not reported.

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Study Citation:	Böhm, L., Düring, R. A. (2010). Partitioning of polycyclic musk compounds in soil and aquatic environment - Experimental determination of KDOC. Journal of Soils and Sediments 10(4):708-713.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5918834			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	pH, temperature, and DOC of the humic acid were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the headspace bottles were capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining the partition coefficient.
	Metric 12:	Test Substance Purity	High	Sampling methods were appropriate for the volatile substance, and frequency was acceptable for the study type.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	The study used humic acid instead of a native soil or sewage sludge, the results may not be directly applicable to other scenarios.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was reported, but extraction efficiency and limits of detection were not reported. The value was normalized to DOC. Raw data was reported graphically.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods for partition coefficient determination were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable based on the method, the values were slightly lower than previous studies. The DOC content was meant to simulate sorption in WWTP sludge but using a humic acid solution may produce different results than sludge, so the reliability of this value has been lowered.
	Metric 18:	QSAR Models	N/A	Not applicable.

Overall Quality Determination**High**

Study Citation:	Carballa, M., Fink, G., Omil, F., Lema, J. M., Ternes, T. (2008). Determination of the solid-water distribution coefficient (Kd) for pharmaceuticals, estrogens and musk fragrances in digested sludge. Water Research 42(1-2):287-295.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5431372

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Sampling Frequency, Sampling Details, and Number of Replicates	Sludge retention times (SRT): 30, 20, 10d; 5 d composite samples, stored at 4 deg C and pH < 2, measured in liquid and sludge phases; 2 - 4 per sludge retention time
pH, Test Temperature, Buffer, and Test Details	6.3, 6.0, and 5.5 per SRT, respectively; 55°C; Not reported; Anaerobic digestion pilot plant with a lab-scale, continuously stirred anaerobic digesters, were operated at 20, 10, and 6 d SRT, and fed with test substance spiked sludge.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Organic matter: 51.1, 23.6, and 43.9%; Organic carbon fraction: 15.2, 3.2, and 11.2% per SRT, respectively; Not reported
Bulk Density and Matrix Details	Not reported; Mixture of primary and secondary sludge (70:30 v/v) collected from an STP in Galicia, Spain
Media, Recovery, and Statistics	Not reported; 88±8% (liquid), 64±12% (sludge); n = 7, 95% confidence levels for standard deviations
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; 1 - 2 SRT; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	LogKoc: 4.48 - 5.96; Summary of results likely ranges across thermophilic and mesophilic conditions.; Not Reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Kd (thermophilic); 6709±2980 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Kd = [sludge] / [liquid]
Mass Balance	Not reported

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	Medium
Domain 2: Test Design	Metric 3:	Study Controls	Medium
	Metric 4:	Test Substance Stability	Medium

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Study Citation:	Carballa, M., Fink, G., Omil, F., Lema, J. M., Ternes, T. (2008). Determination of the solid-water distribution coefficient (Kd) for pharmaceuticals, estrogens and musk fragrances in digested sludge. Water Research 42(1-2):287-295.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5431372			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5: Test Method Suitability	High		Appropriate operational parameters for the lab-scale STP and for sorption were reported.
	Metric 6: Testing Conditions	High		The test method was suitable for the test substance.
	Metric 7: Testing Consistency	High		Test conditions were consistent across samples and study groups.
	Metric 8: System Type and Design	High		Equilibrium was established and the system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9: Outcome Assessment Methodology	N/A		The metric is not applicable to this study type.
	Metric 10: Sampling Methods	N/A		The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11: Test Substance Identity	High		The outcome assessment methodology addressed the outcomes of interest.
	Metric 12: Test Substance Purity	High		Sampling methods addressed the outcomes of interest and used accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13: Confounding Variables	High		Variability was addressed by statistical techniques.
	Metric 14: Health Outcomes Unrelated to Exposure	N/A		The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15: Data Reporting	High		Limited raw data reported for SRT effects, but recovery and limits of detection were reported and the analytical method was appropriate.
	Metric 16: Statistical Methods and Kinetic Calculations	High		Kd was described and appropriate.
Domain 8: Other				
	Metric 17: Verification or Plausibility of Results	High		The results were reasonable and comparable to other values.
	Metric 18: QSAR Models	N/A		The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Carballa, M., Fink, G., Omil, F., Lema, J. M., Ternes, T. (2008). Determination of the solid-water distribution coefficient (Kd) for pharmaceuticals, estrogens and musk fragrances in digested sludge. Water Research 42(1-2):287-295.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5431372

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; other: Not reported			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Sampling Frequency, Sampling Details, and Number of Replicates	Sludge retention times (SRT): 20, 10, 6d; 5 d composite samples, stored at 4 deg C and pH < 2, measured in liquid and sludge phases; 2 - 4 per SRT			
pH, Test Temperature, Buffer, and Test Details	6.6, 6.7, 5.8 per SRT, respectively; 37°C; Not reported; Anaerobic digestion pilot plant with a lab-scale, continuously stirred anaerobic digesters, were operated at 30, 20, and 10 d SRT, and fed with test substance spiked sludge.			
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Organic matter: 48.3, 31.5, 43.0%; Organic carbon fraction: 13.6, 5.8, 10.8% per SRT, respectively; Not reported			
Bulk Density and Matrix Details	Not reported; Mixture of primary and secondary sludge (70:30 v/v) collected from an STP in Galicia, Spain			
Media, Recovery, and Statistics	Not reported; 88±8% (liquid), 64±12% (sludge); n = 6, 95% confidence levels for standard deviations			
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; 1 - 2 SRT; Not Reported			
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; Not Reported			
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	LogKoc: 4.48 - 5.96; Summary of results likely ranges across thermophilic and mesophilic conditions.; Not Reported			
Desorption Type				
Partition Coefficient Type and Partition Coefficient Results	Kd (mesophilic); 13300±5500 L/kg			
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Kd = [sludge] / [liquid]			
Mass Balance	Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The test substance source but not purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blanks were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	Little to no details on test substance preparation and storage were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	Appropriate operational parameters for the lab-scale STP and for sorption were reported.
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Study Citation:		Carballa, M., Fink, G., Omil, F., Lema, J. M., Ternes, T. (2008). Determination of the solid-water distribution coefficient (Kd) for pharmaceuticals, estrogens and musk fragrances in digested sludge. Water Research 42(1-2):287-295.		
OECD Harmonized Template:		Adsorption and Desorption		
HERO ID:		5431372		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	The test method was suitable for the test substance.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical techniques.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Limited raw data reported for SRT effects, but recovery and limits of detection were reported and the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kd was described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other values.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	7607892

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB; HHCB (phenyl-UL-14C)
Confidentiality, Type, Guideline	None; Experimental; other: Sorption to Activated Sludge Solids
Solvent, Reactivity, Storage, Stability	Ethanol; NR; approx. 4°C in the dark; -20±5°C in the dark; NR
Radiolabel, Source, State, Purity	No; 142 µCi/mg specific activity; NR; colorless liquid oil; 99.15% unlabeled; 99.29% radiolabeled Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyran; Lot number: ES 6302-H unlabeled; 960214 radiolabeled
Sampling Frequency, Sampling Details, and Number of Replicates	after 16 hours equilibration; supernatant pipetted and measured for test chemical; solids measured for test chemical; 3
pH, Test Temperature, Buffer, and Test Details	7; Not reported; Not reported; Nominal test concentration 10 ug/L; Test containers were equilibrated for 16 hours on a shaker at approx. 21 turnovers/minute. Containers were centrifuged for 5 minutes.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; activated sludge solids; 4 mg/L TOC
Media, Recovery, and Statistics	synthetic wastewater (KH ₂ PO ₄ , K ₂ HPO ₄ , NaHPO ₄ , NH ₄ Cl, MgSO ₄ , CaCl ₂ , FeCl ₃ , NaHCO ₃); 89%; Kd standard deviation 487
Transformation Products, Equilibrium	Not reported; study done to determine 16 hour equilibration time; Not reported
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	blank included; Not Reported; 99.99%
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 12,312 L/kg; Kd= Dss (test substance on sludge solids (dpm)) X Ms (mass of solids (g))/Dw (concentration test substance in supernatant (dpm/mL)); 10,221 L/kg
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Koc; 67,648 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Koc= Kd/foc (the fraction of sludge solids that is organic matter).
Mass Balance	14C activity 90% for HHCB

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2: Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Concurrent controls were included.

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Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	7607892			
Domain		Metric	EVALUATION Rating	Comments
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
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Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.
OECD Harmonized	Adsorption and Desorption
Template:	
HERO ID:	7607892

		EVALUATION	
Domain	Metric	Rating	Comments
Overall Quality Determination		High	

Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	7607892

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB; HHCB (phenyl-UL-14C)
Confidentiality, Type, Guideline	None; Experimental; other: Sorption to Activated Sludge Solids
Solvent, Reactivity, Storage, Stability	Ethanol; NR; approx. 4°C in the dark; -20±5°C in the dark; NR
Radiolabel, Source, State, Purity	No; 142 µCi/mg specific activity; NR; colorless liquid oil; 99.15% unlabeled; 99.29% radiolabeled Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyran; Lot number: ES 6302-H unlabeled; 960214 radiolabeled
Sampling Frequency, Sampling Details, and Number of Replicates	after 16 hours equilibration; supernatant pipetted and measured for test chemical; solids measured for test chemical; 3
pH, Test Temperature, Buffer, and Test Details	7; Not reported; Not reported; Nominal test concentration 50 ug/L; Test containers were equilibrated for 16 hours on a shaker at approx. 21 turnovers/minute. Containers were centrifuged for 5 minutes.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; activated sludge solids; 4 mg/L TOC
Media, Recovery, and Statistics	synthetic wastewater (KH ₂ PO ₄ , K ₂ HPO ₄ , NaHPO ₄ , NH ₄ Cl, MgSO ₄ , CaCl ₂ , FeCl ₃ , NaHCO ₃); 92%; Kd standard deviation 432
Transformation Products, Equilibrium	Not reported; study done to determine 16 hour equilibration time; Not reported
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	blank included; Not Reported; 99.99%
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 13,313 L/kg; Kd= Dss (test substance on sludge solids (dpm)) X Ms (mass of solids (g))/Dw (concentration test substance in supernatant (dpm/mL)); 10,221 L/kg
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Koc; 73,148 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Koc= Kd/foc (the fraction of sludge solids that is organic matter).
Mass Balance	14C activity 90% for HHCB

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2: Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Concurrent controls were included.
	Metric 4: Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.

Domain 3: Test Conditions

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Study Citation:		Doi, J. (1997). Sorption to activated sludge solids: HHCB.		
OECD Harmonized Template:		Adsorption and Desorption		
HERO ID:		7607892		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	7607892

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB; HHCB (phenyl-UL-14C)
Confidentiality, Type, Guideline	None; Experimental; other: Sorption to Activated Sludge Solids
Solvent, Reactivity, Storage, Stability	Ethanol; NR; approx. 4°C in the dark; -20±5°C in the dark; NR
Radiolabel, Source, State, Purity	No; 142 µCi/mg specific activity; NR; colorless liquid oil; 99.15% unlabeled; 99.29% radiolabeled Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyran; Lot number: ES 6302-H unlabeled; 960214 radiolabeled
Sampling Frequency, Sampling Details, and Number of Replicates	after 16 hours equilibration; supernatant pipetted and measured for test chemical; solids measured for test chemical; 3
pH, Test Temperature, Buffer, and Test Details	7; Not reported; Not reported; Nominal test concentration 150 ug/L; Test containers were equilibrated for 16 hours on a shaker at approx. 21 turnovers/minute. Containers were centrifuged for 5 minutes.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; activated sludge solids; 4 mg/L TOC
Media, Recovery, and Statistics	synthetic wastewater (KH ₂ PO ₄ , K ₂ HPO ₄ , NaHPO ₄ , NH ₄ Cl, MgSO ₄ , CaCl ₂ , FeCl ₃ , NaHCO ₃); 93%; Kd standard deviation 603
Transformation Products, Equilibrium	Not reported; study done to determine 16 hour equilibration time; Not reported
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	blank included; Not Reported; 99.99%
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 13,105 L/kg; Kd= Dss (test substance on sludge solids (dpm)) X Ms (mass of solids (g))/Dw (concentration test substance in supernatant (dpm/mL)); 10,221 L/kg
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Koc; 72,005 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Koc= Kd/foc (the fraction of sludge solids that is organic matter).
Mass Balance	14C activity 90% for HHCB

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2: Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Concurrent controls were included.
	Metric 4: Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.

Domain 3: Test Conditions

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Study Citation:		Doi, J. (1997). Sorption to activated sludge solids: HHCB.		
OECD Harmonized Template:		Adsorption and Desorption		
HERO ID:		7607892		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation: Doi, J. (1997). Sorption to activated sludge solids: HHCB.
OECD Harmonized Adsorption and Desorption
Template:
HERO ID: 7607892

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB; HHCB (phenyl-UL-14C)
Confidentiality, Type, Guideline	None; Experimental; other: Sorption to Activated Sludge Solids
Solvent, Reactivity, Storage, Stability	Ethanol; NR; approx. 4°C in the dark; -20±5°C in the dark; NR
Radiolabel, Source, State, Purity	No; 142 µCi/mg specific activity; NR; colorless liquid oil; 99.15% unlabeled; 99.29% radiolabeled Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-gamma-2-benzopyran; Lot number: ES 6302-H unlabeled; 960214 radiolabeled
Sampling Frequency, Sampling Details, and Number of Replicates	after 16 hours equilibration; supernatant pipetted and measured for test chemical; solids measured for test chemical; 3
pH, Test Temperature, Buffer, and Test Details	7; Not reported; Not reported; Nominal test concentration 300 ug/L; Test containers were equilibrated for 16 hours on a shaker at approx. 21 turnovers/minute. Containers were centrifuged for 5 minutes.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; activated sludge solids; 4 mg/L TOC
Media, Recovery, and Statistics	synthetic wastewater (KH ₂ PO ₄ , K ₂ HPO ₄ , NaHPO ₄ , NH ₄ Cl, MgSO ₄ , CaCl ₂ , FeCl ₃ , NaHCO ₃); 105%; Kd standard deviation 360
Transformation Products, Equilibrium	Not reported; study done to determine 16 hour equilibration time; Not reported
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	blank included; Not Reported; 99.99%
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 12,391 L/kg; Kd= Dss (test substance on sludge solids (dpm)) X Ms (mass of solids (g))/Dw (concentration test substance in supernatant (dpm/mL)); 10,221 L/kg
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Koc; 68,082 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Koc= Kd/foc (the fraction of sludge solids that is organic matter).
Mass Balance	14C activity 90% for HHCB

EVALUATION

Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name and CASRN.
	Metric 2:	Test Substance Purity	High	The source or purity of the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	High	Concurrent controls were included.
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.

Domain 3: Test Conditions

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Study Citation:	Doi, J. (1997). Sorption to activated sludge solids: HHCB.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	7607892			
Domain		Metric	EVALUATION Rating	Comments
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	There omissions in testing conditions; however, sufficient data were reported to determine that the deviations and omissions were not likely to have a substantial impact on study results.
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty in the measurements, and statistical techniques were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The target chemical concentrations, extraction efficiency, percent recovery, or mass balance were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were within expected range.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Fernandez-Fontaina, E., Carballa, M., Omil, F., Lema, J. M. (2014). Modelling cometabolic biotransformation of organic micropollutants in nitrifying reactors. Water Research 65:371-383.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5431360

EXTRACTION	
Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, Type, Guideline	none; experimental; other: non-guideline
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Sampling Frequency, Sampling Details, and Number of Replicates	A pulse of 100 mg/L of micropollutants was added to the reactor; sample taken 5 min after adding the pulse of micropollutants for each of the sampling periods (A1, A2, A3, A4, B1, B2, B3).; 7 sampling campaigns were employed, consisting of feed, mixed liquor, and effluent samples (both solid and liquid phases sampled); 7
pH, Test Temperature, Buffer, and Test Details	sampling period A1-4 pH range 6.9-7.9, B1-3 pH range 6.4-7.6; 25°C; not specified; Not Reported
Matrix, Clay Silts and Organic Carbon, and CEC	other; not reported; not reported
Bulk Density and Matrix Details	not reported; total suspended solids
Media, Recovery, and Statistics	activated sludge; not reported; not reported
Transformation Products, Equilibrium	not reported; steady-state; steady-state
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	not reported; not reported; not reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	not reported; not reported; not reported; not reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	solid-liquid partitioning coefficient (Kd); k(d) = 2571 (Kinetic assay A) and 2838 (Kinetic assay B) L/kg TSS; Kd calculated using experimental concentrations of micropollutants sorbed onto sludge (mg/g TSS) and in solution (mg/L).
Partition Coefficient Phase and Partition Coefficient Results	solid-liquid phase in NAS reactor; Not Reported
Mass Balance	Not Reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	The test substance source was not reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.

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Study Citation:	Fernandez-Fontaina, E., Carballa, M., Omil, F., Lema, J. M. (2014). Modelling cometabolic biotransformation of organic micropollutants in nitrifying reactors. Water Research 65:371-383.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5431360			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to the study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	N/A	The metric is not applicable to the study.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculations were clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination		High		

Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	8784976

EXTRACTION

Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, Type, Guideline	redacted; experimental; other: sludge/effluent partitioning
Solvent, Reactivity, Storage, Stability	NR; NR; aluminum, stainless steel or glass sampling devices, cool or freeze samples and stored in the dark; NR
Radiolabel, Source, State, Purity	None; effluent and sludge samples from 6 Italian treatment plants; NR; NR Notes: analytical standard: 98.5% purity supplied by International Flavors and Fragrances (IFF)
Sampling Frequency, Sampling Details, and Number of Replicates	4 times; grab sample from overflow of secondary clarifier and sludge sample taken on the same day; 2
pH, Test Temperature, Buffer, and Test Details	not applicable; not applicable; not applicable; treatment plants in Ferrandina, Avellino, Roma Est, Martina Franca, Nova Siri and Matera, Italy
Matrix, Clay Silts and Organic Carbon, and CEC	other; TOC: 240-270 g C/kg dry weight; not reported
Bulk Density and Matrix Details	not reported; sludge
Media, Recovery, and Statistics	effluent; average effluent recovery: 94.19%; average sludge recovery: 102.54%; coefficient of variation for duplicate sludge 11%; duplicate effluent 19%
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	not reported; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	D3-AHTN; % recovery: 67-127% (average: 87.0%) 32 values; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Log Kd; Ferrandina: Run 1: 3.63; run 2: 3.98; run 3: 3.77; run 4: 3.71; Avellino: Run 1: 3.83; run 2: 3.90; run 3: 3.91; run 4: 3.93; Roma Est: Run 1: 4.10; run 2: 4.15; run 3: 4.27; run 4: 4.12; Martina Franca: Run 1: 3.84; run 2: 3.94; run 3: 3.94; run 4: 4.20; Nova Siri: Run 1: 3.89; run 2: 3.86; run 3: 3.74; run 4: 3.69; Matera: Run 1: 4.02; run 2: 4.06; run 3: 4.08; run 4: 4.00
Partition Coefficient Phase and Partition Coefficient Results	sludge/effluent; sludge (mg/kg dw)/effluent (ug/L) concentrations: Ferrandina: Run 1: 1.90/0.28; run 2: 3.20/0.28; run 3: 2.30/0.36; run 4: 2.50/0.44; Avellino: Run 1: 3.70/0.46; run 2: 4.30/0.43; run 3: 3.40/0.43; run 4: 4.40/0.35; Roma Est: Run 1: 4.50/0.37; run 2: 5.40/0.36; run 3: 5.40/0.26; run 4: 5.00/0.39; Martina Franca: Run 1: 4.40/0.70; run 2: 6.40/0.80; run 3: 6.10/0.70; run 4: 5.70/0.28; Nova Siri: Run 1: 1.30/0.255; run 2: 1.30/0.22; run 3: 1.40/0.33; run 4: 1.30/0.44; Matera: Run 1: 4.30/0.55; run 2: 6.90/0.49; run 3: 5.50/0.55; run 4: 6.00/0.49
Mass Balance	not applicable

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	High
			The test substance was identified by common name.
			The samples source was reported, the analytical standard source and purity were reported.
Domain 2: Test Design			

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Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	8784976			
Domain		Metric	EVALUATION Rating	Comments
	Metric 3:	Study Controls	High	concurrent blanks, reference and controls were reported
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Spatial variability was accounted for, uncertainty in measurements was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, percent recovery was reported, analytical methods were suitable for detection and detection limits were sensitive enough to detect the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were consistent with related physical chemical properties.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	8784976

EXTRACTION

Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, Type, Guideline	redacted; experimental; other: sludge/effluent partitioning
Solvent, Reactivity, Storage, Stability	NR; NR; aluminum, stainless steel or glass sampling devices, cool or freeze samples and stored in the dark; NR
Radiolabel, Source, State, Purity	None; effluent and sludge samples from 6 Spanish treatment plants; NR; NR Notes: analytical standard: 98.5% purity supplied by International Flavors and Fragrances (IFF)
Sampling Frequency, Sampling Details, and Number of Replicates	4 times; grab sample from overflow of secondary clarifier and sludge sample taken on the same day; 2
pH, Test Temperature, Buffer, and Test Details	not applicable; not applicable; not applicable; treatment plants in Rincon de Leon, Orihuela Costa, Monte Orgegia, Villajoyosa, Almoradi and Orhuela Ciudad, Spain
Matrix, Clay Silts and Organic Carbon, and CEC	other; TOC: 250-280 g C/kg dry weight; not reported
Bulk Density and Matrix Details	not reported; sludge
Media, Recovery, and Statistics	effluent; average effluent recovery: 94.19%; average sludge recovery: 102.54%; coefficient of variation for duplicate sludge 11%; duplicate effluent 19%
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	not reported; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	D3-AHTN; % recovery: 44-112% (average: 69.4%) 23 values; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Log Kd; Rincon de Leon: Run 1: 3.88; run 2: 3.65; run 3: 3.84; run 4: 3.96; Orihuela Costa: Run 1: 3.97; run 2: 3.98; run 3: 3.95; run 4: 4.10; Monte Orgegia: Run 1: 3.81; run 2: 4.00; run 3: 4.12; run 4: 3.89; Villajoyosa: Run 1: 4.36; run 2: 4.08; run 3: 4.04; run 4: 4.07; Almoradi: Run 1: 3.95; run 2: 3.59; run 3: 3.65; run 4: 4.26; Orhuela Ciudad: Run 1: 3.81; run 2: 3.74; run 3: 3.97; run 4: 4.20
Partition Coefficient Phase and Partition Coefficient Results	sludge/effluent; sludge (mg/kg dw)/effluent (ug/L) concentrations: Rincon de Leon: Run 1: 33.00/4.40; run 2: 27.00/6.10; run 3: 29.00/4.20; run 4: 32.00/3.50; Orihuela Costa: Run 1: 12.00/1.30; run 2: 19.00/2.00; run 3: 18.00/2.00; run 4: 15.00/1.40; Monte Orgegia: Run 1: 21.50/3.90; run 2: 18.00/2.25; run 3: 44.00/3.30; run 4: 35.00/4.50; Villajoyosa: Run 1: 21.00/0.88; run 2: 24.00/2.00; run 3: 22.00/2.00; run 4: 21.00/1.80; Almoradi: Run 1: 33.50/3.90; run 2: 20.00/4.60; run 3: 42.00/9.40; run 4: 68.00/4.40; Orhuela Ciudad: Run 1: 16.50/2.50; run 2: 18.00/3.30; run 3: 13.00/1.40; run 4: 22.00/1.20
Mass Balance	not applicable

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	High
			The test substance was identified by common name.
			The samples source was reported, the analytical standard source and purity were reported.

Domain 2: Test Design

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Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	8784976			
Domain		Metric	EVALUATION Rating	Comments
	Metric 3:	Study Controls	High	concurrent blanks, reference and controls were reported
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Spatial variability was accounted for, uncertainty in measurements was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, percent recovery was reported, analytical methods were suitable for detection and detection limits were sensitive enough to detect the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were consistent with related physical chemical properties.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	8784976

EXTRACTION	
Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, Type, Guideline	redacted; experimental; other: sludge/effluent partitioning
Solvent, Reactivity, Storage, Stability	NR; NR; aluminum, stainless steel or glass sampling devices, cool or freeze samples and stored in the dark; NR
Radiolabel, Source, State, Purity	None; effluent and sludge samples from 3 Greek treatment plants; NR; NR Notes: analytical standard: 98.5% purity supplied by International Flavors and Fragrances (IFF)
Sampling Frequency, Sampling Details, and Number of Replicates	4 times; grab sample from overflow of secondary clarifier and sludge sample taken on the same day; 2
pH, Test Temperature, Buffer, and Test Details	not applicable; not applicable; not applicable; treatment plants in Lamia, Volos and Larissa, Greece
Matrix, Clay Silts and Organic Carbon, and CEC	other; not applicable; not reported
Bulk Density and Matrix Details	not reported; sludge
Media, Recovery, and Statistics	effluent; average effluent recovery: 94.19%; average sludge recovery: 102.54%; coefficient of variation for duplicate sludge 11%; duplicate effluent 19%
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	not reported; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	D3-AHTN; % recovery: 65-107% (average: 89.3%) 16 values; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Log Kd; Lamia: Run 1: 3.89; run 2: 3.82; run 3: 3.90; run 4: 3.80; Volos: Run 1: 3.62; run 2: 3.67; run 3: 3.70; run 4: 3.90; Larissa: Run 1: 3.19; run 2: 3.96; run 3: 3.93; run 4: 3.98
Partition Coefficient Phase and Partition Coefficient Results	sludge/effluent; sludge (mg/kg dw)/effluent (ug/L) concentrations: Lamia: Run 1: 20.00/2.60; run 2: 19.00/2.90; run 3: 19.00/2.40; run 4: 20.00/3.20; Volos: Run 1: 12.00/2.90; run 2: 14.00/3.00; run 3: 16.00/3.20; run 4: 23.00/2.90; Larissa: Run 1: 17.00/11.00 (influent); run 2: 32.00/3.50; run 3: 33.00/3.90; run 4: 39.00/4.10
Mass Balance	not applicable

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by common name.
	Metric 2:	Test Substance Purity	High	The samples source was reported, the analytical standard source and purity were reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	concurrent blanks, reference and controls were reported
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.

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Study Citation:		IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).		
OECD Harmonized Template:		Adsorption and Desorption		
HERO ID:		8784976		
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Spatial variability was accounted for, uncertainty in measurements was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, percent recovery was reported, analytical methods were suitable for detection and detection limits were sensitive enough to detect the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were consistent with related physical chemical properties.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	8784976

EXTRACTION	
Parameter	Data
CASRN and Test Material	Not Reported; HHCB
Confidentiality, Type, Guideline	redacted; experimental; other: sludge/effluent partitioning
Solvent, Reactivity, Storage, Stability	NR; NR; aluminum, stainless steel or glass sampling devices, cool or freeze samples and stored in the dark; NR
Radiolabel, Source, State, Purity	None; effluent and sludge samples from 3 German treatment plants; NR; NR Notes: analytical standard: 98.5% purity supplied by International Flavors and Fragrances (IFF)
Sampling Frequency, Sampling Details, and Number of Replicates	2 times; grab sample from overflow of secondary clarifier and sludge sample taken on the same day; 2
pH, Test Temperature, Buffer, and Test Details	not applicable; not applicable; not applicable; treatment plants in Ruhleben, Wassmansdorf and Schonerlinde, Germany
Matrix, Clay Silts and Organic Carbon, and CEC	other; not applicable; not reported
Bulk Density and Matrix Details	not reported; sludge
Media, Recovery, and Statistics	effluent; average effluent recovery: 94.19%; average sludge recovery: 102.54%; coefficient of variation for duplicate sludge 11%; duplicate effluent 19%
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	not reported; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	D3-AHTN; % recovery: 58-115% (average: 80.0%) 9 values; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Log Kd; Ruhleben: Run 1: 3.67; run 2: 3.78; Wassmansdorf: Run 1: 3.80; run 2: 3.84; Schonerlinde: Run 1: 3.76; run 2: 3.68
Partition Coefficient Phase and Partition Coefficient Results	sludge/effluent; sludge (mg/kg dw)/effluent (ug/L) concentrations: Ruhleben: Run 1: 6.50/1.40; run 2: 6.60/1.10; Wassmansdorf: Run 1: 12.00/1.90; run 2: 11.00/1.60; Schonerlinde: Run 1: 12.00/2.00; run 2: 7.20/1.50
Mass Balance	not applicable

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by common name.
	Metric 2:	Test Substance Purity	High	The samples source was reported, the analytical standard source and purity were reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	concurrent blanks, reference and controls were reported
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				

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Study Citation:	IFF, (2005). AHTN and HHCB in sewage treatment plants in Southern Europe and in Berlin (sanitized).			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	8784976			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	Testing conditions were monitored, reported, and appropriate for the method.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome(s) of interest, and used widely accepted methods/approaches for the chemical and media being analyzed.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Spatial variability was accounted for, uncertainty in measurements was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, percent recovery was reported, analytical methods were suitable for detection and detection limits were sensitive enough to detect the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were consistent with related physical chemical properties.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Jiang, S., Wang, L., Zheng, M., Lou, Y., Shi, L. (2018). Determination and environmental risk assessment of synthetic musks in the water and sediments of the Jiaozhou Bay wetland, China. Environmental Science and Pollution Research 25(5):4915-4923.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5428379

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Field Study; other: Not reported
Solvent, Reactivity, Storage, Stability	NA; NR; Sediment samples wrapped in aluminum foil, stored in plastic bags at -20°C; Water samples filtered through glass-fiber film, stored with methanol at 4°C; NR
Radiolabel, Source, State, Purity	NA; Jiaozhou Bay wetland, in Qingdao, Shandong Province, China; NR; NA Notes: Analytical standard obtained from Dr. Ehrenstorfer (Augsburg, Germany)
Sampling Frequency, Sampling Details, and Number of Replicates	Once in March 2014, collected from 18 sites; 18 sediment and 14 surface water samples collected from Taoyuan and Dagou rivers. Sediment collected with a spade at 10 cm. Water samples collected as mixed composite of 3 parts of the river section.; 3
pH, Test Temperature, Buffer, and Test Details	Not reported; Not reported; Not reported; Field samples collected and analyzed.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; TOC 0.264 - 1.38%; Not reported
Bulk Density and Matrix Details	Not reported; Natural estuarine sediment
Media, Recovery, and Statistics	Natural estuarine water; 80.9-97.5% (water), 92.4-109% (sediment); Analysis performed with SPSS 17.0 and Origin 7.5 software, concentrations in sediment and water samples examined using non-parametric Kolmogorov-Smirnov test, $p < 0.05$
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not Reported; Not Reported; Not Reported; 0.132 - 1.76 L/g
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Not Reported; Not Reported
Partition Coefficient Phase and Partition Coefficient Results	sediment-water; Concentrations water: 10.7 - 208 ng/L; sediment: 14 - 27.4 ng/g
Mass Balance	NA

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High The test substance was identified by name.
	Metric 2:	Test Substance Purity	High The samples source was reported, the analytical standard source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium Field blanks were not explicitly included.

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Study Citation:	Jiang, S., Wang, L., Zheng, M., Lou, Y., Shi, L. (2018). Determination and environmental risk assessment of synthetic musks in the water and sediments of the Jiaozhou Bay wetland, China. Environmental Science and Pollution Research 25(5):4915-4923.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5428379			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no sample characteristics were reported.
	Metric 7:	Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8:	System Type and Design	High	Field studies are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the reported outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Spatial variability was accounted for, uncertainty in measurements was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, percent recovery was reported, analytical methods were suitable for detection and detection limits were sensitive enough to detect the target chemical.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Jin, L., He, M., Zhang, J. (2012). Effects of different sediment fractions on sorption of galaxolide. <i>Frontiers of Environmental Science & Engineering</i> 6(1):59-65.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5428386

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	HPLC grade methanol; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Aldrich Chemical Co., American; Liquid; >75%
Sampling Frequency, Sampling Details, and Number of Replicates	After 24 hr; Test tubes were centrifuged for 20 min at 4000 r/min, retaining supernatant for analysis; Not reported
pH, Test Temperature, Buffer, and Test Details	6.22; 25±0.5°C; Not reported; Sorbent and 40 mL test solution containing 0.01 - 1.5 mg/L test substance added to 50 mL glass tubes with Teflon-lined caps, sealed and mixed at 110 r/min for 24 hr
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; 0.19 % clay; 68.45% silt; 31.36% sand; 2.84% TOC; Not reported
Bulk Density and Matrix Details	Not reported; Natural surface (0 - 20 cm) sediment from collected from Daliao River in Yingkuo city, China
Media, Recovery, and Statistics	Aqueous mixture of 0.005 mol/L CaCl ₂ and 100 mg/L NaN ₃ ; Not Reported; Not Reported
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not Reported; Observed in less than 24 h in preliminary studies; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Controls without sorbent; Average loss < 10%; negligible sorption onto glass walls; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Koc; 1.27E5, 1.08E5, 9.62E4 mL/g; Freundlich model. N= 0.93±0.11, R ² = 0.963, Kfoc (organic carbon normalized sorption capacity coefficient) = 9.17E4. For concentrations of 0.01, 0.1, and 0.5 mg/L; Kd = 2.91E3
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Linear model; R ² = 0.961
Partition Coefficient Phase and Partition Coefficient Results	sediment-water; Not Reported
Mass Balance	Not reported

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	Medium	The source and purity of the test substance was reported, however the purity reported was possibly low (> 75%).
Domain 2: Test Design			
Metric 3:	Study Controls	High	A blank without sorbent was included to account for sorption loss to glass.
Metric 4:	Test Substance Stability	Medium	The test substance preparation was reported; storage conditions were not reported.

