United States
Environmental Protection Agency

April 2026
Office of Chemical Safety and
Pollution Prevention

Data Quality Evaluation Information for Environmental Hazard for 1,2-Dichloroethane

Systematic Review Support Document for the Risk Evaluation

CASRN: 107-06-2

April 2026

This supplemental file contains information regarding the data quality evaluation results relevant to the characterization of environmental hazard for the *Risk Evaluation for 1,2-Dichloroethane*. Due to data gaps identified for 1,2-dichloroethane, analog data from 1,1-dichloroethane, 1,2-dichloropropane, and 1,1,2-trichloroethane were included for read-across in the *Risk Evaluation for 1,2-Dichloroethane*. EPA conducted data quality evaluation based on author-reported descriptions and results; additional analyses (*e.g.*, statistical analyses performed during data integration into the risk evaluation) potentially conducted by EPA are not contained in this supplemental file. 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 '2021 Draft Systematic Review Protocol'). Any updated steps in the systematic review process since the publication of the 2021 Draft Systematic Review Protocol are described in the *Systematic Review Protocol for 1,2-Dichloroethane*.

Different data quality evaluation forms were used depending on the organism as described in the PECO statement in Appendix H.5.7 of the 2021 Draft Systematic Review Protocol. Each health outcome was evaluated independently within a given reference, therefore each reference may have more than one overall quality determination (OQD) to more appropriately reflect the quality of each health outcome and the respective hazard endpoints as described by the study authors. Some data evaluation forms have general additional comments presented adjacent to the OQD to add further context. No OQD is determined for each reference as a whole, if it contains data from more than one evidence stream. Data quality evaluation results were organized by first presenting the data for the target compound (1,2-dichloroethane) followed by a separate section for analog data (1,1-dichloroethane, 1,2-dichloropropane and 1,1,2-trichloroethane). The table of contents lists references based on chemical, broad habitat (*e.g.*, aquatic, terrestrial), taxa, taxonomic group, exposure duration, and health outcome (*e.g.*, mortality) categories relevant to the endpoint being evaluated.

Table of Contents

Analog Chemical Data

Habitat: Aquatic (freshwater)

Taxa: Invertebrates

Chironomus riparius

Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Amphibian; *Ambystoma gracile*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature were referred to for DCA on page 6 and 14 along with several other locations.
	Metric 2:	Test Substance Source	Low	The source of the compound was not reported.
	Metric 3:	Test Substance Purity	High	Reported as reagent grade on Page 14.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Control groups were conducted.
	Metric 5:	Negative Control Response	Medium	Control survival was reported for all studies as between 84-99% for 4 days post hatch on page 30.
	Metric 6:	Randomized Allocation	Low	Allocation was not reported as random.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The preparation of treatment waters and bioassay system (flow-through) was well described. Headspace was eliminated as the study was centered on solvents.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	High	GLC was used for verifying concentrations and values are reported as actual concentrations (Page 23).
	Metric 10:	Exposure Duration and Frequency	High	The duration for these acute bioassays is appropriate (from shortly after fertilization through 4 days post hatch).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	These acute bioassays were conducted with 6 concentrations.
	Metric 12:	Testing at or Below Solubility Limit	High	All concentrations (21 mg/L as the highest) were well below the solubility for this compound as reported in the Final Scope (8600 mg/L).
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source was listed for this species on page 13/74.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Water conditions were well described. As these are newly fertilized embryos, the acclimation period was very brief. Many species in this study were from external sources.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each exposure chamber was reported as holding 50-125 embryo on page 20/74.
Domain 5: Outcome Assessment				

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Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Amphibian; *Ambystoma gracile*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Incubation conditions, water chemistry properties, and embryo/larval handling were well reported and appropriate.
	Metric 17:	Outcome Assessment Methodology	High	Outcome assessment was appropriate for these lethal acute bioassays.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment was consistent among treatment and control groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No differences among treatment and control groups were reported for environmental conditions that indicate influence outside of the chemical tested.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing reported to indicate differences among groups in animal attrition unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Log probit analysis was indicated in the methods section on page 20/74.
	Metric 22:	Reporting of Data	High	treatment concentrations, cumulative mortality are reported on page 55. LC50 and 95% confidence estimates are presented in table 14.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: A highly detailed study on embryo-larval survival bioassays from acute exposures to DCA. The study reported deformities observed in these bioassays per treatment concentrations on page 55 (table 8). The deformity data was not analyzed.

Overall Quality Determination High

Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water surface."
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96 hr exposures. This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	High	The 96 hr LC50 and 95% confidence intervals were established from the study.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Study authors did not identify and outcomes unrelated to the exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	”The LC50 concentrations were calculated by using the Trimmed Spearman-Karber method for estimating median lethal concentrations (Hamilton et al. 1977). This method is not subject to the deficiencies of the more common normal or logistic methods and it is not as sensitive to anomalous responses on the conventional Spearman-Karber technique.”
	Metric 22:	Reporting of Data	High	”The 24-, 48-, 72-, and 96-hr LC50 values and 95% confidence intervals of the chlorinated aliphatic compounds are given in Table 3.”
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not identify any unexpected outcomes.

Additional Comments: This form represents 1,2-Dichloroethane acute mortality studies.

Overall Quality Determination Medium

Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity and/or grade of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used, but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96hr exposures This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	Uninformative	The recording of lethargy and anesthesia were not recorded for treatment groups and are subjective observations.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C. T., Fiandt, J. T., Phipps, G. L., Holcombe, G. W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4259619; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No outcomes unrelated to the exposure were identified by the study authors.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	No statistics were applied to observations of lethargy and anesthesia.
	Metric 22:	Reporting of Data	Low	The behavioral observations were not presented by treatment groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This form represents the observations of lethargy and anesthesia that were recorded within the results section on page 5/6 for 1,2-Dichloroethane.

Overall Quality Determination Uninformative

Study Citation:	U.S. EPA, (1987). Toxicological studies of 1,2-dichloroethane with attachments and cover letter dated 072387.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Gasterosteus aculeatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447339

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by CASRN on the title page and on page 3 of the PDF.
	Metric 2:	Test Substance Source	Low	The source of the was reported as RRC, but a batch/lot number was not reported nor was it reported if it was analytically verified.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99+%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control.
	Metric 5:	Negative Control Response	Low	The negative control response was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the test organisms were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The test substance was dissolved in a "small amount" of acetone and then mixed with the test solution. The amount of acetone was unclear. Other aspects of the test system were unclear.
	Metric 8:	Consistency of Exposure Administration	Low	Few details were reported regarding exposure administration.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	It was not reported if the test concentrations were measured at any point in the study.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was 96-hours, which is typical of an acute toxicity test with fish.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	There were only three exposure groups, which is fewer than typical. Two mortalities were reported at the 100 ppm level, but none for the highest exposure group (240 ppm), indicating that testing higher concentrations may have been beneficial.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source of the threespine stickleback was reported to be Alex Fish Co. in San Rafael, CA. The age of the fish was not reported, though length and weight ranges were provided.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	It was not reported if the fish were acclimated to test conditions prior to exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were 10 organisms per test concentration, but it was unclear if there were any replicates.
Domain 5: Outcome Assessment				

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Study Citation:	U.S. EPA, (1987). Toxicological studies of 1,2-dichloroethane with attachments and cover letter dated 072387.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Gasterosteus aculeatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447339

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Low	Little information was provided about the test conditions or housing conditions.
	Metric 17:	Outcome Assessment Methodology	Low	Mortality was reported in terms of an LC50 value, however, the methodology for determining mortality was not reported.
	Metric 18:	Consistency of Outcome Assessment	Low	It appears mortality was monitored every 24h for the duration of the study. However, the method for determining mortality was not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	Study authors did not provide enough information to allow for a comparison of environmental conditions. It was not reported if acclimation occurred.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	The LC50 value was reported to be greater than the highest test concentration, as no mortality occurred at this test concentration. Therefore methods for LC50 estimation were not reported.
	Metric 22:	Reporting of Data	Low	Individual results for each test concentrations were reported in the table, but control results were not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Study authors reported some mortality in the second highest test concentration (100ppm), but not the highest test concentration (240ppm). Possible reasons for this were not discussed.

Additional Comments: This evaluation is for the acute toxicity of 1,2-dichloroethane to the threespine stickleback over 96-hours. The LC50 value was reported to be >240ppm, which was the highest test concentration.

Overall Quality Determination Uninformative

Study Citation:	U.S. EPA, (1987). Toxicological studies of 1,2-dichloroethane with attachments and cover letter dated 072387.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Gasterosteus aculeatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447339

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by CASRN on the title page and on page 3 of the PDF.
	Metric 2:	Test Substance Source	Low	The source of the was reported as RRC, but a batch/lot number was not reported nor was it reported if it was analytically verified.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99+%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control.
	Metric 5:	Negative Control Response	Low	The negative control response was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the test organisms were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The test substance was dissolved in a ”small amount” of acetone and then mixed with the test solution. The amount of acetone was unclear. Other aspects of the test system were unclear.
	Metric 8:	Consistency of Exposure Administration	Low	Few details were reported regarding exposure administration.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	It was not reported if the test concentrations were measured at any point in the study.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was 96-hours, which is typical of an acute toxicity test with fish.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	There were only three exposure groups, which is fewer than typical. Two fish were reported to be depressed and died at the 100 ppm level, but none for the highest exposure group (240 ppm), indicating that testing higher concentrations may have been beneficial.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source of the threespine stickleback was reported to be Alex Fish Co. in San Rafael, CA. The age of the fish was not reported, though length and weight ranges were provided.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	It was not reported if the fish were acclimated to test conditions prior to exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were 10 organisms per test concentration, but it was unclear if there were any replicates.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Little information was provided about the test conditions or housing conditions.

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Study Citation:	U.S. EPA, (1987). Toxicological studies of 1,2-dichloroethane with attachments and cover letter dated 072387.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Gasterosteus aculeatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447339

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	It was reported that two fish became depressed at the 100 ppm concentration. The behavioral observation method was not described.
	Metric 18:	Consistency of Outcome Assessment	Low	The execution of the study protocol for the behavioral outcome assessment was not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	Study authors did not provide enough information to allow for a comparison of environmental conditions. It was not reported if acclimation occurred.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Behavioral effects were only observed in two fish, therefore methods for NOEC/LOEC estimation were not reported.
	Metric 22:	Reporting of Data	Low	Effects on behavior were only described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Study authors reported some depression in the second highest test concentration (100ppm), but not the highest test concentration (240ppm). Possible reasons for this were not discussed.

Additional Comments: This evaluation is for the behavioral outcome for 1,2-dichloroethane acute exposure to the threespine stickleback over 96-hours. The LC50 value was reported to be >240ppm, which was the highest test concentration.

Overall Quality Determination Uninformative

Study Citation:	Buccafusco, R. J., Ells, S. J., Leblanc, G. A. (1981). Acute toxicity of priority pollutants to bluegill (Lepomis macrochirus). Bulletin of Environmental Contamination and Toxicology 26(4):446-452.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Lepomis macrochirus*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18064; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	CASRN not provided.
	Metric 2:	Test Substance Source	Low	Commercial sources were not specified.
	Metric 3:	Test Substance Purity	Medium	Chemical purity reported as at least 80%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Study authors reported using both solvent and clean (water) controls, in cases where a solvent was utilized. Solvent type not specifically stated per chemical. Solvent concentration of control was equal to that of the highest test concentration.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental system and methods for preparation of test media were described generically but lacking chemical-specific preparation details.
	Metric 8:	Consistency of Exposure Administration	High	Exposures for capped and uncapped conditions were described and appeared to be consistent within a condition.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not reported.
	Metric 10:	Exposure Duration and Frequency	High	Duration of acute toxicity seems appropriate with endpoints determined at 24 hr and 96 hr.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	The authors do not state the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Because exposure concentrations were not reported, unable to determine whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The test organisms were adequately described but the exact source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Fish were added to vessels which required capping 30 min prior to addition of test chemical. For uncapped jars, fish were added 30 min after addition of test chemical.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	10 fish were added to a jar per test concentration. No replicate jars reported.
Domain 5: Outcome Assessment				

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Study Citation:	Buccafusco, R. J., Ells, S. J., Leblanc, G. A. (1981). Acute toxicity of priority pollutants to bluegill (Lepomis macrochirus). Bulletin of Environmental Contamination and Toxicology 26(4):446-452.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Lepomis macrochirus*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18064; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Water quality metrics reported before and during exposure. Unclear on biomass loading prior to being placed in test jars.
	Metric 17:	Outcome Assessment Methodology	Medium	Mortality was the endpoint (observations taken at 0 hr and every 24 hr during the test) but no description of how mortality was qualified (example, moribund).
	Metric 18:	Consistency of Outcome Assessment	Medium	Mortality determined at 24 hr and 96 hr; unclear if these were separate test vessels.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Solvent concentration differed from high test concentration (and solvent control) when compared to lower test concentrations per information in the methods.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No information in the study to suggest differences in attrition or health outcomes.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was performed using either Harris' method or, for chemicals not meeting Harris's method requirements, a log probit method.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group. LC50 values are reported in Table 1.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Within-study variability was not reported for individual chemicals.

Additional Comments: This form is for the 24 hr and 96 hr LC50 values and also for any PECO-relevant isomers that were included in the study.

Overall Quality Determination Low

Study Citation:	Barrows, M. E., Petrocelli, S. R., Macek, K. J., Carroll, J. J. (1980). Bioconcentration and elimination of selected water pollutants by bluegill sunfish (Lepomis macrochirus). :379-392.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Lepomis macrochirus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	ADME (biotransformation)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18050; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Test form of the chemical was identified and location of the C 14 label was given.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured regularly along with the tissue concentrations as well as before the exposures began.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	Only one sublethal concentration of each chemical were used to observe for bioconcentration.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit, however, solvents were used to aid in dissolution.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Age of test organisms was not reported, but this is likely to have little impact on the test results.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects
Domain 5: Outcome Assessment				

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Study Citation:	Barrows, M. E., Petrocelli, S. R., Macek, K. J., Carroll, J. J. (1980). Bioconcentration and elimination of selected water pollutants by bluegill sunfish (Lepomis macrochirus). :379-392.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Lepomis macrochirus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	ADME (biotransformation)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18050; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of test system were conducive to maintenance of organism health
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	This study was to determine bioconcentration factors, and thus statistical analysis was not necessary.
	Metric 22:	Reporting of Data	Medium	Most data exposure related finding were reported, but the control group and 2 metals were not included in the charts, but discussed in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	Chemical source was Dow Chemical of Canada Ltd, but the substance was not analytically verified.
	Metric 3:	Test Substance Purity	Medium	Purity was not provided, but the test substance was production grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The 1h exposure did not report that a negative control was used. The control for the 21d exposure may have been used for this study too, but that was not explicitly stated.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail–100% test substance in static exposure for 1h
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups–1h exposure and then embryos were moved to untreated water for observation
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type and/or outcome of interest–1hr exposure to 100% ethylene dichloride to mimic a spill situation
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	There was only one exposure level as the goal was not to have a dose response
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure was to 100% of the test substance, so it was not dissolved in water to create various test concentrations.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Test organisms were from the Capilano River hatchery. There are some concerns about exposure to chemicals and disease.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms–embryos were acclimatized in the dark for 48h at 3C

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Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects–50 organisms in each test vessel performed in duplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Minor uncertainties or limitations were identified regarding environmental conditions–pH was reported at 5.5, which seems a little low.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–mortality after exposure to 100% diethylene chloride.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups–Embryos were placed in untreated water after 1h of exposure and assessed at 1,2,4,8,24,48,72, and 96h.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	No statistical analysis performed as 100% mortality occurred.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all, outcomes–no control was used therefore no control data was provided.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Range of replicates was provided in Figure 1, but SD was not provided

Additional Comments: This evaluation form is for the 'slug dose' experiment (salmon eggs exposed to 100% ethylene dichloride) conducted to mimic worst case chemical spill conditions.

Overall Quality Determination Uninformative

Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: $>$ 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	Chemical source was Dow Chemical of Canada Ltd, but the substance was not analytically verified.
	Metric 3:	Test Substance Purity	Medium	Purity was not provided, but the test substance was production grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail–Serial dilutions were performed with the test water.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups-egg mortality, hatchability, and alevin survival were monitored daily.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured at 0, 12, and 24h to determine actual test concentrations, but were not performed later in the 21d test.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type and/or outcome of interest–21d.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	4 exposure levels and a control with adequate spacing.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Test organisms were from the Capilano River hatchery. There are some concerns about exposure to chemicals and disease.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms–embryos were acclimatized in the dark for 48h at 3C.

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Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects–50 eggs per test vessel performed in duplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Minor uncertainties or limitations were identified regarding environmental conditions–pH ranged from 5.3 to 5.8, which seems a bit low.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest. Criteria for assessing egg mortality, hatchability and alevin survival were provided.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups–Embryos were assessed daily for mortality and hatch. If hatch occurred, alevins were monitored daily for survival.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was not conducted but results were described in the text, and data provided in figures for each replicate.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group
	Metric 23:	Explanation of Unexpected Outcomes	Low	Range of replicates was provided in Figure 1, but SD was not provided

Additional Comments: None

Overall Quality Determination Low

Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	Chemical source was Dow Chemical of Canada Ltd, but the substance was not analytically verified.
	Metric 3:	Test Substance Purity	Medium	Purity was not provided, but the test substance was production grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail–Serial dilutions were performed with the test water.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups-egg mortality, hatchability, and alevin survival were monitored daily.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured at 0, 12, and 24h to determine actual test concentrations, but were not performed later in the 21d test.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type and/or outcome of interest–21d.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	4 exposure levels and a control with adequate spacing.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Test organisms were from the Capilano River hatchery. There are some concerns about exposure to chemicals and disease.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms–embryos were acclimatized in the dark for 48h at 3C
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects–50 eggs per test vessel performed in duplicate.
Domain 5: Outcome Assessment				

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Study Citation:	Reid, B. J., Morgan, J. D., Whelen, M. A. (1982). A preliminary examination of the effects of ethylene dichloride on the hatchability of Coho salmon eggs (Oncorhynchus kisutch). Canadian Technical Report of Fisheries and Aquatic Sciences 1163:145-153.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus kisutch*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214704

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Minor uncertainties or limitations were identified regarding environmental conditions–pH ranged from 5.3 to 5.8, which seems a bit low.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–organisms in 56ppm ethylene dichloride hatched 1-4 days earlier than the control.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups–Embryos were assessed daily for mortality and hatch. If hatch occurred, alevins were monitored daily for survival.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was not conducted but results were described in the text, and data provided in figures for each replicate.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group–figure 2 provides hatch timelines
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability–no measures of variability provided for induced hatching from test substance vs the control

Additional Comments: None

Overall Quality Determination Low

Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus mykiss*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Chemical was identified by name and CASRN (page 293/588).
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity reported as 100.0%
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Though the use of controls was not directly stated in the paper, Fig 1 (page 21/588) shows the concentration ranges used for all chemicals and it includes zero concentrations on the horizontal axis. Also, in the methods it was stated that the static and flow-through techniques were generally those of the American Society for Testing and Materials (1980) and the Committee on Methods for Toxicity Tests with Aquatic Organisms (1975). However, ranking this metric low because with the given information, one cannot confirm that the controls group had all conditions equal except chemical exposure.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had the following details- "Stock solutions were prepared immediately before each test, with commercial grade acetone as the carrier solvent. Occasionally, ethanol or dimethylformamide was substituted. Solvent concentrations did not exceed 0.5 mL/L in final dilution water." Experimental system details were also provided in the cited reference.
	Metric 8:	Consistency of Exposure Administration	Medium	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had more details about the static method and the exposures seems to have been administered consistently across groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	As per the cited reference for methods, at least six concentrations were used but spacing was not reported. No information is provided on the exposure concentration tested in the reference. However, EPA has held conversations with US FWS to confirm the experimental design.
	Metric 12:	Testing at or Below Solubility Limit	Medium	A solvent was used and the maximum solvent concentration was reported in the cited reference for methods but solvent control response was not reported.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus mykiss*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Per the cited reference for methods, fish were obtained from Federal and State hatcheries as either eggs or fry. The weight of rainbow trout used was provided in the results section.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Per the cited reference for methods, fish were acclimated to test water over a 1-3 day period.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Per the cited reference for methods, at least 10 organisms were exposed to each concentration but replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were provided in the cited reference for methods. ”Water was buffered to maintain a pH of 7 .2 to 7 .5, an alkalinity of 30 to 35 mg/L, and a hardness of 40 to 50 mg/L as CaCO3. Temperature of test solutions wasmaintained within $\pm$ 1 °C of that required for a given test.”
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported in the cited reference for methods.
	Metric 18:	Consistency of Outcome Assessment	High	”The number of dead or affected organisms in each test chamber was recorded and the dead organisms were removed every 24 h; general observations on the condition of test organisms were also recorded at these times.”
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were adequately described.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability (e.g., SE, SD, confidence intervals) and/or insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

Additional Comments: LC 50 value for 1,2 DCA was reported as 225 mg/l. The use of control was not directly stated and the control response was not reported. No information was given in the manual regarding the chemical-specific exposure concentration but the EPA has held conversations with US FWS to confirm the experimental design.Another reference cited for methods (Johnson and Finley, 1980; not in HERO but available online) was reviewed and many metrics were rated according to in the information in the cited reference.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oncorhynchus mykiss*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric	Rating	Comments
Overall Quality Determination		**Medium**	

Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Skin & Connective Tissue
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and the performing laboratory did not provide analytical verification of the test substance identity. This report does mention that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be included in the PDF.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was used in the test.
	Metric 5:	Negative Control Response	High	No mortality and no abnormalities were observed in the control group over the course of the test exposure.
	Metric 6:	Randomized Allocation	Medium	Test fish were placed in test vessels by the weight stratified sampling method.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was adequately described. The test was performed in a sealed, flow-through system as described on page 4. The preparation of the test substance solution was adequate and described in section 3.5 on page 5.
	Metric 8:	Consistency of Exposure Administration	High	The exposure was run consistently across the test groups. All test vessels had a 3.4L volume and were maintained in the same flow-through system.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured at the test start, day 3, day 7, day 14, and day 21. All samples were measured using headspace gas chromatography. When analyzing the test solution, a standard solution was measured for each sample measurement to allow quantification from its peak area ratio.
	Metric 10:	Exposure Duration and Frequency	High	The test followed OECD Guideline 204, which indicates the test duration is normally 14 days but can be extended by one to two weeks. This test was conducted for 21 days.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	Based on a 96-hr LC50 value (>126 mg/L) obtained from the fish acute toxicity test, the symptoms observed, and the properties of the test substance, four concentration groups (100, 50, 25.0, and 12.5 mg/L) were set with a concentration common ratio of 2.0 with 100 mg/L as the highest concentration. The LC50 was not determined by this range of concentrations, but the highest nominal concentration tested is the maximum required by OECD guideline 204.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				

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Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Skin & Connective Tissue
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	Details about the fish used in the test were adequate and are reported in section 2 on page 3. The fish were obtained from Nakashima Fish Farm.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The fish were reared and acclimated under the same conditions (water quality, temperature, etc.) as the test conditions for at least 12 days. At the beginning of acclimatization, the fish were treated in a medicinal bath with Elvage (Ueno Fine Chemicals Industry, LTD.) for 24 hours in static conditions. They were fed commercial TetraMin (Tetra Berket). The fish were not fed for 24 hours prior to the start of exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	An acceptable number of fish were included in each group (20 fish), but only one replicate was included in each group.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequate to maintain organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate.
	Metric 18:	Consistency of Outcome Assessment	High	All fish were observed daily for signs of toxicity or abnormalities.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 5.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Qualitative observations are not typically statistically analyzed.
	Metric 22:	Reporting of Data	High	Toxicity symptoms were described in section 5.5 and presented in detail in table 4.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the skin outcome for the definitive prolonged toxicity test using 1,2-dichloroethane. This was a 21-day exposure using medaka (Oryzias latipes).

Overall Quality Determination High

Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and the performing laboratory did not provide analytical verification of the test substance identity. This report does mention that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be included in the PDF.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was used in the test.
	Metric 5:	Negative Control Response	High	Zero mortality occurred in the control group over the course of the test exposure.
	Metric 6:	Randomized Allocation	Medium	Test fish were placed in test vessels by the weight stratified sampling method.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was adequately described. The test was performed in a sealed, flow-through system as described on page 4. The preparation of the test substance solution was adequate and described in section 3.5 on page 5.
	Metric 8:	Consistency of Exposure Administration	High	The exposure was run consistently across the test groups. All test vessels had a 3.4L volume and were maintained in the same flow-through system.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured at the test start, day 3, day 7, day 14, and day 21. All samples were measured using headspace gas chromatography. When analyzing the test solution, a standard solution was measured for each sample measurement to allow quantification from its peak area ratio.
	Metric 10:	Exposure Duration and Frequency	High	The test followed OECD Guideline 204, which indicates the test duration is normally 14 days but can be extended by one to two weeks. This test was conducted for 21 days.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	Based on a 96-hr LC50 value (>126 mg/L) obtained from the fish acute toxicity test, the symptoms observed, and the properties of the test substance, four concentration groups (100, 50, 25.0, and 12.5 mg/L) were set with a concentration common ratio of 2.0 with 100 mg/L as the highest concentration. The LC50 was not determined by this range of concentrations, but the highest nominal concentration tested is the maximum required by OECD guideline 204.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Details about the fish used in the test were adequate and are reported in section 2 on page 3. The fish were obtained from Nakashima Fish Farm.

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Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The fish were reared and acclimated under the same conditions (water quality, temperature, etc.) as the test conditions for at least 12 days. At the beginning of acclimatization, the fish were treated in a medicinal bath with Elvage (Ueno Fine Chemicals Industry, LTD.) for 24 hours in static conditions. They were fed commercial TetraMin (Tetra Berket). The fish were not fed for 24 hours prior to the start of exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	An acceptable number of fish were included in each group (20 fish), but only one replicate was included in each group.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequate to maintain organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate for the behavioral outcome.
	Metric 18:	Consistency of Outcome Assessment	High	All fish were observed daily for signs of toxicity or abnormalities.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 5.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Behavioral observations are not typically statistically analyzed.
	Metric 22:	Reporting of Data	High	Toxicity symptoms were described in section 5.5 and presented in detail in table 4.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the behavioral outcome for the definitive prolonged toxicity test using 1,2-dichloroethane. This was a 21-day exposure using medaka (Oryzias latipes).

Overall Quality Determination High

Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and the performing laboratory did not provide analytical verification of the test substance identity. This report does mention that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be included in the PDF.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was used in the test.
	Metric 5:	Negative Control Response	High	Zero mortality occurred in the control group over the course of the test exposure.
	Metric 6:	Randomized Allocation	Medium	Test fish were placed in test vessels by the weight stratified sampling method.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was adequately described. The test was performed in a sealed, flow-through system as described on page 4. The preparation of the test substance solution was adequate and described in section 3.5 on page 5.
	Metric 8:	Consistency of Exposure Administration	High	The exposure was run consistently across the test groups. All test vessels had a 3.4L volume and were maintained in the same flow-through system.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured at the test start, day 3, day 7, day 14, and day 21. All samples were measured using headspace gas chromatography. When analyzing the test solution, a standard solution was measured for each sample measurement to allow quantification from its peak area ratio.
	Metric 10:	Exposure Duration and Frequency	High	The test followed OECD Guideline 204, which indicates the test duration is normally 14 days but can be extended by one to two weeks. This test was conducted for 21 days.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	Based on a 96-hr LC50 value (>126 mg/L) obtained from the fish acute toxicity test, the symptoms observed, and the properties of the test substance, four concentration groups (100, 50, 25.0, and 12.5 mg/L) were set with a concentration common ratio of 2.0 with 100 mg/L as the highest concentration. The LC50 was not determined by this range of concentrations, but the highest nominal concentration tested is the maximum required by OECD guideline 204.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Details about the fish used in the test were adequate and are reported in section 2 on page 3. The fish were obtained from Nakashima Fish Farm.

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Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The fish were reared and acclimated under the same conditions (water quality, temperature, etc.) as the test conditions for at least 12 days. At the beginning of acclimatization, the fish were treated in a medicinal bath with Elvage (Ueno Fine Chemicals Industry, LTD.) for 24 hours in static conditions. They were fed commercial TetraMin (Tetra Berket). The fish were not fed for 24 hours prior to the start of exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	An acceptable number of fish were included in each group (20 fish), but only one replicate was included in each group.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequate to maintain organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate for the mortality outcome.
	Metric 18:	Consistency of Outcome Assessment	High	Mortality observations occurred daily for all treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 5.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	The LC50 value was determined empirically to be greater than the highest test concentration, and the highest nominal test concentration was the guideline required maximum.
	Metric 22:	Reporting of Data	High	Mortality data were reported for each test and control group in Table 2, the LC50 values were reported in Table 3, and the concentration-toxicity curve was reported in Figure 1.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the mortality outcome for the definitive prolonged toxicity test using 1,2-dichloroethane. This was a 21-day exposure using medaka (Oryzias latipes).

Overall Quality Determination High

Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and the performing laboratory did not provide analytical verification of the test substance identity. This report does mention that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be included in the PDF.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was used in the test.
	Metric 5:	Negative Control Response	High	Zero mortality occurred in the control group over the course of the test exposure.
	Metric 6:	Randomized Allocation	Medium	Test fish were placed in test vessels by the weight stratified sampling method.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was adequately described. The test was performed in a sealed, flow-through system as described on page 4. The preparation of the test substance solution was adequate and described in section 3.5 on page 5.
	Metric 8:	Consistency of Exposure Administration	High	The exposure was run consistently across the test groups. All test vessels had a 3.4L volume and were maintained in the same flow-through system.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured at the test start, day 3, day 7, day 14, and day 21. All samples were measured using headspace gas chromatography. When analyzing the test solution, a standard solution was measured for each sample measurement to allow quantification from its peak area ratio.
	Metric 10:	Exposure Duration and Frequency	High	The test followed OECD Guideline 204, which indicates the test duration is normally 14 days but can be extended by one to two weeks. This test was conducted for 21 days.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	Based on a 96-hr LC50 value (>126 mg/L) obtained from the fish acute toxicity test, the symptoms observed, and the properties of the test substance, four concentration groups (100, 50, 25.0, and 12.5 mg/L) were set with a concentration common ratio of 2.0 with 100 mg/L as the highest concentration. The LC50 was not determined by this range of concentrations, but the highest nominal concentration tested is the maximum required by OECD guideline 204.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Details about the fish used in the test were adequate and are reported in section 2 on page 3. The fish were obtained from Nakashima Fish Farm.