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Study Citation:	Jin, L., He, M., Zhang, J. (2012). Effects of different sediment fractions on sorption of galaxolide. Frontiers of Environmental Science & Engineering 6(1):59-65.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5428386			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The sediment characteristics were reported, including soil pH and organic carbon content.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system type and design were capable of maintaining substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Limits of detection, mass balance, and extraction efficiency were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Sorption calculations were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Jin, L., He, M., Zhang, J. (2012). Effects of different sediment fractions on sorption of galaxolide. <i>Frontiers of Environmental Science & Engineering</i> 6(1):59-65.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5428386

Parameter		EXTRACTION	
CASRN and Test Material		1222-05-5; HHCB	
Confidentiality, Type, Guideline		None; Experimental; other: Not reported	
Solvent, Reactivity, Storage, Stability		HPLC grade methanol; NR; NR; NR	
Radiolabel, Source, State, Purity		NA; Aldrich Chemical Co., American; Liquid; >75%	
Sampling Frequency, Sampling Details, and Number of Replicates		After 24 hr; Test tubes were centrifuged for 20 min at 4000 r/min, retaining supernatant for analysis; Not reported	
pH, Test Temperature, Buffer, and Test Details		6.22; 25±0.5°C; Not reported; Sorbent and 40 mL test solution containing 0.01 - 1.5 mg/L test substance added to 50 mL glass tubes with Teflon-lined caps, sealed and mixed at 110 r/min for 24 hr	
Matrix, Clay Silts and Organic Carbon, and CEC		Not Reported; 0 % clay; 43.59% silt; 56.40% sand; 0.12% TOC; Not reported	
Bulk Density and Matrix Details		Not reported; Natural surface (0 - 20 cm) sediment from collected from Yellow River in Zhengzhou city, China	
Media, Recovery, and Statistics		Aqueous mixture of 0.005 mol/L CaCl ₂ and 100 mg/L Na ₃ N; Not Reported; Not Reported	
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details		Not Reported; Observed in less than 24 h in preliminary studies; Not Reported	
Reference Substance, Reference Substance Results, and Percent Adsorption		Controls without sorbent; Average loss < 10%; negligible sorption onto glass walls; Not Reported	
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type		Koc; 1.77E5, 1.42E6, 1.21E6 mL/g; Freundlich model. N= 0.90±0.12, R ² = 0.973, Kfoc (organic carbon normalized sorption capacity coefficient) = 1.14E6. For concentrations of 0.01, 0.1, and 0.5 mg/L; Kd = 1.50E3	
Partition Coefficient Type and Partition Coefficient Results		Linear model; R ² = 0.973	
Partition Coefficient Phase and Partition Coefficient Results		sediment-water; Not Reported	
Mass Balance		Not reported	
Domain		EVALUATION	
		Metric	Rating
Domain 1: Test Substance			Comments
Metric 1:		Test Substance Identity	High
Metric 2:		Test Substance Purity	Medium
			The test substance was identified by name.
			The source and purity of the test substance was reported, however the purity reported was possibly low (> 75%).
Domain 2: Test Design			
Metric 3:		Study Controls	High
Metric 4:		Test Substance Stability	Medium
			A blank without sorbent was included to account for sorption loss to glass.
			The test substance preparation was reported; storage conditions were not reported.
Domain 3: Test Conditions			

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Study Citation:	Jin, L., He, M., Zhang, J. (2012). Effects of different sediment fractions on sorption of galaxolide. Frontiers of Environmental Science & Engineering 6(1):59-65.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5428386			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The sediment characteristics were reported, including soil pH and organic carbon content.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system type and design were capable of maintaining substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability and uncertainty were considered and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limits of detection, mass balance, and extraction efficiency were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Sorption calculations were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Lu, B., Feng, Y., Gao, P., Zhang, Z., Lin, N. (2015). Distribution and fate of synthetic musks in the Songhua River, Northeastern China: influence of environmental variables. Environmental Science and Pollution Research 22(12):9090-9099.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	3155347

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Monitoring of water/sediment from the Songhua River in Northeastern China
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	No; Promochem, Germany; NR; 75% (by GC) Notes: Galaxolide; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-(g)-2-benzopyran
Sampling Frequency, Sampling Details, and Number of Replicates	Samples collected mid August 2011, October 2011, January 2012 and April 2012; Water and sediment sampled from Songhua River; samples were extracted within 10 days of sampling; Not reported
pH, Test Temperature, Buffer, and Test Details	Not reported; Songhua River Basin temperate zone variation -38.1 to 39.2C; Not reported; Monitoring study
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; River sediment
Media, Recovery, and Statistics	River water; Not reported; Not reported
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; Not reported; Not reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; Not reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not reported; Not reported; Not reported; Not reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	log Koc; 4.65
Partition Coefficient Phase and Partition Coefficient Results	sediment-water; Not reported
Mass Balance	Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	Medium	The test substance source was reported in this monitoring study. The source of analytical standards was reported as 75%.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The metric is not applicable to this study type.
	Metric 4:	Test Substance Stability	High	The test sample preparation and storage conditions were reported.

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Study Citation:	Lu, B., Feng, Y., Gao, P., Zhang, Z., Lin, N. (2015). Distribution and fate of synthetic musks in the Songhua River, Northeastern China: influence of environmental variables. Environmental Science and Pollution Research 22(12):9090-9099.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	3155347			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The method was appropriate for this type of study.
	Metric 6:	Testing Conditions	Low	Monitoring study; some details on water conditions, sediment and particulate matter characteristics omitted.
	Metric 7:	Testing Consistency	Medium	Variation at monitoring sites not reported.
	Metric 8:	System Type and Design	High	The system was appropriate for this type of study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	Sampling details were appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Variation from multiple monitoring spots noted but quantitative results were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical analysis reported but no details provided.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reasonable and consistent with properties of test substance.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Mu, L., Wen, J. P. (2013). Spatial distribution characteristics of polycyclic musks as a chemical marker in river water and sediment compared with other typical pollutants. Water Science and Technology 67(6):1173-1180.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	2553805

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	No; Field study, partition coefficient; Not Reported
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sediment samples stored in amber glass bottles at - 20 deg C; NR
Radiolabel, Source, State, Purity	NA; Nine sampling sites in the Haihe River, Tianjin City, China; NA; NA
Sampling Frequency, Sampling Details, and Number of Replicates	Twice, November 2011 and January 2012; Water samples collected 2 m below the surface; 0 - 5 cm top sediment sampled; 2
pH, Test Temperature, Buffer, and Test Details	NR; NR; NA; Field study at 9 sites, 2 m depth water and 0 - 5 cm top sediment sampled from the Haihe River.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; DOC = 7.30 - 25.1 mg/L (water); suspended organic carbon = 14.7 - 55.2 mg/L; DOC = 6.86 - 87.0 mg/kg (sediment); NR
Bulk Density and Matrix Details	NR; Water and suspended particulate; sediment and pore water
Media, Recovery, and Statistics	Aqueous and solid phases; 85±12% (sediment), 92±7% (water); Correlation between sediment and water: R ² = 0.26, p > 0.1
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	NR; Not Reported; Not Reported
Reference Substance, Reference Substance Results, and Percent Adsorption	NR; NR; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not Reported; Not Reported; Not Reported; Not Reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Kd; Kd (suspended matter/water) = 290, 1330, 240, 2700, 1320, 357, 500, 909, and 3890 L/kg, per site respectively Kd (sediment/porewater) = 3.68, 1.30, 3.05, 7.50, 660, 52.3, 33.1, 6.25, and 140 L/kg
Partition Coefficient Phase and Partition Coefficient Results	Not Reported; Kd = [suspended matter] / [water] or [sediment] / [porewater] Concentrations estimated from graph by reviewer and Kd calculated by reviewer. Variation in Kd typically reflected differences in the level of pollution. Suspended matter: 0.29, 0.2, 0.06, 0.54, 0.33, 0.7, 0.15, 0.1, and 0.7 mg/kg Water: 1.0, 0.15, 0.25, 0.2, 0.25, 1.96, 0.3, 0.11, and 0.18 ug/L Sediment: 0.35, 0.7, 0.25, 0.15, 0.33, 3.92, 0.43, 0.25, 0.28 mg/kg Porewater: 95, 539.4, 82, 20, 0.5, 75, 13, 40, and 2 ug/L
Mass Balance	Not Reported

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	N/A	Not applicable for field studies.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	Not applicable for field studies.

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Study Citation:	Mu, L., Wen, J. P. (2013). Spatial distribution characteristics of polycyclic musks as a chemical marker in river water and sediment compared with other typical pollutants. Water Science and Technology 67(6):1173-1180.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	2553805			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 4:	Test Substance Stability	High	The sample storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The field study method was appropriate for the test substance.
	Metric 6:	Testing Conditions	High	Soil and water characteristics were reported.
	Metric 7:	Testing Consistency	N/A	Not applicable for field studies.
	Metric 8:	System Type and Design	N/A	Not applicable for field studies.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	The outcome assessment methodology was appropriate for determining partitioning and the appropriate media were analyzed. Kd was not determined by the study authors.
	Metric 12:	Test Substance Purity	High	Sampling methods were appropriate, frequency was acceptable.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between sites was discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; extraction efficiency and limits of detection were reported. Raw data was reported graphically and was estimated by the reviewer to calculate partition coefficients.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The partition coefficient was not determined or discussed by the study authors. There was a large range of values due to differences in pollution at the sampling sites.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination			High	

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5349388			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	no; experimental; other: sorption to activated sludge			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR			
Sampling Frequency, Sampling Details, and Number of Replicates	not reported; Not Reported; not reported			
pH, Test Temperature, Buffer, and Test Details	not reported; not reported; Not Reported; The test was carried out with 2.5 g sludge solids/L and 10, 50, 150 and 300 μg test substance/L.			
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; 19% organic carbon; not reported			
Bulk Density and Matrix Details	not reported; sludge solids			
Media, Recovery, and Statistics	Not Reported; 89-105%; Not Reported			
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not Reported; Equilibrated for 16 hours.; Not Reported			
Reference Substance, Reference Substance Results, and Percent Adsorption	not reported; Not Reported; Not Reported			
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 12,780 L/kg; Indirect measurement Kd=13,600 L/kg; log Koc 4.86; Not Reported			
Desorption Type				
Partition Coefficient Type and Partition Coefficient Results	log Koc; 4.85			
Partition Coefficient Phase and Partition Coefficient Results	Not Reported; Not Reported			
Mass Balance	Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was identified by name and CASRN.	
Metric 2:	Test Substance Purity	Medium	The test substance source and purity were not reported; however, the omissions or identified impurities were not likely to have a substantial impact on the study results.	
Domain 2: Test Design				
Metric 3:	Study Controls	N/A	The metric is not applicable to this study type.	
Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study results.	
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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5349388			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	The test method was suitable for the test substance
	Metric 7:	Testing Consistency	High	Test conditions were consistent.
	Metric 8:	System Type and Design	High	Equilibrium was established.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	Medium	sampling methods of the outcome(s) of interest were not reported; however, the lack of information is not likely to have a substantial impact on results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty in the measurements and statistical techniques and between study groups were reported in the study. The differences in the measurements and statistical techniques and between study groups were considered or accounted for in data evaluation with minor deviations or omissions. The minor deviations or omissions were not likely to have a substantial impact on study results.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical and transformation product(s) concentrations, extraction efficiency, percent recovery, or mass balance were not reported; however, these omissions were not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	There were omissions in the statistical methods or kinetic calculations however, the lack of information is not likely to have a substantial impact on study results.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Reported values were consistent with related physical chemical properties.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**High**

* Related References: cites: HERO ID 7607892; MacGillivray (1996). Sorption to activated sludge solids, HHCB. Report to RIFM, Roy F. Weston Inc. Study No. 96-015.

Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5427945

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Guideline not specified
Solvent, Reactivity, Storage, Stability	NA; NR; Wastewater samples collected in stainless steel 2L canisters via Teflon tubing with silicone pump tubing and stored at 4°C; sludge samples sorted in amber glass jars with Teflon lined lids at -18°C; Sludge: concentrations did not change significantly during frozen storage
Radiolabel, Source, State, Purity	NA; WWTP, Canada; NA; NA Notes: Standard: obtained from GmbH (Wesel, Germany)
Sampling Frequency, Sampling Details, and Number of Replicates	25 sampling events over 20 months (Aug. 2003, Apr. 2005); Bulk composite samples: raw influent, primary influent, and secondary influent Grab samples: primary sludge, and waste activated sludge (WAS) collected; 25
pH, Test Temperature, Buffer, and Test Details	6.69 - 7.81; 15 - 22°C; Not reported; Samples collected from WWTP which receives 60% residential and 40% industrial, commercial, and institutional sourced wastewater
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; Primary sludge
Media, Recovery, and Statistics	Primary effluent; TSS 119 - 123 mg/L; Surrogate extraction efficiency: 93.0±20.5%; Summary statistics
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; NA; NA
Reference Substance, Reference Substance Results, and Percent Adsorption	Field blanks (deionized water run through sampler tubing and storage canister); 2 - 3 orders of magnitude below primary effluent; 1 - 2 orders of magnitude below secondary effluent; Not reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Kd; 5,200±1,680 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Determined from ratio of detected concentrations in collected samples.
Mass Balance	NA

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Sample method blanks were included and at appropriate levels.

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Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5427945			
Domain		EVALUATION		
		Metric	Rating	Comments
	Metric 4:	Test Substance Stability	High	Sample preparation, storage conditions, and stability under frozen storage were reported and appropriate for the study.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited sorption relevant parameters were reported.
	Metric 7:	Testing Consistency	High	Sludge sample extraction methods were inconsistent but the final results were corrected by reported loss via the less suitable method.
	Metric 8:	System Type and Design	High	Sampling studies assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	Sampling methodology addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were accounted for by statistical techniques and extraction efficiency tests.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations reported, extraction efficiency reported, analytical method was appropriate and detection limits were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics performed were appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
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Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5427945

		EVALUATION	
Domain	Metric	Rating	Comments
Overall Quality Determination		High	

Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5427945

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Guideline not specified
Solvent, Reactivity, Storage, Stability	NA; NR; Wastewater samples collected in stainless steel 2L canisters via Teflon tubing with silicone pump tubing and stored at 4°C; sludge samples sorted in amber glass jars with Teflon lined lids at -18°C; Sludge: concentrations did not change significantly during frozen storage
Radiolabel, Source, State, Purity	NA; WWTP, Canada; NA; NA Notes: Standard: obtained from GmbH (Wesel, Germany)
Sampling Frequency, Sampling Details, and Number of Replicates	25 sampling events over 20 months (Aug. 2003, Apr. 2005); Bulk composite samples: raw influent, primary influent, and secondary influent
pH, Test Temperature, Buffer, and Test Details	Grab samples: primary sludge, and waste activated sludge (WAS) collected; 25 6.60 - 7.92; 15 - 22°C; Not reported; Samples collected from WWTP which receives 60% residential and 40% industrial, commercial, and institutional sourced wastewater
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; Secondary sludge
Media, Recovery, and Statistics	Secondary effluent; TSS 16 mg/L; Surrogate extraction efficiency: 93.0±20.5%; Summary statistics
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; NA; NA
Reference Substance, Reference Substance Results, and Percent Adsorption	Field blanks (deionized water run through sampler tubing and storage canister); 2 - 3 orders of magnitude below primary effluent; 1 - 2 orders of magnitude below secondary effluent; Not reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption Desorption Type	Not Reported; Not Reported; Not Reported; Not Reported
Partition Coefficient Type and Partition Coefficient Results	Kd; 20,800±7,690 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Determined from ratio of detected concentrations in collected samples.
Mass Balance	NA

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Sample method blanks were included and at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation, storage conditions, and stability under frozen storage were reported and appropriate for the study.

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Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5427945			
		EVALUATION		
Domain	Metric	Rating	Comments	
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited sorption relevant parameters were reported.
	Metric 7:	Testing Consistency	High	Sludge sample extraction methods were inconsistent but the final results were corrected by reported loss via the less suitable method.
	Metric 8:	System Type and Design	High	Sampling studies assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	Sampling methodology addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were accounted for by statistical techniques and extraction efficiency tests.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations reported, extraction efficiency reported, analytical method was appropriate and detection limits were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics performed were appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Thomas, S. M., Bodour, A. A., Murray, K. E., Inness, E. C. (2009). Sorption behavior of a synthetic antioxidant, polycyclic musk, and an organophosphate insecticide in wastewater sludge. Water Science and Technology 60(1):145-154.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5427977

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Guideline not specified
Solvent, Reactivity, Storage, Stability	50% diethyl ether (>99% purity), stock solutions prepared in dichloromethane; NR; Acid cleaned, amber colored autoclaved glassware; NR
Radiolabel, Source, State, Purity	NA; Sigma-Aldrich (St. Louis, Missouri); Liquid; >99%
Sampling Frequency, Sampling Details, and Number of Replicates	Once per test system; Whole samples analyzed, supernatant separated from sludge by centrifugation, both phases retained; 3
pH, Test Temperature, Buffer, and Test Details	Not reported; 22°C; Not reported; Collected sludge separated from supernatant by centrifuge, 2 g sludge added to 18 mL Nanopure water and 0 - 80 mg/L test substance spike in a septa screw cap amber vial, vials shaken on an orbital shaker at 200 rpm for 24 hours
Matrix, Clay Silts and Organic Carbon, and CEC	other; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; Return activated sludge collected from largest WWTP in San Antonio, Texas
Media, Recovery, and Statistics	Nanopure water; 60-70% (sludge), >90% (liquid); Linear regression ($R^2 = 0.90$)
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; Shaken on orbital shaker at 200 rpm for 24 hours; NA
Reference Substance, Reference Substance Results, and Percent Adsorption	0 mg/L spike; 0.01 ± 0.00 mg/L (liquid), 314 ± 0.00 mg/kg (sludge); Not reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not Reported; Not Reported; Not Reported; Not Reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Sludge-water Kd; 31,402 L/kg
Partition Coefficient Phase and Partition Coefficient Results	solids-water in activated sewage sludge; Partition coefficients inversely related to water solubility
Mass Balance	Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The test substance source and purity were reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	A non-spiked control was included and reported appropriate values.
	Metric 4:	Test Substance Stability	High	Test substance preparation and storage conditions (amber bottles) were reported and appropriate.

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Study Citation:	Thomas, S. M., Bodour, A. A., Murray, K. E., Inniss, E. C. (2009). Sorption behavior of a synthetic antioxidant, polycyclic musk, and an organophosphate insecticide in wastewater sludge. Water Science and Technology 60(1):145-154.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5427977			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	pH and organic content were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across replicates and study groups.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system design was capable of maintaining substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study analyzed the whole sample and both phases, which address the outcomes of interest.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical techniques between replicates and groups.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical concentrations were reported, extraction efficiency was reported, and analytical methods were suitable for detection of the test substance; Limits of detection were not reported but this is not likely to have a substantial impact on study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics and linear regression were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were higher than previously reported values, but may highlight a concentration dependence; the results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination			High	

Study Citation:	Wang, L., Wijekoon, K. C., Nghiem, L. D., Khan, S. J. (2014). Removal of polycyclic musks by anaerobic membrane bioreactor: biodegradation, biosorption, and enantioselectivity. Chemosphere 117:722-729.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5431359

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Not reported
Solvent, Reactivity, Storage, Stability	ethyl acetate in synthetic wastewater; NR; 4°C; NR
Radiolabel, Source, State, Purity	NA; Dr. Ehrenstorfer GmbH, Augsburg, Germany; NR; NR Notes: Synthetic wastewater composed of glucose, peptone, potassium dihydrogen phosphate, sodium acetate, urea, FeCl ₂ * 4 H ₂ O, nickel chloride, cobalt chloride, and ammonium molybdate
Sampling Frequency, Sampling Details, and Number of Replicates	Once per week over 4 weeks; Not reported; Not reported
pH, Test Temperature, Buffer, and Test Details	7±0.1; 35.0±0.1°C; NaHCO ₃ ; Laboratory scale AnMBR system set up to assess test substance partitioning between sludge from anaerobic digester of Wollongong Sewage Treatment Plant, NSW, Australia and synthetic wastewater
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; Sludge from anaerobic digester
Media, Recovery, and Statistics	Synthetic wastewater; 93 - 101% (biomass samples); Not reported
Transformation Products, Equilibrium	Not reported; Not Reported; Not Reported
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; 13%
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Kd; 15,560 L/KgSS; solids-water in activated sewage sludge, Kd = [sludge] / [water]; Not Reported
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Not Reported; Not Reported
Partition Coefficient Phase and Partition Coefficient Results	Not Reported; Not Reported
Mass Balance	4% removed in effluent, 83% removed by biotransformation

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The test substance source but not purity was reported
Domain 2: Test Design	Metric 3: Study Controls	Medium	Controls were not explicitly included.
	Metric 4: Test Substance Stability	High	Test substance preparation and storage conditions were reported.

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Study Citation:	Wang, L., Wijekoon, K. C., Nghiem, L. D., Khan, S. J. (2014). Removal of polycyclic musks by anaerobic membrane bioreactor: biodegradation, biosorption, and enantioselectivity. Chemosphere 117:722-729.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	5431359			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Pilot scale system stages and parameters were reported, limited sorption relevant parameters were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	High	Equilibrium was established and the system was capable of maintaining test substance concentrations.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limited raw data reported, analytical methods were acceptable but limits of detection reported elsewhere; percent recovery from biomass samples reported but not for aqueous samples.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods not specified, partition coefficient calculations were described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Wang, Q., Kelly, B. C. (2017). Occurrence and distribution of synthetic musks, triclosan and methyl triclosan in a tropical urban catchment: Influence of land-use proximity, rainfall and physicochemical properties. Science of the Total Environment 574:1439-1447.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	3464285

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCb
Confidentiality, Type, Guideline	no; experimental; Not Reported
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR Notes: NR
Sampling Frequency, Sampling Details, and Number of Replicates	NR; Surface water samples (1 m depth) were collected from all five sites between March 2014 to March 2015. Bottom sediments (2-3 m depth, brownish grey slightly sandy silt) were collected using a petit ponar grab at OWB-1, PWB-2, OWB-3, and CC-1 in October 2014 and January 2015. Suspended particulate matter sample were collected in April, May, June, and July of 2015.; 3 replicates per site
pH, Test Temperature, Buffer, and Test Details	Mean value of 7.63 +/- 0.54; did not vary substantially between sites.; NR; NR; NR
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; NR; NR
Bulk Density and Matrix Details	NR; NR
Media, Recovery, and Statistics	NR; NR; NR
Transformation Products, Equilibrium	NR; NR; NR
Adsorption Details, and Equilibrium Desorption Details	
Reference Substance, Reference Substance Results, and Percent Adsorption	Nr; NR; NR
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	NR; NR; NR; NR
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	Log Koc; log Koc=4.87 +/- 0.36; determined as log [Csediment/(Cwater x foc)]
Partition Coefficient Phase and Partition Coefficient Results	NR; NR
Mass Balance	NR

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The test substance purity and source were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The study did not require concurrent control groups.

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Study Citation:	Wang, Q., Kelly, B. C. (2017). Occurrence and distribution of synthetic musks, triclosan and methyl triclosan in a tropical urban catchment: Influence of land-use proximity, rainfall and physicochemical properties. Science of the Total Environment 574:1439-1447.			
OECD Harmonized Template:	Adsorption and Desorption			
HERO ID:	3464285			
Domain	Metric	EVALUATION		Comments
	Metric 4:	Test Substance Stability	Medium	The test substance stability, homogeneity, preparation or storage conditions were not reported; however, these factors were not likely to influence the test substance or were not likely to have a substantial impact on study result
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	Medium	The test method appears suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	Medium	some test conditions across samples or study groups were not reported, but these discrepancies were not likely to have a substantial impact on study results.
	Metric 8:	System Type and Design	Low	Equilibrium was not reported.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 12:	Test Substance Purity	High	Sampling method was reported.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Confounding variables were not reported.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	The statistical method was reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			Medium	

Study Citation:	Wu, C. Y., Bai, L., Gu, F., Wei, W., Guo, L. X., Wen, D. M. (2018). Elimination of typical polycyclic musks in a full-scale membrane bioreactor combined with anaerobic-anoxic-oxic process in municipal wastewater treatment plant. Water Science and Technology 78(7):1459-1465.
OECD Harmonized Template:	Adsorption and Desorption
HERO ID:	5427884

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; other: Guideline not specified
Solvent, Reactivity, Storage, Stability	Water sample; NA; 4°C; NA
Radiolabel, Source, State, Purity	NA; NR; NR; NA Notes: Reference standards source: Dr. Ehrenstorfer, Augsburg, Germany
Sampling Frequency, Sampling Details, and Number of Replicates	Not reported; 500 mL collected from WWTP sections, filtered with 1 um glass fiber filter, retaining biosolids.; Not reported
pH, Test Temperature, Buffer, and Test Details	Not reported; 26, 26, 27, and 26.5°C (anaerobic, anoxic, oxic, MBR); Not reported; Partitioning determined from samples collected from anerobic, anoxic, oxic sludges, and a membrane bioreactor treatment steps in a wastewater treatment plant.
Matrix, Clay Silts and Organic Carbon, and CEC	Not Reported; Not reported; Not reported
Bulk Density and Matrix Details	Not reported; Suspended matter - water from sludge treatment steps
Media, Recovery, and Statistics	Water; Not reported; Not reported
Transformation Products, Equilibrium Adsorption Details, and Equilibrium Desorption Details	Not reported; Not reported; Not reported
Reference Substance, Reference Substance Results, and Percent Adsorption	Not reported; Not reported; Not Reported
Adsorption Coefficient Type, Adsorption Coefficient Results, Adsorption Coefficient Results Comments, and Adsorption	Not Reported; Not Reported; Not Reported; 8.1, 6.7, 5.5, and 5.3 L/ g SS
Desorption Type	
Partition Coefficient Type and Partition Coefficient Results	solid-water distribution coefficient; Relationship between partition coefficient and removal rate per treatment tank observed.
Partition Coefficient Phase and Partition Coefficient Results	solids-water in settled sewage sludge; Determined for anaerobic, anoxic, oxic, and membrane bioreactor tanks, respectively. $K_d = C_s / C_w$, where C_s is the absorbed concentration per amount of suspended solids, and C_w is the aqueous phase concentration.
Mass Balance	Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Controls are not required for WWTP sample studies.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage was reported and appropriate.

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Study Citation:		Wu, C. Y., Bai, L., Gu, F., Wei, W., Guo, L. X., Wen, D. M. (2018). Elimination of typical polycyclic musks in a full-scale membrane bioreactor combined with anaerobic-anoxic-oxic process in municipal wastewater treatment plant. Water Science and Technology 78(7):1459-1465.		
OECD Harmonized Template:		Adsorption and Desorption		
HERO ID:		5427884		
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Test pH and suspended particle characteristics were not reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed in consistent manners.
	Metric 8:	System Type and Design	High	WWTP plant samples are assumed to be at equilibrium.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	Minimal details on sampling methods were reported.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Uncertainty and variability between replicates were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Extraction efficiency was not reported, detection limits were not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Calculation of the partition coefficient was described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Andresen, J. A., Muir, D., Ueno, D., Darling, C., Theobald, N., Bester, K. (2007). Emerging pollutants in the North Sea in comparison to Lake Ontario, Canada, data. Environmental Toxicology and Chemistry 26(6):1081-1089.
OECD Harmonized Template:	Miscellaneous
HERO ID:	1619118

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Not Reported
Confidentiality, Type, Guideline	No; Estimation, residence time in German Bight; Estimation, residence time in German Bight
Solvent, Reactivity, Storage, Stability	NA; NR; 2L glass bottles at 4 deg C; NR
Radiolabel, Source, State, Purity	NA; Surface water samples of the German Bight; NA; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Water samples of the German Bight were taken at 5 m depth at 14 sites of varying distance from the coast. The test substance concentrations in these samples were used to estimate residence time and persistence using the Federal Maritime and Hydrographic Agency's BSHdmod.L model.; Assumed first-order kinetics and continuous sources and used known transportation times (water residence time in the German Bight: 120 days). Concentrations were normalized by salinity, which supported decrease of concentration was mainly due to dilution. Estimation based on the Elbe River plume sites only.; Not Reported
System Type Design	Not Reported
Sampling Frequency and Sampling Details	May 25 - June 6, 2005; Samples collected 5 m below the surface in 10L glass-sphere samplers.
Test Temperature	NR
Results Details	Half-life = 200 days (range: 99 - 3,000 days)
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; Samples liquid-liquid extracted and concentrated prior to analysis. Recovery: 28% (TCEP) - 128%. RSD: 7-19%
Transformation Products, Statistics, and Kinetics	NR; Not Reported; Not Reported
Reference Substance and Reference Substance Results	NR; NR

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	N/A	Not applicable for field studies/modelled results.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Not applicable for field studies/modelled results.
	Metric 4:	Test Substance Stability	High	The field sample storage conditions were reported and were appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	The model was presumably suitable for the test substance although limited details were provided.
	Metric 6:	Testing Conditions	Low	No sample characteristics were reported, however these inputs were not required for model use. Model details, equations, other inputs were not reported.

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Study Citation:	Andresen, J. A., Muir, D., Ueno, D., Darling, C., Theobald, N., Bester, K. (2007). Emerging pollutants in the North Sea in comparison to Lake Ontario, Canada, data. Environmental Toxicology and Chemistry 26(6):1081-1089.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	1619118			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Test substances concentrations were analyzed consistently and model usage was applied consistently.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment was appropriate for estimating half-lives.
	Metric 12:	Test Substance Purity	Medium	Sampling methods were reported and appropriate but the single sampling campaign may not reflect temporal trends.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Uncertainty in the model outputs was not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; extraction recovery was reported. Raw concentrations were reported graphically only.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Model kinetics were described generally.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study did not report many details of the model and the basis for how the model works, making it difficult to determine the plausibility of this result.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		Medium		

Study Citation:	Arrubla, J. P., Cubillos, J. A., Ramirez, C. A., Arredondo, J. A., Arias, C. A., Paredes, D. (2016). Pharmaceutical and personal care products in domestic wastewater and their removal in anaerobic treatment systems: septic tank - up flow anaerobic filter. 36(1):70-78.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427823

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	no; not specified; not specified
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR Notes: NR
Test Method Details, Test Condition Details, and Test Consistency Details	NR; NR; NR
System Type Design	NR
Sampling Frequency and Sampling Details	NR; Water samples were collected from a WWTP of La Florida (Pareira, Colombia); 4L samples were taken at the inflow and outflow; Sampling was carried out during dry season to avoid affectation by rain events; Collected water samples were stored at 4 C in amber glass containers.
Test Temperature	NR
Results Details	Influent concentration (ug/L): Max=39.2, Min=5.7, average =16.0; Effluent concentration (ug/L): Max= 17.6, Min= 0.1, average=7.2
Analytical Method and Analytical Details	GC-MS; Extracts obtained through solid phase extraction were analyzed in a GC coupled to a mass selective detector operated in ion selective monitoring mode (SIM).
Transformation Products, Statistics, and Kinetics	NR; NR; NR
Reference Substance and Reference Substance Results	NR; NR

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The purity and source of the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	This metric does not apply to this study type.
	Metric 4:	Test Substance Stability	Low	Test substance stability was not reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	The test method appears to be suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	Medium	The testing conditions were consistent.
	Metric 8:	System Type and Design	Low	Equilibrium was not reported.
Domain 4: Test Organisms				

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Study Citation:		Arrubla, J. P., Cubillos, J. A., Ramirez, C. A., Arredondo, J. A., Arias, C. A., Paredes, D. (2016). Pharmaceutical and personal care products in domestic wastewater and their removal in anaerobic treatment systems: septic tank - up flow anaerobic filter. 36(1):70-78.		
OECD Harmonized Template:		Miscellaneous		
HERO ID:		5427823		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There were minor differences between the assessment methodology and the intended outcome assessment.
	Metric 12:	Test Substance Purity	Medium	The sampling method was appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	This metric does not apply to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Unable to determine the source of the values.
	Metric 16:	Statistical Methods and Kinetic Calculations	Low	This metric does not apply to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	This metric does not apply to this study type.