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Study Citation:	CITI, (1996). Prolonged toxicity test (21 days) on medaka (Oryzias latipes) exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Adult
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346436

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The fish were reared and acclimated under the same conditions (water quality, temperature, etc.) as the test conditions for at least 12 days. At the beginning of acclimatization, the fish were treated in a medicinal bath with Elvage (Ueno Fine Chemicals Industry, LTD.) for 24 hours in static conditions. They were fed commercial TetraMin (Tetra Berket). The fish were not fed for 24 hours prior to the start of exposure.
	Metric 15:	Number of Organisms and Replicates per Group	Low	An acceptable number of fish were included in each group (20 fish), but only one replicate was included in each group.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequate to maintain organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate for the development/growth outcome.
	Metric 18:	Consistency of Outcome Assessment	High	Weight and length were measured for all fish at the start and end of exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 5.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	One-way analysis of variance was used for statistical comparison of growth rates between the treatment groups and control.
	Metric 22:	Reporting of Data	High	Results of statistical analysis of growth rate were reported in section 5.6. Individual body weights and growth rates were reported in tables 5 and 6 respectively.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the development/growth outcome for the definitive prolonged toxicity test using 1,2-dichloroethane. This was a 21-day exposure using medaka (Oryzias latipes).

Overall Quality Determination High

Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and condensed structural formula.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The LC 50 data provided is not original data. No study details were provided in the paper for the derivation of LC 50 values.
	Metric 5:	Negative Control Response	Uninformative	No study details were provided.
	Metric 6:	Randomized Allocation	Uninformative	No study details were provided.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The type of experimental system and/or test media preparation methods were not reported.
	Metric 8:	Consistency of Exposure Administration	Uninformative	No study details were provided.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	No study details were provided.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Uninformative	No information was provided.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The LC 50 test was conducted with 30 day old fish.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The numbers of test organisms and replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Organism environmental conditions were not reported.

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Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were presented for each treatment, but the control groups were not reported. Only LC 50 values were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation form is for the mortality outcome, specifically for 96-hr LC 50 reported in the study. However, this is not original data, and the acute toxicity test was conducted prior to the test in the study by different authors.

Overall Quality Determination Uninformative

Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	32169

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and CAS#.
	Metric 2:	Test Substance Source	Low	The test substance was purchased from Aldrich Chemical Company (page 61/346), but the identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The chemical purity was reported as 99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail and appropriately accounted for the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured and were similar to nominal concentrations, but analytical technologies used were less sensitive.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms (50 per test vessel) was reported in the datasheet (page 62) but tested only in duplicate.
Domain 5: Outcome Assessment				

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Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	32169

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 values with corresponding confidence intervals were determined using the trimmed Spearman- Karber method.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values for the endpoint.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The LC 50 value for 1,2-dichloroethane was 136 mg/l (CI: 129-144 mg/l), and all associated data was provided on page 61/346.

Overall Quality Determination High

Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and condensed structural formula.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Growth and normal larvae at hatch were assessed in this form.

Overall Quality Determination High

Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical identified by name.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.

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Study Citation:	Benoit, D. A., Puglisi, F. A., Olson, D. L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18052; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Mortality and hatch were assessed.

Overall Quality Determination High

Study Citation:	Könemann, H. (1981). Quantitative structure-activity relationships in fish toxicity studies. Part 1: Relationship for 50 industrial pollutants. Toxicology 19(3):209-221.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Poecilia reticulata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3684127

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Test substance was identified by name only.
	Metric 2:	Test Substance Source	Low	Test substance source was not reported nor was the test substance analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	A concurrent negative control group was not included or reported.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Alabaster and Abram were cited for water preparation. Glass covers were placed over test vessels with daily renewals. Details were fairly limited otherwise.
	Metric 8:	Consistency of Exposure Administration	Medium	7 day exposures with a geometrical progression ratio of 3.2. There was no mention of irregularities in the exposure administration.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type–7 day exposure
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	Concentrations were reported to have a geometrical progression with a ratio of 3.2. The number of concentrations was not reported nor was the concentration of each treatment.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit, but a solvent was used to aid in solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Test organisms were adequately described, but there was no mention of the source of the organisms.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized or whether pretreatment conditions were the same for control and exposed groups
	Metric 15:	Number of Organisms and Replicates per Group	Low	Only eight guppies were tested in each concentration. There was no mention of replicates.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Food, water, temperature, and D.O. were adequately described. Loading rate was not described.

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Study Citation:	Könemann, H. (1981). Quantitative structure-activity relationships in fish toxicity studies. Part 1: Relationship for 50 industrial pollutants. Toxicology 19(3):209-221.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Poecilia reticulata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3684127

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest–LC50s were reported and used for QSAR.
	Metric 18:	Consistency of Outcome Assessment	Medium	Study duration was 7 days and fish were checked for mortalities. Fish were determined to be dead if there was no gill movement when prodded. It was unclear as to how often the fish were assessed. Was it every 24hr? Or was it just at the end of the exposure?
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 calculations were determined by using methods citing Litchfield and Wilcoxon or by log/probit-plot if the concentration effect relationships were too steep. QSAR calculations were demonstrated in the paper.
	Metric 22:	Reporting of Data	Medium	Data in the form of LC50s was reported, but there was no mention of control performance.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: A concurrent negative control was not included or reported. The number of exposure concentrations and spacing of levels were not provided. Only LC 50 values (without confidence limits) were reported.

Overall Quality Determination Uninformative

Study Citation:	K, Kaiser, L. E., Mckinnon, M. B., Stendahl, D. H., Pett, W. B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4840530

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified using proper IUPAC nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	No information was provided regarding the source of the chemicals used in the study, and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	purity and grade were not reported
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Methanol, carrier solvent, was used as a control (results shown in figure 1 – "Recorded response traces of four representative I-min timeslices for the exposure of rainbow trout to 4,000 pg/L methanol. Therhythmic ventilation was sustained for 60 min, indicating no responseto the methanol."
	Metric 5:	Negative Control Response	High	Normal ventilation sustained in response to methanol exposure – "Figure 1 shows examples of four 1-min time slices of a1-h test run with a methanol (solvent carrier) control at4,000 pg/L. There was no response by the fish; both ventilatoryfrequency and amplitude remained normal over the 1-hperiod"
	Metric 6:	Randomized Allocation	Medium	Not entirely clear but the study authors reported "For 1 h priorto exposure and for 1 h during exposure, the average amplitudeand frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	"The tank was filled in steps of approximately 20 L by diverting part of the biosensor unit supply water to it. Water entered the tank through a fixed stainless steel tube extended to the bottom. This allowed the tank to fill without disturbing the surface of the water. After each addition of stock solution, the water was manually mixed by a smooth repeated up-down movement with a stainless steel plunger of approximately 10-cm diameter. Care was given not to extend the plunger beyond the surface of the water while mixing to minimize any volatilization of the contaminant. When filled to capacity, the stainless steel tank was immediately sealed with a stainless steel lid, allowing only a minimal air layer above the water in the tank."

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Study Citation:	K, Kaiser, L. E., Mckinnon, M. B., Stendahl, D. H., Pett, W. B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 8:	Consistency of Exposure Administration	High	"At the start of an experiment, the water normally flowing through the upper set of the four test cells in the biosensor unit (250 to 300 ml/min for each cell) was diverted with a three-way valve to flow into the bottom of the stainless steel tank. The in-flowing water entered the bottom of the tank and displaced an equal volume of the test solution through an outlet at the top of the tank. The test water was routed to the biosensor unit via Teflon@ tubing. At the slow filling/exchange rate of 1 .O to 1.2 L/min for the tank, any vertical mixing of the incoming clean water with the overlying solution was expected to be minimal. This was confirmed with a separate test using 500 pg/L of 2,4-dichlorophenol, where the observed effects lasted for very close to 1 h and disappeared quickly thereafter."
	Metric 9:	Measurement of Test Substance Concentration	Medium	Not reported, however care was taken to minimalize loss to volatilization – "After each addition of stock solution, the waterwas manually mixed by a smooth repeated up-downmovement with a stainless steel plunger of approximately10-cm diameter. Care was given not to extend the plunger beyondthe surface of the water while mixing to minimize anyvolatilization of the contaminant. When filled to capacity,the stainless steel tank was immediately sealed with a stainlesssteel lid, allowing only a minimal air layer above the waterin the tank."
	Metric 10:	Exposure Duration and Frequency	High	"Fish were normally placed into the biosensor cells at least 12 h before beginning an experiment. The fish displayed little signs of stress and usually settled down after transfer from the aquarium in less than 1 h, beginning to ventilate and swim in a regular and steady fashion. Review of the electrical signals recorded together with video recordings of the same tests, taken under low-level red light, confirmed the interpretation of most of the signals from the strip charts, such as coughing, positioning perpendicular to the water current, turning, rapid and hectic movement about the cell, and facing downstream. In most experiments where a stress response was noted, the fish when exposed to clean water calmed down and returned to a normal behavior within 2 h or less afterending the exposure."
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	The objective was to evaluate fish response thresholds after low-dose 1,2-DCA exposure; only one dose was tested.
	Metric 12:	Testing at or Below Solubility Limit	Low	No information was reported regarding the solubility of the chemical
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The only information that was reported was, "Rainbow trout fingerlings of approximately 4 cm in length (weight 2 to 4 g) were purchased from a local southern Ontario fish hatchery and were held in an aquarium for several days prior to testing."

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Study Citation:	K, Kaiser, L. E., Mckinnon, M. B., Stendahl, D. H., Pett, W. B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	”Fish were normally placed into the biosensor cells at least12 h before beginning an experiment. The fish displayed littlesigns of stress and usually settled down after transfer fromthe aquarium in less than 1 h, beginning to ventilate and swimin a regular and steady fashion. Review of the electrical signalsrecorded together with video recordings of the sametests, taken under low-level red light, confirmed the interpretationof most of the signals from the strip charts, such ascoughing, positioning perpendicular to the water current,turning, rapid and hectic movement about the cell, and facingdownstream. In most experiments where a stress responsewas noted, the fish when exposed to clean water calmed downand returned to a normal behavior within 2 h or less afterending the exposure.”
	Metric 15:	Number of Organisms and Replicates per Group	Low	Not entirely clear how many fish were studied per treatment. Each fish served as its own control. The study authors reported, ”The testing unit used was the Bio-Sensor@, model 6008A, electronic biomonitoring unit (Biomonitoring Inc., Blacksburg, VA), which contains a total of eight fish-monitoring chambers or cells with a volume of 250 ml water each. Of these, four cells were used for routine water quality monitoring of the water authority’s raw watersupply, and three cells were used simultaneously for the experiments (one cell was inoperative). Each cell contained onefish that was individually monitored by electronic capture ofthe ventilation amplitude and frequency, averaged over 1-minperiods, by recording visual observations, by video recording,and by strip-chart recording of the computer-enhancedelectrical signals from the cell electrodes.”
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Testing conditions were adequate.
	Metric 17:	Outcome Assessment Methodology	Medium	Ventilation response is described graphically in figures, and numerically in tables. Coughing response is only described qualitatively in text.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were identified
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No differences unrelated to exposure were identified by study authors
Domain 7: Data Presentation and Analysis				

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Study Citation:	K, Kaiser, L. E., Mckinnon, M. B., Stendahl, D. H., Pett, W. B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 21:	Statistical Methods	High	"Because of the natural biological variance between fish, each of the test fish was used as its own control. For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
	Metric 22:	Reporting of Data	Medium	Data were reported for 1,2-DCA at one test concentration, only for the ventilation results. Increased coughing was reported in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were identified

Additional Comments: None

Overall Quality Determination High

Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Amphibian; *Rana pipiens*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature were referred to for DCA on page 6 and 14 along with several other locations.
	Metric 2:	Test Substance Source	Low	The source of the compound was not reported.
	Metric 3:	Test Substance Purity	High	Reported as reagent grade on Page 14.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Control groups were conducted.
	Metric 5:	Negative Control Response	Medium	Control survival was reported for all studies as between 84-99% for 4 days post hatch on page 30.
	Metric 6:	Randomized Allocation	Low	Allocation was not reported as random.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The preparation of treatment waters and bioassay system (flow-through) was well described. Headspace was eliminated as the study was centered on solvents.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	High	GLC was used for verifying concentrations and values are reported as actual concentrations (Page 23).
	Metric 10:	Exposure Duration and Frequency	High	The duration for these acute bioassays is appropriate (from shortly after fertilization through 4 days post hatch).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	These acute bioassays were conducted with 6 concentrations.
	Metric 12:	Testing at or Below Solubility Limit	High	All concentrations (21 mg/L as the highest) were well below the solubility for this compound as reported in the Final Scope (8600 mg/L).
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source was listed for this species on page 13/74.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Water conditions were well described. As these are newly fertilized embryos, the acclimation period was very brief. Many species in this study were from external sources.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each exposure chamber was reported as holding 50-125 embryo on page 20/74.
Domain 5: Outcome Assessment				

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Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Amphibian; *Rana pipiens*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Incubation conditions, water chemistry properties, and embryo/larval handling were well reported and appropriate.
	Metric 17:	Outcome Assessment Methodology	High	Outcome assessment was appropriate for these lethal acute bioassays.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment was consistent among treatment and control groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No differences among treatment and control groups were reported for environmental conditions that indicate influence outside of the chemical tested.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing reported to indicate differences among groups in animal attrition unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Log probit analysis was indicated in the methods section on page 20/74.
	Metric 22:	Reporting of Data	High	treatment concentrations, cumulative mortality are reported on page 55. LC50 and 95% confidence estimates are presented in table 14.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: A highly detailed study on embryo-larval survival bioassays from acute exposures to DCA. The study reported deformities observed in these bioassays per treatment concentrations on page 55 (table 8). The deformity data was not analyzed.

Overall Quality Determination High

Study Citation:	Dow Chemical, (1979). Toxicity of ethylene dichloride to rainbow trout.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Salmo gairdneri*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447279

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	ethylene dichloride was stated as the test substance but it is unclear what ”production grade” means
	Metric 2:	Test Substance Source	Low	ethylene dichloride labelled as ”furnace feed” was obtained from Dow chemical. No analytical verification was conducted, and the purity of the chemical is not stated.
	Metric 3:	Test Substance Purity	Low	It is unclear what ”production grade” means in terms of purity. Impurities could be present, and no verification was provided.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Authors state a control group was used and showed no mortality (Page 5/15).
	Metric 5:	Negative Control Response	High	Authors state there was no mortality in controls (Page 5/15).
	Metric 6:	Randomized Allocation	Low	Unclear how fish were allocated (randomly, etc). Average fish weight was 0.39 g and length of 32.5 mm (Page 5/15).
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	Due to the nature of the test substance (volatile), the lack of details surrounding the static exposure (were tank covered?) and the lack of measured concentrations make the effect concentrations highly uncertain and are likely to be under estimates of actual toxic concentrations.
	Metric 8:	Consistency of Exposure Administration	Medium	The chemical was mixed vigorously with 2 L of water before being added to an additional 8 L in tanks. No capping of the tanks to minimize volatilization was described.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	Exposure concentrations were not measured and actual concentrations are uncertain due to volatile nature of 1,2-Dichloroethane
	Metric 10:	Exposure Duration and Frequency	High	The study was a typical duration and captured lethal effects after a 96-hour exposure.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	8 concentrations were used, and were spaced closely together. Mortality did not appear to follow a dose response relationship, at 96 hours the second lowest concentration caused 50% mortality.
	Metric 12:	Testing at or Below Solubility Limit	High	No solvent was used. The chemical substance is a solvent.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The trout were reared in the laboratory but no background was provided on their sex or size at the start of the experiment.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Fish were acclimatized for 24 hours

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Study Citation:	Dow Chemical, (1979). Toxicity of ethylene dichloride to rainbow trout.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Salmo gairdneri*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5447279

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	10 fish were exposed per treatment group
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Water quality data were reported in Table 1
	Metric 17:	Outcome Assessment Methodology	High	The assessment outcome was mortality, which was defined as ”no gill movement and no response to gentle prodding”
	Metric 18:	Consistency of Outcome Assessment	High	Assessment of mortality was consistent across groups
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Data on attrition and/or outcomes unrelated to controlled variables for each study group were not reported
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No information in the study to suggest differences unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Methods describe the use of either probit analyses or Thomson’s moving average
	Metric 22:	Reporting of Data	High	The average LC50 and 95% CIs were reported for all time points and data for mortality within each treatment was reported. No mortality was observed in controls
	Metric 23:	Explanation of Unexpected Outcomes	Low	The second to lowest concentration caused 50% mortality at 96 hours and that the dose response was not typical. This was note explained.

Additional Comments: None

Overall Quality Determination Uninformative

Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Salmo gairdneri*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature were referred to for DCA on page 6 and 14 along with several other locations.
	Metric 2:	Test Substance Source	Low	The source of the compound was not reported.
	Metric 3:	Test Substance Purity	High	Reported as reagent grade on Page 14.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Control groups were conducted.
	Metric 5:	Negative Control Response	Medium	Control survival was reported for all studies as between 84-99% for 4 days post hatch on page 30.
	Metric 6:	Randomized Allocation	Low	Allocation was not reported as random.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The preparation of treatment waters and bioassay system (flow-through) was well described. Headspace was eliminated as the study was centered on solvents.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	High	GLC was used for verifying concentrations and values are reported as actual concentrations (Page 23).
	Metric 10:	Exposure Duration and Frequency	High	The duration for these acute bioassays is appropriate (from shortly after fertilization through 4 days post hatch).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	These acute bioassays were conducted with 6 concentrations.
	Metric 12:	Testing at or Below Solubility Limit	High	All concentrations (21 mg/L as the highest) were well below the solubility for this compound as reported in the Final Scope (8600 mg/L).
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source was listed for this species on page 13/74.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Water conditions were well described. As these are newly fertilized embryos, the acclimation period was very brief. Many species in this study were from external sources.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each exposure chamber was reported as holding 50-125 embryo on page 20/74.
Domain 5: Outcome Assessment				

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Study Citation:	Black, J. A., Birge, W. J., Mcdonnell, W. E., Westerman, A. G., Ramey, B. A., Bruser, D. M. (1982). The aquatic toxicity of organic compounds to embryo-larval stages of fish and amphibians. :61.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Salmo gairdneri*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	93660

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Incubation conditions, water chemistry properties, and embryo/larval handling were well reported and appropriate.
	Metric 17:	Outcome Assessment Methodology	High	Outcome assessment was appropriate for these lethal acute bioassays.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment was consistent among treatment and control groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No differences among treatment and control groups were reported for environmental conditions that indicate influence outside of the chemical tested.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing reported to indicate differences among groups in animal attrition unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Log probit analysis was indicated in the methods section on page 20/74.
	Metric 22:	Reporting of Data	High	treatment concentrations, cumulative mortality are reported on page 55. LC50 and 95% confidence estimates are presented in table 14.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: A highly detailed study on embryo-larval survival bioassays from acute exposures to DCA. The study reported deformities observed in these bioassays per treatment concentrations on page 55 (table 8). The deformity data was not analyzed.

Overall Quality Determination High

Study Citation:	CITI, (1996). Acute immobilization test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346441

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and analytical verification of the test substance identity by the performing laboratory was not reported. The report states that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be a part of this report.
	Metric 3:	Test Substance Purity	High	The test substance purity was identified as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was used in the test.
	Metric 5:	Negative Control Response	High	There were zero immobilized Daphnia magna at 24 and 48 hours in the control group.
	Metric 6:	Randomized Allocation	Low	It was not reported how Daphnia magna were allocated to treatment groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was adequately described. The test was conducted in a sealed, semi-static system (water change after 24 hours). Details are provided on page 4. The preparation of the test substance was adequate and described in section 3.5 on page 5, as well as in Appendix 2.
	Metric 8:	Consistency of Exposure Administration	High	The exposure was conducted consistently across test groups.
	Metric 9:	Measurement of Test Substance Concentration	High	At the start of exposure and before water change (24 hours after the start of exposure), equal amounts of the test solution were collected from the middle layer of the four vessels in each test group, mixed, then analyzed by headspace gas chromatography. When analyzing the test solution, a standard solution (concentration 5.0 mg/L) was measured for each sample measurement to allow quantification from its peak area ratio.
	Metric 10:	Exposure Duration and Frequency	High	This test was conducted according to OECD Guideline 202. Forty-eight hours is standard for acute immobilization tests with Daphnia magna.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	A preliminary test suggested that 500 mg/L leads to 100% growth inhibition, 100 mg/L leads to 0% growth inhibition, and 50 mg/L leads to no effects, therefore, 500 mg/L was set as the highest concentration, and 6 concentration groups (500, 312, 195, 122, 76.3, 47.7 mg/L) were set with a common ratio of 1.6. These concentrations allowed for adequate assessment of the desired outcomes.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				

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Study Citation:	CITI, (1996). Acute immobilization test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346441

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	Daphnia magna offspring within 24 hours old were used in the test. The original Daphnia were obtained from the USEPA lab in Duluth, MN and were then reared multi-generationally at the performing lab. Two to four-week old Daphnia that are being reared multi-generationally were used as parent Daphnia for the test. Once mature and producing offspring, the produced offspring were removed at least one day before the test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Daphnia were acclimatized to test conditions. The same dilution water, water temperature, and lighting were used prior to test start.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were four replicates per test group and five organisms per replicate for a total of 20 organisms per treatment group.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing was adequate, as well as test vessel conditions. A summary of test conditions can be found in section 5.5. Tables 5-7 present the water quality conditions throughout the test.
	Metric 17:	Outcome Assessment Methodology	High	Observations on the number of immobilized Daphnia were conducted 24 and 48 hours after the start of exposure. Immobilized was defined as "being unable to swim for 15 seconds after the test vessel was gently moved (swimming refers to moving within the water column; fish that were moving only along the bottom of the vessel were considered immobilized.) Also, even if swimming was abnormal, if the fish swam in the water even once during the 15 seconds, it was not considered immobilized)."
	Metric 18:	Consistency of Outcome Assessment	High	Immobilization was assessed consistently across all treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	Daphnia were acclimated to test conditions prior to the exposure start. Test conditions were consistent across the treatment groups throughout the test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No information was reported on differences between treatment groups that could have affected the immobilization assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The percent immobility was calculated from the number of test organisms (20 specimens) and the number of immobilized Daphnia in each concentration group, and the Median Effective Concentration for Immobility (EiC50) was calculated using the Probit model and the Binomial model. The NOECi and LOECi were also determined.
	Metric 22:	Reporting of Data	High	Results were summarized in sections 5.3 and 5.4. Table 2 presents the immobility data for all treatments at both timepoints. Tables 3 and 4 show the calculated EiC50, NOECi, and LOECi values.

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Study Citation:	CITI, (1996). Acute immobilization test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346441

Domain	Metric		Rating	Comments
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the immobilization assessment of Daphnia magna exposed to 1,2-DCA.

Overall Quality Determination High

Study Citation:	Freitag, D., Ballhorn, L., Behechti, A., Fischer, K., Thumm, W. (1994). Structural configuration and toxicity of chlorinated alkanes. Chemosphere 28(2):253-259.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	660810

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	The test substance source was not reported nor was it analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Reporting of EC50 implies the use of a control, and OECD guidelines were cited, which would indicate use of a control. Paper mentioned controls had to have less than %10 immobilization for a valid test.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Only limited details were provided about test substance preparation and the experimental system.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered in duplicates in increasing concentrations for 24hr in the dark after which, the number immobilized were determined.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured using gas chromatrography
	Metric 10:	Exposure Duration and Frequency	Medium	Daphnid EC50s were measured for 24hrs not 48hrs
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	OECD methodology is cited for test protocol, little information was provided in the paper regarding test exposure groups and spacing of exposure levels
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Source of test organisms was not provided.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Groups of 10 daphnia were used in each concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate.

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Study Citation:	Freitag, D., Ballhorn, L., Behechti, A., Fischer, K., Thumm, W. (1994). Structural configuration and toxicity of chlorinated alkanes. Chemosphere 28(2):253-259.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	660810

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Medium	EC50s were reported, but for 24hr rather than 48hr.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol were limited, though OECD guidelines were cited for the the protocol.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but all that was reported was the use of probability paper to determine EC50s.
	Metric 22:	Reporting of Data	Low	EC50s were the only data reported. Control responses were not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	They study did not report any measures of variability, no confidence intervals.

Additional Comments: OECD guidelines were cited for study protocol, but little extra information was provided in this paper, thus the numerous low ratings on many of the metrics.

Overall Quality Determination Low

Study Citation:	Kühn, R., Pattard, M., Pernak, K. D., Winter, A. (1989). Results of the harmful effects of selected water pollutants (anilines, phenols, aliphatic compounds) to Daphnia magna. Water Research 23(4):495-499.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	85242

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,2-Dichloroethane was identified as one of the many substances tested, proper IUPAC nomenclature given.
	Metric 2:	Test Substance Source	Low	Test substance source was not reported and identity was not verified
	Metric 3:	Test Substance Purity	Low	Purity was not reported
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	A negative control group was used
	Metric 5:	Negative Control Response	High	”The test was considered valid when fewer than 10% of the animals in the control solutions were unable to swim, when the pH value was not below 7.0”
	Metric 6:	Randomized Allocation	Medium	10 6-24 h old daphnids were assigned to each test vessel
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Glass stoppers were used for 1,2-Dichloroethane, which is volatile
	Metric 8:	Consistency of Exposure Administration	High	Exposures were completed in the same manner across groups
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not verified analytically, but loss of the chemical was likely minimized by the use of closed test vessels. Nominal concentrations used to calculate the ECx values were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The number of swimming daphnia were counted at 24 and 48 hours.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	The explicit number of exposure concentrations was not reported for specific chemicals. A description is provided that concentrations were ”selected so as to give 3–4 EC values in a range between EC 0 and EC 100, of which at least one value was below and one above EC 50”
	Metric 12:	Testing at or Below Solubility Limit	Low	Because nominal concentrations were not reported, it is not possible to determine if the concentrations exceeded the water solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Daphnia 6-24 hours old were used. The source of the organisms was not described.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized ahead of the 48 hour exposure

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Study Citation:	Kühn, R., Pattard, M., Pernak, K. D., Winter, A. (1989). Results of the harmful effects of selected water pollutants (anilines, phenols, aliphatic compounds) to Daphnia magna. Water Research 23(4):495-499.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	85242

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The use of 10 animals per test vessel and 20 animals per concentration was reported. This translates to only two technical replicates (two test vessels, each with 10 animals per treatment) which means no statistical methods could have been used to calculate the ECX values. unless the authors pooled across the two replicates (pseudo-replication). No details are described.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	pH and oxygen were monitored to ensure acceptable ranges for daphnia were met. Loading of animals was 1 daphnia/2 mL
	Metric 17:	Outcome Assessment Methodology	High	The ability of daphnia to swim was the outcome of interest (the opposite of which would be immobilization)
	Metric 18:	Consistency of Outcome Assessment	Low	Limited details are provided as to how the authors counted swimming daphnia at 24 and 48 hours. How long were animals observed before they were considered ”still able to swim”?
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The authors do report that they measured oxygen and pH but did not provide the specific information to allow a comparison of environmental conditions for 1,2-Dichloroethane
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Treatment and control data enabling an independent statistical analysis or calculation of the effect size (ECx) were not provided. The only information provided by the authors about the EC50 calculation is: ”the 24 and 48 h EC 50s calculated arithmetically from the concentration/effect ratio.”
	Metric 22:	Reporting of Data	Uninformative	The study does not differentiate among findings in multiple treatment versus control groups
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes

Additional Comments: No nominal concentration reported, no treatment and control data reported (only EC50s and 95% CIs)

Overall Quality Determination Uninformative

Study Citation:	Leblanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7508; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.

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Study Citation:	Leblanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7508; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,2 Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance was obtained from Aldrich Chemical Co., Milwaukee, WI but was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Medium	It was stated that the percent purity for all chemicals in the paper ranged from 95-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative water control was used in the acute bioassay.
	Metric 5:	Negative Control Response	High	It was stated that there was no mortality among controls.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and test media preparation methods were adequately reported. Flask were stoppered with foil wrapped neoprene stoppers to minimize loss of volatile test substance.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured in select test vessels at the beginning and end of the acute bioassay but was not reported. Nominal concentrations were also not reported. End points were based on measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	Duration of exposure was 48 hours and was appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	It was reported that there were six toxicant levels for 'fed' and 'unfed' bioassays. But nominal concentrations and measured concentrations for the acute bioassay were not reported.
	Metric 12:	Testing at or Below Solubility Limit	High	bioassays were conducted below water solubility limits for the compound, which has a solubility of 8600 mg/L in the Final Scope.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Adult daphnids (Daphnia magna) were obtained from laboratorystock reared at the U.S. Environmental Protection Agency, Duluth, MN. First instar daphnids less than 24 hr old were collected from brood animals that were 3 weeks old.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and whether pretreatment conditions were the same for control and exposed groups.

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Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Five animals each were used for the control and six exposure levels and four replicates were used for both 'fed' and 'unfed' acute bioassays.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Environmental conditions (pH, dissolved oxygen , hardness, etc.) were reported as ranges for the acute bioassay and therefore could not evaluate whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	Immobilization was determined after 48 hours of exposure by microscopic examination and confirmed by the absence of heart beat and gut movement.
	Metric 18:	Consistency of Outcome Assessment	Low	Immobilization assessment was conducted 48 hours after exposure but cannot determine whether the timing of outcome assessment was same across study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC 50 and LC 50 values for 'fed' and 'unfed' experiments were calculated by probit, binominal or moving average method and the specific method used was indicated in Table 2.
	Metric 22:	Reporting of Data	Low	Immobilization data for each treatment group and control group was not reported. Only EC50 values along with confidence intervals were reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Exposure concentrations and measured concentrations were not reported. Mortality and immobilization data was not presented for each treatment group and controls. LC 50 and EC 50 values with confidence intervals derived from measured concentrations were reported.