Overall Quality Determination**Medium**

* Related References: Unable to determine the source of the values reported.

Study Citation:	Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427808

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NA Notes: Analytical standard: >98%, from International Flavors and Fragrances (IFF), Hilversum, The Netherlands
Test Method Details, Test Condition Details, and Test Consistency Details	Grab samples of influent and effluent of the Zeist WWTP, in the Netherlands; Sewage flow: 0.34 m ³ /PE dNumber of inhabitants: 75,000 PESludge loading rate: 0.12 kg_BOD/ kg_dwt dHRT: 5.1 h; Not reported
System Type Design	Bubble aeration
Sampling Frequency and Sampling Details	Not reported; Not reported
Test Temperature	Not reported
Results Details	57% removalInfluent: 4.30 (total), 1.63 (free) µg/LEffluent: 1.84 (total), 1.83 (free) µg/L
Analytical Method and Analytical Details	Not reported; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Controls are not required for this type of study.
	Metric 4:	Test Substance Stability	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 7:	Testing Consistency	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.

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Study Citation:		Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.		
OECD Harmonized Template:		Miscellaneous		
HERO ID:		5427808		
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427808

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NA Notes: Analytical standard: >98%, from International Flavors and Fragrances (IFF), Hilversum, The Netherlands
Test Method Details, Test Condition Details, and Test Consistency Details	Grab samples of influent and effluent of the Nieuwegein WWTP, in the Netherlands; Sewage flow: 0.28 m ³ /PE dNumber of inhabitants: 120,000 PESludge loading rate: 0.05 kg_BOD/ kg_dwt dHRT: 13.7 h; Not reported
System Type Design	Surface aeration
Sampling Frequency and Sampling Details	Not reported; Not reported
Test Temperature	Not reported
Results Details	60% removalInfluent: 3.56 (total), 1.55 (free) µg/LEffluent: 1.43 (total), 1.97 (free) µg/L
Analytical Method and Analytical Details	Not reported; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Controls are not required for this type of study.
	Metric 4:	Test Substance Stability	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 7:	Testing Consistency	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.

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Study Citation:	Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427808			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427808

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NA Notes: Analytical standard: >98%, from International Flavors and Fragrances (IFF), Hilversum, The Netherlands
Test Method Details, Test Condition Details, and Test Consistency Details	Grab samples of influent and effluent of the De Bilt WWTP, in the Netherlands; Sewage flow: 0.28 m ³ /PE dNumber of inhabitants: 68,500 PESludge loading rate: 0.15 kg_BOD/ kg_dwt dHRT: 4.9 h; Not reported
System Type Design	Surface aeration
Sampling Frequency and Sampling Details	Not reported; Not reported
Test Temperature	Not reported
Results Details	32% removalInfluent: 3.26 (total), 1.18 (free) µg/LEffluent: 2.22 (total), 1.44 (free) µg/L
Analytical Method and Analytical Details	Not reported; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Controls are not required for this type of study.
	Metric 4:	Test Substance Stability	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 7:	Testing Consistency	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.

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Study Citation:	Artola-Garicano, E., Hermens, J. L. M., Vaes, W. H. J. (2003). Evaluation of Simple Treat 3.0 for two hydrophobic and slowly biodegradable chemicals: polycyclic musks HHCB and AHTN. Water Research 37(18):4377-4384.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427808			
Domain		Metric	EVALUATION	
			Rating	Comments
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	No details on this metric were reported, they may be reported in a previous study.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	No details on this metric were reported, they may be reported in a previous study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Berset, J. D., Kupper, T., Etter, R., Tarradellas, J. (2004). Considerations about the enantioselective transformation of polycyclic musks in wastewater, treated wastewater and sewage sludge and analysis of their fate in a sequencing batch reactor plant. Chemosphere 57(8):987-996.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431376

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Protected from sunlight, stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Wastewater samples collected from WWTPs in Prahins, Echallens, Wohlen, Konolfingen, and Chevilly; Liquid; NA Notes: Standards obtained from Promochem, Wesel, Germany, 75% purity (GC)
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from WWTP to determine removal efficiency.; 60% domestic, 0% industrial, 40% stormwater and infiltration water; SRT 20 d; BOD removal 99%; total phosphorus removal 97%; n = 7
System Type Design	Separate sewer system, sequencing batch reactor, aerobic stabilization
Sampling Frequency and Sampling Details	Not reported; Samples collected during one week in April 2001; ISCO 3710 flow related sampler used for influent, peristaltic pump operated time proportionally used for effluent.
Test Temperature	Not reported
Results Details	Average influent (min - max): 6900 ng/L (5390 - 9020 ng/L)Average effluent (min - max): 860 ng/L (730 - 1080 ng/L)Removal rate: 87%
Analytical Method and Analytical Details	GC-MSD in electron impact mode; LOQ 20 ng/L; Wastewater extracted in n-hexane and concentrated by rotary evaporator; Recovery: 78% ±8% RSD
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Tap water blank; Below LOQ

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	Sample source was reported, analytical standard source and purity was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	An analytical blank was included and the test substance was not detected.
	Metric 4: Test Substance Stability	High	Sample storage conditions and analytical preparation were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	WWTP operational stages were reported but not operational parameters.
	Metric 7: Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Berset, J. D., Kupper, T., Etter, R., Tarradellas, J. (2004). Considerations about the enantioselective transformation of polycyclic musks in wastewater, treated wastewater and sewage sludge and analysis of their fate in a sequencing batch reactor plant. Chemosphere 57(8):987-996.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431376			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between samples was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Summary statistics of the raw data was reported, extraction recovery and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistics besides summary statistics were not specified.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Berset, J. D., Kupper, T., Etter, R., Tarradellas, J. (2004). Considerations about the enantioselective transformation of polycyclic musks in wastewater, treated wastewater and sewage sludge and analysis of their fate in a sequencing batch reactor plant. Chemosphere 57(8):987-996.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431376

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Protected from sunlight, stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; Wastewater samples collected from WWTPs in Prahins, Echallens, Wohlen, Konolfingen, and Chevilly; Liquid; NA Notes: Standards obtained from Promochem, Wesel, Germany, 75% purity (GC)
Test Method Details, Test Condition Details, and Test Consistency	Influent and effluent samples collected from a WWTP (Prahins) to determine enantioselective transformation between trans-4S7S/trans-4R7R-HHCB and cis-4R7S/cis-4S7R -HHCB; 88% domestic, 0% industrial, 12% stormwater and infiltration water; SRT 20 d; BOD removal 99%; total phosphorus removal 95%
Details	
System Type Design	Separate sewer system extended aeration, aerobic stabilization
Sampling Frequency and Sampling Details	Not reported; Samples collected during March and July 2000; Grab samples collected for influent, 24h peristaltic pump operated time proportionally used for effluent.
Test Temperature	Not reported
Results Details	Influent trans-4S7S/trans-4R7R-HHCB ratio: 1.00Influent cis-4R7S/cis-4S7R -HHCB ratio: 0.97Effluent trans-4S7S/trans-4R7R-HHCB ratio: 0.81Effluent cis-4R7S/cis-4S7R -HHCB ratio: 1.00
Analytical Method and Analytical Details	GC-MSD in electron impact mode; LOQ 20 ng/L; Wastewater extracted in n-hexane and concentrated by rotary evaporator; Recovery: 78% ±8% RSD
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Tap water blank; Below LOQ

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	Sample source was reported, analytical standard source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	An analytical blank was included and the test substance was not detected.
	Metric 4:	Test Substance Stability	High	Sample storage conditions and analytical preparation were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	WWTP operational stages were reported but not operational parameters.
	Metric 7:	Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.

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Study Citation:	Berset, J. D., Kupper, T., Etter, R., Tarradellas, J. (2004). Considerations about the enantioselective transformation of polycyclic musks in wastewater, treated wastewater and sewage sludge and analysis of their fate in a sequencing batch reactor plant. Chemosphere 57(8):987-996.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431376			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between samples was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Summary statistics of the raw data was reported, extraction recovery and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistics besides summary statistics were not specified.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Bester, K. (2004). Retention characteristics and balance assessment for two polycyclic musk fragrances (HHCB and AHTN) in a typical German sewage treatment plant. Chemosphere 57(8):863-870.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428639

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; at 4°C; NR
Radiolabel, Source, State, Purity	NA; Samples collected from STP in Dortmund, Germany.; Liquid; NA Notes: Standards obtained from Ehrestorfer, Augsburg, Germany, 50% purity, technical grade
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from sewage treatment plant in order to determine removal efficiency.; Half of the wastewater processed is domestic, other sources are industrial but mainly from brewing. Hydraulic retention in aeration basin: 8 hSludge retention in aeration basin: 8-10 dSludge retention in digester: 20 d at 37°C; Samples collected in duplicate.TSS: 9 (influent) and < 0.1 mL/L (effluent)COD: 410 mg/L with 11% relative standard deviation
System Type Design	Activated sludge with secondary treatment; primary settlement basin, activated sludge treatment (aeration) basin, sludge separation basin, anaerobic digesters, and final clarifier
Sampling Frequency and Sampling Details	Samples collected April 8-12, 2002, every 2 h and mixed to give 24 h composite samples; Influent collected after the grid chamber, effluent collected after final settlement basins
Test Temperature	10°C (influent) and 14°C (effluent)
Results Details	Average removal: 63%Average (influent, effluent): 1941, 695 ng/gRemoval efficiency: 64, 70, 66, 64, and 52%Day 1 (influent, effluent): 2182, 795 ng/gDay 2 (influent, effluent): 2325, 691 ng/gDay 3 (influent, effluent): 1933, 652 ng/gDay 4 (influent, effluent): 1857, 669 ng/gDay 5 (influent, effluent): 1409, 669 ng/g
Analytical Method and Analytical Details	GC-MS in photomultiplier and selected ion mode; LOQ 100 ng/L; Unfiltered samples extracted by liquid-liquid extraction with toluene, water was removed by freezing at -20°C, extracts concentrated on a rotary evaporator; recovery 75 ± 6%
Transformation Products, Statistics, and Kinetics	HHCB-lactone; Biotransformation not a dominant role, 50% removed by sorption; Not reported; Not reported
Reference Substance and Reference Substance Results	Procedural blank; 30 ng/L

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name and structure.
Metric 2:	Test Substance Purity	High	The source of the STP samples was reported, the source and purity of the analytical standards was reported and low purity was corrected for.
Domain 2: Test Design			
Metric 3:	Study Controls	High	A procedural blank was included and were within a valid range.
Metric 4:	Test Substance Stability	High	The sample storage conditions and preparation were reported and appropriate.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.

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Study Citation:	Bester, K. (2004). Retention characteristics and balance assessment for two polycyclic musk fragrances (HHCB and AHTN) in a typical German sewage treatment plant. Chemosphere 57(8):863-870.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428639			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	STP processes and operational conditions were reported.
	Metric 7:	Testing Consistency	High	Samples were collected, prepared, analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sample methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty was discussed and accounted for in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data was reported, extraction recovery and limits of quantification were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods beyond summary statistics were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Biel-Maeso, M., Corada-Fernández, C., Lara-Martín, P. A. (2018). Removal of personal care products (PCPs) in wastewater and sludge treatment and their occurrence in receiving soils. Water Research 150:129-139.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5017319

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Influent and effluent filtered particulate stored at -20°C; NR
Radiolabel, Source, State, Purity	NA; WWTP in Jerez de la Frontera, Spain; NA; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Influent, effluent, and sludge samples collected from WWTP in Spain to determine removal efficiency of pollutants of interest; Designed to treat 103,000 m ³ /d domestic and industrial wasteHydraulic retention time: 24 hAnaerobic digester sludge retention time: 30 d; Wastewater samples: influent after pretreatment and effluent after secondary treatmentSludge samples: before and after anaerobic digestion
System Type Design	Pretreatment for solid and grit removal, primary physiochemical treatment, secondary biological treatment (nitrification and denitrification zones), UV radiation disinfection after filtration
Sampling Frequency and Sampling Details	Monthly, in 10 sample campaigns from July 2014 - June 2015; Wastewater daily composite samples obtained by mixing samples auto collected over 24 h, particulate filtered on Whatman 1 µm glass fiber filters and retained; Sludge samples collected in amber glass jars and lyophilized to dryness
Test Temperature	Not reported
Results Details	WWTP removal efficiency: -44% to 31% (aqueous), -57% to 30% (particulate)Removal of studied fragrances: 29% (summer), 0% (autumn), 4% (winter), 41% (spring), 21% (year)Influent: 1110 - 4020 ng/L (aqueous), 1560 - 25700 ng/g (particulate)Effluent: 770 - 5770 ng/L (aqueous), 1090 - 40400 ng/g (particulate)Sludge inlet: 13200 ng/gSludge outlet: 12000 ng/gAnerobic digester removal: 9%
Analytical Method and Analytical Details	GC-MS/MS; Wastewater samples 2x extracted by Stir bar sorptive extraction; sludge and particulate samples 2x extracted by pressurized liquid extraction
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The WWTP sample source was reported.
Domain 2: Test Design	Metric 3: Study Controls	Medium	Analytical or field blanks were not explicitly included.
	Metric 4: Test Substance Stability	High	Sample collection and preparation were reported.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	Samples were collected, processed, and analyzed consistently.
	Metric 6: Testing Conditions	Medium	Retention times and WWTP operational stages were reported; temperature was not reported.

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Study Citation:	Biel-Maeso, M., Corada-Fernández, C., Lara-Martín, P. A. (2018). Removal of personal care products (PCPs) in wastewater and sludge treatment and their occurrence in receiving soils. Water Research 150:129-139.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5017319			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining removal efficiency.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and account for seasonal variation.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability was not accounted for by statistical techniques, only ranges provided. No major uncertainty in methodology identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limits of detection and percent recovery were not reported but may be included in supplemental information. Only sludge removal efficiency was reported, wastewater influent and effluent concentration ranges were reported and were very broad. Seasonal removal efficiency reported for pollutant class not specific species.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable based on the method however were very broadly reported, an overall average removal efficiency for the specific pollutant cannot be determined.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Bueno, M. J., Gomez, M. J., Herrera, S., Hernando, M. D., Agüera, A., Fernández-Alba, A. R. (2012). Occurrence and persistence of organic emerging contaminants and priority pollutants in five sewage treatment plants of Spain: two years pilot survey monitoring. Environmental Pollution 164:267-273.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428730

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; 5 STPs in Spain; Almeria, Cantabria, Madrid, and Barcelona; Liquid; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from STPs in Spain to determine test substance removal efficiency.; Influent sources: urban/agricultural (STP Almeria), urban (STPs Cantabria, Madrid, and Barcelona), urban/industrial (STP Madrid); Not reported
System Type Design	Not reported
Sampling Frequency and Sampling Details	2-yr monitoring program; n = 15 (Almeria), 8 (Cantabria), 12 (Madrid), 22 (Madrid), and 9 (Barcelona); Not reported
Test Temperature	Not reported
Results Details	Approx. 70% average, high removal compared to other substances of interest. Activated sludge biological treatment was more effective at removal. Effluent: 1.8 - 9 µg/L
Analytical Method and Analytical Details	LC-MS/MS and GC-MS; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples containing the test substance was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4: Test Substance Stability	Medium	Little to no details on sample preparation or storage conditions were reported, preparation may be described in the supplemental information.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	No STP operational stages or parameters were reported.
	Metric 7: Testing Consistency	Medium	Samples were presumably analyzed consistently, but details were not reported.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms			

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Study Citation:	Bueno, M. J., Gomez, M. J., Herrera, S., Hernando, M. D., Agüera, A., Fernández-Alba, A. R. (2012). Occurrence and persistence of organic emerging contaminants and priority pollutants in five sewage treatment plants of Spain: two years pilot survey monitoring. Environmental Pollution 164:267-273.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428730			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Limited discussion of variability between STPs, and limited to no discussion of uncertainty.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limited raw data reported, no extraction efficiency or limit of detection reported, analytical method appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not specified.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Carballa, M., Omil, F., Lema, J. M., Llompart, M., Garcia, C., Rodriguez, I., Gomez, M., Ternes, T. (2005). Behaviour of pharmaceuticals and personal care products in a sewage treatment plant of northwest Spain. Water Science and Technology 52(8):29-35.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428732

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; STP in Galicia, Spain; Liquid; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent of an STP plant collected and analyzed to determine test substance removal efficiency.; Not reported; Total solids (92 - 94% removal) and chemical oxygen demand (80 - 94% removal) measured
System Type Design	Pretreatment (course screening bar racks, fine screening, aerated chambers for grit and fat removal), primary treatment (circular sedimentation tanks), secondary treatment (biological reactors with activated sludge process), secondary sedimentation unit.
Sampling Frequency and Sampling Details	October 2001, January 2002, April 2002, and June 2002.; 24 hour samples collected at inlet to grit removal unit, inlet to primary clarifier, inlet to biological reactor, inlet to secondary clarifier, and effluent of the plant.
Test Temperature	Not reported
Results Details	Primary treatment: approx. 43% removalSecondary treatment: approx. 38% removalOverall: 81% removalDetected at 2.1 - 3.4 µg/LAbsorption onto solid particles important removal route.
Analytical Method and Analytical Details	GC/MS; LOQ 4 ng/L; Liquid samples extracted by SPE with OASIS HLB cartridges and eluted with ethyl acetate; solids extracted by SPME using PDMS/DVB fiber; 88% recovery
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The STP sample source was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4: Test Substance Stability	Medium	Sample preparation was reported, but storage conditions were not.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was appropriate for the test substance.
	Metric 6: Testing Conditions	Medium	Operational stages for the STP were reported, but no operational parameters.
	Metric 7: Testing Consistency	High	Samples were collected, prepared, and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Carballa, M., Omil, F., Lema, J. M., Llompарт, M., Garcia, C., Rodriguez, I., Gomez, M., Ternes, T. (2005). Behaviour of pharmaceuticals and personal care products in a sewage treatment plant of northwest Spain. Water Science and Technology 52(8):29-35.				
OECD Harmonized Template:	Miscellaneous				
HERO ID:	5428732				
Domain		Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms					
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.	
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.	
Domain 5: Outcome Assessment					
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.	
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used accepted approaches.	
Domain 6: Confounding/Variable Control					
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed through statistical techniques or discussion in data evaluation.	
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.	
Domain 7: Data Presentation and Analysis					
	Metric 15:	Data Reporting	Medium	Minimal raw data reported; extraction recovery, limit of quantification reported, analytical method appropriate.	
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistics not specified outside of summary statistics.	
Domain 8: Other					
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to findings from other studies.	
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.	
Overall Quality Determination			High		

Study Citation:	Cavalheiro, J., Zuloaga, O., Prieto, A., Preudhomme, H., Amouroux, D., Monperrus, M. (2017). Occurrence and Fate of Organic and Organometallic Pollutants in Municipal Wastewater Treatment Plants and Their Impact on Receiving Waters (Adour Estuary, France). Archives of Environmental Contamination and Toxicology 73(4):619-630.
OECD Harmonized Template:	Miscellaneous
HERO ID:	4196927

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Obtained from WWTP influent and effluent. Surrogates purchased from Dr. Ehrenstorfer (Germany).; NR; NR Notes: 1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethylcyclopenta[g]-2-benzo-pyrene.
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent from WWTPs along the Aduor estuary in southwest France were sampled.; Temperature, conductivity, pH, dissolved O2, and redox potential were all measured.; Not reported
System Type Design	WWTPs 2 and 3 used sedimentation in the pretreatment and primary treatment and activated sludge in the secondary treatment. W1 used the same treatments but included biofilters in the secondary treatment. W1 and W2: urban/industrial; W3: mainly urban.
Sampling Frequency and Sampling Details	24 hour composite samples were collected in October 2013, December 2013, and February 2014.; Influent and effluent from local WWTP were collected using a refrigerated 24-h composite sampler.
Test Temperature	Not reported
Results Details	Average removal efficiency (%): WWTP1 -52 ± 97; WWTP2 -20 ± 80; WWTP3 21 ± 15. Negative efficiencies were attributed to either absorption to particulates and molecule-particulate separation, transformation of conjugated products, or shifting of effluent sampling in a way that does not cover total influent load.
Analytical Method and Analytical Details	GC-MS (large volume injection-programmable temperature vaporization) from Agilent. RSD = 3%; LOD 27.6 ng/L; LOQ 41.5 ng/L; R ² = 0.975.; Column extraction with spiked surrogates. 50µL injection in GC-MS; results were average of four replicates.
Transformation Products, Statistics, and Kinetics	Not reported; Removal efficiency: 100 x [Concentration pretreatment - concentration post-treatment]/(Concentration pre-treatment); Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by common nomenclature.
	Metric 2:	Test Substance Purity	High	The test substance was collected from field samples and verified by appropriate analytical means.
Domain 2: Test Design	Metric 3:	Study Controls	High	Appropriate blank groups were used.
	Metric 4:	Test Substance Stability	Medium	Some details regarding the test substance storage conditions and preparation were not reported but the omissions are unlikely to have a substantial impact on the study results.
Domain 3: Test Conditions				

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Study Citation:	Cavalheiro, J., Zuloaga, O., Prieto, A., Preudhomme, H., Amouroux, D., Monperrus, M. (2017). Occurrence and Fate of Organic and Organometallic Pollutants in Municipal Wastewater Treatment Plants and Their Impact on Receiving Waters (Adour Estuary, France). Archives of Environmental Contamination and Toxicology 73(4):619-630.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	4196927			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test material.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were measured but only reported in the supporting data; the omission is unlikely to have a substantial impact on the study results.
	Metric 7:	Testing Consistency	Medium	Since some testing conditions were not reported, the testing consistency could not be evaluated; however, the omission is unlikely to have a substantial impact on the study results.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to the study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The test organism information was described and appropriate for the study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods were reported and appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	The precision of the test substance measurement was reported and acceptable; however, the variability in the removal efficiencies was very high for two of the treatment plants and may impact the study results.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was suitable for detection of the test substance.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	The statistical analysis was appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Low	Plausible explanations for the negative removal efficiencies were suggested but none were verified.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		Low		

Study Citation:	Chase, D. A., Karnjanapiboonwong, A., Fang, Y., Cobb, G. P., Morse, A. N., Anderson, T. A. (2012). Occurrence of synthetic musk fragrances in effluent and non-effluent impacted environments. Science of the Total Environment 416:253-260.
OECD Harmonized Template:	Miscellaneous
HERO ID:	4326553

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; samples stored at 4 °C until analysis; NR
Radiolabel, Source, State, Purity	NR; WWTP samples; analytical standard from LGC Standards (Teddington, UK); NR; 76% Notes: HHCB
Test Method Details, Test Condition Details, and Test Consistency Details	wastewater treatment plant; samples collected from different treatment processes: influent, aeration basin or biological nutrient reactor-aerobic portion (Plant 4), effluent (Plant 3), and effluent (Plant 4); different treatment processes samples were collected on the same day
System Type Design	primary and secondary treatment processes for removal of suspended solids and organic carbon through different operating flow streams
Sampling Frequency and Sampling Details	samples were collected on a quarterly basis: Winter 2009, Spring 2010, Summer 2010, Fall 2010, Winter 2010; grab samples and collected in amber glass jars stored at 4 °C until analysis
Test Temperature	not reported
Results Details	Influent: Winter 2009 = 5224 ng/L, Spring 2010 5524ng/L, Summer 2010 = 4772 ng/L, Fall 2010 = 5735 ng/L, Winter 2010 = 13399 ng/L (SBSE method); Plant 3 effluent: Winter 2009 = 3789 ng/L, Spring 2010 = 6136 ng/L, Summer 2010 = 3259 ng/L, Fall 2010 = 3858 ng/L, Winter 2010 = 10525 ng/L (SBSE method) Plant 4: Winter 2009 = 2016 ng/L (aeration basin), Spring 2010 = 6271 ng/L (biological nutrient removal), Summer 2010 = 3185 ng/L (biological nutrient removal) 2960 ng/L (effluent), Fall 2010= 3129 ng/L (biological nutrient removal) 2928 ng/L (effluent), Winter 2010 (SBSE method) = 46748 ng/L (biological nutrient removal) 3805 ng/L (effluent)
Analytical Method and Analytical Details	solid-phase extraction (SPE) and stir-bar sorptive extraction (SBSE); GC/MS; SPE method MDL and MQL for wastewater and secondary effluent reservoir = 4 and 40 ng/L, respectively, surface water and groundwater = 1 and 5 ng/L, respectively; SBSE method water MDL = 66.7 ng/L , MQL = 333 ng/L
Transformation Products, Statistics, and Kinetics	not applicable; not applicable; not applicable
Reference Substance and Reference Substance Results	not applicable; not applicable

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The WWTP sample source was reported. Analytical standard source and purity reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Analytical blanks were included.
	Metric 4:	Test Substance Stability	High	Sample collection and preparation were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	Samples were collected, processed, and analyzed consistently.

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Study Citation:	Chase, D. A., Karnjanapiboonwong, A., Fang, Y., Cobb, G. P., Morse, A. N., Anderson, T. A. (2012). Occurrence of synthetic musk fragrances in effluent and non-effluent impacted environments. Science of the Total Environment 416:253-260.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	4326553			
Domain		Metric	EVALUATION Rating	Comments
	Metric 6:	Testing Conditions	Medium	Limited WWTP operational details were reported.
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	This metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining removal efficiency.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and account for seasonal variation.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability was not accounted for by statistical techniques, only ranges provided. No major uncertainty in methodology identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Data reporting acceptable.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Chen, D., Zeng, X., Sheng, Y., Bi, X., Gui, H., Sheng, G., Fu, J. (2007). The concentrations and distribution of polycyclic musks in a typical cosmetic plant. Chemosphere 66(2):252-258.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428484

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 0.5% menthol (v/v) added and refrigerated; NR
Radiolabel, Source, State, Purity	NA; Cosmetic plant in HuangPu industrial park in GuangZhou; Liquid; NA Notes: Analytical standard obtained from Promochem, Germany.
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from wastewater treatment plant attached to a cosmetic plant in order to determine removal efficiency of the test substance.; Not reported; Soaps and hand cream not used in washing glassware, disposable plastic gloves used, in order to minimize contamination. Laboratory and method blanks (n = 3 and 3) were included.
System Type Design	Not reported
Sampling Frequency and Sampling Details	15 to 22 November, 2004. N = 2; Samples taken every 2h and mixed to give 24h composite samples. Influent sample volume = 100 mL; effluent sample volume = 500 mL
Test Temperature	Not reported
Results Details	Removal efficiency (sample 1, 2): 94.37 and 93.93% Average removal efficiency: 94.17% Influent (sample 1, 2): 595.48 and 503.88 µg/L Effluent (sample 1, 2): 33.54 and 30.57 µg/L
Analytical Method and Analytical Details	GC-MS in electron impact mode; Data acquisition and processing carried out by Masslynx v 2.3; LOD 0.12 ug/mL; Samples extracted using Disk C18, eluted with hexane: DCM, concentrated, then separated with 2:1 silica-alumina column; Recovery 107.82%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory and method blanks; Below detection limit

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Laboratory and procedural blanks were included.
	Metric 4: Test Substance Stability	Medium	The sample preparation was reported, storage conditions reported in low detail.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	No WWTP operational parameters were reported.
	Metric 7: Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Chen, D., Zeng, X., Sheng, Y., Bi, X., Gui, H., Sheng, G., Fu, J. (2007). The concentrations and distribution of polycyclic musks in a typical cosmetic plant. Chemosphere 66(2):252-258.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428484			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	The sampling methodology used appropriate methods and addressed the outcomes of interest, however the sample number was low and may not be representative.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability from potential contamination and uncertainty from measurements and extraction were accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, LODs, and analytical method were all reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were comparable to the one cited previous study, but the lack of data on the plant operation and low sample size makes confirming the plausibility difficult.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Chen, F., Ying, G. G., Ma, Y. B., Chen, Z. F., Lai, H. J. (2014). Field dissipation of four personal care products in biosolids-amended soils in North China. Environmental Toxicology and Chemistry 33(11):2413-2421.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428509

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	no; experimental: biodegradation in biosolids; experimental: biodegradation in biosolids
Solvent, Reactivity, Storage, Stability	methanol; NR; stored in amber glass bottles at -18 deg C; NR
Radiolabel, Source, State, Purity	NR; Dr. Ehrenstorfer; NR; NR Notes: stock solution concentration: 100 mg/L
Test Method Details, Test Condition Details, and Test Consistency Details	Collected Biosolids in May 2006 from a Beijing centralized sludge treatment plant to mix with surface soils. In the old group, biosolids were applied starting October 2006 and the same amount of biosolids were applied each year for 5 years. In the new group, biosolids were applied starting October 2010 and the same amount of biosolids were applied for 2 years. Wheat and Corn were planted in both new and old treatment plots.; For all groups, pH= 7.5-7.7, OC (%)= 0.67-1.35, clay (<0.002 mm) (%)=16.5-31.8. Biosolids application (t/ha, frequency) and urea application (t/ha): Old group: Control 1 (0,0), Control 2 (0, 0.09), Test 1 (5, every year, 0.09), Test 2 (10, every year, 0.09), Test 3 (20, every year, 0.09), Test 4 (40, every year, 0.09). For new group: Control 3 (0,0), Test 2 (10, once, 0), Test 3 (20, once, 0), Test 4 (40, once, 0).; significant differences (p<0.05)
System Type Design	NR
Sampling Frequency and Sampling Details	once a month for a year; Sampling occurred once a month from October 2010 to October 2011. 5 subsamples were collected from each plot at a depth of 0 to 20 cm. Composite samples were prepared by mixing equal amounts of the discrete subsamples. Sampling did not occur in January and February 2011 due to frost.
Test Temperature	NR
Results Details	dissipation half-life (days) DT50 (error): OT1=33 (6), OT2= 26 (3), OT3=86 (22), OT4=54 (11), NT2= 33 (6), NT3= 87 (23), NT4=98 (21); Average DT50=60 for OT1, OT2, OT3, OT4, NT2, NT3, and NT4
Analytical Method and Analytical Details	Biosolids and soil samples analyzed using acetone-dichloromethane (1:1 v/v) extraction and GC-MS.; LOQ=1.1 ug/kg dry weight
Transformation Products, Statistics, and Kinetics	NR; NR; A standard first-order degradation model was applied to investigate dissipation pattern.
Reference Substance and Reference Substance Results	NR; NR

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The test material source was reported, the purity was not.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Control groups details were reported.
	Metric 4: Test Substance Stability	Medium	Test substance stability was not reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable.
	Metric 6: Testing Conditions	High	Some testing conditions were reported.