Overall Quality Determination Medium

Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,2 Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance was obtained from Aldrich Chemical Co., Milwaukee, WI but was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Medium	It was stated that the percent purity for all chemicals in the paper ranged from 95-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative water control was used in the acute bioassay.
	Metric 5:	Negative Control Response	High	It was stated that there was no mortality among controls.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and test media preparation methods were adequately reported. Flask were stoppered with foil wrapped neoprene stoppers to minimize loss of volatile test substance.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured in select test vessels at the beginning and end of the acute bioassay but was not reported. Nominal concentrations were also not reported. End points were based on measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	Duration of exposure was 48 hours and was appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	It was reported that there were six toxicant levels for 'fed' and 'unfed' bioassays. But nominal concentrations and measured concentrations for the acute bioassay were not reported.
	Metric 12:	Testing at or Below Solubility Limit	High	bioassays were conducted below water solubility limits for the compound, which has a solubility of 8600 mg/L in the Final Scope.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Adult daphnids (Daphnia magna) were obtained from laboratorystock reared at the U.S. Environmental Protection Agency, Duluth, MN. First instar daphnids less than 24 hr old were collected from brood animals that were 3 weeks old.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Five animals each were used for the control and six exposure levels and four replicates were used for both 'fed' and 'unfed' acute bioassays.

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Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Environmental conditions (pH, dissolved oxygen , hardness, etc.) were reported as ranges for the acute bioassay and therefore could not evaluate whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	Mortality was determined after 48 hours of exposure by microscopic examination and confirmed by the absence of heart beat and gut movement.
	Metric 18:	Consistency of Outcome Assessment	Low	Mortality assessment was conducted 48 hours after exposure but cannot determine whether the timing of outcome assessment was same across study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC 50 and LC 50 values for 'fed' and 'unfed' experiments were calculated by probit, binominal or moving average method and the specific method used was indicated in Table 2.
	Metric 22:	Reporting of Data	Low	Mortality data for each treatment group and control group was not reported. Only LC50 values along with confidence intervals were reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Exposure concentrations and measured concentrations were not reported. Mortality data was not presented for each treatment group and controls. LC 50 values with confidence intervals derived from measured concentrations were reported.

Overall Quality Determination Medium

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Skin & Connective Tissue
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	Low	Changes in pigmentation were not reported for the control.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stick solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Skin & Connective Tissue
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported for skin pigmentation observations.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for the outcome assessment for skin pigment observations were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Statistical analyses are not typically conducted on qualitative observations.
	Metric 22:	Reporting of Data	Low	Results were only described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the skin pigmentation outcome. Study authors reported on skin pigment changes of the parent Daphnia.

Overall Quality Determination High

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	Low	Behavioral observations of the control were not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stick solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported for behavioral observations.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for the outcome assessment for behavioral observations were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Statistical analyses are not typically conducted on qualitative behavioral observations.
	Metric 22:	Reporting of Data	Low	Results were only described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the behavioral outcome. Study authors reported on decreased activity of the parent Daphnia.

Overall Quality Determination High

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stick solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported for immobility.
	Metric 18:	Consistency of Outcome Assessment	High	The parent generation was monitored daily for immobilization.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Study authors did not report if statistical analysis was performed for this portion of the study. No raw data was provided for independent statistical analysis.
	Metric 22:	Reporting of Data	Low	Results were only described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the parent generation immobilization outcome for D. magna exposed to 1,2-DCA in a 21 day reproductive test.

Overall Quality Determination Uninformative

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	Low	The report stated that there was no difference between the test groups and the control up to 40 mg/L, but it did not report measurements or calculated values for this outcome.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stick solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported for size and condition of the organisms.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for the outcome assessment for size and condition were not reported. It is unclear if weights or measurements were taken. There is no measurement data reported for this outcome.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Study authors did not report if statistical analysis was performed for this portion of the study. No raw data was provided for independent statistical analysis.
	Metric 22:	Reporting of Data	Low	Results were only described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the development/growth outcome. Study authors reported on size and condition of the parent Daphnia. No information was provided on how the size and condition were assessed. This portion received an unacceptable outcome due to the lack of statistical analysis. No raw data was provided.

Overall Quality Determination Uninformative

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1, 2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	High	The negative control response for reproductive outcomes is reported throughout the results section, in Tables 3-1, 3-2, 4-1, 4-2, 7-1, and 7-2, and in Figures 2-1, 2-2. Control data was also reported in Appendices 3-1 and 3-2.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stick solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest-parent generation reproduction.
	Metric 18:	Consistency of Outcome Assessment	High	The parent generation was monitored daily. The number of days to the first brood was reported, and the number of offspring produced each day was recorded. The occurrence of resting eggs was also recorded.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The statistical analysis for the date of the first brood was conducted with the Kruskal-Wallis rank sum test and nonparametric multiple comparison method. The mean cumulative number of offspring produced was statistically analyzed using one-way analysis of variance and Dunnett's multiple comparison method. The ErC50 value was calculated according to the equation in section 4.2 and by using the Probit model. NOEC and LOEC values were also determined based on these statistical analyses.
	Metric 22:	Reporting of Data	High	Results for the reproductive outcomes are reported throughout the results section, in Tables 3-1, 3-2, 4-1, 4-2, 6, 7-1, and 7-2, and in Figures 2-1, and 2-2. Raw data was reported in Appendices 3-1 and 3-2.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the parent generation reproduction of D. magna exposed to 1,2-DCA in a 21 day reproductive test. The ErC50, NOEC, and LOEC were determined.

Overall Quality Determination High

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	High	The negative control response for the offspring mortality is provided in Appendices 3-1 and 3-2.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stock solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties are reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest-offspring mortality.
	Metric 18:	Consistency of Outcome Assessment	High	Offspring were counted daily when the parent generation began to produce offspring. The number of live and the number of dead offspring were recorded and reported in Appendix 3.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis of offspring mortality was not performed. Raw data for offspring survival is reported in Appendix 3 for all test concentrations and controls so that independent statistical analysis could be conducted if desired.
	Metric 22:	Reporting of Data	High	Exposure and control responses were reported in Appendix 3. Live and dead organisms were recorded for each test concentration and control for each replicate.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the mortality of the F1 generation of D. magna in a 21d reproductive test. Study authors reported 2 exposures. One had test concentrations of 100, 40, 16.0, 6.40, and 2.56mg/L 1, 2-DCA. The second was immediately after the first and tested concentrations of 2.56, 1.02, and 0.410mg/L of 1, 2-DCA. Live and dead offspring were recorded in Appendix 3 for all test concentrations and controls. Statistical analysis was not conducted on this data as this was not an outcome of interest.

Overall Quality Determination High

Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported for the test chemical.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted. It was not reported if it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1, 2-DCA used in this test was 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a dilution water-only control concurrently with the study.
	Metric 5:	Negative Control Response	High	The negative control response was adequate and reported throughout the results section, in Tables 2-1 and 2-2, in Figures 1-1 and 1-2, and in Appendices 3-1 and 3-2.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test system was reported to be a semi-static system with daily test substance renewals. The test solution preparation was reported in section 3.5. The test substance was added to the dilution water using a micropipette and stirred with a magnetic stir bar to make the stock solution. The appropriate amount of test stock solution was added to the dilution water to create the test concentrations.
	Metric 8:	Consistency of Exposure Administration	High	All organisms were exposed for 21 days in 1L sealed glass vessels with semi-static daily renewal. Measured test concentrations were similar to nominal concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography on days 0, 7, 8, 14, and 15 to analyze the test concentrations. Test concentrations were assessed before renewals and 1 day after renewals.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 21 days. This is appropriate for a daphnia reproductive test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure groups in the first exposure, and an additional 3 exposure groups in the added exposure. The second exposure grouping was added to obtain more data after the original 5 exposure groups were tested. Each exposure was associated with a concurrent control group.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit for 1,2-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The original culture was reported to be from the U.S. EPA in Duluth, MN. The daphnia were reported to be cultured at the performing laboratory for multiple generations. Organisms under 24h old were used to initiate the tests.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The daphnia were reported to be cultured under similar conditions to the test conditions.

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 40 organisms for each test group split into 4 replicates with 10 daphnids each. This was adequate for the outcomes of interest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The dilution water was reported to be dechlorinated tap water, and the properties were reported in Appendix 1. The organisms were kept at 20C with a 16L:8D photoperiod. Temperature, pH, and DO were monitored for the duration of the study. The daphnids were fed Chlorella vulgaris.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest-parent mortality.
	Metric 18:	Consistency of Outcome Assessment	High	The parent generation was monitored daily for mortality. Dead organisms were removed.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 values could not be calculated because the highest concentration tested only had 10% mortality. The LC50 value was expressed as above the highest nominal test concentration of 100 mg/L. Values were determined in this manner for days 1, 2, 4, 7, 14, and 21. Equal variances were not observed in the first portion of the test, so the Kruskal-Wallis rank sum test and nonparametric multiple comparison method were used to determine significant differences.
	Metric 22:	Reporting of Data	High	Exposure and control responses were reported in Tables 2-1 and 2-2, as well as in Figures 1-1 and 1-2. They were adequate for the outcome of interest.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This portion of the evaluation is for the mortality of the parent generation of D. magna exposed to 1,2-DCA in a 21 day reproductive test. Study authors reported 2 exposures. One had test concentrations of 100, 40, 16.0, 6.40, and 2.56 mg/L 1,2-DCA. The second exposure tested concentrations of 2.56, 1.02, and 0.410 mg/L. The highest test concentration of 100 mg/L resulted in only 10% mortality. This was not adequate to calculate an LC50 value, so the LC50 values were expressed as being >100mg/L. OECD test guideline 202 does not list a maximum required concentration for the reproduction test, however 100 mg/L is the maximum required dose for the acute immobilization test, which is used to set the concentration range for the reproduction test.

Overall Quality Determination High

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Study Citation:	CITI, (1996). Reproductive inhibition test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346439

Domain	Metric	Rating	Comments

Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,2 Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance was obtained from Aldrich Chemical Co., Milwaukee, WI but was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Medium	It was stated that the percent purity for all chemicals in the paper ranged from 95-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative water control was used in the chronic bioassay (Table 3).
	Metric 5:	Negative Control Response	Medium	It was stated that control mortality was less than 30% in the controls. According to OECD guidelines 202, mortality in controls for daphnia chronic test should not exceed 20%. The test was conducted according to Comotto, 1978 but was not available in HERO for review.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and test media preparation methods were adequately reported. Flask were stoppered with foil wrapped neoprene stoppers to minimize loss of volatile test substance.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured before and during renewal of the test solution in the chronic bioassay. Nominal concentrations were not reported. End points were based on measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	Duration of exposure was 28 days and was appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	It was reported that there were six test concentrations in a geometric series with a 0.5 dilution factor. Nominal concentrations were not reported but mean measured concentrations (measured at and before renewals of test solution) were reported.
	Metric 12:	Testing at or Below Solubility Limit	High	Measured concentrations were reported and these values were below the solubility limit of the test substance.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Adult daphnids (Daphnia magna) were obtained from laboratorystock reared at the U.S. Environmental Protection Agency, Duluth, MN. First instar daphnids less than 24 hr old were collected from brood animals that were 3 weeks old.

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Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and whether pretreatment conditions were the same for control and exposed groups
	Metric 15:	Number of Organisms and Replicates per Group	Medium	One daphnid per test vessel used for the control and six exposure levels and it was stated that 7-10 replicate flasks were used.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions (pH, dissolved oxygen , hardness, etc.) were reported as ranges for the chronic bioassay and therefore could not evaluate whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	The length of adults was determined after 28 days of exposure by determined with a 30 x dissection scope and measuring from the top of the head to the base of the spine with an ocular micrometer.
	Metric 18:	Consistency of Outcome Assessment	High	Growth outcome appears to be consistent across study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	ANOVA and Dunett's test were utilized to determine treatment differences on the mean length of adult during 28 days of exposure.
	Metric 22:	Reporting of Data	High	The mean length of adult and standard deviation were given for each measured concentration.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,2 Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance was obtained from Aldrich Chemical Co., Milwaukee, WI but was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Medium	it was stated that the percent purity for all chemicals in the paper ranged from 95-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative water control was used in the chronic bioassay (Table 3).
	Metric 5:	Negative Control Response	Medium	It was stated that control mortality was less than 30% in the controls. According to OECD guidelines 202, mortality in controls for daphnia chronic test should not exceed 20%. The test was conducted according to Comotto, 1978 but was not available in HERO for review.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and test media preparation methods were adequately reported. Flask were stoppered with foil wrapped neoprene stoppers to minimize loss of volatile test substance.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured before and during renewal of the test solution in the chronic bioassay. Nominal concentrations were not reported. End points were based on measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	Duration of exposure was 28 days and was appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	It was reported that there were six test concentrations in a geometric series with a 0.5 dilution factor. Nominal concentrations were not reported but mean measured concentrations (measured at and before renewals of test solution) were reported.
	Metric 12:	Testing at or Below Solubility Limit	High	Measured concentrations were reported and these values were below the solubility limit of the test substance.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Adult daphnids (Daphnia magna) were obtained from laboratorystock reared at the U.S. Environmental Protection Agency, Duluth, MN. First instar daphnids less than 24 hr old were collected from brood animals that were 3 weeks old.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and whether pretreatment conditions were the same for control and exposed groups

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Study Citation:	Richter, J. E., Peterson, S. F., Kleiner, C. F. (1983). Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Archives of Environmental Contamination and Toxicology 12(6):679-684.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3634174; Linked HERO ID(s): 3634174, 18052, 3634370, 4259619, 7494661

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	One daphnid per test vessel used for the control and six exposure levels and it was stated that 7-10 replicate flasks were used.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions (pH, dissolved oxygen , hardness, etc.) were reported as ranges for the chronic bioassay and therefore could not evaluate whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	Reproductive success was determined after 28 days of exposure by counting young daphnids using an Artek counter.
	Metric 18:	Consistency of Outcome Assessment	Low	No details were given on when and how frequently the authors counted the young produced in the study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	ANOVA and Dunett's test were utilized to determine treatment differences on the mean number of young produced per adult during 28 days of exposure.
	Metric 22:	Reporting of Data	High	The mean number of young produced per adult and standard deviation were given for each measured concentration.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.
Additional Comments:	None			

Overall Quality Determination High

Study Citation:	CITI, (1996). Acute immobilization test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346441

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The CAS number and structural formula were reported.
	Metric 2:	Test Substance Source	Low	The test substance supplier was redacted in the report and analytical verification of the test substance identity by the performing laboratory was not reported. The report states that the supplier provided attached documents with additional information on the test substance, however those documents do not appear to be a part of this report.
	Metric 3:	Test Substance Purity	High	The test substance purity was identified as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	It was not reported if a control group was used in the preliminary test.
	Metric 5:	Negative Control Response	Low	The biological response of a control group was not reported for the preliminary test.
	Metric 6:	Randomized Allocation	Low	It was not reported how Daphnia magna were allocated to treatment groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The experimental system and test media preparation were not reported for the preliminary test.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were not reported for the preliminary test.
	Metric 9:	Measurement of Test Substance Concentration	Low	It was not reported if exposure concentrations were measured in the preliminary test.
	Metric 10:	Exposure Duration and Frequency	Uninformative	The exposure duration was not reported for the preliminary test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	It was reported that in the preliminary test 500 mg/L leads to 100% growth inhibition, 100 mg/L leads to 0% growth inhibition, and 50 mg/L leads to no effects. It was not clear if this is a complete list of concentrations tested in the preliminary test.
	Metric 12:	Testing at or Below Solubility Limit	High	Reported test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original Daphnia were obtained from the USEPA lab in Duluth, MN and were then reared multi-generationally at the performing lab. The age of Daphnia used in the preliminary test was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report if Daphnia were acclimated prior to the preliminary test.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Replication was not reported for the preliminary test.