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Study Citation:	Chen, F., Ying, G. G., Ma, Y. B., Chen, Z. F., Lai, H. J. (2014). Field dissipation of four personal care products in biosolids-amended soils in North China. Environmental Toxicology and Chemistry 33(11):2413-2421.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428509			
Domain		Metric	EVALUATION Rating	Comments
	Metric 7:	Testing Consistency	High	Testing conditions were consistent.
	Metric 8:	System Type and Design	Medium	Equilibrium was not reported.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The inoculum source was reported.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome of interest was reported.
	Metric 12:	Test Substance Purity	High	The sampling method was reported.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Confounding variables were not addressed; notes uncontrollable field conditions but doesn't go into detail.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	There was insufficient evidence presented to confirm that parent compound disappearance was not likely due to some other process.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	statistical analysis was not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	Due to limited information, evaluation of the reasonableness of the study results was not possible
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			High	

Study Citation:	Chen, F., Ying, G., Ma, Y.,iB, Chen, Z., Lai, H., Peng, F. J. (2014). Field dissipation and risk assessment of typical personal care products TCC, TCS, AHTN and HHCB in biosolid-amended soils. Science of the Total Environment 470:1078-1086.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428493

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Soil dissipation study; Experimental; Soil dissipation study
Solvent, Reactivity, Storage, Stability	NA; NR; Soil and biosolid samples stored at 4 deg C in the dark, prior to extraction; NR
Radiolabel, Source, State, Purity	NA; Biosolid from 70% domestic wastewater centralized sludge treatment plant; Solid; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Field dissipation studies were conducted in Shandong, China. Three treatments (n = 4/treatment) were conducted: control (no biosolid application), one biosolid application, and repeated biosolid application (repeated every year). Biosolid was obtained from a centralized sludge treatment plant and mixed with top 20 cm of soil. Study conducted between May 2007 to October 2010.; Average test substance concentration in biosolid: 2950 ug/kgSingle application: 60 t/ha on May 31st 2007Repeated applications: 60 t/ha on May 31 and October 5 2007, and yearly thereafter until October 2010Average annual rainfall: 522 mm Shandong (wheat and maize fields): fluvo-aquic soil/clay loam, 23% soil moisture, 7.5 - 7.6 pH, 0.6 - 1.4 % OC, 8.0 - 13.5 % sand, 21.4 - 28.8 % coarse sand, 39.1 - 46.5 % silt, 21.7 - 26.0 % clay.; Not Reported
System Type Design	Agricultural field plots, 3 x 2 m
Sampling Frequency and Sampling Details	Monthly for one year; Surface soil samples (0 - 20 cm) were collected as a composite of 5 different points in each plot on October 5 2010 and monthly thereafter until October 2011, except for January and February 2011 when sampling was not carried out in Shandong due to freezing weather. The study was suspended in Zhejiang and Hunan after the first sampling due to sample transport logistical issues.
Test Temperature	12.9 deg C
Results Details	Dissipation half-life = 900 days (single biosolid application) and 83 days (repeated biosolid application)
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode after electron-impact ionization (LOQ = 0.39 - 1.58 ug/kg); Samples extracted by ASE with 1:1 v/v acetone-DCM, concentrated by rotary evaporator and under N2 to near dryness, then re-dissolved in hexane. Extraction recovery = 95 - 115%
Transformation Products, Statistics, and Kinetics	NR; Not Reported; First-order kinetics determined for period from March 2011 to October 2011. R2 = 0.1762 (single application) and 0.6605 (repeated application).
Reference Substance and Reference Substance Results	Control field; No or trace test substance detected in control field

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The biosolid sample source was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	A control field was included and the test substance was not detected in the control samples.
	Metric 4: Test Substance Stability	High	Field sample storage and preparation conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The field dissipation method was appropriate for the test substance.

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Study Citation:	Chen, F., Ying, G., Ma, Y.,iB, Chen, Z., Lai, H., Peng, F. J. (2014). Field dissipation and risk assessment of typical personal care products TCC, TCS, AHTN and HHCB in biosolid-amended soils. Science of the Total Environment 470:1078-1086.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428493			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 6:	Testing Conditions	High	Appropriate soil characteristics and climate conditions were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across replicates.
	Metric 8:	System Type and Design	N/A	Not applicable for dissipation studies.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable for dissipation studies.
	Metric 10:	Sampling Methods	N/A	Not applicable for dissipation studies.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining field dissipation half-lives.
	Metric 12:	Test Substance Purity	High	Sampling methods were described and applied appropriately.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were addressed by the study authors.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable for dissipation studies.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was appropriate, limits of detection and extraction recovery were reported. Raw data may be reported in the supplemental info.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Kinetic calculations were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable, limited discussion of why the dissipation half-lives were different between the two treatments was included.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination			High	

Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428501

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; 14 WWTP influent and effluents.; NR; NA Notes: Analytical standard obtained from Promochem-LGC Standards, Wesel, Germany, 76% purity
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from WWTPs with several various types of treatment.; Industrial influence > 75%; COD WWTP 13 (influent, effluent): 900, 35 ug/LCOD WWTP 14 (influent, effluent): 1200, 40 ug/LCOD WWTP 3 (influent, effluent): 198, 34 ug/
System Type Design	WWTP 13: primary clarification, activated sludge treatmentWWTP 14: primary clarification, 2-stage activated sludge treatment
Sampling Frequency and Sampling Details	Once on the same day; Composite influent and effluent samples (normalized for daily flow)
Test Temperature	Not reported
Results Details	Removal efficiencies: >84% and > 84%WWTP 13 (influent, effluent): 5.2, < 0.85 µg/LWWTP 14 (influent, effluent): 5.3, <0.83 µg/L
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOD 0.02 ug/L; LOQ 0.04 ug/L; Samples extracted 3x with dichloromethane, concentrated under nitrogen, cleaned up on an aluminum oxide column and eluted with n-hexane/ethyl acetate, and concentrated; Recovery 79 - 115%
Transformation Products, Statistics, and Kinetics	Not reported; Analytical validation performed by statistical software package SQS following standard method DIN 32645; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples was reported, the source and purity of the analytical standard was reported and measurements were corrected for the standards purity.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4: Test Substance Stability	Medium	The sample preparation was reported, the sample storage conditions were not reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	The WWTP processes were reported but no operational parameters were included.
	Metric 7: Testing Consistency	High	The samples were collected, prepared, analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428501			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	The sampling methods addressed the outcomes of interest and used accepted approaches, however only one sample was collected per plant so should not be considered representative.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups and uncertainty in measurements was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data was reported, extraction recovery and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were reported and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to previous studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428501

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; 14 WWTP influent and effluents.; NR; NA Notes: Analytical standard obtained from Promochem-LGC Standards, Wesel, Germany, 76% purity
Test Method Details, Test Condition Details, and Test Consistency	Influent and effluent samples collected from WWTPs with several various types of treatment.; Industrial influence < 25%; COD WWTP 1 (influent, effluent): 347, 29 ug/LCOD WWTP 2 (influent, effluent): 560, 36 ug/LCOD WWTP 3 (influent, effluent): 198, 34 ug/L
Details	
System Type Design	WWTP 1: activated sludge treatmentWWTP 2: primary clarification, activated sludge treatment, trickling filterWWTP 3: primary clarification, activated sludge treatment
Sampling Frequency and Sampling Details	Once on the same day; Composite influent and effluent samples (normalized for daily flow)
Test Temperature	Not reported
Results Details	Removal efficiencies: >81%, 86%, and > 42%WWTP 1 (influent, effluent): 4.3, < 0.83 µg/LWWTP 2 (influent, effluent): 6.8, 0.95 µg/LWWTP 3 (influent, effluent): 1.4, < 0.80 µg/L
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOD 0.02 ug/L; LOQ 0.04 ug/L; Samples extracted 3x with dichloromethane, concentrated under nitrogen, cleaned up on an aluminum oxide column and eluted with n-hexane/ethyl acetate, and concentrated; Recovery 79 - 115%
Transformation Products, Statistics, and Kinetics	Not reported; Analytical validation performed by statistical software package SQS following standard method DIN 32645; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported, the source and purity of the analytical standard was reported and measurements were corrected for the standards purity.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	The sample preparation was reported, the sample storage conditions were not reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	The WWTP processes were reported but no operational parameters were included.
	Metric 7:	Testing Consistency	High	The samples were collected, prepared, analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

Domain 4: Test Organisms

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Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428501			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	The sampling methods addressed the outcomes of interest and used accepted approaches, however only one sample was collected per plant so should not be considered representative.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups and uncertainty in measurements was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data was reported, extraction recovery and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were reported and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to previous studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428501			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR			
Radiolabel, Source, State, Purity	NA; 14 WWTP influent and effluents.; NR; NA Notes: Analytical standard obtained from Promochem-LGC Standards, Wesel, Germany, 76% purity			
Test Method Details, Test Condition Details, and Test Consistency	Influent and effluent samples collected from WWTPs with several various types of treatment.; Industrial influence 25 - 75%; COD (influent, effluent): 147 - 660 ug/L, 21 - 40 ug/L			
Details				
System Type Design	WWTP 4: primary clarification, trickling filterWWTP 5, 9: activated sludge (AS)WWTP 6: 2-stage ASWWTP 7: primary clarification, 2-stage AS and trickling filterWWTP 8, 10: primary clarification, ASWWTP 11, 12: primary clarification, 2-stage AS			
Sampling Frequency and Sampling Details	Once on the same day; Composite influent and effluent samples (normalized for daily flow)			
Test Temperature	Not reported			
Results Details	Removal efficiencies: > 41% (WWTP 4), >59 – 71% (WWTP 5, 9), > 73% (WWTP 6), > 85% (WWTP 7), > 56% - > 78% (WWTP 8, 10), > 85% - 92% (WWTP 11, 12)WWTP influent: < 1.4 - 13 µg/LWWTP effluent: < 0.83 - 1.1 µg/L			
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOD 0.02 ug/L; LOQ 0.04 ug/L; Samples extracted 3x with dichloromethane, concentrated under nitrogen, cleaned up on an aluminum oxide column and eluted with n-hexane/ethyl acetate, and concentrated; Recovery 79 - 115%			
Transformation Products, Statistics, and Kinetics	Not reported; Analytical validation performed by statistical software package SQS following standard method DIN 32645; Not applicable			
Reference Substance and Reference Substance Results	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported, the source and purity of the analytical standard was reported and measurements were corrected for the standards purity.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	The sample preparation was reported, the sample storage conditions were not reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	The WWTP processes were reported but no operational parameters were included.
	Metric 7:	Testing Consistency	High	The samples were collected, prepared, analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
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Study Citation:	Clara, M., Gans, O., Windhofer, G., Krenn, U., Hartl, W., Braun, K., Scharf, S., Scheffknecht, C. (2011). Occurrence of polycyclic musks in wastewater and receiving water bodies and fate during wastewater treatment. Chemosphere 82(8):1116-1123.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428501			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	The sampling methods addressed the outcomes of interest and used accepted approaches, however only one sample was collected per plant so should not be considered representative.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups and uncertainty in measurements was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data was reported, extraction recovery and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were reported and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to previous studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Clara, M., Strenn, B., Ausserleitner, M., Kreuzinger, N. (2004). Comparison of the behaviour of selected micropollutants in a membrane bioreactor and a conventional wastewater treatment plant. Water Science and Technology 50(5):29-36.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428497

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; STP in a rural community in south-east Austria.; NA; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from a full scale conventional activated sludge plant; SRT: 114, 237, and 52 daysSRT related to 20°C (calculated): 91, 275, 21 d; COD average: 1,090 mg/LCOD range: 1,900 - > 6,000 mg/L
System Type Design	Simultaneous sludge stabilization, simultaneous phosphorus precipitation with ferric chloride, and intermittent and simultaneous nitrification and denitrification.
Sampling Frequency and Sampling Details	May, July, and December 2002; Daily composite samples of influent and effluent
Test Temperature	16.8, 22.1, and 6.8°C
Results Details	Removal efficiency: approx. 85%
Analytical Method and Analytical Details	GC-MS; LOQ 20 ng/L; LOD 10ng/L; Samples extracted and enriched by C18 solid phase cartridges, derivatized with diazomethane and cleaned up by silica gel chromatography.
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4: Test Substance Stability	Medium	Minimal details on sample preparation and storage conditions reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6: Testing Conditions	High	Operational parameters and WWTP plant processes were reported.
	Metric 7: Testing Consistency	High	The samples were collected, processed, and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

Domain 4: Test Organisms

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Study Citation:	Clara, M., Strenn, B., Ausserleitner, M., Kreuzinger, N. (2004). Comparison of the behaviour of selected micropollutants in a membrane bioreactor and a conventional wastewater treatment plant. Water Science and Technology 50(5):29-36.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428497			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods addressed the outcomes of interest and used widely accepted methods.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between study groups was discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Removal efficiencies reported graphically as an average over the sampling campaigns, and extraction efficiencies were not reported. Target chemical concentrations not reported. Analytical methods were appropriate and reported limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Clara, M., Strenn, B., Ausserleitner, M., Kreuzinger, N. (2004). Comparison of the behaviour of selected micropollutants in a membrane bioreactor and a conventional wastewater treatment plant. Water Science and Technology 50(5):29-36.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428497			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR			
Radiolabel, Source, State, Purity	NA; STP in a rural community in south-east Austria.; NA; NA			
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from pilot plant equipped with an ultrafiltration membrane; SRT: 10, 27, and 56 daysSRT related to 20°C (calculated): 11, 41, 20 d; Not reported			
System Type Design	Screen and grit chamber, feed tank, denitrification tank, nitrification tank, membrane module, permeate tank			
Sampling Frequency and Sampling Details	May, July, and December 2002; Daily composite samples of influent and effluent			
Test Temperature	22.2, 27.2, and 5.5°C			
Results Details	Removal efficiency: approx. 80%			
Analytical Method and Analytical Details	GC-MS; LOQ 20 ng/L; LOD 10ng/L; Samples extracted and enriched by C18 solid phase cartridges, derivatized with diazomethane and cleaned up by silica gel chromatography.			
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable			
Reference Substance and Reference Substance Results	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Field or other blanks were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	Minimal details on sample preparation and storage conditions reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6:	Testing Conditions	High	Operational parameters and WWTP plant processes were reported.
	Metric 7:	Testing Consistency	High	The samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
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Study Citation:	Clara, M., Strenn, B., Ausserleitner, M., Kreuzinger, N. (2004). Comparison of the behaviour of selected micropollutants in a membrane bioreactor and a conventional wastewater treatment plant. Water Science and Technology 50(5):29-36.		
OECD Harmonized Template:	Miscellaneous		
HERO ID:	5428497		
Domain	Metric	EVALUATION Rating	Comments
Domain 5: Outcome Assessment			
	Metric 11: Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12: Test Substance Purity	High	The sampling methods addressed the outcomes of interest and used widely accepted methods.
Domain 6: Confounding/Variable Control			
	Metric 13: Confounding Variables	High	Variability between study groups was discussed in data evaluation.
	Metric 14: Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis			
	Metric 15: Data Reporting	Medium	Removal efficiencies reported graphically as an average over the sampling campaigns, and extraction efficiencies were not reported. Target chemical concentrations not reported. Analytical methods were appropriate and reported limits of detection were sensitive enough.
	Metric 16: Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not reported.
Domain 8: Other			
	Metric 17: Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18: QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High	

Study Citation:	COWI AS, (2018). Screening programme 2017: Suspected PBT compounds.
OECD Harmonized Template:	Miscellaneous
HERO ID:	7303021

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR Notes: HHCB; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethyl-cyclopenta[g]benzopyran
Test Method Details, Test Condition Details, and Test Consistency	Samples collected from locations within Oslofjord, Lake Mjosa and near the City of Oslo; samples include biota, municipal wastewaters, sludge, sediment, air and dust; WWTPs: Vestfjorden Avløpsselskap (VEAS), Hedmarken Interkommunale VAR-selskap (HIAS); Monitoring study; Monitoring study
System Type Design	Monitoring study
Sampling Frequency and Sampling Details	sampling/screening conducted from June to Sept 2017; Passive samplers with SPMD (Semi Permeable Membrane Device) and POCIS (Polar Organic Chemical Integrative Sampler) membrane
Test Temperature	Not reported
Results Details	WWTP screening samples - influent: 8400 ng/L (VEAS) 13000 ng/L (HIAS); effluent 1000 ng/L (VEAS) 2600 ng/L (HIAS); SPMD effluent 38000-40000 ng/L (VEAS) 33000-37000 ng/L (HIAS); sludge: 6800-8100 ng/g (VEAS) 12000-14000 ng/L (HIAS); COD liver 56-290 ng/g dw, fish fillet 22-33 ng/g dw, juvenile fish 45 ng/g dw, krill 41 ng/g, indoor dust 390 ng/g dw
Analytical Method and Analytical Details	water: purge and trap method followed by GC-MS; sediment and sludge: Solid Phase Micro Extraction followed by GC-MS; biota: homogenization, extraction and clean up followed by GC-MS/MS; air and dust: eluted from sorption tubes followed by GC-MS; Water, sediment and sludge samples: LOD and LOQ calculated as 3x S/N ratio and 9x S/N ratio, respectively; biota LOQ calculated from lowest calibration where RSD of response factor <30%
Transformation Products, Statistics, and Kinetics	Not applicable; WWTP sludge appeared to be major sink and notable accumulation was observed in biota; Not reported
Reference Substance and Reference Substance Results	Not applicable; Not applicable

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by chemical name.
	Metric 2:	Test Substance Purity	Low	Analytical standard source and purity were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The metric is not applicable to this study type.
	Metric 4:	Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Low	Non-guideline, non-standard data for environmental partitioning.
	Metric 6:	Testing Conditions	N/A	The metric is not applicable to this study type.
	Metric 7:	Testing Consistency	N/A	The metric is not applicable to this study type.

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Study Citation:	COWI AS, (2018). Screening programme 2017: Suspected PBT compounds.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	7303021			
Domain	Metric	EVALUATION		Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	Low	Limited detail on specific biota samples.
Domain 5: Outcome Assessment	Metric 11:	Test Substance Identity	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 12:	Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 6: Confounding/Variable Control	Metric 13:	Confounding Variables	N/A	No confounding variables were noted.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis	Metric 15:	Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	The analysis of data was clearly described.
Domain 8: Other	Metric 17:	Verification or Plausibility of Results	Medium	The study results are reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			Medium	

Study Citation:	He, Y., Chen, W.,ei, Zheng, X. Y., Wang, X., Huang, X.,i (2013). Fate and removal of typical pharmaceuticals and personal care products by three different treatment processes. Science of the Total Environment 447:248-254.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428318

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 2 L amber glass bottles, at 4°C in the dark; NR
Radiolabel, Source, State, Purity	NA; 2 WWTPs in Nanjing and Wuxi; NA; NA Notes: Reference standards in methylene chloride purchased from Sigma-Aldrich, USA, >98% purity, stored at 4°C.
Test Method Details, Test Condition Details, and Test Consistency	Influent and effluent samples collected from WWTP which utilizes anaerobic/oxic process to determine removal efficiency.; Influent: urban wastewaterSRT: 8 dHRT: 6.7 h; Wastewater characteristicsCOD: 123.2±8.5 (influent), 25.2±1.5 (effluent) ng/LpH: 7.19-7.76 (influent)
Details	
System Type Design	bar screening chamber, aerated grit chamber, primary sedimentary tank, anerobic/oxic tank, secondary sedimentary tank, UV disinfection
Sampling Frequency and Sampling Details	3 campaigns, once every 10 d in July 2011, starting at 9 a.m.; Samples collected at the influent, aeration grit chamber, primary sedimentary tank, anerobic/oxic tank, and secondary sedimentary tank, filtered by glass-fiber membranes.
Test Temperature	26.2-28.2°C
Results Details	Influent: 316 ± 10 ng/L Effluent: 103 ± 7 ng/L Removal efficiency: 67%
Analytical Method and Analytical Details	DSQ II Single Quadrapole GC-MS with fused-silica TR-5MS capillary column; LOD 0.4 ng/L; Samples prepared by SPE cartridges, eluted with hexane then hexane/methylene chloride. Solvent was blown down to 1 mL with gentle N2 flow; Mean recoveries 99 - 111%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Analytical blank; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the WWTP samples was reported, in addition to the source and purity of the analytical standards.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	An analytical blank was included, it was not clear if a sampling blank was included as well.
	Metric 4: Test Substance Stability	High	The sample preparation and storage conditions were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	High	The WWTP operational stages and conditions were reported.
	Metric 7: Testing Consistency	High	Sample collection and analysis was conducted consistently.

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Study Citation:	He, Y., Chen, W.,ei, Zheng, X. Y., Wang, X., Huang, X.,i (2013). Fate and removal of typical pharmaceuticals and personal care products by three different treatment processes. Science of the Total Environment 447:248-254.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428318			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was accounted for through statistical techniques between analyses.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, extraction efficiency, and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not explicitly reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	He, Y., Chen, W.,ei, Zheng, X. Y., Wang, X., Huang, X.,i (2013). Fate and removal of typical pharmaceuticals and personal care products by three different treatment processes. Science of the Total Environment 447:248-254.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428318

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 2 L amber glass bottles, at 4°C in the dark; NR
Radiolabel, Source, State, Purity	NA; 2 WWTPs in Nanjing and Wuxi; NA; NA Notes: Reference standards in methylene chloride purchased from Sigma-Aldrich, USA, >98% purity, stored at 4°C.
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected from WWTP which utilizes both anaerobic/anoxic/anoxic/oxic membrane biological reactor (process 1) and combined orbal ditch (process 2) processes separately to determine removal efficiency.; Influent: 40% industrial wastewaterSRT (process 1, process 2): 22, 23 dHRT (process 1, process 2): 10, 20 h; Wastewater characteristicsCOD: 243.0±3.8 (influent), 24.5±0.4 (effluent, process 1), 25.6±1.0 mg/L (effluent, process 2)pH: 7.19-7.76 (influent)
System Type Design	Both processes: bar screening chamber, aerated grit chamber, primary sedimentary tankProcess 1: anerobic/anoxic/anoxic/oxic tank, MBR, ozone disinfectionProcess 2:combined orbal oxidation ditch, secondary sedimentary tank, rotating disk filter
Sampling Frequency and Sampling Details	3 campaigns, once every 10 d in July 2011, starting at 9 a.m.; Samples collected at the aeration grit chamber, anerobic/anoxic/anoxic/oxic tank, MBR and MBR effluent (process 1), and at the combined orbal oxidation ditch and secondary sedimentary tank (process 2), filtered by glass-fiber membranes.
Test Temperature	24.8-27.0°C
Results Details	Influent: 306 ± 6 ng/L Effluent: 88 ± 11 (process 1), 186 ± 7 ng/L (process 2) Removal efficiency: 71%
Analytical Method and Analytical Details	DSQ II Single Quadrupole GC-MS with fused-siliva TR-5MS capillary column; LOD 0.4 ng/L; Samples prepared by SPE cartridges, eluted with hexane then hexane/methylene chloride. Solvent was blown down to 1 mL with gentle N2 flow; Mean recoveries 99 - 111%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Analytical blank; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP samples was reported, in addition to the source and purity of the analytical standards.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	An analytical blank was included, it was not clear if a sampling blank was included as well.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The WWTP operational stages and conditions were reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis was conducted consistently.

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Study Citation:	He, Y., Chen, W.,ei, Zheng, X. Y., Wang, X., Huang, X.,i (2013). Fate and removal of typical pharmaceuticals and personal care products by three different treatment processes. Science of the Total Environment 447:248-254.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428318			
Domain		Metric	EVALUATION Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was accounted for through statistical techniques between analyses.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, extraction efficiency, and limits of detection were reported, the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not explicitly reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Herrera-Cárdenas, J., Navarro, A. E., Torres, E. (2016). Effects of porous media, macrophyte type and hydraulic retention time on the removal of organic load and micropollutants in constructed wetlands. Journal of Environmental Science and Health, Part A: Toxic/Hazardous Substances & Environmental Engineering 51(5):380-388.
OECD Harmonized Template:	Miscellaneous
HERO ID:	3362137

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR			
Radiolabel, Source, State, Purity	NA; WWTP of Izucar de Matamoros, Mexico; NA; NA			
Test Method Details, Test Condition Details, and Test Consistency Details	Mesocosm wetlands constructed with variable porous media, macrophytes, and HRT to determine the impacts to removal efficiency of selected pollutants from WWTP effluent.; 9 mesocosms constructed following a Latin Square Design. Porous medium: river gravel, fine volcanic gravel (tezontle), or coarse volcanic gravel. Macrophyte: Thypa latifolia, Phragmites australis, or Cyperus papyrusHRT: 1, 3, 5 days.; Effluent collected from WWTP Izucar de Matamoros, Mexico. Mean parameters: pH: 7.42; DO: 0.21 mg/L; temp 25.22°C; redox potential: -325.09; conductivity: 2507.55 µS/cm; turbidity: 16.92.			
System Type Design	Mesocosms constructed in 650 L polyethylene tanks, 360 kg porous material and 50 plants per mesocosm.			
Sampling Frequency and Sampling Details	February to August 2013: Weekly (5 samples), every two weeks (3 samples), monthly (2 samples); Water samples collected according to Mexican standard NMX-AA-003-1980, in Winkler and amber glass bottles			
Test Temperature	Approx. 32 to 22°C			
Results Details	Average influent (range): 433.67 ± 197.76 µg/d m^2 (163.71 - 663.89 µg/d m^2)Average removal efficiency (range): 79.02 ± 11.06% (62.75 - 96.46%)HRT the variable that most impacts removal efficiency (high removal with longer HRT). Removal efficiencies decreased over time: approx. average 87%, decreasing to 78% after 2 and 4 weeks.			
Analytical Method and Analytical Details	GC-MS in electronic impact mode, analytes separated on AB5-MS capillary column; Samples filtered, SPE used for aqueous phase, ultrasonic extraction used for particulate phase, purified on column. Both extracts concentrated.			
Transformation Products, Statistics, and Kinetics	Nr; Statistical v. 12: Kolmogorov-Smirnoff for data normality, ANOVA and Tukey post-hoc test, P<0.05 for significant differences; Not applicable			
Reference Substance and Reference Substance Results	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The influent sample source was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Controls or analytical blanks were not explicitly included.
	Metric 4:	Test Substance Stability	Medium	Influent preparation or feed rate were not reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
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Study Citation:	Herrera-Cárdenas, J., Navarro, A. E., Torres, E. (2016). Effects of porous media, macrophyte type and hydraulic retention time on the removal of organic load and micropollutants in constructed wetlands. Journal of Environmental Science and Health, Part A: Toxic/Hazardous Substances & Environmental Engineering 51(5):380-388.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	3362137			
EVALUATION				
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	pH, temperature, and other conditions were monitored. Mesocosm set up was described.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining removal efficiency.
	Metric 12:	Test Substance Purity	High	Sampling methods were performed for a formalized standard and briefly described.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Specific mesocosm results were not reported and effects of different variables were only described briefly.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; extraction efficiency and limits of detection were not reported. Mesocosm specific data were not reported. Time effects on removal efficiency were estimated from a figure.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and additional appendices included higher than normal amount of data.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		High		

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA
Test Method Details, Test Condition Details, and Test Consistency Details	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m ² day (summer), 10 g/m ² day (winter)
System Type Design	Unplanted. With gravel bed. Free-water flow, effluent leaving through bottom.
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)
Results Details	Mass removal efficiency: approx. 45% (winter), 75% (summer) Calculated by $(CiQi - CeQe) / CiQi * 100\%$ Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate
Analytical Method and Analytical Details	GC-MS; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. $p < 0.05$; Not applicable
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.

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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR			
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA			
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant (Leon, northwest Spain) to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m^2 day (summer), 10 g/m^2 day (winter)			
Details				
System Type Design	Planted with Typha sp. Without gravel bed. Floating macrophytes, free-water surface flow.			
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.			
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)			
Results Details	Mass removal efficiency: approx. 40% (winter), 75% (summer) Calculated by (CiQi - CeQe) / CiQi * 100% Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate			
Analytical Method and Analytical Details	GC-MS; Not reported			
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. p < 0.05; Not applicable			
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR			
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA			
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m^2 day (summer), 10 g/m^2 day (winter)			
System Type Design	Planted with Typha sp. With gravel bed. Free-water surface flow.			
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.			
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)			
Results Details	Mass removal efficiency: approx. 25% (winter), 55% (summer) Calculated by (CiQi - CeQe) / CiQi * 100% Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate			
Analytical Method and Analytical Details	GC-MS; Not reported			
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. p < 0.05; Not applicable			
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR			
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA			
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m^2 day (summer), 10 g/m^2 day (winter)			
Details	Planted with Phragmites australis. With gravel bed. Subsurface flow.			
System Type Design	Planted with Phragmites australis. With gravel bed. Subsurface flow.			
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.			
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)			
Results Details	Mass removal efficiency: approx. 15% (winter), 65% (summer) Calculated by $(CiQi - CeQe) / CiQi * 100\%$ Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate			
Analytical Method and Analytical Details	GC-MS; Not reported			
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. p < 0.05; Not applicable			
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR			
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA			
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m^2 day (summer), 10 g/m^2 day (winter)			
System Type Design	Planted with Phragmites australis. Without gravel bed. Floating macrophytes, free-water surface flow.			
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.			
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)			
Results Details	Mass removal efficiency: approx. 10% (winter), 80% (summer)Calculated by (CiQi - CeQe) / CiQi * 100%Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate			
Analytical Method and Analytical Details	GC-MS; Not reported			
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. p < 0.05; Not applicable			
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCb			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR			
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA			
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m^2 day (summer), 10 g/m^2 day (winter)			
System Type Design	Unplanted. With gravel bed. Subsurface flow.			
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.			
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)			
Results Details	Mass removal efficiency: approx. 0% (winter), 30% (summer) Calculated by (CiQi - CeQe) / CiQi * 100% Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate			
Analytical Method and Analytical Details	GC-MS; Not reported			
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. p < 0.05; Not applicable			
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the WWTP wastewater samples containing the test substance was reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	There was not a concurrent control for every mesocosm variable.
	Metric 4:	Test Substance Stability	High	The test substance preparation, homogenization, and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Temperature was reported, wastewater characteristics were reported in supplemental data (not accessible here), other mesocosm conditions were not reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across study groups.
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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428348

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber bottles, 4°C; NR
Radiolabel, Source, State, Purity	NA; Urban wastewater from primary clarifier of WWTP in Leon, Spain; Liquid; NA
Test Method Details, Test Condition Details, and Test Consistency	From January to September 2008, mesocosm-scale constructed wetlands received homogenized urban wastewater collected from a primary clarifier of a WWTP plant to determine mass removal efficiency; Constructed wetlands fed wastewater at continuous flow rate of 50 L/day; Seasonal variability in pollutant load observed. BOD5: 3 g/m ² day (summer), 10 g/m ² day (winter)
System Type Design	Planted with Typha sp. With gravel bed. Free-water flow, effluent leaving through bottom.
Sampling Frequency and Sampling Details	January - March 2008, July - September 2008, collected once a week, same day and time (n = 8 in winter, 7 in summer); Influent and effluent grab samples collected in 1L amber bottles and stored at 4°C, analyzed within 24 hr.
Test Temperature	Average: 7.0°C (winter), 19.9°C (summer)
Results Details	Mass removal efficiency: approx. 65% (winter), 70% (summer) Calculated by $(CiQi - CeQe) / CiQi * 100\%$ Where Ci = influent concentration, Qi = influent flow rate, Ce = effluent concentration, Qe = effluent flow rate
Analytical Method and Analytical Details	GC-MS; Not reported
Transformation Products, Statistics, and Kinetics	Not reported; SPSS 16 package. Data normality and homoscedasticity checked by Shapiro-Wilk W test and Levene test. Efficiency comparison done by non-parametric Mann-Whitney U test. Linear correlations between variables checked by the Spearman coefficient. $p < 0.05$; Not applicable
Reference Substance and Reference Substance Results	WWTP mass removal efficiency; approx. 0%

EVALUATION			
Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High
	Metric 2:	Test Substance Purity	High
Domain 2: Test Design	Metric 3:	Study Controls	Medium
	Metric 4:	Test Substance Stability	High
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High
	Metric 6:	Testing Conditions	Medium
	Metric 7:	Testing Consistency	High

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Study Citation:	Hijosa-Valsero, M., Matamoros, V., Sidrach-Cardona, R., Martín-Villacorta, J., Bécares, E., Bayona, J. M. (2010). Comprehensive assessment of the design configuration of constructed wetlands for the removal of pharmaceuticals and personal care products from urban wastewaters. Water Research 44(12):3669-3678.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428348			
EVALUATION				
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Seasonal variability was discussed in data evaluation, statistical techniques accounted for variability between samples.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Mass removal efficiencies primarily reported graphically. Analytical methods and sample preparation may be reported in greater detail in Matamoros et al. 2005.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and appropriate for the study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Horii, Y., Reiner, J. L., Loganathan, B. G., Senthil Kumar, K., Sajwan, K., Kannan, K. (2007). Occurrence and fate of polycyclic musks in wastewater treatment plants in Kentucky and Georgia, USA. Chemosphere 68(11):2011-2020.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431373

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 500 mL polypropylene bottles at -20°C; NR
Radiolabel, Source, State, Purity	NA; Two WWTPs in Kentucky or Georgia; Liquid and sludge; NA Notes: Analytical standards obtained from Dr. Ehrenstorfer GmbH, Augsburg, Germany, with 51% purity
Test Method Details, Test Condition Details, and Test Consistency	Wastewater samples at various points in a WWTP in Kentucky were collected in order to determine removal efficiency.; WWTP treats primarily domestic and commercial wastewater.; Not reported
Details	
System Type Design	Plant A: Raw sewage, bar screens/grit removal, primary sedimentation tanks, bioreactor, secondary sedimentation tanks to either chlorine contact or processing to dry ponds before effluent.
Sampling Frequency and Sampling Details	Winter, spring, summer, and fall 2005; Grab samples, collected from influent, before chlorination water, effluent, oxidation ditch sludge, reactivated sludge, sludge compressed cake, and final solid waste in dry pond.
Test Temperature	Not reported
Results Details	Average influent: 2499 ng/L Average effluent: 44 ng/L Average percent removal: 99% Influent: 43 (winter), NA (spring), 7032 (summer), 423 ng/L (fall) Effluent: 67 (winter), 10 (spring), 53 (summer), 46 ng/L (fall) Percent removal: -56%, NA, 99%, 89%
Analytical Method and Analytical Details	GC/MSD in electron impact selected ion monitoring mode; LOQ 10 ng/L; Wastewater samples 2x liquid-liquid extracted by separatory funnel into hexane and dichloromethane, concentrated by rotary evaporator and nitrogen-purge concentrator; recovery 87±4%
Transformation Products, Statistics, and Kinetics	HHCB-lactone, no significant relationship to test substance concentration in sludge or wastewater ($r^2 = 0.004, 0.78$); Pairwise correlation between test substance and transformation product in wastewater and sludge samples, $p < 0.05$; Not applicable
Reference Substance and Reference Substance Results	Procedural blanks with Milli-Q water; Not detected

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The sample source was reported; the analytical standard source and purity was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Procedural blanks were included and below detection.
	Metric 4: Test Substance Stability	High	Sample preparation and storage conditions were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	The STP operational stages were included but operational parameters were not.
	Metric 7: Testing Consistency	High	The samples were collected, prepared, and analyzed consistently.