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Study Citation:	CITI, (1996). Acute immobilization test on Daphnia magna exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346441

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were not reported for the preliminary test.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported for the preliminary test.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the outcome assessment protocol were not reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide details on environmental conditions or other non-treatment related factors for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No information was reported on differences between treatment groups that could have affected the growth assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	It was not reported if statistical analysis was conducted in the preliminary test.
	Metric 22:	Reporting of Data	Low	Results from the preliminary test were summarized in the text.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Insufficient information was provided to determine if excessive variability or unexpected outcomes occurred in the preliminary test.

Additional Comments: This evaluation is for the preliminary test exposing Daphnia magna to 1,2-DCA.

Overall Quality Determination Uninformative

Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Gammarus fasciatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Chemical was identified by name and CASRN (page 293/588).
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity reported as 100.0%
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Though the use of controls was not directly stated in the paper, Fig 1 (page 21/588) shows the concentration ranges used for all chemicals and it includes zero concentrations on the horizontal axis. Also, in the methods it was stated that the static and flow-through techniques were generally those of the American Society for Testing and Materials (1980) and the Committee on Methods for Toxicity Tests with Aquatic Organisms (1975). However, ranking this metric low because with the given information, one cannot confirm that the controls group had all conditions equal except chemical exposure.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had the following details- "Stock solutions were prepared immediately before each test, with commercial grade acetone as the carrier solvent. Occasionally, ethanol or dimethylformamide was substituted. Solvent concentrations did not exceed 0.5 mL/L in final dilution water." Experimental system details for invertebrate testing was vague. "Test chambers varied in size for invertebrates, depending on the species used; volume of test solution ranged from 0.25 to 4 liters."
	Metric 8:	Consistency of Exposure Administration	Medium	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had more details about the static method and the exposures seems to have been administered consistently across groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	The duration of exposure for invertebrates was for 48 hours, which was lower than the typical duration of 96 hours used in acute toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	As per the cited reference for methods, at least six concentrations were used No information is provided on the exposure concentration tested in the reference However, EPA has held conversations with US FWS to confirm the experimental design. Also, the exposure concentrations tested were not sufficient to derive a definitive LC50 value.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Gammarus fasciatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
	Metric 12:	Testing at or Below Solubility Limit	Medium	A solvent was used and the maximum solvent concentration was reported in the cited reference for methods but solvent control response was not reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	”Original stocks of invertebrates were collected and cultured from wild populations with no known source of contamination; thesepopulations were replenished regularly. The invertebrateswere cultured in the Laboratory by methods similar to those described by Sanders and Cope (1966).”
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Per the cited reference for methods, invertebrates were acclimated to dilution water over a 406 h period.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Per the cited reference for methods, at least 10 organisms were exposed to each concentration but replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Environmental conditions were provided in the cited reference for methods. ”Water was buffered to maintain a pH of 7 .2 to 7 .5, an alkalinity of 30 to 35 mg/L, and a hardness of 40 to 50 mg/L as CaCO3. Temperature of test solutions wasmaintained within ± 1 °C of that required for a given test.”
	Metric 17:	Outcome Assessment Methodology	Medium	The outcome assessment methodology addressed or reported the intended outcome of interest- immobilization in invertebrates, however criteria for the same were not reported.
	Metric 18:	Consistency of Outcome Assessment	High	”The number of dead or affected organisms in each test chamber was recorded and the dead organisms were removed every 24 h; general observations on the condition of test organisms were also recorded at these times.”
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. comparison of environmental conditions. Temperature, pH and hardness were provided in the results section
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were adequately described
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability (e.g., SE, SD, confidence intervals) and/or insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Gammarus fasciatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric	Rating	Comments
Additional Comments:	LC 50 value for 1,2 DCA was reported as > 100 mg/l. The use of control was not directly stated and the control response was not reported. No information was given in the manual regarding the chemical-specific exposure concentration but EPA has held conversations with US FWS to confirm the experimental design.Another reference cited for methods (Johnson and Finley, 1980; not in HERO but available online) was reviewed and many metrics were rated according to in the information in the cited reference.		

Overall Quality Determination Medium

Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Pteronarcys californica*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Chemical was identified by name and CASRN (page 293/588).
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity reported as 100.0%
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Though the use of controls was not directly stated in the paper, Fig 1 (page 21/588) shows the concentration ranges used for all chemicals and it includes zero concentrations on the horizontal axis. Also, in the methods it was stated that the static and flow-through techniques were generally those of the American Society for Testing and Materials (1980) and the Committee on Methods for Toxicity Tests with Aquatic Organisms (1975). However, ranking this metric low because with the given information, one cannot confirm that the controls group had all conditions equal except chemical exposure.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had the following details- "Stock solutions were prepared immediately before each test, with commercial grade acetone as the carrier solvent. Occasionally, ethanol or dimethylformamide was substituted. Solvent concentrations did not exceed 0.5 mL/L in final dilution water." Experimental system details for invertebrate testing was vague. "Test chambers varied in size for invertebrates, depending on the species used; volume of test solution ranged from 0.25 to 4 liters."
	Metric 8:	Consistency of Exposure Administration	Medium	The study cites earlier publication (Johnson and Finley, 1980; not in HERO but available online) for methods. The cited reference had more details about the static method and the exposures seems to have been administered consistently across groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	The duration of exposure for invertebrates was for 48 hours, which was lower than the typical duration of 96 hours used in acute toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	As per the cited reference for methods, at least six concentrations were used No information is provided on the exposure concentration tested in the reference However, EPA has held conversations with US FWS to confirm the experimental design. Also, the exposure concentrations tested were not sufficient to derive a definitive LC50 value.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Pteronarcys californica*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric		Rating	Comments
	Metric 12:	Testing at or Below Solubility Limit	Medium	A solvent was used and the maximum solvent concentration was reported in the cited reference for methods but solvent control response was not reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	”Original stocks of invertebrates were collected and cultured from wild populations with no known source of contamination; thesepopulations were replenished regularly. The invertebrateswere cultured in the Laboratory by methods similar to those described by Sanders and Cope (1966).”
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Per the cited reference for methods, invertebrates were acclimated to dilution water over a 406 h period.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Per the cited reference for methods, at least 10 organisms were exposed to each concentration but replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Environmental conditions were provided in the cited reference for methods. ”Water was buffered to maintain a pH of 7 .2 to 7 .5, an alkalinity of 30 to 35 mg/L, and a hardness of 40 to 50 mg/L as CaCO3. Temperature of test solutions wasmaintained within ± 1 °C of that required for a given test.”
	Metric 17:	Outcome Assessment Methodology	Medium	The outcome assessment methodology addressed or reported the intended outcome of interest- immobilization in invertebrates, however criteria for the same were not reported.
	Metric 18:	Consistency of Outcome Assessment	High	”The number of dead or affected organisms in each test chamber was recorded and the dead organisms were removed every 24 h; general observations on the condition of test organisms were also recorded at these times.”
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. comparison of environmental conditions. Temperature, pH and hardness were provided in the results section
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were adequately described
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability (e.g., SE, SD, confidence intervals) and/or insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

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Study Citation:	Mayer, F. L., Jr, Ellersieck, M. R. (1986). Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Pteronarcys californica*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348414

Domain	Metric	Rating	Comments
Additional Comments:	LC 50 value for 1,2 DCA was reported as > 100 mg/l. The use of control was not directly stated and the control response was not reported. No information was given in the manual regarding the chemical-specific exposure concentration but EPA has held conversations with US FWS to confirm the experimental design.Another reference cited for methods (Johnson and Finley, 1980; not in HERO but available online) was reviewed and many metrics were rated according to in the information in the cited reference.		

Overall Quality Determination Medium

Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4141189

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory. Source not reported.
	Metric 3:	Test Substance Purity	High	Chemical purity reported as >= 98%, reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Authors referred to comparing 48 hour results with initial cell number or the change in D.O. production (baseline values). Cited reference (Chen et al 2005) mentions use of a control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Closed system with no headspace was described. Authors performed QC checks on treatments with algae to ensure no greater than 8% difference between nominal and measured.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be administered consistently among treatment groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Concentration controls conducted without algae to ensure measured concentration no greater than 8% different than nominal concentration. HPLC was utilized for analysis and frequency or timing of measurement not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	48 hour test, sufficient to observe results.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The algal source was not reported but cited methods describe strain as UTEX 1648.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Study did not report acclimatization to the 300 mL bottles.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Tests run in triplicate.

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Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4141189

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions adequately described.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology for dissolved oxygen and cell density was not clearly reported
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes determined at 48 h exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were obtained using probit analysis.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the tables as EC50s with CIs.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes or none were indicated.

Additional Comments: Algal growth rate. Growth rate data later recalculated and presented in HERO ID 3617867.

Overall Quality Determination Uninformative

Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4141189

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory. Source not reported.
	Metric 3:	Test Substance Purity	High	Chemical purity reported as >= 98%, reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Authors referred to comparing 48 hour results with initial cell number or the change in D.O. production (baseline values). Cited reference (Chen et al 2005) mentions use of a control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Closed system with no headspace was described. Authors performed QC checks on treatments with algae to ensure no greater than 8% difference between nominal and measured.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be administered consistently among treatment groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Concentration controls conducted without algae to ensure measured concentration no greater than 8% different than nominal concentration. HPLC was utilized for analysis and frequency or timing of measurement not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	48 hour test, sufficient to observe results.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The algal source was not reported but cited methods describe strain as UTEX 1648.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Study did not report acclimatization to the 300 mL bottles.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Tests run in triplicate.
Domain 5: Outcome Assessment				

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Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Respiratory
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	4141189

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions adequately described.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology for dissolved oxygen and cell density was not clearly reported
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes determined at 48 h exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were obtained using probit analysis.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the tables as EC50s with CIs.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes or none were indicated.

Additional Comments: Dissolved Oxygen Production.

Overall Quality Determination Uninformative

Study Citation:	Tsai, K. P., Chen, C. Y. (2007). An algal toxicity database of organic toxicants derived by a closed-system technique. Environmental Toxicology and Chemistry 26(9):1931-1939.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3617867

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance was identified by name only.
	Metric 2:	Test Substance Source	High	Chemical was analyzed using HPLC prior to conducting experiments.
	Metric 3:	Test Substance Purity	High	The purity of the trans 1,2 dichloroethylene was stated as reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors report the use of a negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae was allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Experimental design described adequately.
	Metric 8:	Consistency of Exposure Administration	Medium	All exposures were for 48h in closed systems to prevent volatilization. Test bottles contained no headspace and were shaken during the duration of exposure.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Stock solutions and test concentrations were reported to be measured using HPLC.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 48h, which was adequate for the outcome of interest.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	The number of exposure levels and the spacing of the levels were not reported. Test concentrations were not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Test concentrations were not reported, so it was uncertain if the test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The algae was reported to be from the University of Texas-Austin in Austin, TX, USA.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	It was not reported if the algae were acclimated.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The starting algae concentrations were reported to be 15,000cells/mL. Each concentrations was repeated in triplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Algae was tested at 24C on an orbital shaker in a closed system with 65uE/m^2/s. pH and starting cell density stated.

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Study Citation:	Tsai, K. P., Chen, C. Y. (2007). An algal toxicity database of organic toxicants derived by a closed-system technique. Environmental Toxicology and Chemistry 26(9):1931-1939.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3617867

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–algae density.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups–algae density was determined using a particle counter and then calculate inhibition.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Data on attrition and/or outcomes unrelated to controlled variables for each study group were not reported because only substantial differences among groups were noted (as indicated by study authors), and it is unlikely there were any substantial impacts on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were calculated using probit analysis.
	Metric 22:	Reporting of Data	Medium	EC50 values were reported in the Appendix.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation was on the effect of 1,2-dichloroethane on density of P. subcapitata. Development/growth was selected as the outcome of interest. The study received and unacceptable ranking due to the lack of information regarding the test concentrations and the spacing of them. Primary data was generated for 1,2-dichloroethane in a previous study, however, the data was recalculated in the current study.

Overall Quality Determination Uninformative

Study Citation:	Behechti, A., Ballhorn, L., Kettrup, A. (1995). Toxicity of chlorinated alkanes on the alga Scenedesmus subspicatus in a closed test vessel. Fresenius Environmental Bulletin 4(3):148-153.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Scendesmus subspicatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214703

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Test substance was identified by name only.
	Metric 2:	Test Substance Source	Low	Test source was Aldrich, but the test substance was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity for all test substances in this study were reported as 98% or higher.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	A concurrent negative control group was not included or reported.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail–closed test system was used for volatile test substance to compare with open test sytem.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Test concentrations were analyzed at the beginning of the test using GC analysis or headspace technique. Test substance concentration was not determined at the end of the test.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and exposure frequency were reported and appropriate for the study type and outcome of interest
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Increasing concentration factors were given and were reported to cover a range of 0 to 100% survival of algae, but actual chemical concentrations were not given.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized
	Metric 15:	Number of Organisms and Replicates per Group	Low	All test flasks contained the same initial algal concentration but replicates were not reported.

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Study Citation:	Behechti, A., Ballhorn, L., Kettrup, A. (1995). Toxicity of chlorinated alkanes on the alga Scenedesmus subspicatus in a closed test vessel. Fresenius Environmental Bulletin 4(3):148-153.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Scendesmus subspicatus*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	10214703

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	OECD guidelines were cited for culturing and testing conditions/methods. Little details were provided in the paper on environmental conditions, however, the algae performed well enough to get EC50 results.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. Measurements were taken daily at the same time each day.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately. EC50 calculation methods were not reported.
	Metric 22:	Reporting of Data	Medium	Control group outcomes were not reported, just EC50s.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability

Additional Comments: A concurrent control group was not included in the algal toxicity test, therefore this study got an uninformative ranking.

Overall Quality Determination Uninformative

Study Citation:	Freitag, D., Ballhorn, L., Behechti, A., Fischer, K., Thumm, W. (1994). Structural configuration and toxicity of chlorinated alkanes. Chemosphere 28(2):253-259.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Scenedesmus subspicata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	660810

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	The test substance source was reported nor was it analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Reporting of EC50 implies the use of a control, and OECD guidelines were cited, which would indicate use of a control. .
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how the algae was allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Only limited details were provided about test substance preparation and the experimental system.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered in closed test containers to prevent loss of substance due to volatility. Aeration before the test start with CO2 enriched air with optimized air space.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured using gas chromatrography.
	Metric 10:	Exposure Duration and Frequency	Medium	Algae EC50s were for 72hr not 96hr. Exposure was for 96hr.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	OECD methodology is cited for test protocol, little information was provided in the paper regarding test exposure groups and spacing of exposure levels
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Algae was from a continuously irradiated algae culture, though exact source was not specified.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and replicates was not reported.
Domain 5: Outcome Assessment				

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Study Citation:	Freitag, D., Ballhorn, L., Behechti, A., Fischer, K., Thumm, W. (1994). Structural configuration and toxicity of chlorinated alkanes. Chemosphere 28(2):253-259.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Scenedesmus subspicata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	660810

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate.
	Metric 17:	Outcome Assessment Methodology	Medium	EC50s were reported, but for 72hr rather than 96hr.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol were limited, though OECD guidelines were cited for the the protocol.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis to determine EC50s was performed by plotting the linear percentage of growth inhibition against the logarithm of the concentration.
	Metric 22:	Reporting of Data	Low	EC50s were the only data reported. Control responses were not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	They study did not report any measures of variability, no confidence intervals.