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Study Citation:	Horii, Y., Reiner, J. L., Loganathan, B. G., Senthil Kumar, K., Sajwan, K., Kannan, K. (2007). Occurrence and fate of polycyclic musks in wastewater treatment plants in Kentucky and Georgia, USA. Chemosphere 68(11):2011-2020.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431373			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data, extraction efficiency, and limits of detection were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistics were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Horii, Y., Reiner, J. L., Loganathan, B. G., Senthil Kumar, K., Sajwan, K., Kannan, K. (2007). Occurrence and fate of polycyclic musks in wastewater treatment plants in Kentucky and Georgia, USA. Chemosphere 68(11):2011-2020.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431373

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 500 mL polypropylene bottles at -20°C; NR
Radiolabel, Source, State, Purity	NA; Two WWTPs in Kentucky or Georgia; Liquid and sludge; NA Notes: Analytical standards obtained from Dr. Ehrenstorfer GmbH, Augsburg, Germany, with 51% purity
Test Method Details, Test Condition Details, and Test Consistency	Wastewater samples at various points in a WWTP in Georgia were collected in order to determine removal efficiency.; WWTP treats primarily domestic and commercial wastewater.; Not reported
Details	
System Type Design	Plant B: Raw sewage, bar screens/grit removal, primary sedimentation tanks, aeration, secondary sedimentation tanks to either chlorine contact before effluent or incineration to ash basin.
Sampling Frequency and Sampling Details	Spring, summer, and fall 2005; Grab samples, collected from influent, primary, effluent, ash basin water, aeration-mixed liquid suspension solids, reactivated sludge, sludge compressed cake, and burnt sludge compressed cake
Test Temperature	Not reported
Results Details	Average influent: 420 ng/L Average effluent: 55 ng/L Average percent removal: 84%Influent: 455 (spring), 284 (summer), 522 ng/L (fall) Effluent: 28 (spring), 98 (summer), 39 ng/L (fall) Percent removal: 94%, 65%, 93%
Analytical Method and Analytical Details	GC/MSD in electron impact selected ion monitoring mode; LOQ 10 ng/L; Wastewater samples 2x liquid-liquid extracted by separatory funnel into hexane and dichloromethane, concentrated by rotary evaporator and nitrogen-purge concentrator; recovery 87±4%
Transformation Products, Statistics, and Kinetics	HHCB-lactone, no significant relationship to test substance concentration in sludge or wastewater ($r^2 = 0.004, 0.78$); Pairwise correlation between test substance and transformation product in wastewater and sludge samples, $p < 0.05$; Not applicable
Reference Substance and Reference Substance Results	Procedural blanks with Milli-Q water; Not detected

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported; the analytical standard source and purity was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Procedural blanks were included and below detection.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	The STP operational stages were included but operational parameters were not.
	Metric 7:	Testing Consistency	High	The samples were collected, prepared, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Horii, Y., Reiner, J. L., Loganathan, B. G., Senthil Kumar, K., Sajwan, K., Kannan, K. (2007). Occurrence and fate of polycyclic musks in wastewater treatment plants in Kentucky and Georgia, USA. Chemosphere 68(11):2011-2020.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431373			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were discussed in data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data, extraction efficiency, and limits of detection were reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistics were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Hu, Z., Shi, Y., Zhang, S., Niu, H., Cai, Y. (2011). Assessment of synthetic musk fragrances in seven wastewater treatment plants of Beijing, China. Bulletin of Environmental Contamination and Toxicology 86(3):302-306.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428350

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Water and sewage samples stored at -20°C; NA
Radiolabel, Source, State, Purity	NR; 7 municipal WWTPs in Beijing; NA; NA Notes: Analytical standard obtained from Dr. Ehrestorfer, Augsburg, Germany
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples from 7 WWTPs analyzed to determine removal efficiency; Not reported; Not reported
System Type Design	Not reported
Sampling Frequency and Sampling Details	Once per 7 WWTP on January 15, May 28, and September 24 2008; n = 45 (17 influent, 16 effluent); 24 h composite samples. Sewage samples filtered through nylon film; sludge freeze-dried, ground, homogenized through 75-mesh sieve
Test Temperature	Not reported
Results Details	Removal efficiencies: < 14.3 - 98.0% Influent: 28.61 - 1,486.1 ng/LRemoval efficiencies: < 14.3 - 98.0% Influent: 28.61 - 1,486.1 ng/LSludge: 0.26 - 12.59 mg/kd dwEffluent release into environment: 1.8 - 685.6 g/d (mean 70.1 g/d)Effluent concentrations comparable or sometimes higher than influents for some WWTPs. No significant difference in removal efficiencies between seasons.
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; LOD 3.3 ng/g (sludge) 1.2 ng/L (sewage); Recoveries 89.7%-104.9%; Water extracted and concentrated by SPE, eluted consecutively with n-hexane and n-hexane/DCM; sludge extracted using an accelerated solvent extraction system into C6H14:CH2Cl2, cleaned up with activated copper, passed through a column into n-hexane.
Transformation Products, Statistics, and Kinetics	Not reported; U Kruskal-Wallis test to calculate difference in concentrations between sewage and sludge samples (p < 0.05). Statistical analyses performed by SPSS 13.0; Not applicable
Reference Substance and Reference Substance Results	Field blank and procedural blank for each batch of 6 samples; Below detection limit

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The WWTP sample source was reported in minimal detail.
Domain 2: Test Design	Metric 3: Study Controls	High	A field blank was included and test substance concentrations were below the detection limit.
	Metric 4: Test Substance Stability	High	The test substance preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	No WWTP operational conditions were reported.

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Study Citation:	Hu, Z., Shi, Y., Zhang, S., Niu, H., Cai, Y. (2011). Assessment of synthetic musk fragrances in seven wastewater treatment plants of Beijing, China. Bulletin of Environmental Contamination and Toxicology 86(3):302-306.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428350			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Samples were collected and prepared consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Sources of variability were discussed during data evaluation.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Raw data for the individual WWTPs not reported, seasonal influent and effluent concentrations reported graphically. Analytical methods appropriate and limits of detection were sensitive enough. Extraction efficiency for other internal standard reported and appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods described and appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	Difficult to determine the plausibility of the results based on the large range in efficiencies with little detail on WWTP parameters.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Joss, A., Keller, E., Alder, A. C., Gobel, A., Mcardell, C. S., Ternes, T., Siegrist, H. (2005). Removal of pharmaceuticals and fragrances in biological wastewater treatment. Water Research 39(14):3139.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5919080

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; full-scale WWTP removal efficiency; Experimental; full-scale WWTP removal efficiency
Solvent, Reactivity, Storage, Stability	NA; NR; Stored at 4 deg C; NR
Radiolabel, Source, State, Purity	NA; Two WWTPs in Switzerland; NA; NA
Test Method Details, Test Condition Details, and Test Consistency Details	WWTP removal efficiency was determined at the Kloten/Opfikon and Altenrhein WWTPs in Switzerland. Removal efficiency was calculated from values in Fig. 6 as the total % test substance (influent) minus the % test substance in the effluent.; Kloten/Opfikon: conventional activated sludge (CAS) treatment run in parallel with pilot-scale membrane bioreactor (MBR).SRT: 10-12 days (CAS); 16, 33, and 60-80 days (MBR)HRT: 7.3 h; 13 h (MBR)Scheme: screen and grit removal, primary clarifier, denitrification, nitrification, secondary clarifier, and sand filter. Altenrhein: conventional activated sludge treatment run in parallel with a fixed-bed reactor (FBR). SRT: 22-24 days (CAS)HRT: 16.8 h; 0.7 h (FBR)Scheme: screen and grit removal, primary clarifier, denitrification, nitrification, secondary clarifier, and sand filter. Fixed-bed reactor: anaerobic chamber, denitrification, and nitrification; Not Reported
System Type Design	Not Reported
Sampling Frequency and Sampling Details	2-3 sample campaigns.; Influent and effluent samples were collected on March 11-18, 2002, January 30 - February 5, 2003, and November 19-25, 2003 (Kloten/Opfikon); September 12-18, 2002, and February 26 - March 4, 2003 (Altenrhein). Samples collected as two weekday samples (combining two and three days) and one weekend sample (combining Saturday and Sunday) by 24-h composite sampling. Excess sludge samples were also collected.
Test Temperature	12 - 21 deg C
Results Details	Kloten/Opfikon removal efficiency: 36 to 57% (CAS), 44 to 59% (MBR). Altenrhein removal efficiency: 50 to 53% (CAS) and 52 to 53% (FBR)
Analytical Method and Analytical Details	GC/MS in single-ion monitoring without derivatization; Samples filtered through glass-fiber filters and concentrated on RP-EC18 EC solid-phase material.
Transformation Products, Statistics, and Kinetics	NA; NR; NA
Reference Substance and Reference Substance Results	NA; NA

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The WWTP sample source was reported. Purity is not applicable for this study type.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Unclear if field blanks were included.
	Metric 4: Test Substance Stability	Medium	Sample storage was reported generally and was appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was appropriate for the test substance.

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Study Citation:	Joss, A., Keller, E., Alder, A. C., Gobel, A., Mcardell, C. S., Ternes, T., Siegrist, H. (2005). Removal of pharmaceuticals and fragrances in biological wastewater treatment. Water Research 39(14):3139.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5919080			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	Appropriate WWTP operational stages and conditions were reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis was consistent between the two WWTPs.
	Metric 8:	System Type and Design	N/A	Not applicable.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining removal efficiency.
	Metric 12:	Test Substance Purity	High	Sampling methods were described and were appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty and variability were discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; limit of detection, extraction recovery, and raw data (reported in figure only) were not explicitly reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	Statistical and kinetic calculations were not conducted.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable based on the method but results were not compared to previous studies.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		High		

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428393

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity
Test Method Details, Test Condition Details, and Test Consistency Details	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Flow: 103 m ³ /day; RBC and reed beds. Plant serves small village with no industrial inputs.; Not reported
System Type Design	Plant has rotating biological contactor (RBC) and reed beds (Constructed wetlands).
Sampling Frequency and Sampling Details	Twice (December 17 and 18, 2001); Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing
Test Temperature	Not reported
Results Details	Crude influent (sample day 1, 2): 19200 and 10200 ng/LRBC effluent (sample day 1, 2): 3200 and 5300 ng/LReed bed effluent (sample day 1, 2): 1300 and 1300 ng/LRBC removal efficiency (sample day 1, 2): 83.33% and 48.04%Reed bed removal efficiency (sample day 1, 2): 93.23 and 87.25%
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4: Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	No operational parameters for the WWTP were reported.
	Metric 7: Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.

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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
Domain		Metric	EVALUATION Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428393

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity
Test Method Details, Test Condition Details, and Test Consistency	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Plant serves residential care center; Not reported
System Type Design	Plant has submerged aerated filter (SAF).
Sampling Frequency and Sampling Details	Twice (December 11 and 10, 2001); Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing
Test Temperature	Not reported
Results Details	Crude influent (sample day 1, 2): 14000 and 10500 ng/LSAF effluent (sample day 1, 2): 5900 and 6400 ng/LRemoval efficiency (sample day 1, 2): 57.86 and 39.05%
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no operational parameters for the WWTP were reported.
	Metric 7:	Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428393

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity
Test Method Details, Test Condition Details, and Test Consistency	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Flow: 3198 m ³ /day; Plant serves average size domestic catchment with some industrial input.; Not reported
System Type Design	Plant has oxidation ditch with long residence times, followed by two final settlement tanks before discharge.
Sampling Frequency and Sampling Details	Three times (December 10, 11, and 12, 2001); Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing
Test Temperature	Not reported
Results Details	Crude influent (sample day 1, 2, and 3): 11900, 11600, and 12300 ng/LDitch effluent (sample day 1, 2, and 3): 1500, 1700, and 1900 ng/LRemoval efficiency (sample day 1, 2, and 3): 87.39, 85.34, and 84.55%
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no operational parameters for the WWTP were reported.
	Metric 7:	Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428393

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity
Test Method Details, Test Condition Details, and Test Consistency	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Flow: 1134 m ³ /day; Plant serves a domestic catchment.; Not reported
System Type Design	Plant has two biological filter bed system.
Sampling Frequency and Sampling Details	Twice (December 17 and 18, 2001); Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing
Test Temperature	Not reported
Results Details	Crude influent (sample day 1, 2): 7900 and 7800 ng/LHumus effluent (sample day 1, 2): 2200 and 1900 ng/LRemoval efficiency (sample day 1, 2): 72.15% and 75.64%
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no operational parameters for the WWTP were reported.
	Metric 7:	Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR			
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity			
Test Method Details, Test Condition Details, and Test Consistency	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Plant serves a hospital.; Not reported			
Details				
System Type Design	Plant has two activated sludge processes (non-nitrifying and nitrifying).			
Sampling Frequency and Sampling Details	Twice; Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing			
Test Temperature	Not reported			
Results Details	Crude influent (sample day 1, 2): 13100 and 16900 ng/LOld ASP effluent (sample day 1, 2): 1600 and 1500 ng/LNew ASP effluent (sample day 1, 2): 2800 and 1100 ng/LOLD ASP removal efficiency (sample day 1, 2): 87.79 and 91.12%NEW ASP removal efficiency (sample day 1, 2): 78.63 and 93.49%			
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%			
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable			
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no operational parameters for the WWTP were reported.
	Metric 7:	Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.				
OECD Harmonized Template:	Miscellaneous				
HERO ID:	5428393				
Domain		Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms					
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.	
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.	
Domain 5: Outcome Assessment					
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.	
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.	
Domain 6: Confounding/Variable Control					
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.	
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.	
Domain 7: Data Presentation and Analysis					
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.	
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.	
Domain 8: Other					
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.	
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.	
Overall Quality Determination			High		

Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428393

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; <6°C in glass bottles; NR
Radiolabel, Source, State, Purity	NA; 6 sewage treatment plants in the United Kingdom; NA; NR Notes: Analytical standards obtained from Sigma-Aldrich, Gillingham, Dorset, >95% purity
Test Method Details, Test Condition Details, and Test Consistency	Samples collected late autumn and early winter of influent and effluent collected from a sewage treatment plant to determine removal efficiency and test substance distribution.; Plant serves domestic catchment with 10% from industry.; Not reported
System Type Design	Plant has conventional ASP and trickling filters.
Sampling Frequency and Sampling Details	Twice (December 11 and 12, 2001); Collected as time weighted composites in glass bottles and kept at 4 - 6°C before processing
Test Temperature	Not reported
Results Details	Crude influent (sample day 1, 2): 8400 and 9800 ng/LASP effluent (sample day 1, 2): 2200 and 2200 ng/Lremoval efficiency (sample day 1, 2): 73.81 and 77.55%
Analytical Method and Analytical Details	GC-MS operated in the positive ion electron impact mode and selected ion monitoring; LOD 8.1 ng/L; Samples acidified to pH 2, extracted by separating funnel twice with dichloromethane, filtered through salinized glass wool and concentrated using a TurboVap concentrator and nitrogen blow down apparatus; Recovery 93.1%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Laboratory blanks to determine contamination of samples. Fields blanks not reported.; No target analytes detected in procedural blanks. Overall analytical QC showed excellent reproducibility and effectiveness.

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blanks and positive spiked blanks were included. Field blanks were not explicitly included.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited to no operational parameters for the WWTP were reported.
	Metric 7:	Testing Consistency	High	Sample collection and preparation was consistent cross samples and study groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Kanda, R., Griffin, P., James, H. A., Fothergill, J. (2003). Pharmaceutical and personal care products in sewage treatment works. Journal of Environmental Monitoring 5(5):823-830.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428393			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of uncertainty and variability were briefly discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations and extraction efficiency were reported, analytical methods were appropriate and limits of detection were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Klaschka, U., von der Ohe, P. C., Bschorer, A., Krezmer, S., Sengl, M., Letzel, M. (2013). Occurrences and potential risks of 16 fragrances in five German sewage treatment plants and their receiving waters. Environmental Science and Pollution Research 20(4):2456-2471.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431366

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Stored cool or frozen; Stability in fortified tap water after storage at -18°C for 1, 2, and 7 wk: stable but 10-40% lower concentration at 7 wk
Radiolabel, Source, State, Purity	Na; STP in Bavaria, Germany, along the Ammer river; Liquid; NA Notes: Standard obtained from Dr. Ehrenstorfer, Augsburg, Germany
Test Method Details, Test Condition Details, and Test Consistency Details	Wastewater samples collected at various points from an activated sludge plant in Germany.; Not reported; Samples analyzed in duplicate
System Type Design	STP system (plant capacity 30,000 pop. eq.): rake (influent), grit chambers, pre-settling basin (primary effluent), anaerobic zone (effluent anerobic zone), aerobic basin, post settling basin, sand filtration (final effluent)
Sampling Frequency and Sampling Details	5 sampling periods; July 20-23, August 19-22, September 7-10, 23-26, and September 29 - October 2, 2009; 24 hr composite samples collected for influent, effluent of primary treatment, effluent of anaerobic section, and final effluent
Test Temperature	Not reported
Results Details	62.8% eliminationInfluent (average): 3.50 µg/LEffluent (average): 1.08 µg/LLoad per inhabitant (influent, effluent): 588, 179 µg/inh d
Analytical Method and Analytical Details	GC-MS after thermodesorption, in selected ion mode; Water samples prepared by stir bar sorptive extraction with a polydimethylsiloxane-coated stir bar at 1,080 rpm for 3 hr,
Transformation Products, Statistics, and Kinetics	Not reported; n=5; Not applicable
Reference Substance and Reference Substance Results	Blanks; < 0.01 - 0.02 ug/L

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The new chemical substance was identified by name and CASRN.
Metric 2:	Test Substance Purity	Medium	The sample source was reported; the analytical standard source but not purity was reported.
Domain 2: Test Design			
Metric 3:	Study Controls	High	Blanks were included and sample measurements were corrected.
Metric 4:	Test Substance Stability	Medium	Vague details on sample storage were provided, however stability tests were conducted and sample preparation methods were reported and appropriate.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
Metric 6:	Testing Conditions	Medium	STP operational stages were reported but not operational parameters, although varying retention times were accounted for in sample collection.

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Study Citation:	Klaschka, U., von der Ohe, P. C., Bschorer, A., Krezmer, S., Sengl, M., Letzel, M. (2013). Occurrences and potential risks of 16 fragrances in five German sewage treatment plants and their receiving waters. Environmental Science and Pollution Research 20(4):2456-2471.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431366			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Samples were collected, processed, and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty were not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Minimal raw data reported, extraction recovery not reported, limits of detection not reported, analytical methods were suitable.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods not specified.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were comparable to previous studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Komarkova, P., Vavrova, M., Kralova, Z. (2014). Evaluation of the water contamination level by synthetic musk compounds. Fresenius Environmental Bulletin 23(12A):3227-3231.
OECD Harmonized Template:	Miscellaneous
HERO ID:	3030665

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Monitoring study; analytical standard: Dr. Ehrenstorfer GmbH (Germany); NR; NR Notes: NR
Test Method Details, Test Condition Details, and Test Consistency Details	Concentrations of musk compounds in wastewater samples collected from WWTP in Brno-Modrice (Czech Republic) from September 4th-13th, 2013; Not reported; Not reported
System Type Design	WWTP
Sampling Frequency and Sampling Details	every 24 hrs; Samples were obtained as mixed 24hr samples; 10 samples from the influent and 10 from the effluent
Test Temperature	Not reported
Results Details	Galaxolide concentration in WWTP influent = 2.367 µg/L and effluent = 0.822 µg/L; removal efficiency: 58.26%
Analytical Method and Analytical Details	Solid-phase microextraction (SPME) coupled with GC-MS; LOD = 0.0003 ug/L; LOQ = 0.0009 ug/L Repeatability RSD = 8.13%; m/z 243 (258)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by chemical name.
	Metric 2:	Test Substance Purity	High	Source and purity of analytical standard were reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	Not applicable to the field/monitoring studies.
	Metric 4:	Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Low	WWTP operating process not reported.
	Metric 6:	Testing Conditions	Low	Operating conditions not reported.
	Metric 7:	Testing Consistency	Medium	Limited detail; this metric met the criteria for medium confidence as expected for this type of study.
	Metric 8:	System Type and Design	Medium	WWTP operating process not reported.
Domain 4: Test Organisms				

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Study Citation:	Komarkova, P., Vavrova, M., Kralova, Z. (2014). Evaluation of the water contamination level by synthetic musk compounds. Fresenius Environmental Bulletin 23(12A):3227-3231.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	3030665			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	WWTP monitoring study; could be considered site-specific data.
	Metric 12:	Test Substance Purity	Medium	Information on sampling methods were limited; however, the limitations were not likely to have had a substantial impact on results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	No confounding variables were noted.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results are reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		Medium		

Study Citation:	Kwon, J. W., Rodriguez, J. M. (2014). Occurrence and removal of selected pharmaceuticals and personal care products in three wastewater-treatment plants. Archives of Environmental Contamination and Toxicology 66(4):538-548.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428197

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Samples collected in prewashed amber bottles 4 L, filtered through glass fiber filters and stored at < 4°C; NR
Radiolabel, Source, State, Purity	NA; Three WWTPs in Mississippi; Liquid; NA Notes: Galaxolide obtained from SAFC (St. Louis, Missouri)
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent water samples collected from 3 WWTPs in Mississippi to determine average removal efficiency.; Detention time: 34, 4, and 6 hours, respectively; pH: 6.04 - 7.73 Conductivity: 302 - 756 uS/cm (influent), 220 - 724 uS/cm (effluent)
System Type Design	All WWTPs had final chlorine treatment step. WWTP 1 primary bar screen and grit chamber, secondary activated sludge in oxidation ditches; WWTP 2 primary settling out, secondary activated sludge; WWTP 3 primary screening, conventional activated sludge
Sampling Frequency and Sampling Details	n = 81, November 2011 - September 2012; WWTP 1 samples collected 53 m upstream and 150 m downstream; WWTP 2 samples collected 720 m upstream and 240 m downstream; WWTP 3 samples collected 1,200 m upstream and 360 m downstream
Test Temperature	Not reported
Results Details	Mean (min - max) influent: 1,376 ng/L (240 - 4,020 ng/L) Mean (min - max) effluent: 465 ng/L (145 - 1,104 ng/L) Mean removal efficiencies: 50 - 76% Secondary activated sludge in oxidation ditch process increased removal.
Analytical Method and Analytical Details	LC-tandem MS (LC-MS-MS) with electrospray ionization; LOQ 16-67 ng/L influent; 6-26 ng/L effluent; Samples extracted by liquid-liquid extraction 2x via separatory funnel into hexane-saturated sodium chloride solution, extract was evaporated to dryness under nitrogen stream, and redissolved in hexane for analysis; Recovery 72.47 - 104.70 ± 2.11-9.81%
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Cross contamination test for sample bottles; Below detection limit

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The source of the test substance was described in low detail; WWTP in Mississippi.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Blanks to correct for cross contamination were analyzed and below detection limits.
	Metric 4: Test Substance Stability	High	Test substance preparation and storage conditions were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	High	WWTP operational conditions and stages were reported.
	Metric 7: Testing Consistency	High	Sample collection, preparation, and analysis were consistent across study groups.

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Study Citation:	Kwon, J. W., Rodriguez, J. M. (2014). Occurrence and removal of selected pharmaceuticals and personal care products in three wastewater-treatment plants. Archives of Environmental Contamination and Toxicology 66(4):538-548.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428197			
Domain		Metric	EVALUATION Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted methods.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical techniques.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations reported, LOQs reported and analytical methods were appropriate, extraction recovery was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and supported by previous studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Langdon, K. A., Warne, M. S., Kookana, R. S. (2010). Aquatic hazard assessment for pharmaceuticals, personal care products, and endocrine-disrupting compounds from biosolids-amended land. Integrated Environmental Assessment and Management 6(4):663-676.
OECD Harmonized Template:	Miscellaneous
HERO ID:	1402874

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	No; Estimation, run-off; Estimation, run-off
Solvent, Reactivity, Storage, Stability	NA; NA; NA; NA
Radiolabel, Source, State, Purity	NA; NA; NA; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Maximum concentration present in soil after application of biosolids was calculated based on literature values of biosolid concentrations and prediction of maximum concentrations in runoff water after precipitation.; max. soil concentration = concentration in biosolids x (mass biosolids / mass soil)Conc. in biosolids = 14,100 ug/kg (literature average)Mass biosolids = 40 dry t/haMass soil = 1300 t/ha (incorporation depth of 100 mm and soil bulk density 1.3 g/cm ³)M _b /M _{soln} = (K _d *M _s)/V ₀ M _b = mass bound to the soil phase at equilibrium (ug)M _{soln} = mass in aqueous phase at equilibrium (ug)K _d = soil-solution partition coefficientM _s = mass of soil in 1 cm ³ (g, d.w.)V ₀ = volume of aqueous phase in 1 cm ³ soil (mL)M _{soln} = M ₀ / [(M _b /M _{soln})+1]M ₀ = total mass of test substance in soil (ug)K _d = K _{oc} x f _{oc} f _{oc} = fraction of organic carbon = 0.016log K _{oc} = 0.544 log K _{ow} + 1.377Log k _{ow} = 5.90 (literature value)Log K _{oc} = 4.59 (calculated)K _d = 618 (calculated); Not Reported
System Type Design	Not Reported
Sampling Frequency and Sampling Details	Not Reported; Not Reported
Test Temperature	Not Reported
Results Details	Predicted to be immobile. Predicted max. soil concentration = 5450 ug/kg; M _b /M _{soln} = 1610; % compound in solution = 0.06%; Predicted max. runoff concentration = 8.81 ug/L
Analytical Method and Analytical Details	Not Reported; Not Reported
Transformation Products, Statistics, and Kinetics	Not Reported; Not Reported; Not Reported
Reference Substance and Reference Substance Results	Not Reported; Not Reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	N/A	Not applicable for calculated results.
Domain 2: Test Design			
Metric 3:	Study Controls	N/A	Not applicable for calculated results.
Metric 4:	Test Substance Stability	N/A	Not applicable for calculated results.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The calculation method was appropriate.
Metric 6:	Testing Conditions	High	The equations and inputs used to produce the result were described in depth.
Metric 7:	Testing Consistency	N/A	Not applicable for calculated results.

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Study Citation:	Langdon, K. A., Warne, M. S., Kookana, R. S. (2010). Aquatic hazard assessment for pharmaceuticals, personal care products, and endocrine-disrupting compounds from biosolids-amended land. Integrated Environmental Assessment and Management 6(4):663-676.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	1402874			
Domain		EVALUATION		Comments
Metric		Rating		
	Metric 8:	System Type and Design	N/A	Not applicable for calculated results.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Low	The outcome assessment methodology was acceptable for determining mobility in soil but did not include possible removal by volatilization or biodegradation.
	Metric 12:	Test Substance Purity	N/A	Not applicable for calculated results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Low	Uncertainty and variation was not explicitly considered or addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	N/A	Not applicable for calculated results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not conducted.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable based on the calculation method however uncertainty and possible variability were not addressed in this simple estimation, and results were not compared to any experimental values or studies for verification.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		Medium		

Study Citation:	Lv, Y., Yuan, T., Hu, J., Wang, W. (2010). Seasonal occurrence and behavior of synthetic musks (SMs) during wastewater treatment process in Shanghai, China. Science of the Total Environment 408(19):4170-4176.
OECD Harmonized Template:	Miscellaneous
HERO ID:	1964555

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	Standard in cyclohexane, 10 µg/mL; NR; All the samples were stored in the dark at 4 °C for sewage samples and −20 °C for sludge samples before extraction, which was processed within 24 h after collection; NR
Radiolabel, Source, State, Purity	NR; standard chemicals from Dr. Ehrenstorfer; NR; NR Notes: HHCB; 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-(g)-2-benzopyran
Test Method Details, Test Condition Details, and Test Consistency Details	Wastewater treatment plant sampled to capture seasonal variability: October and November 2007 (Fall); December 2007 and January 2008 (Winter); March and April 2008 (Spring); June and July 2008 (Summer); WWTP serves a population of about 120,000 with an average flow approximately 50,000 m3 of wastewater per day; influent consists of about 30% industrial wastewater and 70% domestic sewage; hydraulic retention time (HRT) is 13.3 h (1 h, 4 h and 8.3 h for anaerobic, anoxic and aerobic treatment, respectively). The sludge retention time (SRT) is about 27 d
System Type Design	WWTP using anaerobic–anoxic–oxic technology
Sampling Frequency and Sampling Details	water samples were composed of every two hours sampling in consecutive 12 h over 2-day period; grab sludge samples were taken every 2-days; samples taken from points representing influent, pretreated effluent, primary effluent and final effluent; sludge samples taken were grit, primary sludge, excess sludge and treated sludge
Test Temperature	15–26 °C, −5–10 °C, 12–22 °C, and 28–38 °C for the fall, winter, spring as well as summer sampling, respectively
Results Details	HHCB concentration = 181.1±10.2–2214.3±189.2 ng/L in water and 1365.7±341.8–4680.0±297.4 ng/g dry weight in sludge samples
Analytical Method and Analytical Details	GC/MS; recoveries of all analytes tested ranged from 72.3–107.8%; LOD 2 ng/L, LOQ 8 ng/L
Transformation Products, Statistics, and Kinetics	Overall elimination ranged from 35.5–62.5%; Net input and output of (g/day) Input: spring 79.8, summer 132.9, fall 119.4, winter 84.7 (year average = 104.2); Discharge in effluent: spring 9.8, summer 12.9, fall 13.3, winter 11.2 (year average = 12.1); Net input and output of (g/day) Discharge in sludge: spring 37.7, summer 48.2, fall 31.5, winter 43.5 (year average = 42.0); Mass loss bioreactor: spring 13.8, summer 18.6, fall 21.9, winter 6.4 (year average = 14.9)
Reference Substance and Reference Substance Results	Total mass loss: spring 32.2, summer 71.8, fall 74.6, winter 30.0 (year average = 50.1); Not applicable

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified clearly.
	Metric 2:	Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 2: Test Design	Metric 3:	Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 4:	Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.

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Study Citation:	Lv, Y., Yuan, T., Hu, J., Wang, W. (2010). Seasonal occurrence and behavior of synthetic musks (SMs) during wastewater treatment process in Shanghai, China. Science of the Total Environment 408(19):4170-4176.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	1964555			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 7:	Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 8:	System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to this type of study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 12:	Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	This metric is not applicable to this type of study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	This metric is not applicable to this type of study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to this type of study.
Overall Quality Determination		High		

Study Citation:	Matamoros, V., Bayona, J. M. (2006). Elimination of pharmaceuticals and personal care products in subsurface flow constructed wetlands. Environmental Science & Technology 40(18):5811-5816.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428319

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	no; experimental; experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Sigma-Aldrich (Steinheim, Germany); NR; NR Notes: NR
Test Method Details, Test Condition Details, and Test Consistency Details	Wastewater treated by a pilot subsurface flow wetland.; NR; NR
System Type Design	NR
Sampling Frequency and Sampling Details	NR; Sampled Influent and effluent from two beds (C2 and D2) at a depth of 0.27 and 0.5 m daily for 1 week in three different periods, May 2004, May 2005, and July 2005. Samples were stored at 4 deg C until analysis. Gravel beds with biofilms were also sampled and kept at -20 deg C prior to analysis.
Test Temperature	NR
Results Details	Mean % removal: May 2004, C2=31+/- 11, D2=45 +/-1; May 2005, C2=44 +/- 6/80, D2=50 +/-7/85; July 2005, D2= 61 +/-10/88. log Kd in influent samples (suspended particulate matter) =4.81, Log Kd in gravel bed=2.92 and Koc=5.7
Analytical Method and Analytical Details	Solid-phase extraction then analyzed by TRACE GC-MS; For waste water analysis, r^2 >0.998, surrogate recoveries >90%; for SPM analysis, recoveries were 70% and 90%, LOD and LOQ (in ug/L) were 0.97 to 1.1 respectively; for gravel recoveries were 70 and 90%, LOD and LOQ (ug/Kg) were between 2.9 to 4.
Transformation Products, Statistics, and Kinetics	NR; NR; Rate constants for removal from D2: Zero-order kinetics=0.204 mg m^2/day and 0.015/m; first-order kinetics=0.050 m/day
Reference Substance and Reference Substance Results	NR; NR

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Test substance source was reported, purity was not.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Study controls were not reported.
	Metric 4:	Test Substance Stability	Medium	Test substance stability was not reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	Medium	The test method appears suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	High	Testing was consistent.

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Study Citation:	Matamoros, V., Bayona, J. M. (2006). Elimination of pharmaceuticals and personal care products in subsurface flow constructed wetlands. Environmental Science & Technology 40(18):5811-5816.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428319			
EVALUATION				
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	Medium	Equilibrium was not reported.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome of interest was reported.
	Metric 12:	Test Substance Purity	High	The sampling method was appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Confounding variables were not reported.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical method were reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination			High	

Study Citation:	Matamoros, V., Salvadó, V. (2013). Evaluation of a coagulation/flocculation-lamellar clarifier and filtration-UV-chlorination reactor for removing emerging contaminants at full-scale wastewater treatment plants in Spain. Journal of Environmental Management 117:96-102.
OECD Harmonized Template:	Miscellaneous
HERO ID:	4290438

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	no; experimental: WWTP removal efficiency; experimental: WWTP removal efficiency
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Sigma-Aldrich (Steinheim, Germany); NR; NR Notes: NR
Test Method Details, Test Condition Details, and Test Consistency Details	Water samples were filtered and spiked with 1 ug of standard.; Not Reported; NR
System Type Design	WWTP
Sampling Frequency and Sampling Details	Daily for 5 days; Sampling daily for five days from Monday to Friday in July 2009 and 5 days in March 2010 from two WWTP, Blanes, and Tossa de Mar in north-east Spain. At Blanes WWTP, samples were taken after the secondary treatment, after passing through the lamellar clarifier, and after the filtration-UV-chlorination units. For Tossa de Mar WWTP, samples were taken after the secondary and the tertiary treatment. Downstream samples from the river and stream next to WWTP were also collected. Total of 55 samples were taken and stored at 4 deg C until analysis.
Test Temperature	NR
Results Details	Blanes WWTP: Removal efficiency= 26% +/- 1, Concentration= 1308 +/- 125 ng/L; Tossa de Mar WWTP: Removal (%)= 31 +/- 6%, Concentration =700 +/-17 ng/L; River Tordera concentration=100 +/- 5 ng/L; Tossa de Mar stream concentration=<12 ng/L
Analytical Method and Analytical Details	DSQ GC-MS; LOD= 1- 40 ng/L; LOQ=3-80 mg/L; Recoveries: >90% and repeatability: <20%.
Transformation Products, Statistics, and Kinetics	NR; NR; NR
Reference Substance and Reference Substance Results	NR; NR

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	Test substance source was reported, purity was not.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Study controls were not reported.
	Metric 4: Test Substance Stability	Medium	Test substance stability was not reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	Medium	The test method was suitable.
	Metric 6: Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7: Testing Consistency	High	Testing conditions were consistent across samples.
	Metric 8: System Type and Design	Medium	Equilibrium was not reported.

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Study Citation:	Matamoros, V., Salvadó, V. (2013). Evaluation of a coagulation/flocculation-lamellar clarifier and filtration-UV-chlorination reactor for removing emerging contaminants at full-scale wastewater treatment plants in Spain. Journal of Environmental Management 117:96-102.				
OECD Harmonized Template:	Miscellaneous				
HERO ID:	4290438				
Domain		Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms					
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.	
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.	
Domain 5: Outcome Assessment					
	Metric 11:	Test Substance Identity	High	The outcome of interest was reported.	
	Metric 12:	Test Substance Purity	High	The sampling method was reported.	
Domain 6: Confounding/Variable Control					
	Metric 13:	Confounding Variables	Medium	Confounding variables were not reported.	
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.	
Domain 7: Data Presentation and Analysis					
	Metric 15:	Data Reporting	High	The analytical method was reported and suitable.	
	Metric 16:	Statistical Methods and Kinetic Calculations	High	The statistical method was reported.	
Domain 8: Other					
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.	
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.	
Overall Quality Determination			High		

Study Citation:	Moldovan, Z., Chira, R., Alder, A. C. (2009). Environmental exposure of pharmaceuticals and musk fragrances in the Somes River before and after upgrading the municipal wastewater treatment plant Cluj-Napoca, Romania. Environmental Science and Pollution Research 16(1 p.46-54):46-54.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2598189			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, Guideline	no; experimental; experimental			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; NR; NR; NR Notes: NR			
Test Method Details, Test Condition Details, and Test Consistency Details	Water samples were taken at 3 different sites along the Somes river at lease 1 km downstream of WWTP effluents. The test substance concentrations were used to evaluate the contribution of WWTP effluents before and after upgrading the municipal WWTP; WWTP operated for 12 days. Primary treatment consists of a screen, grit removal, and primary clarifier. Effluent then transferred into an activated sludge reactor followed by a secondary clarifier.; NR			
System Type Design	WWTP Cluj-Napoca			
Sampling Frequency and Sampling Details	Sampling campaign in April 2001 before plant upgrade and September 2006 after plant upgrade; Effluent collected from three sites along the river between Cluj-Napoca and Dej in Transylvania, Romania			
Test Temperature	NR			
Results Details	Average concentration (ng/L) before and after upgrade: Site 1 (300, 81), Site 2 (314, 115), Site 3 (172, 13)			
Analytical Method and Analytical Details	solid phase extraction followed by GC/MS; LOQ: 30 ng/L for first campaign, 10 ng/L for second campaign; recoveries ranged from 55% - 110%			
Transformation Products, Statistics, and Kinetics	NR; NR; NR			
Reference Substance and Reference Substance Results	NR; NR			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	N/A	Test material source and purity were not reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	This metric does not apply to this study type.
	Metric 4:	Test Substance Stability	Low	Test substance stability was not reported.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	High	The testing conditions were consistent.
	Metric 8:	System Type and Design	Medium	Equilibrium was not reported.
Domain 4: Test Organisms				
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Study Citation:	Moldovan, Z., Chira, R., Alder, A. C. (2009). Environmental exposure of pharmaceuticals and musk fragrances in the Somes River before and after upgrading the municipal wastewater treatment plant Cluj-Napoca, Romania. Environmental Science and Pollution Research 16(1 p.46-54):46-54.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2598189			
Domain		Metric	EVALUATION Rating	Comments
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Uninformative	Reported effluent only, not influent.
	Metric 12:	Test Substance Purity	High	The sampling method was appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	This metric does not apply to this study type.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Uninformative	Only reported the effluent concentrations, not the influent.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	This metric does not apply to this study type.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The results were reasonable.
	Metric 18:	QSAR Models	N/A	This metric does not apply to this study type.
Overall Quality Determination			Uninformative	

Study Citation:	Oppenheimer, J., Stephenson, R., Burbano, A., Liu, L. (2007). Characterizing the passage of personal care products through wastewater treatment processes. Water Environment Research 79(13):2564-2577.
OECD Harmonized Template:	Miscellaneous
HERO ID:	1410400

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Wastewater; NR; NR Notes: Standard prepared from 50% in diethyl phthalate obtained from Sigma Aldrich (St. Louis, MO)
Test Method Details, Test Condition Details, and Test Consistency Details	Municipal treatment facilities; Plant D: municipal with significant industrial component, primary treatment: no chemicals, secondary treatment: nitrification/denitrification, secondary aeration: diffused air, filters: granular MF/RO, disinfection: chlorine; Plant F municipal with light industrial component, primary treatment: none, secondary treatment: extended aeration nitrification/denitrification, secondary aeration: surface air, filters: deep bed, disinfection: UV
System Type Design	Plant D: SRT ca. 7-20 days; Plant F: SRT ca. 20-30 days
Sampling Frequency and Sampling Details	Sampling events in October, November and January; Influent and effluent samples collected.
Test Temperature	Seasonal: 18.9 to 25.8°C
Results Details	Removal from tertiary filters ranged from ND to -18% at plant F and -51 to 8% at plant D; removal from reverse osmosis ranged from >42->77% at plant D
Analytical Method and Analytical Details	Solid phase extraction followed by GC/MS; MDL: 0.61 µg/L
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified clearly.
	Metric 2:	Test Substance Purity	High	The source and purity were reported.
Domain 2: Test Design	Metric 3:	Study Controls	N/A	The metric is not applicable to this type of study.
	Metric 4:	Test Substance Stability	N/A	The metric is not applicable to this type of study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The metric met the criteria for high confidence for this type of study.
	Metric 6:	Testing Conditions	High	The metric met the criteria for high confidence for this type of study.
	Metric 7:	Testing Consistency	N/A	The metric is not applicable to this type of study.
	Metric 8:	System Type and Design	High	The metric met the criteria for high confidence for this type of study.
Domain 4: Test Organisms				

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Study Citation:	Oppenheimer, J., Stephenson, R., Burbano, A., Liu, L. (2007). Characterizing the passage of personal care products through wastewater treatment processes. Water Environment Research 79(13):2564-2577.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	1410400			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this type of study.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The metric met the criteria for high confidence for this type of study.
	Metric 12:	Test Substance Purity	High	The metric met the criteria for high confidence for this type of study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	The metric is not applicable to this type of study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The metric met the criteria for high confidence for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	The metric is not applicable to this type of study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	N/A	The metric is not applicable to this type of study.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this type of study.
Overall Quality Determination		High		

Study Citation:	Reif, R., Besancon, A., Le Corre, K., Jefferson, B., Lema, J. M., Omil, F. (2011). Comparison of PPCPs removal on a parallel-operated MBR and AS system and evaluation of effluent post-treatment on vertical flow reed beds. Water Science and Technology 63(10):2411-2417.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428049

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	no; experimental; experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR Notes: NR
Test Method Details, Test Condition Details, and Test Consistency Details	% removal from MBR and AS systems with vertical flow freed beds.; Operating parameters were the same for all samplings; Hydraulic retention time of 8 days, sludge retention time of 20 days (except 1st sampling when it was 6 days). The Flow rate (L/d) for Activated sludge unit is 90 and Membrane Bioreactors is 105.; NR
System Type Design	WWTP
Sampling Frequency and Sampling Details	NR; Five samples were taken between 8:00 and 10:00 on each day during three sampling campaigns (December 12th, March 27th, and July 26th. Sampling points were primary effluent, after MBR and after AS and after vertical flow reed bed for both MBR and AS. During second sampling campaign, primary and biological sludge were taken from both bioreactors to determine Kd.
Test Temperature	NR
Results Details	HHBC concentration (ug/L): 1st sampling: VFRB AS Inlet =0.65, outlet=0.27, VFRB MBR inlet =0.50, outlet=0.31; 2nd sampling: VFRB AS inlet=0.54, outlet= 0.19, VFRB MBR inlet=0.21, outlet=0.12; 3rd sampling: VFRB AS inlet=1.73, outlet 1.02, VFRB MBR inlet=1.14, outlet=1.01. Log Kd primary sludge=3.63, secondary sludge (CAS)=3.57, secondary sludge (MBR)=4.44.
Analytical Method and Analytical Details	solid-phase extraction followed by the Spectroquant Cell Test; ultrasonic solvent extraction method for Kd determination; NR
Transformation Products, Statistics, and Kinetics	NR; NR; NR
Reference Substance and Reference Substance Results	NR; NR

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified.
	Metric 2: Test Substance Purity	Medium	Test purity and source were not reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Study controls were not reported.
	Metric 4: Test Substance Stability	Medium	Test substance stability was not reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	Medium	The test method appears suitable.
	Metric 6: Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7: Testing Consistency	Medium	Testing consistency was not reported.
	Metric 8: System Type and Design	Medium	Equilibrium was not reported.

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Study Citation:	Reif, R., Besancon, A., Le Corre, K., Jefferson, B., Lema, J. M., Omil, F. (2011). Comparison of PPCPs removal on a parallel-operated MBR and AS system and evaluation of effluent post-treatment on vertical flow reed beds. Water Science and Technology 63(10):2411-2417.				
OECD Harmonized Template:	Miscellaneous				
HERO ID:	5428049				
Domain		Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms					
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.	
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.	
Domain 5: Outcome Assessment					
	Metric 11:	Test Substance Identity	High	The outcome of interest was reported.	
	Metric 12:	Test Substance Purity	High	The sampling method was appropriate.	
Domain 6: Confounding/Variable Control					
	Metric 13:	Confounding Variables	High	Confounding variables were not reported.	
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.	
Domain 7: Data Presentation and Analysis					
	Metric 15:	Data Reporting	High	The analytical method as reported.	
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	This metric does not apply to this study type.	
Domain 8: Other					
	Metric 17:	Verification or Plausibility of Results	High	The study results were reasonable.	
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.	
Overall Quality Determination			High		

Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5349388

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	no; experimental; experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; 3 STPs of German Ruhrverband; NR; NR
Test Method Details, Test Condition Details, and Test Consistency Details	Samples were collected during one week. Effluent samples were 24-h time-proportional.; not reported; not reported
System Type Design	not reported
Sampling Frequency and Sampling Details	not reported; Not Reported
Test Temperature	not reported
Results Details	~25% removal: mean influent concentrations: 1.46 ug/L; mean effluent concentrations: 1.09 ug/L.
Analytical Method and Analytical Details	not reported; Not Reported
Transformation Products, Statistics, and Kinetics	not reported; results are only indicative not representative.; Not Reported
Reference Substance and Reference Substance Results	Not Reported; Not Reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name, structure and CASRN.
Metric 2:	Test Substance Purity	N/A	The metric is not applicable to this study type.
Domain 2: Test Design			
Metric 3:	Study Controls	N/A	The metric is not applicable to this study type.
Metric 4:	Test Substance Stability	Medium	Little to no details on sample preparation or storage conditions were reported, preparation may be described in cited article.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
Metric 6:	Testing Conditions	Medium	Testing conditions were not reported; however, the omissions were not likely to impact the results.
Metric 7:	Testing Consistency	Medium	Samples were presumably analyzed consistently, but details were not reported.
Metric 8:	System Type and Design	High	Equilibrium is assumed in this type of study.
Domain 4: Test Organisms			

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Study Citation:	RIVM, (1997). Environmental risk assessment of the polycyclic musks AHTN and HHCB according to the EU-TGD.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5349388			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There was incomplete reporting of outcome assessment methods; however, such differences or absence of details were not likely to be severe or have a substantial impact on the study results.
	Metric 12:	Test Substance Purity	Low	Details regarding sampling methods of the outcome(s) were not fully reported, and the omissions were likely to have a substantial impact on study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Limited discussion of variability and uncertainty.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Concentrations of the target chemical or transformation product(s), extraction efficiency, percent recovery, or mass balance were not measured or reported, preventing meaningful interpretation of study results.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Kinetic calculations were not clearly described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		Low		

* Related References: cited: Eschke, H.D., J. Traud, H.J. Dibowski (1994). Studies on the occurrence of Polycyclic Musk Flavors in Different Environmental compartments. 1st Communication: Detection and analysis by GC/MS chromatograms in surface and sewage waters and fish. UWSF. Z.Umweltchem. Okotox. 6, (4), 183-189. No HERO ID located.

Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428083

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Aqueous samples collected in amber glass bottles, adjusted to pH 3 (1% orthophosphoric acid), stored in the dark at 4°C; Sludge samples freeze dried, stored in sealed plastic bottle at 4°C; NR
Radiolabel, Source, State, Purity	NA; Four STPs in Shanghai, China; NA; NA Notes: Analytical standards obtained from Dr. Ehrenstorger GmbH (Augsburg, Germany), standard solutions prepared in n-hexane, stored at 4°C, and remade weekly
Test Method Details, Test Condition Details, and Test Consistency Details	STP sewage and sludge samples collected to determine the distribution and removal of the test substance in sewage treatment plants.; Flow rate 28,000 m ³ /d, 100% residential source waste, landfill sludge disposal.; All samples analyzed in triplicate.
System Type Design	STP: conventional activated sludge treatment
Sampling Frequency and Sampling Details	December 2008, March 2009, June 2009; Aqueous grab samples of sewage influent (after bar screen) and effluent (after advanced treatment). Sludge samples collected as waste sludge (from sludge dewatering unit).
Test Temperature	Not reported
Results Details	Mean influent: 1,345.1 ng/L Mean effluent: 1,422.9 ng/L Sludge: 757.8 µg/kg dry wt Dec influent: 2,184.6 ng/L Dec effluent: 1,475.6 ng/L Dec sludge: 470.0 µg/kg dry wt Mar influent: 919.2 ng/L Mar effluent: 1,706.6 ng/L Mar sludge: 1,434.0 µg/kg dry wt June influent: 931.4 ng/L June effluent: 1,086.4 ng/L June sludge: 396.4 µg/kg dry wt Highest removal efficiency for HHCB - 60%
Analytical Method and Analytical Details	GC-MS, operated in electron impact ionization and full scan or selected-ion monitoring mode; LOQ 30 mg/L (sewage), 10 µg/kg dw (sludge); Sewage samples filtered, adjusted to pH 7-7.5, extracted by SPE ENVI-C18 cartridge, evaporated and dissolved in HEX; sludge samples extracted with Soxtec Avanti 2050; recovery 83.98±3.61% (sewage), 81.15±6.05% (sludge)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The sample source was reported; the source of the analytical standard was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	A field blank was not explicitly included.
	Metric 4: Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Minimal operational characteristics of the STP were reported.

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Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428083			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Differences in removal efficiency or apparent lack thereof between study groups was minimally discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of quantification were reported, analytical methods were suitable for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The detected concentrations in the study were comparable to other studies and variations in removal efficiency were supported by findings in other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428083

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Aqueous samples collected in amber glass bottles, adjusted to pH 3 (1% orthophosphoric acid), stored in the dark at 4°C; Sludge samples freeze dried, stored in sealed plastic bottle at 4°C; NR
Radiolabel, Source, State, Purity	NA; Four STPs in Shanghai, China; NA; NA Notes: Analytical standards obtained from Dr. Ehrenstorger GmbH (Augsburg, Germany), standard solutions prepared in n-hexane, stored at 4°C, and remade weekly
Test Method Details, Test Condition Details, and Test Consistency Details	STP sewage and sludge samples collected to determine the distribution and removal of the test substance in sewage treatment plants.; Flow rate 60,000 m ³ /d, 100% residential source waste, landfill sludge disposal.; All samples analyzed in triplicate.
System Type Design	STP: anaerobic + anoxic + oxide process
Sampling Frequency and Sampling Details	December 2008, March 2009, June 2009; Aqueous grab samples of sewage influent (after bar screen) and effluent (after advanced treatment). Sludge samples collected as waste sludge (from sludge dewatering unit).
Test Temperature	Not reported
Results Details	Mean influent: 1,126.7 ng/LMean effluent: 605.7 ng/LMean sludge: 1,507.1 µg/kg dry wtDec influent: 1,100.4 ng/LDec effluent: 596.4 ng/LDec sludge: 211.7 µg/kg dry wtMar influent: 1,479.2 ng/LMar effluent: 658.4 ng/LMar sludge: 3,492.5 µg/kg dry wtJune influent: 800.6 ng/LJune effluent: 562.4 ng/L June sludge: 817.1 µg/kg dry wt Highest removal efficiency for HHCB - 60%
Analytical Method and Analytical Details	GC-MS, operated in electron impact ionization and full scan or selected-ion monitoring mode; LOQ 30 mg/L (sewage), 10 ug/kg dw (sludge); Sewage samples filtered, adjusted to pH 7-7.5, extracted by SPE ENVI-C18 cartridge, evaporated and dissolved in HEX; sludge samples extracted with Soxtec Avanti 2050; recovery 83.98±3.61% (sewage), 81.15±6.05% (sludge)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The sample source was reported; the source of the analytical standard was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	A field blank was not explicitly included.
	Metric 4: Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Minimal operational characteristics of the STP were reported.
	Metric 7: Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428083			
Domain	Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Differences in removal efficiency or apparent lack thereof between study groups was minimally discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of quantification were reported, analytical methods were suitable for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The detected concentrations in the study were comparable to other studies and variations in removal efficiency were supported by findings in other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428083

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Aqueous samples collected in amber glass bottles, adjusted to pH 3 (1% orthophosphoric acid), stored in the dark at 4°C; Sludge samples freeze dried, stored in sealed plastic bottle at 4°C; NR
Radiolabel, Source, State, Purity	NA; Four STPs in Shanghai, China; NA; NA Notes: Analytical standards obtained from Dr. Ehrenstorger GmbH (Augsburg, Germany), standard solutions prepared in n-hexane, stored at 4°C, and remade weekly
Test Method Details, Test Condition Details, and Test Consistency Details	STP sewage and sludge samples collected to determine the distribution and removal of the test substance in sewage treatment plants.; Flow rate 400,000 m ³ /d, 50% residential source, 50% industrial source waste. Landfill sludge disposal.; All samples analyzed in triplicate.
System Type Design	STP: modified sequencing batch reactor
Sampling Frequency and Sampling Details	December 2008, March 2009, June 2009; Aqueous grab samples of sewage influent (after bar screen) and effluent (after advanced treatment). Sludge samples collected as waste sludge (from sludge dewatering unit).
Test Temperature	Not reported
Results Details	Mean influent: 767.9 ng/LMean effluent: 703.6 ng/LMean sludge: 610.0 µg/kg dry wtDec influent: 356.4 ng/LDec effluent: 350.8 ng/LDec sludge: 268.2 µg/kg dry wtMar influent: 1,106.6 ng/LMar effluent: 445.2 ng/LMar sludge: 1,269.2 µg/kg dry wtJune influent: 840.6 ng/LJune effluent: 1,314.8 ng/L June sludge: 292.5 µg/kg dry wtHighest removal efficiency for HHCB - 60%
Analytical Method and Analytical Details	GC-MS, operated in electron impact ionization and full scan or selected-ion monitoring mode; LOQ 30 mg/L (sewage), 10 ug/kg dw (sludge); Sewage samples filtered, adjusted to pH 7-7.5, extracted by SPE ENVI-C18 cartridge, evaporated and dissolved in HEX; sludge samples extracted with Soxtec Avanti 2050; recovery 83.98±3.61% (sewage), 81.15±6.05% (sludge)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The sample source was reported; the source of the analytical standard was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	A field blank was not explicitly included.
	Metric 4: Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Minimal operational characteristics of the STP were reported.
	Metric 7: Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.				
OECD Harmonized Template:	Miscellaneous				
HERO ID:	5428083				
Domain		Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms					
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.	
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.	
Domain 5: Outcome Assessment					
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.	
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.	
Domain 6: Confounding/Variable Control					
	Metric 13:	Confounding Variables	Medium	Differences in removal efficiency or apparent lack thereof between study groups was minimally discussed.	
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.	
Domain 7: Data Presentation and Analysis					
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of quantification were reported, analytical methods were suitable for detection.	
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.	
Domain 8: Other					
	Metric 17:	Verification or Plausibility of Results	High	The detected concentrations in the study were comparable to other studies and variations in removal efficiency were supported by findings in other studies.	
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.	
Overall Quality Determination			High		

Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428083			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; Aqueous samples collected in amber glass bottles, adjusted to pH 3 (1% orthophosphoric acid), stored in the dark at 4°C; Sludge samples freeze dried, stored in sealed plastic bottle at 4°C; NR			
Radiolabel, Source, State, Purity	NA; Four STPs in Shanghai, China; NA; NA Notes: Analytical standards obtained from Dr. Ehrenstorger GmbH (Augsburg, Germany), standard solutions prepared in n-hexane, stored at 4°C, and remade weekly			
Test Method Details, Test Condition Details, and Test Consistency	STP sewage and sludge samples collected to determine the distribution and removal of the test substance in sewage treatment plants.; Flow rate 20,000 m^3/d, 100% residential source waste, landfill sludge disposal.; All samples analyzed in triplicate.			
Details				
System Type Design	STP: anaerobic + anoxic + oxide process			
Sampling Frequency and Sampling Details	December 2008, March 2009, June 2009; Aqueous grab samples of sewage influent (after bar screen) and effluent (after advanced treatment). Sludge samples collected as waste sludge (from sludge dewatering unit).			
Test Temperature	Not reported			
Results Details	Mean influent: 965.5 ng/LMean effluent: 965.2 ng/LMean sludge: 840.9 µg/kg dry wtDec influent: 988.2 ng/LDec effluent: 477.4 ng/LDec sludge: 111.5 µg/kg dry wtMar influent: 884.2 ng/LMar effluent: 1,503.6 ng/LMar sludge: 2,216.9 µg/kg dry wtJune influent: 1,014.2 ng/LJune effluent: 914.6 ng/L June sludge: 194.4 µg/kg dry wtHighest removal efficiency for HHCB - 60%			
Analytical Method and Analytical Details	GC-MS, operated in electron impact ionization and full scan or selected-ion monitoring mode; LOQ 30 mg/L (sewage), 10 ug/kg dw (sludge); Sewage samples filtered, adjusted to pH 7-7.5, extracted by SPE ENVI-C18 cartridge, evaporated and dissolved in HEX; sludge samples extracted with Soxtec Avanti 2050; recovery 83.98±3.61% (sewage), 81.15±6.05% (sludge)			
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable			
Reference Substance and Reference Substance Results	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source was reported; the source of the analytical standard was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	A field blank was not explicitly included.
	Metric 4:	Test Substance Stability	High	Sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Minimal operational characteristics of the STP were reported.
	Metric 7:	Testing Consistency	High	Samples were processed and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Sang, W., Zhang, Y., Zhou, X., Zhang, T. C. (2012). Spatial and seasonal distribution of synthetic musks in sewage treatment plants of Shanghai, China. Water Science and Technology 66(1):201-209.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428083			
Domain	Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Differences in removal efficiency or apparent lack thereof between study groups was minimally discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of quantification were reported, analytical methods were suitable for detection.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The detected concentrations in the study were comparable to other studies and variations in removal efficiency were supported by findings in other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Schaefer, E. C., Koper, C. M. (2009). 14C-HHCB: Removal and/or biodegradation of a semi-volatile organic compound in an activated sludge simulation system.
OECD Harmonized Template:	Miscellaneous
HERO ID:	7607877

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	Ethanol; NR; Frozen; NR
Radiolabel, Source, State, Purity	14C-HHCB: 53 mCi/mmol (0.2051 mCi/mg) specific activity; NR, lot no. 333-071-053; Liquid; 98.4% (radiochemical purity)
Test Method Details, Test Condition Details, and Test Consistency Details	A continuous flow activated sludge system was maintained to determine the primary and ultimate biodegradation of the test substance.; Nominal influent: 5.6 ug/L in 1 mg/L surfactantHRT: 6 hrSRT: 10 dActivated sludge and wastewater collected from Cambridge Wastewater Treatment Facility in Cambridge, Maryland.TSS: 3000 mg/L; Alkyl ethoxylated sulfate (C14E2S Na salt) used to overcome test substance solubility issues. No system acclimation phase was included.Stabilization period: 7 dEquilibration period (test substance added): 22 dSteady state period: 32 d
System Type Design	One test unit continuous flow activated sludge system.
Sampling Frequency and Sampling Details	2x/week (equilibration period), 5x/week (steady state period); Influent, effluent, acidified effluent, mixed liquor samples, and CO2 traps analyzed.
Test Temperature	20±1°C
Results Details	Removal efficiency: 82.3±4.0% (parent), 64.5±7.5% (total reactivity), 6.47±1.89% (mineralization). % of initial radioactivity as parent compound: Influent: 91.7±3.7%, Sludge: 25.1±8.0%, Effluent: 9.2±1.8%.
Analytical Method and Analytical Details	Radio-thin layer chromatography; combustion analysis (solids); Samples were extracted sequentially with methanol and acetone/methanol. Extracted solids were collected on glass fiber filters for analysis.
Transformation Products, Statistics, and Kinetics	Unidentified products: Influent: 8.3±3.7%; Sludge: 2.8±1.2%; Effluent: 9.0±3.3%, 3.6±1.9%, 3.3±2.0%, 9.8±3.2%; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The test substance purity but not source was reported. Specific activity was reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Controls or analytical blanks were not included.
	Metric 4: Test Substance Stability	High	The test substance storage and preparation in solvent and surfactant were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	High	Appropriate operational conditions were reported.
	Metric 7: Testing Consistency	High	Test conditions were consistent throughout the duration of the study.
	Metric 8: System Type and Design	N/A	Not applicable.

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Study Citation:	Schaefer, E. C., Koper, C. M. (2009). 14C-HHCB: Removal and/or biodegradation of a semi-volatile organic compound in an activated sludge simulation system.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	7607877			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable.
	Metric 10:	Sampling Methods	N/A	Not applicable.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining removal efficiency by activated sludge treatment.
	Metric 12:	Test Substance Purity	High	Sampling methods were described generally and frequency was appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	No notable sources of uncertainty were identified.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The analytical method was appropriate; extraction efficiency and limits of detection were not reported. Raw data was included.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	Statistical and kinetic calculations were not included.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable based on the method but were not compared to previous studies.
	Metric 18:	QSAR Models	N/A	Not applicable.
Overall Quality Determination		High		

Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427945

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Wastewater samples collected in stainless steel 2L canisters via Teflon tubing with silicone pump tubing and stored at 4°C; sludge samples sorted in amber glass jars with Teflon lined lids at -18°C; Sludge: concentrations did not change significantly during frozen storage
Radiolabel, Source, State, Purity	NA; WWTP, Canada; NA; NA Notes: Standard: obtained from GmbH (Wesel, Germany)
Test Method Details, Test Condition Details, and Test Consistency	Samples collected from WWTP over August 2003 to April 2005 from WWTP which receives 60% residential and 40% industrial, commercial, and institutional sourced wastewater; Sampling from single train of treatment plant (5% overall plant flow); mean flow 7,900 m ³ /d, median hydraulic retention time 9hr; pH, COD, TSS, and BOD monitored and reported
System Type Design	WWTP system: primary clarification with primary sludge, aeration tank, secondary clarification with waste activated sludge
Sampling Frequency and Sampling Details	25 sampling events over 20 months; Bulk composite samples: raw influent, primary influent, and secondary influent Grab samples: primary sludge, and waste activated sludge (WAS) collected
Test Temperature	22°C
Results Details	Median removal (n = 13): 31% (primary treatment), 75% (secondary treatment), 82% (overall) Raw Influent: 7030±2120 ng/L Primary Effluent: 4640±1260 ng/L Secondary Effluent: 1300±274 ng/L Primary sludge: 26,600±7,850 ng/L WAS: 25,200±6,500 ng/L
Analytical Method and Analytical Details	GC/MS; Detection limit: 11 ng/L (wastewater), 32 ng/g (sludge); Samples liquid-liquid extracted with petroleum ether, cleaned up on silica column gel. 3 sludge samples extracted with SFE, 5 samples extracted with MAE due to loss concerns from preliminary drying (results corrected); Extraction efficiency: 93.0 ± 20.5%
Transformation Products, Statistics, and Kinetics	Not reported; Summary statistics; Not reported
Reference Substance and Reference Substance Results	Field blanks (deionized water run through sampler tubing and storage canister); 2 - 3 orders of magnitude below primary effluent; 1 - 2 orders of magnitude below secondary effluent. Background contamination considered negligible.

EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Sample method blanks were included and at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation, storage conditions, and stability under frozen storage were reported and appropriate for the study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was appropriate for the test substance.
	Metric 6:	Testing Conditions	High	WWTP operational parameters and sample characteristics (pH, TSS) were reported.