Additional Comments: OECD guidelines were cited for study protocol, but little extra information was provided in this paper, thus the numerous low ratings on many of the metrics.

Overall Quality Determination Low

Study Citation:	CITI, (1996). Algal growth inhibition test of Selenastrum capricornurum exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346443

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by CASRN and structural formula.
	Metric 2:	Test Substance Source	Low	The supplier was redacted. It was not reported if the identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control that contained algal media only without any test substance.
	Metric 5:	Negative Control Response	High	The negative control response was described in the results section and reported in Tables 3 and 4 as well as Figure 1. The control response was adequate for the outcome of interest.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae was allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The test solution was prepared by adding the required amount of test substance to a test vessel containing 100mL of medium. Section 3.5 presents a table containing the amount of test substance added to each test vessel to obtain the desired concentration. Test vessels were 500mL glass Erlenmeyer flasks with airtight corks. Algae tests were placed in an incubation chamber that allowed for shaking at 100rpm. Concentrations decreased significantly between measurements, but measured concentrations were used for determining endpoints.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across test concentrations.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported using headspace gas chromatography to measure the test substance. Samples were taken at 0h and 72h of the study (exposure initiation and termination).
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 72h. This is typical for an algae toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure levels and the spacing was adequate to observe a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the water solubility limit of the test substance.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The S. capricornutum were reported to be from the American Type Culture Collection in Maryland, USA. The algae were incubated for 3 days prior to the start of the exposure.

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Study Citation:	CITI, (1996). Algal growth inhibition test of Selenastrum capricornurum exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346443

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The algae were cultured in similar conditions to testing conditions at the performing laboratory.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	It was reported that each test vessel was started with 1 x 10^4 cells/mL of the algae. Each test concentration had 3 replicates.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The algae were cultured in OECD test medium. The properties of the medium can be found in Table 1. The algae was kept at 23C in an incubation chamber. The algae was shaken at 100rpm to prevent it from settling.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–algal growth and algal growth inhibition.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. Cell densities were measured at 24, 48, and 72h by taking a small amount of test solution from each test vessel and using a Coulter counter.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis methods were described in section 4 and were appropriate for the outcome of interest.
	Metric 22:	Reporting of Data	High	The exposure and control responses were described in the results section and reported in Tables 3 and 4. Table 5 reported the calculated EC50 values as well as the NOEC values.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation was on the toxicity of 1,2-DCA to algae S. capricornutum. The algae was exposed for 72h, and EC50 and NOEC values were determined. The cell density was determined every 24h. Development/growth was the outcome of interest.

Overall Quality Determination High

Study Citation:	CITI, (1996). Algal growth inhibition test of Selenastrum capricornurum exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346443

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by CASRN and structural formula.
	Metric 2:	Test Substance Source	Low	The supplier was redacted. It was not reported if the identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	Study authors did not report if a control was used in the preliminary test.
	Metric 5:	Negative Control Response	Low	The negative control response was not reported for the preliminary test.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae was allocated to study groups for the preliminary test.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The experimental system and test media preparation were not reported for the preliminary test.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were not reported for the preliminary test.
	Metric 9:	Measurement of Test Substance Concentration	Low	Analytical measurement of exposure concentrations was not reported for the preliminary test.
	Metric 10:	Exposure Duration and Frequency	Uninformative	The exposure duration was not reported for the preliminary test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Results from the preliminary test for two exposure groups are reported. It is not clear if other exposure groups were tested.
	Metric 12:	Testing at or Below Solubility Limit	High	Reported exposure concentrations were below the water solubility limit of the test substance.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The S. capricornutum were reported to be from the American Type Culture Collection in Maryland, USA.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation and pretreatment conditions were not reported for the preliminary test.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Replication was not reported for the preliminary test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	There was no test condition information reported for the preliminary test.

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Study Citation:	CITI, (1996). Algal growth inhibition test of Selenastrum capricornurum exposed to 1,2-dichloroethane (translation).
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	11346443

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported for the preliminary test.
	Metric 18:	Consistency of Outcome Assessment	Low	Details of the outcome assessment protocol were not reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	Environmental conditions and other non-treatment related factors were not reported for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in organism attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Statistical analysis was not reported for the preliminary test and data enabling independent statistical analysis were not provided.
	Metric 22:	Reporting of Data	Low	Results from the preliminary test were summarized in the text.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Insufficient information was provided to determine if excessive variability or unexpected outcomes occurred in the preliminary test.

Additional Comments: This evaluation was on the preliminary test of the toxicity of 1,2-DCA to algae. Development/growth was the outcome of interest.

Overall Quality Determination Uninformative

Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Limanda limanda*; Dabs from the UK–species was not specified.; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	Test substance source was not reported, nor was it analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The study does not state the use of a negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided few details on exposure media preparation and the experimental system
	Metric 8:	Consistency of Exposure Administration	Low	The study provided few details on exposure administration
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the animals was not reported, and the species was not stated, just the common name.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized
	Metric 15:	Number of Organisms and Replicates per Group	Low	5 test organisms per container, but the number of replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate

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Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Limanda limanda*; Dabs from the UK–species was not specified.; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	LC50s were reported and were the intended outcomes.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Doudoroff (1951) was cited for obtaining LC50s
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all outcomes. Control group data was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability

Additional Comments: The study did not report the use of a concurrent negative control group, the number of exposure groups and exposure concentrations.A field survey was also conducted in this study of concentrations of various chemicals in a variety of species sampled from an industrial area. I did not include a review for that portion due to the fact that the source of any chemical accumulating in the tissues could not necessarily be identified and a specific concentration of said chemical was not determined.

Overall Quality Determination Uninformative

Study Citation:	Foster, G. D., Tullis, R. E. (1985). Quantitative structure-toxicity relationships with osmotically stressed Artemia salina nauplii. Environmental Pollution Series A: Ecological and Biological 38(3):273-281.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5437918

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The chemical name was provided, but not a CASRN.
	Metric 2:	Test Substance Source	High	The manufacturer name is provided.
	Metric 3:	Test Substance Purity	Medium	Only the purity percentage of the main chemical is provided.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	The type of control is not specified, only reported as, "No immobilization occurred in the control tests". Acetone was used in the test solutions, so it is unclear if the control is concurrent negative or vehicle/solvent.
	Metric 5:	Negative Control Response	High	There was no Artemia immobilisation in the control tests.
	Metric 6:	Randomized Allocation	Low	Randomized allocation method was not specified. N=25 nauplii were used for each test replicate.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Test media was reported and concentrations were measured. The paper did not specify the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	The paper reports that five test concentrations were used, toxicity measurements were taken at each concentration, but the doses themselves were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The study duration is reported as 24 hours.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The exposure concentrations were justified for a dose response by study authors.
	Metric 12:	Testing at or Below Solubility Limit	Low	The solvent concentration (acetone) was not reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The species, sex, age, and life stage of the test organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Artemia cysts were brought into the lab, the exposure began after hatching. Some acclimatization conditions differed between control and exposed populations.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	N=25 nauplii were used for the toxicity tests. N=3 replicates for toxicity measurements at each concentration.
Domain 5: Outcome Assessment				

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Study Citation:	Foster, G. D., Tullis, R. E. (1985). Quantitative structure-toxicity relationships with osmotically stressed Artemia salina nauplii. Environmental Pollution Series A: Ecological and Biological 38(3):273-281.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5437918

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Salinity, pH, and dissolved oxygen measurements were made at the onset and completion of each experiment. Two salinities were used as variables. Minor uncertainties or limitations were identified regarding organism housing, environmental conditions, food, water, nutrients, and/or biomass loading, but these are not likely to have a substantial impact on results.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups using the same protocol in all study groups. The 25 nauplii were always accounted for in each flask.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Separate tests were conducted using different salinity levels, but there were controls for each salinity level.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described for calculating IC50s. A linear regression was also used to compare IC50s.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were reported for treatment groups. Data for control group was reported only in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained. Confidence intervals of IC50 values were reported.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Foster, G., Tullis, R. E. (1984). A quantitative structure-activity relationship between partition coefficients and the acute toxicity of naphthalene derivatives in Artemia salina nauplii. Aquatic Toxicology AMST(AMST):245-254.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1470591

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance source was J.T. Baker Chemical Co., but no certificate or analytical verification of chemical identity.
	Metric 3:	Test Substance Purity	Medium	All test substances with a purity of <98% were recrystallized or glass distilled prior to use.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	There were concurrent negative controls as well as solvent controls.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system was described in adequate detail, methods for preparation of test media were minimal
	Metric 8:	Consistency of Exposure Administration	Medium	Exposures appeared to be administered the same across groups, however, it was reported that there were 5-8 exposure groups depending on the test substance. It was not reported which test substance had more or which had less exposure groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured for most test substances at initiation and after 24hr. In this case the 24h concentration of 1,2 dichloroethane was not measured and assumed to be at nominal.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type. IC50s were obtained.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	There were 5-8 exposure concentrations in geometric progression for each test substance (in triplicate). Exact concentrations for each exposure level were not given.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit. Study reported using solvents if necessary, but concentrations of test substances were not given to determine if they exceeded solubility or not.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	There was no mention of acclimatization, however culture conditions appeared to be the same as the test conditions.

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Study Citation:	Foster, G., Tullis, R. E. (1984). A quantitative structure-activity relationship between partition coefficients and the acute toxicity of naphthalene derivatives in Artemia salina nauplii. Aquatic Toxicology AMST(AMST):245-254.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1470591

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects. 25 organisms per container in triplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of test system were conducive to maintenance of organism health
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest. IC50s were obtained.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Finney (1971) cited for IC50 determination and Daniel (1978) cited for correlation coefficients, regression standard deviations, and 95% confidence intervals.
	Metric 22:	Reporting of Data	Medium	IC50s were reported for each test substance but solvent control data was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Kerster, H. W., Schaeffer, D. J. (1983). Brine shrimp (Artemia salina) nauplii as a teratogen test system. Ecotoxicology and Environmental Safety 7(3):342-349.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1944747

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified using proper IUPAC nomenclature (1,2-Dichloroethane).
	Metric 2:	Test Substance Source	Low	The source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity or grade of the chemical was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Controls were utilized in the experiments. Test dishes and control dishes are brought to a final volume of 25ml and are all brought to be ionically equivalent to 3.5% artificial seawater (ASW). Control and test dishes are handled in the same manner, and stored in the same 25°C incubator. However, it is unclear if or how much DMSO was used as a solvent to solubilize our test substance of interest, and it seems that DMSO was not used in the negative control to match any tests substances that needed the aid of a solvent.
	Metric 5:	Negative Control Response	Low	Response of controls were not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how Artemia were allocated for the experiments.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental design was detailed in the Procedure.
	Metric 8:	Consistency of Exposure Administration	Medium	Details on the administration were reported, inconsistencies were not reported.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	Exposure concentrations were not measured, nor clearly reported. The results table states that the concentration for 1,2-Dichloroethane was ”0.25-25” ppm. The study notes that the petri dishes are covered, but the study authors do not detail precautions taken to minimalize volatilization of our particular test substance of interest, which is highly volatile.
	Metric 10:	Exposure Duration and Frequency	High	Duration of exposure was appropriate – ”Tests are scored at about 48 hr after the cysts were first wetted. (The incubatortemperature or the cyst source can be changed to vary the timing a bit to suit laboratory personnel.) It is important to assure that two molts take place during the test and that the nauplii do not die of starvation.”
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Number of exposure groups was not clearly stated in the paper.
	Metric 12:	Testing at or Below Solubility Limit	Medium	Water solubility was acknowledged in the paper. The paper states that ”organic substances may be brought into solution withdimethyl sulfoxide (DMSO); up to 1.3% is nonteratogenic to nauplii,” though doesn’t state if DMSO was required to solubilize the very small concentration of 1,2-Dichloroethane, and if so, how much DMSO was used.

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Study Citation:	Kerster, H. W., Schaeffer, D. J. (1983). Brine shrimp (Artemia salina) nauplii as a teratogen test system. Ecotoxicology and Environmental Safety 7(3):342-349.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1944747

Domain	Metric		Rating	Comments
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Age of test species stated.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Culturing of the organisms in the lab was explained.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	50 animals were measured.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Minor uncertainties in the test conditions.
	Metric 17:	Outcome Assessment Methodology	High	The outcome of teratogenicity was addressed.
	Metric 18:	Consistency of Outcome Assessment	Medium	Differences in the outcomes were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Differences were not reported.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Differences were not reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Mean, standard deviation, and t test.
	Metric 22:	Reporting of Data	Medium	Data was reported as the concentration(s) and the outcomes (positive or negative).
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Uncertainties were not reported.

Additional Comments: The study omits or lacks specificity concerning key methodological details. Exact exposure is unclear, and the low study rating reflects these deficiencies. However, the endpoint defined and measured in the study is reported on a dichotomous basis (Positive or Negative), and the positive finding for 1,2-Dichloroethane could inform hazard ID for the chemical.

Overall Quality Determination Low

Study Citation:	Price, K. S., Waggy, G. T., Conway, R. A. (1974). Brine shrimp bioassay and seawater BOD of petrochemicals. Water Environment and Technology 46(1):63-77.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	31087

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	Test substance source was not reported nor was it analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and/or test media preparation methods were adequately reported but did not completely account for physical-chemical properties–1% chemical solution was placed in each bottle to reach desired concentration. Relatively insoluble substances were tested at saturation.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups–24hr exposure at 24.5C after which they were assessed for mortality.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	24h exposure duration appeared suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Concentrations of 100, 1,000, and 10,000mg/L were tested for screening tests. Median tolerance limits for 1, 2 DCA was determined using dosage concentrations of 100, 180, 320, 560 and 1000 mg/l.
	Metric 12:	Testing at or Below Solubility Limit	Low	10,000mg/L was slightly above solubility, so the test would have been conducted at saturation. There were not very many exposure concentrations, so perhaps a vehicle solvent should have been used.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test species was not reported.

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Study Citation:	Price, K. S., Waggy, G. T., Conway, R. A. (1974). Brine shrimp bioassay and seawater BOD of petrochemicals. Water Environment and Technology 46(1):63-77.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	31087

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized or whether pretreatment conditions were the same for control and exposed groups. Test was incubated at 24.5 C, but no information was given on whether they were hatched at the same temperature.
	Metric 15:	Number of Organisms and Replicates per Group	Low	1 mL of brine shrimp at a titer of 30-50 brine shrimp/mL was used in each test vessel. The number of replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	In the toxicity study -"The bottles were then loosely capped and incubated atambient temperature (24.5°C) for 24 hrs." But the temperature and conditions of hatching vessel were not reported and limited information was provided about the overall environmental conditions in the test.
	Metric 17:	Outcome Assessment Methodology	High	Preliminary outcome assessment provided very erratic results; this method was discontinued for other portions of the study. Tarzwell was cited for the other study portion with a few modifications to account for different test substance characteristics. The outcome assessment methods including criteria to assess dead organisms were provided.
	Metric 18:	Consistency of Outcome Assessment	High	Organisms were assessed for mortality after 24h with use of a colony counter
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Preliminary toxicity studies reported outcomes unrelated to the exposure with possible contamination by yeast and bacteria. This method was not used further in the study. There was no information in the final toxicity study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	TLm determinations were calculated, but could have been described more.
	Metric 22:	Reporting of Data	Medium	Control performance was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Measures of variability were not reported.