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Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427945			
Domain		EVALUATION		
		Metric	Rating	Comments
	Metric 7:	Testing Consistency	Medium	Sludge sample extraction methods were inconsistent but the final results were corrected by reported loss via the less suitable method.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were accounted for by statistical techniques and extraction efficiency tests.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations reported, extraction efficiency reported, analytical method was appropriate and detection limits were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics performed were appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427945			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NA; NR; Wastewater samples collected in stainless steel 2L canisters via Teflon tubing with silicone pump tubing and stored at 4°C; sludge samples sorted in amber glass jars with Teflon lined lids at -18°C; Sludge: concentrations did not change significantly during frozen storage			
Radiolabel, Source, State, Purity	NA; WWTP, Canada; NA; NA Notes: Standard: obtained from GmbH (Wesel, Germany)			
Test Method Details, Test Condition Details, and Test Consistency	Samples collected from WWTP over August 2003 to April 2005 from WWTP which receives 60% residential and 40% industrial, commercial, and institutional sourced wastewater; Sampling from single train of treatment plant (5% overall plant flow); mean flow 7,900 m^3/d, median hydraulic retention time 9hr; pH, COD, TSS, and BOD monitored and reported			
System Type Design	WWTP system: primary clarification with primary sludge, aeration tank, secondary clarification with waste activated sludge			
Sampling Frequency and Sampling Details	25 sampling events over 20 months; Bulk composite samples: raw influent, primary influent, and secondary influentGrab samples: primary sludge, and waste activated sludge (WAS) collected			
Test Temperature	15°C			
Results Details	Median removal (n = 12): 9.7% (primary treatment), 66% (secondary treatment), 70% (overall)Raw Influent: 6660±1920 ng/LPrimary Effluent: 6230±1750 ng/LSecondary Effluent: 2000±686 ng/LPrimary sludge: 24,800±6,170 ng/LWAS: 38,800±13,300 ng/L			
Analytical Method and Analytical Details	GC/MS; Detection limit: 11 ng/L (wastewater), 32 ng/g (sludge); Samples liquid-liquid extracted with petroleum ether, cleaned up on silica column gel. 3 sludge samples extracted with SFE, 5 samples extracted with MAE due to loss concerns from preliminary drying (results corrected); Extraction efficiency: 93.0 ± 20.5%			
Transformation Products, Statistics, and Kinetics	Not reported; Summary statistics; Not reported			
Reference Substance and Reference Substance Results	Field blanks (deionized water run through sampler tubing and storage canister); 2 - 3 orders of magnitude below primary effluent; 1 - 2 orders of magnitude below secondary effluent. Background contamination was considered to be negligible.			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	Medium	The source of the samples was reported.
Domain 2: Test Design	Metric 3:	Study Controls	High	Sample method blanks were included and at appropriate levels.
	Metric 4:	Test Substance Stability	High	Sample preparation, storage conditions, and stability under frozen storage were reported and appropriate for the study.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was appropriate for the test substance.
	Metric 6:	Testing Conditions	High	WWTP operational parameters and sample characteristics (pH, TSS) were reported.
	Metric 7:	Testing Consistency	Medium	Sludge sample extraction methods were inconsistent but the final results were corrected by reported loss via the less suitable method.
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Study Citation:	Smyth, S. A., Lishman, L. A., Mcbean, E. A., Kleywegt, S., Yang, J., Svoboda, M. L., Ormonde, S., Pileggi, V., Lee, H., Seto, P. (2007). Polycyclic and nitro musks in Canadian municipal wastewater: Occurrence and removal in wastewater treatment. Water Quality Research Journal of Canada 42(3):138-152.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427945			
		EVALUATION		
Domain		Metric	Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were accounted for by statistical techniques and extraction efficiency tests.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations reported, extraction efficiency reported, analytical method was appropriate and detection limits were sensitive enough.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics performed were appropriate.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Stephenson, R. (2007). Fate of pharmaceuticals and personal care products through wastewater treatment processes.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5919305

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Experimental; full-scale and pilot-scale WWTP removal efficiency; Experimental; full-scale and pilot-scale WWTP removal efficiency
Solvent, Reactivity, Storage, Stability	NA; NR; Refrigerated; NR
Radiolabel, Source, State, Purity	NA; WWTPs in southwestern United States; Liquid; NA
Test Method Details, Test Condition Details, and Test Consistency Details	Several wastewater treatment plants in the southwestern United States were monitored to determine aqueous test substance removal efficiency.; Facility A: polymer ferric primary treatment, high purity O2 activated sludge secondary treatment, SRT = 0.5 - 1.5 days, no filters, no disinfection; Facility B: no chemical primary treatment, modified Ludzack Ettinger process with nitrification/denitrification secondary treatment, SRT = 3-5 days, deep bed filter, chlorine disinfection; Facility C: no chemical primary treatment, activated sludge secondary treatment, SRT = 4-6 days, deep bed filters, UV disinfection; Facility D: no chemical primary treatment, nitrification/denitrification secondary treatment, SRT = 7-20 days, granular microfiltration/reverse-osmosis filters, chlorine disinfection; Facility E: no primary treatment, nitrification/denitrification secondary treatment, SRT = 11-16, no filters, UV disinfection; Facility F: no primary treatment, nitrification/denitrification, SRT = 20-30 days, deep bed filters, UV disinfection; MBR 1 (located at facility E): nitrification/denitrification, SRT = 14 days; MBR 2 : SRT = 15 days; Not Reported
System Type Design	Not Reported
Sampling Frequency and Sampling Details	3 sampling campaigns for most facilities; Samples collected as 24-h time-weighted composites. Samples collected in summer and winter months.
Test Temperature	NR
Results Details	Frequently detected, poor removal. SRT 80% \neq > 30 days, percent removal Facility A: ND, NA (effluent > influent, could not calculate removal efficiency), NA Facility B: 21%, 1%, NA Facility C: NA, 13%, NA Facility D: NA, 32%, NA Facility E: ND, 67% Facility F: >86%, ND, NA MBR 1 (located at facility E): 57%, 46%, 36% MBR 2: NA, 68%
Analytical Method and Analytical Details	GC/MS in selective ion monitoring mode; detection limit: 0.61 ug/mL; Samples extracted by SPE, eluted with acetone, dried over Na2SO4.
Transformation Products, Statistics, and Kinetics	NA; Student's t test to determine SRT 80%; NA
Reference Substance and Reference Substance Results	Field blanks; Below the detection limit

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	The WWTPs monitored in the study were reported generally.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Field blanks were included and were within an acceptable range.
	Metric 4: Test Substance Stability	Medium	Sample storage conditions were reported generally.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was appropriate for the test substance.
	Metric 6: Testing Conditions	High	WWTP operational stages and conditions were reported.

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Study Citation:	Stephenson, R. (2007). Fate of pharmaceuticals and personal care products through wastewater treatment processes.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5919305			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 7:	Testing Consistency	High	Samples were collected and analyzed consistently.
	Metric 8:	System Type and Design	N/A	This metric is not applicable to this type of study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric is not applicable to this type of study.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to this type of study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining waste water treatment removal.
	Metric 12:	Test Substance Purity	High	Sampling methods were described and appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty and variability were discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was reported and appropriate; limits of detection and raw data was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods for determining SRT 80% were described and applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable based on the method.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to this type of study.
Overall Quality Determination		High		

Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. <i>Frontiers of Environmental Science & Engineering</i> 7(2):166-172.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5428050

Parameter		EXTRACTION		
CASRN and Test Material		1222-05-5; HHCB		
Confidentiality, Type, Guideline		None; Experimental; Experimental		
Solvent, Reactivity, Storage, Stability		NR; NR; Water samples collected and stored in glass bottles with pH adjusted to 2.0 by addition of hydrochloric acid; NR		
Radiolabel, Source, State, Purity		NA; Two STPs in Xi'an, China; Liquid; NA Notes: Reference standard: in cyclohexane (10 mg/L, 51.0% purity), obtained from Dr. Ehrenstorfer, Augsburg, Germany. Stock solutions prepared in cyclohexane in glass tubes, stored in a dark room at 4°C and new stock solutions were prepared every 2 mo		
Test Method Details, Test Condition Details, and Test Consistency Details		Water samples collected from effluent of each treatment phase of an STP receiving 40% domestic and 60% industrial wastewater, 250000 m ³ /d flow capacity, from November 2010 to January 2011.; Hydraulic retention time: 0.12 (aerated grit chamber), 2.0 (primary sedimentation), 10.92 (biologic reactor), and 2.5 / hr (secondary sedimentation)Mixed liquor suspended solids: 3100 mg/LSludge retention time: 14.0 / d; 3 replicates analyzed, blank samples treated and analyzed		
System Type Design		Operational stages (STP A): aerated grit chamber, primary sedimentation tank, anoxic, anaerobic, and oxic processes, and secondary sedimentation tank		
Sampling Frequency and Sampling Details		Daily, for 24 hr; Samples collected using autosamplers attached to glass sampling bottles		
Test Temperature		Not reported		
Results Details		Removal efficiency: 70.4% Concentrations increased gradually along primary treatment processes, mostly removed in secondary treatment (biologic treatment). Loss largely attributed to adsorption to sludge.		
Analytical Method and Analytical Details		GC/MS in selected ion monitoring mode; LOQ 3.3 ug/L, LOD 1.0 ug/L; Samples filtered through GF/C and GF/D filters, spiked into Cleanert PEP cartridges and eluted with ACN/DCM and DCM, evaporated close to dryness and stored at -30°C. Sample dissolved in cyclohexane for analysis. Recovery: 83.02 ± 5.29%		
Transformation Products, Statistics, and Kinetics		Not reported; Linear regression was performed based on calibration measurements. Correlation coefficients were all 0.998 for HHCB.; Not reported		
Reference Substance and Reference Substance Results		Blank treated samples; Not reported		
Domain		EVALUATION		
		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source and analytical standard sources were reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Blank samples were included, the results were not reported but were assumed to be within a valid range.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions				

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Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. Frontiers of Environmental Science & Engineering 7(2):166-172.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428050			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Appropriate STP operational parameters were reported, but some conditions (temperature, pH) were not reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis were conducted consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between recoveries of samples was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of detection and quantification were reported and the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. Frontiers of Environmental Science & Engineering 7(2):166-172.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428050			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NR; NR; Water samples collected and stored in glass bottles with pH adjusted to 2.0 by addition of hydrochloric acid; NR			
Radiolabel, Source, State, Purity	NA; Two STPs in Xi'an, China; Liquid; NA Notes: Reference standard: in cyclohexane (10 mg/L, 51.0% purity), obtained from Dr. Ehrenstorfer, Augsburg, Germany. Stock solutions prepared in cyclohexane in glass tubes, stored in a dark room at 4°C and new stock solutions were prepared every 2 mo			
Test Method Details, Test Condition Details, and Test Consistency Details	Water samples collected from effluent of each treatment phase of an STP receiving 30% domestic and 70% industrial wastewater, 250000 m^3/d flow capacity, from November 2010 to January 2011.; Hydraulic retention time: 0.1 (aerated grit chamber), 1.7-2.5 (primary sedimentation), 12.83 (biologic reactor), and 5.8 / hr (secondary sedimentation)Mixed liquor suspended solids: 3300 mg/LSludge retention time: 15.3 / d; 3 replicates analyzed, blank samples treated and analyzed			
System Type Design	Operational stages (STP-Ba) : aerated grit chamber, primary sedimentation tank, wastewater diverted to two different process streams, this one being anaerobic, anoxic, and oxic processes, and secondary sedimentation tank			
Sampling Frequency and Sampling Details	Daily, for 24 hr; Samples collected using autosamplers attached to glass sampling bottles			
Test Temperature	Not reported			
Results Details	Removal efficiency: 43.1% Concentrations increased gradually along primary treatment processes, mostly removed in secondary treatment (biologic treatment). Loss was attributed mostly to adsorption to sludge based on concentrated sludge samples containing HHCB at higher levels than the water samples. HHCB in sludge cakes in STP B-a was high at 1268.6 ng/L.			
Analytical Method and Analytical Details	GC/MS in selected ion monitoring mode; LOQ 3.3 ug/L; Samples filtered through GF/C and GF/D filters, spiked into Cleanert PEP cartridges and eluted with ACN/DCM and DCM, evaporated close to dryness and stored at -30°C. Sample dissolved in cyclohexane for analysis. Recovery: 83.02 ± 5.29%			
Transformation Products, Statistics, and Kinetics	Not reported; Linear regression was performed based on calibration measurements. Correlation coefficients were all 0.998 for HHCB.; Not reported			
Reference Substance and Reference Substance Results	Blank treated samples; Not reported			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source and analytical standard sources were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blank samples were included, the results were not reported but were assumed to be within a valid range.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
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Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. Frontiers of Environmental Science & Engineering 7(2):166-172.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428050			
Domain		Metric	EVALUATION Rating	Comments
	Metric 6:	Testing Conditions	Medium	Appropriate STP operational parameters were reported, but some conditions (temperature, pH) were not reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis were conducted consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between recoveries of samples was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of detection and quantification were reported and the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. Frontiers of Environmental Science & Engineering 7(2):166-172.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428050			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NR; NR; Water samples collected and stored in glass bottles with pH adjusted to 2.0 by addition of hydrochloric acid; NR			
Radiolabel, Source, State, Purity	NA; Two STPs in Xi'an, China; Liquid; NA Notes: Reference standard: in cyclohexane (10 mg/L, 51.0% purity), obtained from Dr. Ehrenstorfer, Augsburg, Germany. Stock solutions prepared in cyclohexane in glass tubes, stored in a dark room at 4°C and new stock solutions were prepared every 2 mo			
Test Method Details, Test Condition Details, and Test Consistency Details	Water samples collected from effluent of each treatment phase of an STP receiving 30% domestic and 70% industrial wastewater, 250000 m^3/d flow capacity, from November 2010 to January 2011.; Hydraulic retention time: 0.1 (aerated grit chamber), 1.7-2.5 (primary sedimentation), 5.75 (biologic reactor), and 4.7 / hr (secondary sedimentation)Mixed liquor suspended solids: 4100 mg/LSludge retention time: 6.5 / d; 3 replicates analyzed, blank samples treated and analyzed			
System Type Design	Operational stages (STP-Bb): aerated grit chamber, primary sedimentation tank, wastewater diverted to two different process streams, this one being aeration tank, and secondary sedimentation tank			
Sampling Frequency and Sampling Details	Daily, for 24 hr; Samples collected using autosamplers attached to glass sampling bottles			
Test Temperature	Not reported			
Results Details	Removal efficiency: 64.6% Concentrations increased gradually along primary treatment processes, mostly removed in secondary treatment (biologic treatment). Loss was attributed mostly to adsorption to sludge based on concentrated sludge samples containing HHCB at higher levels than the water samples. HHCB in sludge cakes in STP B-b was high at 2345.4 ng/L.			
Analytical Method and Analytical Details	GC/MS in selected ion monitoring mode; LOQ 3.3 ug/L; Samples filtered through GF/C and GF/D filters, spiked into Cleanert PEP cartridges and eluted with ACN/DCM and DCM, evaporated close to dryness and stored at -30°C. Sample dissolved in cyclohexane for analysis. Recovery: 83.02 ± 5.29%			
Transformation Products, Statistics, and Kinetics	Not reported; Linear regression was performed based on calibration measurements. Correlation coefficients were all 0.998 for HHCB.; Not reported			
Reference Substance and Reference Substance Results	Blank treated samples; Not reported			
EVALUATION				
Domain	Metric	Rating		Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The sample source and analytical standard sources were reported.
Domain 2: Test Design	Metric 3:	Study Controls	Medium	Blank samples were included, the results were not reported but were assumed to be within a valid range.
	Metric 4:	Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
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Study Citation:	SUNY, (2013). Occurrence and removal of selected polycyclic musks in two sewage treatment plants in Xi'an, China. Frontiers of Environmental Science & Engineering 7(2):166-172.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5428050			
Domain		Metric	EVALUATION Rating	Comments
	Metric 6:	Testing Conditions	Medium	Appropriate STP operational parameters were reported, but some conditions (temperature, pH) were not reported.
	Metric 7:	Testing Consistency	High	Sample collection and analysis were conducted consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability between recoveries of samples was accounted for.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations, percent recovery, and limits of detection and quantification were reported and the analytical method was appropriate.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Villa, S., Vighi, M., Finizio, A. (2014). Theoretical and experimental evidences of medium range atmospheric transport processes of polycyclic musk fragrances. Science of the Total Environment 481(1):27-34.
OECD Harmonized Template:	Miscellaneous
HERO ID:	2541915

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; Galaxolide
Confidentiality, Type, Guideline	None; Calculation; Overall environmental persistence; Calculation; Overall environmental persistence
Solvent, Reactivity, Storage, Stability	NA; NA; NA; NA
Radiolabel, Source, State, Purity	NA; NA; NA; NA Notes: NA
Test Method Details, Test Condition Details, and Test Consistency Details	The OECD Pov screening tool software (v. 2.2) was used to determine overall environmental persistence for the test substance. The model incorporates a steady-state fugacity based model with three main environmental compartments (troposphere, soil surface layer, and seawater surface layer).; $P_{ov} = M_{tot} / (F_{deg_a} + F_{deg_w} + F_{deg_s})$ Where P-Ov = environmental persistence (days) M_{tot} = total amount of chemical at steady-state (kg) F_{deg_a} , F_{deg_w} , F_{deg_s} = degradation mass fluxes in air, water, and soil, respectively (kg/h) Model inputs: HLC = 36.9 Pa m ³ /mol at 25 deg C Log K _{ow} = -1.83 Log K _{ow} = 5.3 to 5.9 at 25 deg C log K _{oa} = 7.2 DT50 air = 3.4 h at 23 deg C DT50 water = 3600 h at 23 deg C DT50 soil = 4320 h; Not Reported
System Type Design	Computational model
Sampling Frequency and Sampling Details	Not Reported; Not Reported
Test Temperature	Not Reported
Results Details	Overall persistence (Pov) = 240 - 250 days
Analytical Method and Analytical Details	Not Reported; Not Reported
Transformation Products, Statistics, and Kinetics	Not Reported; Not Reported; Not Reported
Reference Substance and Reference Substance Results	Not Reported; Not Reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	The test substance was identified by name.
Metric 2:	Test Substance Purity	N/A	Not applicable for calculated/modelled results.
Domain 2: Test Design			
Metric 3:	Study Controls	N/A	Not applicable for calculated/modelled results.
Metric 4:	Test Substance Stability	N/A	Not applicable for calculated/modelled results.
Domain 3: Test Conditions			
Metric 5:	Test Method Suitability	High	The model appears to be appropriate for the test substance.
Metric 6:	Testing Conditions	High	Appropriate model inputs were reported.
Metric 7:	Testing Consistency	N/A	Not applicable for calculated/modelled results.
Metric 8:	System Type and Design	N/A	Not applicable for calculated/modelled results.

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Study Citation:	Villa, S., Vighi, M., Finizio, A. (2014). Theoretical and experimental evidences of medium range atmospheric transport processes of polycyclic musk fragrances. Science of the Total Environment 481(1):27-34.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2541915			
		EVALUATION		
Domain	Metric	Rating		Comments
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable for this study type.
	Metric 10:	Sampling Methods	N/A	Not applicable for this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining overall persistence.
	Metric 12:	Test Substance Purity	N/A	Not applicable for calculated/modelled results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty with the results (ex. half-lives reflecting worse case scenarios) was discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable for this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Data was reported graphically, persistence was reported as a range.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	Statistical calculations were not conducted.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results of the study are reasonable based on the use of an OECD developed model.
	Metric 18:	QSAR Models	N/A	Not applicable for this study type.
Overall Quality Determination			High	

Study Citation:	Villa, S., Vighi, M., Finizio, A. (2014). Theoretical and experimental evidences of medium range atmospheric transport processes of polycyclic musk fragrances. Science of the Total Environment 481(1):27-34.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2541915			
EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; Galaxolide			
Confidentiality, Type, Guideline	None; Calculation; Potential for atmospheric transport; Calculation; Potential for atmospheric transport			
Solvent, Reactivity, Storage, Stability	NA; NA; NA; NA			
Radiolabel, Source, State, Purity	NA; NA; NA; NA Notes: NA			
Test Method Details, Test Condition Details, and Test Consistency Details	The OECD Pov screening tool software (v. 2.2) was used to determine the potential for atmospheric transport of the test substance. The model incorporates a steady-state fugacity based model with three main environmental compartments (troposphere, soil surface layer, and seawater surface layer).; CTD = (M_itot/F_ie) * (M_ii/M_itot) * viCTD = characteristic travel distance (km), the distance at which the chemical’s concentration has fallen to ~37% of it’s initial concentration at point of release.M_itot = total amount of chemical at steady-state (kg)F_ie = emission mass flux that enters medium iM_ii/M_itot = dimensionless mass fraction in the mobile medium (the medium that received the emissions)vi = assumed transport velocity in the mobile mediumAssuming constant windspeed (4 m/s) or flow of water (0.02 m/s). TEi = F_id/F_ie * 100%TE% = transfer efficiency F_id = atmospheric deposition mass flux in target regionF_ie = emission mass flux in source region.Model inputs:HLC = 36.9 Pa m^3/mol at 25 deg CLog Kaw = -1.83Log Kow = 5.3 to 5.9 at 25 deg Clog Koa = 7.2DT50 air = 3.4 h at 23 deg CDT50 water = 3600 h at 23 deg CDT50 soil = 4320 h; Not Reported			
System Type Design	Computational model			
Sampling Frequency and Sampling Details	Not Reported; Not Reported			
Test Temperature	Not Reported			
Results Details	CTD = ~ 150 km; very low TE.			
Analytical Method and Analytical Details	Not Reported; Not Reported			
Transformation Products, Statistics, and Kinetics	Not Reported; Not Reported; Not Reported			
Reference Substance and Reference Substance Results	Not Reported; Not Reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	N/A	Not applicable for calculated/modelled results.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	Not applicable for calculated/modelled results.
	Metric 4:	Test Substance Stability	N/A	Not applicable for calculated/modelled results.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The model appears to be appropriate for the test substance.
	Metric 6:	Testing Conditions	High	Appropriate model inputs were reported.
	Metric 7:	Testing Consistency	N/A	Not applicable for calculated/modelled results.
	Metric 8:	System Type and Design	N/A	Not applicable for calculated/modelled results.

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Study Citation:	Villa, S., Vighi, M., Finizio, A. (2014). Theoretical and experimental evidences of medium range atmospheric transport processes of polycyclic musk fragrances. Science of the Total Environment 481(1):27-34.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2541915			
Domain	Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	Not applicable for this study type.
	Metric 10:	Sampling Methods	N/A	Not applicable for this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology was appropriate for determining atmospheric transport potential.
	Metric 12:	Test Substance Purity	N/A	Not applicable for calculated/modelled results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty with the results (ex. half-lives reflecting worse case scenarios) was discussed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	Not applicable for this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Data was reported graphically, persistence was reported as a range.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	Statistical calculations were not conducted.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results of the study are reasonable based on the use of an OECD developed model.
	Metric 18:	QSAR Models	N/A	Not applicable for this study type.
Overall Quality Determination		High		

Study Citation:	Wang, L., Khan, S. J. (2014). Enantioselective analysis and fate of polycyclic musks in a water recycling plant in Sydney (Australia). Water Science and Technology 69(10):1996-2003.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427995

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; 1L amber glass bottles with polypropylene caps; NR
Radiolabel, Source, State, Purity	NA; Samples collected from advanced water treatment plant in Sydney, Australia, which treats raw water from sewer-mining municipal wastewater; NR; NA Notes: Analytical standards from Dr. Ehrenstorfer GmbH (Augsburg, Germany)
Test Method Details, Test Condition Details, and Test Consistency	Wastewater samples collected from advanced water treatment plant in Sydney, Australia, and analyzed for the test substance to determine removal efficiencies; Samples extracted by SPE; Internal standard AHTN-d3 (0.5 mL, 100 ng/mL) added to samples prior to extraction
Details	
System Type Design	Treatment phases: buffer tank, fine screen, moving bed biofilm reactor (MBBR), membrane bioreactor (MBR), reverse osmosis (RO), UV light, and chlorination
Sampling Frequency and Sampling Details	Samples collected on March 5, 2013; Samples collected after the buffer tank, MBBR, MBR, RO, UV, and chlorination phases; samples filtered prior to processing
Test Temperature	Not reported
Results Details	Removal efficiencies: MBBR: 52%; MBR: 2.6%; RO: 97%; UV: 33%; Chlorination: 25%; Detected concentrations: Buffer tank: 2545 ± 146 ng/L; MBBR: 1220 ± 56 ng/L; MBR: 1188 ± 51 ng/L; RO: 41.3 ± 2.4 ng/L; UV: 27.5 ± 2.1 ng/L; Chlorination: 20.5 ± 0.4 ng/L; No apparent enantioselective transformation during any treatment phase observed, all processes estimated to have the same treatment ability for each enantiomer of the test substance.
Analytical Method and Analytical Details	Agilent 7890A GC, Agilent 7000B triple quadrupole MS/MS, operated in electron ionization mode; Not reported
Transformation Products, Statistics, and Kinetics	Not Reported; Summary statistics; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The sample source was identified, the source of the analytical standards was identified.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Sampling blanks were not explicitly included in the study.
	Metric 4: Test Substance Stability	Medium	Minimal details on sample preparation and storage were provided, more details on preparation may be reported in a previously published paper.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.

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Study Citation:	Wang, L., Khan, S. J. (2014). Enantioselective analysis and fate of polycyclic musks in a water recycling plant in Sydney (Australia). Water Science and Technology 69(10):1996-2003.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427995			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	Medium	Operational stages of the AWTP were reported but not conditions such as temperature or retention times.
	Metric 7:	Testing Consistency	High	Sampling and sample processing were consistent across samples.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	Sampling methods addressed the outcomes of interest, limited details on approaches were provided.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was addressed by statistical techniques.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	The target chemical concentrations were reported and analytical methods were appropriate, extraction efficiency was not reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and compared to other studies' findings.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Wang, L., Wijekoon, K. C., Nghiem, L. D., Khan, S. J. (2014). Removal of polycyclic musks by anaerobic membrane bioreactor: biodegradation, biosorption, and enantioselectivity. Chemosphere 117:722-729.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431359

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	ethyl acetate in synthetic wastewater; NR; 4°C; NR
Radiolabel, Source, State, Purity	NA; Dr. Ehrenstorfer GmbH, Augsburg, Germany; NR; NR Notes: Synthetic wastewater composed of glucose, peptone, potassium dihydrogen phosphate, sodium acetate, urea, FeCl ₂ * 4 H ₂ O, nickel chloride, cobalt chloride, and ammonium molybdate
Test Method Details, Test Condition Details, and Test Consistency	Laboratory scale anaerobic MBR system set up to assess test substance fate in synthetic wastewater.; SRT: 150 daysHRT: 4 dCeramic membrane pore size: 0.1 umEffective membrane surface area: 0.09 m ² Permeate flux: 5L/dSludge from anaerobic digester of Wollongong Sewage Treatment Plant, NSW, Australia.; pH buffered to 7 ± 0.1 by NaHCO ₃ Mixed liquid suspended solids maintained at 10 g/LStarting concentration: 2 ug/L
System Type Design	10 L steel feed container, 30 L stainless steel reactor chamber, feed pump, sludge circulation pump, retentate recirculation pump, permeate suction pump, temperature control unit, and external ceramic membrane filtration unit.
Sampling Frequency and Sampling Details	Once per week over 4 weeks; Not reported
Test Temperature	35.0 ± 0.1°C
Results Details	Influent: 204 µgEffluent: 3 µgBiomass waste: 3 µgBiotransformation: 169 µgRemoval by biomass waste: 13%Removal in effluent: 4%Biotransformation: 83%Minor changes in 4 stereoisomer ratios, (4R,7S)- and (4R, 7R)-HHCB showed some preferential metabolism (effluent ratios: 0.25 and 0.21, respectively, 0.27 and 0.27 for 2 other stereoisomers)
Analytical Method and Analytical Details	GC-MS/MS in electron ionization mode and multiple reaction monitoring; Freeze-dried and ground biomass samples extracted 2x by ultrasonic solvent extraction in ethyl acetate, cleaned up with SPE; Aqueous samples filtered, extracted by SPE via HLB cartridges, and concentrated; recovery 93 - 101% (biomass samples)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name and structure.
	Metric 2: Test Substance Purity	Medium	The source of the test substance was reported; purity was not reported.
Domain 2: Test Design			
	Metric 3: Study Controls	Medium	Controls were not explicitly included.
	Metric 4: Test Substance Stability	High	Test substance preparation and storage conditions were reported.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	High	Pilot scale system stages and parameters were reported.
	Metric 7: Testing Consistency	High	Test conditions were consistent across samples.

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Study Citation:	Wang, L., Wijekoon, K. C., Nghiem, L. D., Khan, S. J. (2014). Removal of polycyclic musks by anaerobic membrane bioreactor: biodegradation, biosorption, and enantioselectivity. Chemosphere 117:722-729.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431359			
Domain		Metric	EVALUATION	
			Rating	Comments
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Variability and uncertainty was not explicitly addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Limited raw data reported, analytical methods were acceptable but limits of detection reported elsewhere; percent recovery from biomass samples reported but not for aqueous samples.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods not specified.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable and comparable to other studies.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination			High	

Study Citation:	Winkler, M., Kopf, G., Hauptvogel, C., Neu, T. (1998). Fate of artificial musk fragrances associated with suspended particulate matter (SPM) from the River Elbe (Germany) in comparison to other organic contaminants. Chemosphere 37(6):1139-1156.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5149743

Parameter		EXTRACTION		
CASRN and Test Material		1222-05-5; Galaxolide		
Confidentiality, Type, Guideline		No; experimental; experimental		
Solvent, Reactivity, Storage, Stability		NR; NR; NR; NR		
Radiolabel, Source, State, Purity		NR; Promochem (Germany); NR; NR Notes: NR		
Test Method Details, Test Condition Details, and Test Consistency Details		Concentration of musk fragrances in suspended particulate matter from the River Elbe in Germany.; SPM samples were spiked with selected contaminant in acetone to give a substance concentration of 10 ug/g. Samples were stored at room temperature in the dark for four weeks and then freeze dried and sorted in the freezer for an additional 6 weeks. For Desorption experiments: 15 mg of spiked SPM was mixed with 1 L of distilled water or a solution of humic acid in distilled water (7 mg/L).; NR		
System Type Design		NR		
Sampling Frequency and Sampling Details		weekly for the first four months then biweekly after.; Samples taken from The River Elbe in Magdeburg Germany from June 1996 to May 1997		
Test Temperature		NR		
Results Details		partitioning coefficient for laboratory experiments: In distilled water =1.29E4; In Humic acid: 4.14E3; In field experiments =1.68E3-8.14E3 (mean=4.49E3)		
Analytical Method and Analytical Details		liquid-liquid extraction followed by GC-ECD and GC-MS; Detection limit= 4 ng/g in SPM and 3 ng/L in water; Recovery was >70%		
Transformation Products, Statistics, and Kinetics		NR; NR; NR		
Reference Substance and Reference Substance Results		NR; NR		
Domain		EVALUATION		
		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified.
	Metric 2:	Test Substance Purity	Medium	Test substance source was eluted to but not stated definitively, purity was not reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	Medium	Study controls were not reported.
	Metric 4:	Test Substance Stability	Medium	Stability was not reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	Medium	The test method appears to be suitable.
	Metric 6:	Testing Conditions	Medium	Some testing conditions were reported.
	Metric 7:	Testing Consistency	Medium	Testing consistency was not reported
	Metric 8:	System Type and Design	Medium	Equilibrium was not reported.
Domain 4: Test Organisms				

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Study Citation:	Winkler, M., Kopf, G., Hauptvogel, C., Neu, T. (1998). Fate of artificial musk fragrances associated with suspended particulate matter (SPM) from the River Elbe (Germany) in comparison to other organic contaminants. Chemosphere 37(6):1139-1156.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5149743			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this study type.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome of interest was reported.
	Metric 12:	Test Substance Purity	High	The sampling method was reported.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Confounding variables were not reported.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was reported.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	The statistical method was reported.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	A QSAR model was not reported.
Overall Quality Determination		High		

Study Citation:	Wombacher, W. D., Hornbuckle, K. C. (2009). Synthetic Musk Fragrances in a Conventional Drinking Water Treatment Plant with Lime Softening. Journal of Environmental Engineering 135(11):1192-1198.
OECD Harmonized Template:	Miscellaneous
HERO ID:	1971706

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; Wastewater; analytical standard: Teddington, UK; NR; NR Notes: 1,3,4,6,7,8-hexahydro-4,6,6,7,8-hexamethylcyclopenta- γ -2-benzopyran; Galaxolide
Test Method Details, Test Condition Details, and Test Consistency Details	Chemical concentrations were measured in water, waste sludge, and air throughout the plant; The main treatment processes include sedimentation using ferric sulfate for coagulation, slaked lime water softening, chlorine gas disinfection, and gravity filtration using anthracite, sand, and dual media filters; water samples collected from Oct 2006 - June 2007; passive air samplers with polyurethane foam disks used from Dec 14 to Feb 5, 2007 and May 26 to June 16, 2007
System Type Design	University of Iowa Water Treatment Plant - Water treatment plant with lime softening; plant capacity is up to 6 million gallons per day (MGD) and typically operates around 3 MGD (11,000 m3/d).
Sampling Frequency and Sampling Details	14 water samples collected at each of 4 sampling points; 16 air samples collected throughout the plant; and 16 samples of solid sludge from the sedimentation and softening basins of the plant; HHCB was detected in 100% of samples; concentrations in raw Iowa River water ranged from 1 to 20 ng/L
Test Temperature	Not reported
Results Details	HHCB total removal averaged between 67-70%, primarily by adsorption to water softener sludge, and removal by sludge wasting and media filtration; cold weather removal = 70%, warm weather removal = 67%
Analytical Method and Analytical Details	Agilent Technologies 6890N Network GC system with a Hewlett Packard 5973 Mass Selective Detector using selected ion monitoring (SIM) and electron impact mode. Ion 243 was used for quantification and confirmation.; labeled musk xylene (D15) was used to spike water and sludge samples for analysis; recovery of all analytes were greater than 90%, MDLs were all below 0.25 ng/L
Transformation Products, Statistics, and Kinetics	Not applicable; Not applicable; Not applicable
Reference Substance and Reference Substance Results	Not applicable; Not applicable

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified clearly.
	Metric 2: Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 2: Test Design			
	Metric 3: Study Controls	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 4: Test Substance Stability	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	This metric met the criteria for high confidence as expected for this type of study.

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Study Citation:	Wombacher, W. D., Hornbuckle, K. C. (2009). Synthetic Musk Fragrances in a Conventional Drinking Water Treatment Plant with Lime Softening. Journal of Environmental Engineering 135(11):1192-1198.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	1971706			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 6:	Testing Conditions	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 7:	Testing Consistency	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 8:	System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric is not applicable to this type of study.
	Metric 10:	Sampling Methods	N/A	This metric is not applicable to this type of study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 12:	Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	This metric is not applicable to this type of study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric is not applicable to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	This metric is not applicable to this type of study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 18:	QSAR Models	N/A	This metric is not applicable to this type of study.
Overall Quality Determination		High		

Study Citation:	Wu, C. Y., Bai, L., Gu, F., Wei, W., Guo, L. X., Wen, D. M. (2018). Elimination of typical polycyclic musks in a full-scale membrane bioreactor combined with anaerobic-anoxic-oxic process in municipal wastewater treatment plant. Water Science and Technology 78(7):1459-1465.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427884

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	Water sample; NA; 4°C; NA
Radiolabel, Source, State, Purity	NA; NR; NR; NA Notes: Reference standards source: Dr. Ehrenstorfer, Augsburg, Germany
Test Method Details, Test Condition Details, and Test Consistency Details	Removal efficiency determined from influent and effluent water samples collected from anerobic, anoxic, oxic sludges, and a membrane bioreactor treatment steps in a wastewater treatment plant.; Sludge retention time (reported for anaerobic tank): 16.6 d; Not reported
System Type Design	Wastewater treatment plant with grit aeration chamber, bar screen chamber, anerobic sludge tank, anoxic sludge tank, oxic sludge tank, and membrane bioreactor tank.
Sampling Frequency and Sampling Details	Not reported; 500 mL collected from WWTP sections, filtered with 1 um glass fiber filter.
Test Temperature	26, 26, 27, and 26.5°C
Results Details	Overall removal efficiency for HHCB: 84.6%Anerobic stage influent: 124.7 ng/LAnerobic stage effluent: 51.8 ng/L
Analytical Method and Analytical Details	Gas chromatograph with mass selective detector, in single ion monitoring mode; Water sample further treated with SPE, evaporated under nitrogen stream and dissolved in n-hexane for analysis
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The substance was identified by name.
	Metric 2: Test Substance Purity	Medium	Minimal details on sample source were provided.
Domain 2: Test Design			
	Metric 3: Study Controls	N/A	Study controls are not required for WWTP efficiency studies.
	Metric 4: Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method is suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Minimal operating conditions of the WWTP plant were reported.
	Metric 7: Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

Domain 4: Test Organisms

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Study Citation:	Wu, C. Y., Bai, L., Gu, F., Wei, W., Guo, L. X., Wen, D. M. (2018). Elimination of typical polycyclic musks in a full-scale membrane bioreactor combined with anaerobic-anoxic-oxic process in municipal wastewater treatment plant. Water Science and Technology 78(7):1459-1465.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427884			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability was accounted for between measurements by appropriate statistical techniques.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Removal efficiencies for each stage were only reported graphically, little numerical data on removal was provided.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistics were applied appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Xie, Z., Ebinghaus, R., Temme, C., Heemken, O., Ruck, W. (2007). Air-sea exchange fluxes of synthetic polycyclic musks in the North Sea and the Arctic. Environmental Science & Technology 41(16):5654-5659.
OECD Harmonized Template:	Miscellaneous
HERO ID:	2188577

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; NR; NR; NR
Test Method Details, Test Condition Details, and Test Consistency Details	Air and seawater samples were simultaneously collected in the northeast Atlantic and the Arctic during a polar expedition cruise; Air-sea gas exchange fluxes estimated w/ modified version of the Whitman two film resistance model; Field/monitoring study
System Type Design	Volatilization (Fvol) and deposition (Fdep) fluxes: $F_{vol} = K_{ol}C_w$; $F_{dep} = K_{ol}C_a/H^*$; F (flux) C_w (dissolved conc) C_a (gas-phase conc) H^* (HLC) K_{ol} (mass transfer coefficient)
Sampling Frequency and Sampling Details	High volume air samples collected with PUF/XAD-2 column for the gas phase and a glass fiber filter for atmospheric particles (GF/F 8, pore size = 0.45 μm).; Water samples collected with in situ pump at 11 m on Polarstern (500-1000 L) and 1m on Ludwig Prandtl (10-50 L); PAD-2 columns used to extract dissolved analytes, a glass fiber filter for collecting suspended matter (GF/F 52, pore size 0.7 μm).
Test Temperature	Not reported average wind speeds 2-7 m/s
Results Details	North Sea: Median volatilization flux = 27.2 ng/m ² *day; depositional flux = 5.9 ng/m ² *day; Arctic: depositional flux 0.4 - 3.2 ng/m ² *day (mean: 1.5 ng/m ² *day)
Analytical Method and Analytical Details	GC-MS; Gas chromatography with quadrupole mass selective detector (MSD) with electron impact ionization. LOD = 0.1 pg; MDL derived from three times the standard deviation of field blanks.
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not reported
Reference Substance and Reference Substance Results	Field air-blanks were prepared on sets. Field blanks of water sampling were prepared onboard.; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified clearly.
	Metric 2: Test Substance Purity	Medium	Analytical standards were not reported.
Domain 2: Test Design	Metric 3: Study Controls	N/A	This metric does not apply to field studies.
	Metric 4: Test Substance Stability	N/A	This metric does not apply to field studies.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was appropriate.
	Metric 6: Testing Conditions	Medium	Matrix details were not fully reported.
	Metric 7: Testing Consistency	N/A	This metric does not apply to field studies.

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Study Citation:	Xie, Z., Ebinghaus, R., Temme, C., Heemken, O., Ruck, W. (2007). Air-sea exchange fluxes of synthetic polycyclic musks in the North Sea and the Arctic. Environmental Science & Technology 41(16):5654-5659.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2188577			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	This metric does not apply to this type of study.
	Metric 10:	Sampling Methods	N/A	This metric does not apply to this type of study.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 12:	Test Substance Purity	High	This metric met the criteria for high confidence as expected for this type of study.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	N/A	This metric does not apply to this type of study.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	This metric does not apply to this type of study.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	This metric met the criteria for high confidence as expected for this type of study.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	This metric does not apply to this type of study.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results are reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Yager, T. J. B., Furlong, E. T., Kolpin, D. W., Kinney, C. A., Zaugg, S. D., Burkhardt, M. R. (2014). Dissipation of contaminants of emerging concern in biosolids applied to nonirrigated farmland in eastern Colorado. Journal of the American Water Resources Association 50(2):343-357.
OECD Harmonized Template:	Miscellaneous
HERO ID:	2346027

EXTRACTION	
Parameter	Data
CASRN and Test Material	NR; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR
Radiolabel, Source, State, Purity	NR; biosolids; NR; NR Notes: 180 day weathered biosolids
Test Method Details, Test Condition Details, and Test Consistency Details	Agronomic biosolids were applied to nonirrigated farmland and sampled. Dewatered municipal biosolids resulting from secondary treatment May 2-7, 2007; biosolids were partially incorporated in the soil using a rotating, tractor-pulled aerator. A crop of winter wheat was planted four months after biosolids were applied and harvested after 14 months.; The study area was in the eastern plains of Colorado, northeast of Denver. (ca. 79% sand, ca. 20% clay, ca. 0.1% silt).; Variability found for analytes discussed in the supporting information file
System Type Design	crop field study with regular sampling
Sampling Frequency and Sampling Details	-7, 3, 17, 41, 90, 180 days post biosolid application; Weathered biosolids were collected from the land surface at 17, 41, 90, and 180 days post-application, separated from the soil. Soil was sampled seven days prior to biosolids. Soil sampling at each selected sampling node, 0-126 cm below land surface, sampled as seven separate vertical depth increments.
Test Temperature	NA
Results Details	Highest value detected in biosolid (116,000 ug/kg, est.), soil (1060 ug/kg) and crop (<400 ug/kg). HHCB was one of the monitored substances that were present in the largest concentration in six-month weathered biosolids and dissipated rapidly to pre-application levels after 180 days.
Analytical Method and Analytical Details	GC/MS; Biosolids and soil samples analyzed using pressurized solvent extraction, solid phase extraction, and capillary-column gas chromatography/mass spectrometry; crop samples measured with a modification of method from Burkhardt et al. (2006)
Transformation Products, Statistics, and Kinetics	NR; Not Reported; NR
Reference Substance and Reference Substance Results	laboratory blank, spiked samples, internal standards and continuing calibration verification samples were analysed; reported in supporting information files

EVALUATION				
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Purity	High	The source of the test substance was reported and purity were verified by analytical means.
Domain 2: Test Design	Metric 3:	Study Controls	High	A concurrent negative control, or blank group, toxicity control, and positive control were included.
	Metric 4:	Test Substance Stability	N/A	This metric is not applicable to this study type.
Domain 3: Test Conditions				

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Study Citation:	Yager, T. J. B., Furlong, E. T., Kolpin, D. W., Kinney, C. A., Zaugg, S. D., Burkhardt, M. R. (2014). Dissipation of contaminants of emerging concern in biosolids applied to nonirrigated farmland in eastern Colorado. Journal of the American Water Resources Association 50(2):343-357.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2346027			
Domain	Metric	EVALUATION		Comments
	Metric 5:	Test Method Suitability	Medium	The test method was suitable for the test substance and nominal estimates of media concentrations were provided, these deviations or omissions were not likely to have a substantial impact on study results
	Metric 6:	Testing Conditions	Medium	There were reported deviations or omissions in testing conditions and variability in the samples.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples or study groups.
	Metric 8:	System Type and Design	Medium	The system type and design were not capable of appropriately maintaining substance concentrations or not described but the deviation was not likely to have a substantial impact on study results.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	Medium	There were minor differences between the assessment methodology and the intended outcome assessment, estimates were reported for many values.
	Metric 12:	Test Substance Purity	High	The study reported the use of sampling methods that address the outcome of interest.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	Medium	Sources of variability and uncertainty in the measurements and statistical techniques and between study groups (if applicable) were reported in the study and the minor deviations or omissions were not likely to have a substantial impact on study results.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Low	Dissipation could be attributed to various processes and analysis and discussion did not include all monitored substances. This makes it difficult to form conclusions on all substances analyzed.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods or kinetic calculations were clearly described and address the dataset(s).
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The study results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.

Overall Quality Determination**Medium**

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Study Citation:	Yager, T. J. B., Furlong, E. T., Kolpin, D. W., Kinney, C. A., Zaugg, S. D., Burkhardt, M. R. (2014). Dissipation of contaminants of emerging concern in biosolids applied to nonirrigated farmland in eastern Colorado. Journal of the American Water Resources Association 50(2):343-357.
OECD Harmonized Template:	Miscellaneous
HERO ID:	2346027

		EVALUATION	
Domain	Metric	Rating	Comments

* Related References: Supporting information files were used to review the data and perform the evaluation.

Study Citation:	Yang, J. J., Metcalfe, C. D. (2006). Fate of synthetic musks in a domestic wastewater treatment plant and in an agricultural field amended with biosolids. Science of the Total Environment 363(1-3):149-165.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427892

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Sewage stored in solvent-washed glass bottles, stored in the dark at 4°C; biosolids stored in solvent-washed glass jars and frozen; NR
Radiolabel, Source, State, Purity	NA; Municipal wastewater treatment facility in Peterborough, ON, Canada; influent 25% industrial wastewater and 75% domestic sewage; NR; NA Notes: Standards prepared from test substance (>98% purity, purchased from LGC Promochem GmbH, Wesel, Germany) in ethyl acetate.
Test Method Details, Test Condition Details, and Test Consistency	Sewage and biosolid grab samples from Peterborough WWTP (Ontario); Hydraulic retention time: 15 - 22 hBiosolids retention time: 6 - 10 d; Flow rates, total solids, suspended solids, TSS, BOD, TOC, and pH monitored.
Details	
System Type Design	WWTP system with preliminary treatment, primary tank, aeration tank, final tank, and UV disinfection stages
Sampling Frequency and Sampling Details	Samples collected February, April, July, and October 2003.; Composite samples collected for raw sewage (influent), primary effluent, final tank effluent, and final effluent after UV treatment. Grab samples collected for waste activated sludge, return activated sludge, combined raw sewage, and digested biosolids
Test Temperature	Not reported
Results Details	3% discharged in SS final effluent, 73% removed by biosolids, 24% remained in aqueous final effluentAnnual averages:Removal efficiency based on mass balance: 72 - 82% (factors in recycling of waste activated sludge and flow changes)Removal efficiency: 72.7% (no UV), 53.5% (with UV)Primary removal efficiency: 13.1 - 18.8% Primary + secondary removal efficiency: 58.8 - 87.6%Primary + secondary + UV removal efficiency (Jul, Oct): 43.7 - 49.6%Raw influent: 390.2 ng/LPrimary effluent: 324.8 ng/LFinal effluent: 173.1 ng/LWaste activated sludge: 3302.5 µg/kg d.m. Return activated sludge: 3309.9 µg/kg dmDigested biosolids: 6788.4 µg/kg dm
Analytical Method and Analytical Details	Varian 3800 GC and Varian Saturn 220 ion trap mass spectrometer in selected ion storage mode; LOQ 0.4 - 4.0 ng/L; Aqueous samples filtered and extracted into hexane, dried, and concentrated with a rotary evaporator; biosolids were centrifuged, extracted by accelerated solvent extraction in hexane and ethyl acetate; extraction efficiency > 80%
Transformation Products, Statistics, and Kinetics	Not reported; Two-way MANOVA: showed the differences in concentration at different treatment stages were statistically significant, and that the test substance accumulates in sludge/biosolids.; Not applicable
Reference Substance and Reference Substance Results	Method blank samples; Not reported

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the WWTP samples was reported, in addition to internal standard solution source and purity.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Method controls were included and assumed to be valid.
	Metric 4: Test Substance Stability	High	The sample preparation and storage conditions were reported and appropriate.

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Study Citation:	Yang, J. J., Metcalfe, C. D. (2006). Fate of synthetic musks in a domestic wastewater treatment plant and in an agricultural field amended with biosolids. Science of the Total Environment 363(1-3):149-165.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427892			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	WWTP operational conditions were monitored and reported, appropriate sample characteristics were reported.
	Metric 7:	Testing Consistency	High	Test conditions were consistent across samples.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability and uncertainty were addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Extraction efficiency and limits of quantification were reported, mass balance was calculated and factored into overall removal efficiency.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Statistical methods were described and used appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Zeng, X., Sheng, G., Gui, H., Chen, D., Shao, W., Fu, J. (2007). Preliminary study on the occurrence and distribution of polycyclic musks in a wastewater treatment plant in Guangdong, China. Chemosphere 69(8):1305-1311.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5431424

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; In amber bottles with 0.5% methanol v/v, at 4°C; NR
Radiolabel, Source, State, Purity	NA; Municipal WWTP in Guangdong Province, China; Liquid; NA Notes: Analytical standard purchased Promochem, Germany
Test Method Details, Test Condition Details, and Test Consistency Details	Wastewater samples collected at various stages of a WWTP in Guangdong, China; WWTP receives 30% domestic and 70% industrial wastewater, including pre-treated (in on-site WWTPs) waste from two cosmetic plants; Method blanks (n=3), distilled water (n = 3) controls
System Type Design	Influent, screen, primary clarifier, aeration tank, secondary clarifier (return sludge to aeration tank), effluent
Sampling Frequency and Sampling Details	Composite samples (every 4 hours) over 24 hours; Samples collected from influent, primary effluent, and effluent, n = 6 per sample location
Test Temperature	Not reported
Results Details	Influent: 1.22 - 3.08 (water), 11.0 - 144 µg/L (particles)Primary effluent: 1.15 - 3.19, 8.66 - 57.4 µg/L (particles)Effluent: 0.95 - 2.02 µg/L (water)20.7 - 74.5 % recovered in the primary settler with particles sedimentation. Overall removal efficiency: 96.9%
Analytical Method and Analytical Details	HP6890 gas chromatography with Platform II mass spectrometric detector; LOD 20 ng/L (water) and 20 ng/g (particles).; Particles filtered through glass fibers. Liquid extracted and concentrated by SPE with a C-18 disc, eluted with n-hexane and n-hexane/DCM, concentrated by rotary evaporator. Recovery:108.14 ± 1.4% (particles) 81.56 ± 3.18 - 71.08 ± 7.55% (liquid)
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Method blanks and distilled water controls; Not detected or below detection limit

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	High	The source of the WWTP samples and analytical standards was reported.
Domain 2: Test Design	Metric 3: Study Controls	High	Method blanks were included and the test substance was detected below the detection limit.
	Metric 4: Test Substance Stability	High	Sample storage conditions and preparation were reported and appropriate.
Domain 3: Test Conditions	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	WWTP operational stages but not operational conditions were reported.
	Metric 7: Testing Consistency	High	Samples were treated, collected, and analyzed consistently.
	Metric 8: System Type and Design	N/A	The metric is not applicable to this study type.

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Study Citation:	Zeng, X., Sheng, G., Gui, H., Chen, D., Shao, W., Fu, J. (2007). Preliminary study on the occurrence and distribution of polycyclic musks in a wastewater treatment plant in Guandong, China. Chemosphere 69(8):1305-1311.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5431424			
Domain	Metric	EVALUATION		Comments
		Rating		
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	The study used sampling methods that addressed the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Variability in study groups was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Raw data was reported, extraction efficiency and limits of detection were reported, the analytical method was appropriate for the test substance.
	Metric 16:	Statistical Methods and Kinetic Calculations	Medium	Statistical methods were not described.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Zhang, X., Yao, Y.,u, Zeng, X., Qian, G., Guo, Y., Wu, M., Sheng, G., Fu, J. (2008). Synthetic musks in the aquatic environment and personal care products in Shanghai, China. Chemosphere 72(10):1553-1558.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427894

EXTRACTION

Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; Stored at 4°C with 0.5% methanol; NR
Radiolabel, Source, State, Purity	NA; Municipal STP; Liquid; NA Notes: Standard: 75% purity (GC), obtained from Promochem, Germany
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluents collected from municipal STP and analyzed to determine test substance removal efficiency.; Dissolved and particulate phase analyzed for influent, dissolved only analyzed for effluent.; Procedural blank, spiked blank, matrix spiking sample, and matrix spiking sample duplicate sample
System Type Design	STP activated sludge system with a screen, grit chamber, primary clarifier, aeration tank, and secondary clarifier. Treats 56,000 m ³ of domestic wastewater per day.
Sampling Frequency and Sampling Details	Collected on four dry days between 9 and 10:30 am during April 12 - 22, 2007; 1000 mL grab samples
Test Temperature	Not reported
Results Details	Average removal efficiency: 87%; Removal efficiency may be overestimated due to not detecting particulate concentrations in effluent. Average influent: 2300 ng/L Average effluent: 297 ng/L
Analytical Method and Analytical Details	GC/MS, electron impact selected ion monitoring mode; LOQ: 4 ng/L (water), 1 ng/g (sediment); Influent and effluent dissolved and particulate phase separated by glass fibers. Water extracted with C18 discs and discs eluted with hexane/DCM; Particulate phase Soxhlet extracted with DCM, extract purified on silica/alumina column, and concentrated prior to analysis
Transformation Products, Statistics, and Kinetics	Not reported; Not reported; Not applicable
Reference Substance and Reference Substance Results	Spiked blanks; Average recovery rate: 77.8%

EVALUATION

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified by name.
	Metric 2: Test Substance Purity	Medium	Minimal details on sample source reported, purity and source of analytical standard reported.
Domain 2: Test Design			
	Metric 3: Study Controls	High	Procedural blanks and spiked samples included and were valid.
	Metric 4: Test Substance Stability	High	STP sample preparation and storage reported and appropriate.
Domain 3: Test Conditions			
	Metric 5: Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6: Testing Conditions	Medium	Limited STP operational parameters were reported.
	Metric 7: Testing Consistency	High	Collection and analysis were consistent across samples.

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Study Citation:	Zhang, X., Yao, Y.,u, Zeng, X., Qian, G., Guo, Y., Wu, M., Sheng, G., Fu, J. (2008). Synthetic musks in the aquatic environment and personal care products in Shanghai, China. Chemosphere 72(10):1553-1558.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427894			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	Medium	Limitations in sampling methods were reported, only the dissolved concentration was analyzed in the effluent which may have impacted study results.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in measurements was addressed.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	Target chemical concentrations were reported, extraction efficiency and limits of detection were reported, analytical methods were suitable.
	Metric 16:	Statistical Methods and Kinetic Calculations	N/A	Statistical methods were not used.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	Medium	The limitation in sample analysis was reported to likely produce an artificially high removal efficiency.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

Study Citation:	Zhou, H., Huang, X., Gao, M., Wang, X., Wen, X. (2009). Distribution and elimination of polycyclic musks in three sewage treatment plants of Beijing, China. Journal of Environmental Sciences 21(5):561-567.
OECD Harmonized Template:	Miscellaneous
HERO ID:	2571422

EXTRACTION				
Parameter	Data			
CASRN and Test Material	1222-05-5; HHCB			
Confidentiality, Type, Guideline	None; Experimental; Experimental			
Solvent, Reactivity, Storage, Stability	NR; NR; NR; NR			
Radiolabel, Source, State, Purity	NR; Dr. Ehrenstorfer, Augsburg, Germany.; NR; 98.50% Notes: 1,2,4,6,7,8-hexahydro-4,6,6,7,8,8,-hexamethylcyclopenta[g]-2-benzopyrane			
Test Method Details, Test Condition Details, and Test Consistency Details	Samples were filtered through a GF/B glass fiber filter. The solid fraction was freeze-dried, ground, and mixed before extraction with ultrasonic solvent extraction. Filtered sewage was extracted with SPE (Oasis HLB cartridge).; All STPs included a bar screening chamber, followed by a grit aeration chamber. Influent samples were taken between these steps.; Not reported			
System Type Design	STP A: aerobic/anoxic/oxic processes; STP B: Anoxic/oxic; STP C: Extended aeration oxidized ditch with anaerobic reactor.			
Sampling Frequency and Sampling Details	October - December; 2 L samples were collected from each point after the bar screening chamber and stored at 4°C.			
Test Temperature	Not reported			
Results Details	Removal (%): STP A: 70.1; STP B: 41.7; STP C: 58.1; Mean: 56.6.			
Analytical Method and Analytical Details	GC-MS; LOD in sewage: 0.4 ng/L; in sludge: 0.20. LOQ = 3.3 x LOD. Recovery (%) in UP water: 83.5±11.6; in sewage: 81.3±10.1; in sludge: 74.8±10.6.			
Transformation Products, Statistics, and Kinetics	Not reported; Primary treatment (grit chamber, primary sedimentation, flow-regulating well) removal in A, B, and C: 24.6, 4.2, and 12.0%. Secondary treatment (anaerobic, anoxic, aerated, biological selection tank) removal in A, B, C: 45.5, 37.5, and 45.2%.; Not reported			
Reference Substance and Reference Substance Results	Not reported; Not reported			
EVALUATION				
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	The test substance was identified using common nomenclature.
	Metric 2:	Test Substance Purity	High	The test substance purity was reported and impurities were accounted for in the study results.
Domain 2: Test Design	Metric 3:	Study Controls	High	Appropriate blanks were reported.
	Metric 4:	Test Substance Stability	High	The homogeneity, preparation, and storage conditions of the samples containing the test substance were reported and appropriate.
Domain 3: Test Conditions	Metric 5:	Test Method Suitability	High	The test method was suitable for the test substance.
	Metric 6:	Testing Conditions	High	The conditions present in the STPs were reported and appropriate.
	Metric 7:	Testing Consistency	High	There were no reported changes in the testing conditions across the sample groups.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to the study type.

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Study Citation:	Zhou, H., Huang, X., Gao, M., Wang, X., Wen, X. (2009). Distribution and elimination of polycyclic musks in three sewage treatment plants of Beijing, China. Journal of Environmental Sciences 21(5):561-567.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	2571422			
Domain	Metric	EVALUATION Rating		Comments
Domain 4: Test Organisms				
	Metric 9:	Outcome Assessment Methodology	High	The treatment types used in each STP were reported and appropriate.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to the study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 12:	Test Substance Purity	High	The sampling methods were clearly reported and appropriate.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Uncertainty in the extraction recovery was reported and not likely to have an impact on the study results.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to the study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	High	The analytical method was clearly described and suitable for the test substance.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	The statistical analysis was appropriate and addressed the dataset.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The study results are reasonable as compared to the reported results from other STPs.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to the study type.
Overall Quality Determination		High		

Study Citation:	Zouhar, L., Vavrova, M., Mravcova, L., Kubickova, K., Vecerek, V. (2012). Evaluation of wastewater contamination by musk compounds. Fresenius Environmental Bulletin 21(11A):3352-3356.
OECD Harmonized Template:	Miscellaneous
HERO ID:	5427939

EXTRACTION	
Parameter	Data
CASRN and Test Material	1222-05-5; HHCB
Confidentiality, Type, Guideline	None; Experimental; Experimental
Solvent, Reactivity, Storage, Stability	NA; NR; NR; NR
Radiolabel, Source, State, Purity	NA; Wastewater treatment plant in Brno-Modrice; NR; NA Notes: Standards obtained from Chiron, Norway.
Test Method Details, Test Condition Details, and Test Consistency Details	Influent and effluent samples collected in February 2010 from a wastewater treatment facility; Not reported; Relative standard deviation determined
System Type Design	Not reported
Sampling Frequency and Sampling Details	Daily (28 days); Daily samples were mixed aliquots of samples collected every 2 hours according to flow-rate.
Test Temperature	Not reported
Results Details	Removal efficiency: 55.48%Influent (average): 757.8 - 13485 ng/L (2765 ng/L)Effluent (average): 399.5 - 4911 ng/L (1231 ng/L)
Analytical Method and Analytical Details	GC-MS in selected ion monitoring mode; Samples extracted by SPME prior to analysis; LOD 77.04 ng/L; LOQ 256.8 ng/L
Transformation Products, Statistics, and Kinetics	Not reported; Repeatability (relative standard deviation): 8.26%; Not applicable
Reference Substance and Reference Substance Results	Not reported; Not reported

EVALUATION				
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Purity	High	The source of the samples was reported.
Domain 2: Test Design				
	Metric 3:	Study Controls	N/A	Concurrent controls are not required for this study type.
	Metric 4:	Test Substance Stability	Medium	Limited details on sampling and storage conditions were reported.
Domain 3: Test Conditions				
	Metric 5:	Test Method Suitability	High	The method was suitable for the test substance.
	Metric 6:	Testing Conditions	Medium	Limited sample characteristics and WWTP system operational parameters were reported.
	Metric 7:	Testing Consistency	High	Samples were collected and analyzed consistently.
	Metric 8:	System Type and Design	N/A	The metric is not applicable to this study type.
Domain 4: Test Organisms				

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Study Citation:	Zouhar, L., Vavrova, M., Mravcova, L., Kubickova, K., Vecerek, V. (2012). Evaluation of wastewater contamination by musk compounds. Fresenius Environmental Bulletin 21(11A):3352-3356.			
OECD Harmonized Template:	Miscellaneous			
HERO ID:	5427939			
		EVALUATION		
Domain	Metric	Rating	Comments	
	Metric 9:	Outcome Assessment Methodology	N/A	The metric is not applicable to this study type.
	Metric 10:	Sampling Methods	N/A	The metric is not applicable to this study type.
Domain 5: Outcome Assessment				
	Metric 11:	Test Substance Identity	High	The outcome assessment methodology addressed the intended outcomes of interest.
	Metric 12:	Test Substance Purity	High	Sampling methods address the outcomes of interest and used widely accepted approaches.
Domain 6: Confounding/Variable Control				
	Metric 13:	Confounding Variables	High	Repeatability between analytical determinations was reported.
	Metric 14:	Health Outcomes Unrelated to Exposure	N/A	The metric is not applicable to this study type.
Domain 7: Data Presentation and Analysis				
	Metric 15:	Data Reporting	Medium	Target chemical concentrations and limits of detection were reported, extraction efficiency was not reported but it unlikely to impact the overall results.
	Metric 16:	Statistical Methods and Kinetic Calculations	High	Summary statistics were performed appropriately.
Domain 8: Other				
	Metric 17:	Verification or Plausibility of Results	High	The results were reasonable.
	Metric 18:	QSAR Models	N/A	The metric is not applicable to this study type.
Overall Quality Determination		High		

List of Abbreviations and Acronyms for Data Quality Evaluation and Extraction Tables

Term	Definition
BAF	Biaccumulation Factor
BCF	Bioconcentration Factor
BMF	Biomagnification Factor
BSAF	Biota-sediment Accumulation Factor
C	Concentration
CASRN	Chemical Abstract Service registry number
DOC	Dissolved Organic Carbon
dw	Dry weight
DW	Drinking Water
DWTP	Drinking Water Treatment Plant
EPA	Environmental Protection Agency
ESI	Electrospray Ionisation
FID	Flame Ionisation Detector
FPD	Flame Photometric Detector
GC	Gas Chromatography
g/L	Grams per Liter
HLC	Henry's Law Constant
HPLC	High-performance liquid chromatography
ISO	International Organization for Standardization
K _{oa}	Octanol-Air partition coefficient
K _{oc}	Organic carbon-water partition coefficient
K _{ow}	Octanol-Water partition coefficient
L/d	Liters per day
LOD	Limit of Detection
LOQ	Limit of Quantification
lw	Lipid weight
M	Molarity (mol/L = moles per Liter)
mL/min	Milliliters per minute
mM	Millimolar
MDL	Method Detection Limit
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
mg/m ³	Milligrams per cubic meter
MRL	Method Reporting Limit
MS	Mass Spectrometry
n	Sample Size
N/A	Not applicable
ND	Non-Detection
ng/L	Nanograms per Liter

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Term	Definition
nm	Nanometers
NR	Not Reported
OECD	Organisation for Economic Co-operation and Development
· OH	Hydroxyl radical
OPE	Organophosphate Ester
pg/L	Picograms per Liter
ppm	parts per million
QSAR	Quantitative Structure Activity Relationship
RSD	Relative Standard Deviation
SI	Supplemental Information
SIM	Selected Ion Monitoring
SPE	Solid Phase Extraction
STP	Sewage Treatment Plant
TMF	Trophic Magnification Factor
TOC	Total Organic Carbon
TOF	Time of Flight
µg/L or µg/mL	micrograms per liter or per milliliter
UPLC	Ultra-performance liquid chromatography
US or USA	United States of America
UV (UV-Vis)	Ultra Violet (Visible)
ww	Wet Weight
WWTP	Wastewater Treatment Plant