Additional Comments: Control response and the use of replicates were not reported. The median tolerance limit for 1,2 DCA was 320 mg/L.

Overall Quality Determination Low

Study Citation:	Sanchez-Fortun, S., Sanz, F., Santa-Maria, A., Ros, J. M., Vicente, De, M. L., Encinas, M. T., Vinagre, E., Barahona, M. V. (1997). Acute sensitivity of three age classes of Artemia salina larvae to seven chlorinated solvents. Bulletin of Environmental Contamination and Toxicology 59(3):445-451.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	200570

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance has been identified as 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance was obtained Sigma Chemical Company (St. Louis, USA) but was not analytically verified.
	Metric 3:	Test Substance Purity	High	Test substance was reported as ”analytical grade”
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls (solvent and water) were used.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Test media preparation details were limited. Concentration of test substance was not measured during the study.
	Metric 8:	Consistency of Exposure Administration	Low	No details were provided on solvent concentration, exposure solution volume and nominal exposure concentrations.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured and nominal concentrations were not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	Acute toxicity tests for 24 hr duration.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	It was stated that the final concentration of ethanol never exceeded 1% but the actual solvent concentration and the biological response of solvent control were not reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The encysted eggs of Artemia salina in dry state was obtained from San Francisco Bay Brand, Inc and nauplii were produced in the lab. Larvae aged 24-, 48- and 72-hr were tested separately.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	10 larvae were used per concentration and 4 replicates were used.

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Study Citation:	Sanchez-Fortun, S., Sanz, F., Santa-Maria, A., Ros, J. M., Vicente, De, M. L., Encinas, M. T., Vinagre, E., Barahona, M. V. (1997). Acute sensitivity of three age classes of Artemia salina larvae to seven chlorinated solvents. Bulletin of Environmental Contamination and Toxicology 59(3):445-451.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Artemia salina*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	200570

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	There was no report on environmental conditions (other than incubating at 25oC) to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	Larvae were considered dead if they did not exhibit any internal or external movement during10 sec of observation.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment was done after 24 hours of exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The 24 hr-LC50 values, with 95 % confidence limits, were calculated according to Litchfield and Wilcoxon method (1949). Two-way analysis of variance with replication was conducted on LC50 values obtained for 3 age groups followed by post hoc contrast with Newman-Keuls Test.
	Metric 22:	Reporting of Data	Medium	Dose-dependent mortality data was not presented. LC50 values with confidence intervals were presented for each age class of the test organism (Table1).
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The exposure concentrations and the number of exposure groups used were not reported. Mortality data was not provided. Only LC 50 values were provided.

Overall Quality Determination Uninformative

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Crangon crangon*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	Use of control was not reported in text, figures or tables.
	Metric 5:	Negative Control Response	Low	No negative control reported.
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Authors reported evaporation "probably" effected results.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Authors reported concentrations likely decreased during test due to evaporation. However only the initial concentration was measured or estimated. Change in concentration was expected to effect results.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Organisms were wild caught.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Acclimation was 3-5 days. Therefore, there may have been unreported differences.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group (n=30) were adequate for the teest.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	LC50 with 95% CI method described, however 95 CI only shown in graph and difficult to determine what the 95 CI is.

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Crangon crangon*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical method adequately described.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Mortality decreased over time ”probably” due to evaporation, as reported by authors.

Additional Comments: This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination Uninformative

Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Elminus modestus*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	Test substance source was not reported, nor was it analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The study does noot state the use of a negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided few details on exposure media preparation and little information was provided on the experimental system
	Metric 8:	Consistency of Exposure Administration	Low	The study provided few details on exposure administration
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type–48h LC50
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the animals was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized
	Metric 15:	Number of Organisms and Replicates per Group	Low	20 test organisms per container, but the number of replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate
	Metric 17:	Outcome Assessment Methodology	High	LC50s were reported and were the intended outcomes.

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Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Elminus modestus*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Doudoroff (1951) was cited for obtaining LC50s
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all outcomes. Control group data was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability

Additional Comments: The study did not report the use of a concurrent negative control group, the number of exposure groups and exposure concentrations.A field survey was also conducted in this study of concentrations of various chemicals in a variety of species sampled from an industrial area. I did not include a review for that portion due to the fact that the source of any chemical accumulating in the tissues could not necessarily be identified and a specific concentration of said chemical was not determined.

Overall Quality Determination Uninformative

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls reported.
	Metric 5:	Negative Control Response	High	Control response shown in graph adequate for test (Fig 3/4 on Page 3/6).
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test vessels were air tight and solution was renewed every second day.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test vessels were air tight and solution was renewed according methods described in text.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Source of organisms not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group (n=25) were adequate for the test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	Intended outcomes reported.

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Statistical method for 96 hour LC50 ”roughly estimated”, while also reporting ”half of the test population was dead” within 24 hrs.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Half the population was dead at 24 hrs, whereas only an additional 10% mortality after 8 days.

Additional Comments: This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination Uninformative

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls reported.
	Metric 5:	Negative Control Response	High	Control response shown in table 1 (page 4) adequate for test.
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test vessels were air tight and solution was renewed every second day.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test vessels were air tight and solution was renewed according methods described in text.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Source of organisms not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group were adequate for the test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	Intended outcomes reported.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	hatching percent was calculated.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes reported

Additional Comments: This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination High

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls reported.
	Metric 5:	Negative Control Response	High	Control response shown in table 1 (page 4) adequate for test.
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test vessels were air tight and solution was renewed every second day.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test vessels were air tight and solution was renewed according methods described in text.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Source of organisms not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group were adequate for the test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	Intended outcomes reported.

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	hatching percent was calculated.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes reported

Additional Comments: This form represents Ophryotrocha labronica reproduction reported at 216 hours. This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination High

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls reported.
	Metric 5:	Negative Control Response	High	Control response shown in graph adequate for test (Fig 3/4 on Page 3/6).
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test vessels were air tight and solution was renewed every second day.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test vessels were air tight and solution was renewed according methods described in text.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Source of organisms not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group (n=25) were adequate for the test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	Intended outcomes reported.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Statistical method for 96 hour LC50 ”roughly estimated”, while also reporting ”half of the test population was dead” within 24 hrs.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Half the population was dead at 24 hrs, whereas only an additional 10% mortality after 8 days.

Additional Comments: This form represents Ophryotrocha labronica mortality reported at 144 hours. This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination Uninformative

Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Compound referred to by nomenclature: 1,2-dichloroethane.
	Metric 2:	Test Substance Source	Low	Source was not reported.
	Metric 3:	Test Substance Purity	Low	Neither purity or grade was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative controls reported.
	Metric 5:	Negative Control Response	High	Control response shown in graph adequate for test (Fig 3/4 on Page 3/6).
	Metric 6:	Randomized Allocation	Low	Method of allocation not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test vessels were air tight and solution was renewed every second day.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were consistent across groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test vessels were air tight and solution was renewed according methods described in text.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was adequate for test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Number of exposure groups and spacing were adequate for test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Source of organisms not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Number of organisms per group (n=25) were adequate for the test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were appropriate for the test.
	Metric 17:	Outcome Assessment Methodology	High	Intended outcomes reported.
	Metric 18:	Consistency of Outcome Assessment	High	Outcome assessment consistent across groups.
Domain 6: Confounding / Variable Control				

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Study Citation:	Rosenberg, R., Grahn, O., Johansson, L. (1975). Toxic effects of aliphatic chlorinated by-products from vinyl chloride production on marine animals. Water Research 9(7):607-612.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Ophryotrocha labronica*; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5442093

Domain	Metric		Rating	Comments
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables reported.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no unrelated exposures reported.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	No statistics are presented for activity observations.
	Metric 22:	Reporting of Data	High	Results for all groups were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Half the population was dead at 24 hrs, whereas only an additional 10% mortality after 8 days.

Additional Comments: This form represents Ophryotrocha labronica behavior. These data are presented as ”activity” within Figure 9. This form also applies for endpoints associated with 1,1,2-TCA.

Overall Quality Determination Uninformative

Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Phaeodactylum tricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Photosynthesis
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only
	Metric 2:	Test Substance Source	Low	Test substance source was not reported, nor was it analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The study does not state the use of a negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided few details on exposure media preparation and little information was provided on the experimental system
	Metric 8:	Consistency of Exposure Administration	Low	The study provided few details on exposure administration
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	Uninformative	The duration of the exposure was not reported.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the algae was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate
	Metric 17:	Outcome Assessment Methodology	High	IC50s were reported and were the intended outcomes.

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Study Citation:	Pearson, C. R., Mcconnell, G. (1975). Chlorinated C1 and C2 hydrocarbons in the marine environment. Proceedings of the Royal Society: Biological Sciences 189(1096):305-332.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Phaeodactylum tricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Photosynthesis
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	75062

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Doudoroff (1951) was cited for obtaining IC50s
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all outcomes. Control group data was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability

Additional Comments: The study did not report the use of a concurrent negative control group, the number of exposure groups and exposure concentrations.A field survey was also conducted in this study of concentrations of various chemicals in a variety of species sampled from an industrial area. I did not include a review for that portion due to the fact that the source of any chemical accumulating in the tissues could not necessarily be identified and a specific concentration of said chemical was not determined.

Overall Quality Determination Uninformative

Study Citation:	Wang, X., Li, Y., Wei, S., Pan, L., Miao, J., Lin, Y., Wu, J. (2021). Acute toxic effect of typical chemicals and ecological risk assessment based on two marine microalgae, Phaeodactylum tricornutum and Platymonas subcordiformis. Environmental Toxicology and Pharmacology 85:103649.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Phaeodactylum tricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7697647

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	1,2-Dichloroethane was identified by name only.
	Metric 2:	Test Substance Source	Low	The source of the test chemical was reported to be from Sigma Company, but analytical verification of test substance identity was not reported.
	Metric 3:	Test Substance Purity	Low	The purity was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of an appropriate concurrent negative control.
	Metric 5:	Negative Control Response	Low	The negative control response was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported if measures were taken to allocate the algae to study groups randomly.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test chemical stock solution was prepared by dissolving 1,2-dichloroethane in DMSO. The appropriate amount of stock solution was then added to the culture solution to make the correct test concentration. 250 mL flasks with 100mL of test solution in F/2 medium were used. Flasks were shaken five times a day to prevent settling. This was a static test. The bottle mouth was sealed to limit volatilization.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be conducted consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	It was not reported if the test concentrations were measured at any point during the study.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 96 hours, which is appropriate to assess effects on growth rate for algae.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were five exposure concentrations, and spacing was adequate to observe a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Both algal species were from the Lab of Applied Microalgae Biology of Ocean University of China in Yushan, Qingdao, China. The microalgae was cultured to the exponential growth phase to be used in the study.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Culture flasks were placed in a constant temperature light incubator. Tests appeared to be conducted in the same conditions.

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Study Citation:	Wang, X., Li, Y., Wei, S., Pan, L., Miao, J., Lin, Y., Wu, J. (2021). Acute toxic effect of typical chemicals and ecological risk assessment based on two marine microalgae, Phaeodactylum tricornutum and Platymonas subcordiformis. Environmental Toxicology and Pharmacology 85:103649.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Phaeodactylum tricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7697647

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Low	The initial experimental cell density for each treatment was reported to be 4 x 10^6 cell/mL. The number of replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Algae were cultured in 250mL flasks with 100mL of F/2 culture medium. The culture flasks were kept in a constant temperature light incubator with a temperature of 20C. Light intensity was reported to be 80umol/s^2 with a 12:12 light cycle. Salinity was 31. Flasks were shaken regularly five times a day during the experiment to prevent settling.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest-growth inhibition in terms of EC values.
	Metric 18:	Consistency of Outcome Assessment	High	Samples were collected at 14-, 48-, 72-, and 96-hour intervals. The algal cells were counted with a hemocytometer, while OD750 of the algae was measured with the UV-2000 spectrophotometer.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups for outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted and was appropriate. It is reported in section 2.5.
	Metric 22:	Reporting of Data	Medium	Results for each exposure group were reported in Figure 1, but the control data was not reported. EC10, EC15, EC30, and EC50 values were reported in Table 2.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes. Variability was reported.

Additional Comments: This evaluation is for the effect of 1,2-dichloroethane on growth inhibition of Phaeodactylum tricornutum.

Overall Quality Determination High

Study Citation:	Wang, X., Li, Y., Wei, S., Pan, L., Miao, J., Lin, Y., Wu, J. (2021). Acute toxic effect of typical chemicals and ecological risk assessment based on two marine microalgae, Phaeodactylum tricornutum and Platymonas subcordiformis. Environmental Toxicology and Pharmacology 85:103649.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Platymonas subcordiformis*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7697647

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	1,2-Dichloroethane was identified by name only.
	Metric 2:	Test Substance Source	Low	The source of the test chemical was reported to be from Sigma Company, but analytical verification of test substance identity was not reported.
	Metric 3:	Test Substance Purity	Low	The purity was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of an appropriate concurrent negative control.
	Metric 5:	Negative Control Response	Low	The negative control response was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported if measures were taken to allocate the algae to study groups randomly.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test chemical stock solution was prepared by dissolving 1,2-dichloroethane in DMSO. The appropriate amount of stock solution was then added to the culture solution to make the correct test concentration. 250 mL flasks with 100mL of test solution in F/2 medium were used. Flasks were shaken five times a day to prevent settling. This was a static test. The bottle mouth was sealed to limit volatilization.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be conducted consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	It was not reported if the test concentrations were measured at any point during the study.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 96 hours, which is appropriate to assess effects on growth rate for algae.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were five exposure concentrations, and spacing was adequate to observe a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	Both algal species were from the Lab of Applied Microalgae Biology of Ocean University of China in Yushan, Qingdao, China. The microalgae was cultured to the exponential growth phase to be used in the study.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Culture flasks were placed in a constant temperature light incubator. Tests appeared to be conducted in the same conditions.

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Study Citation:	Wang, X., Li, Y., Wei, S., Pan, L., Miao, J., Lin, Y., Wu, J. (2021). Acute toxic effect of typical chemicals and ecological risk assessment based on two marine microalgae, Phaeodactylum tricornutum and Platymonas subcordiformis. Environmental Toxicology and Pharmacology 85:103649.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Platymonas subcordiformis*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	7697647

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Low	The initial experimental cell density for each treatment was reported to be 4 x 10^6 cell/mL. The number of replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Algae were cultured in 250mL flasks with 100mL of F/2 culture medium. The culture flasks were kept in a constant temperature light incubator with a temperature of 20C. Light intensity was reported to be 80umol/s^2 with a 12:12 light cycle. Salinity was 31. Flasks were shaken regularly five times a day during the experiment to prevent settling.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest-growth inhibition in terms of EC values.
	Metric 18:	Consistency of Outcome Assessment	High	Samples were collected at 14-, 48-, 72-, and 96-hour intervals. The algal cells were counted with a hemocytometer, while OD750 of the algae was measured with the UV-2000 spectrophotometer.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted and was appropriate. It is reported in section 2.5.
	Metric 22:	Reporting of Data	Medium	Results for each exposure group were reported in Figure 1, but the control data was not reported. EC10, EC15, EC30, and EC50 values were reported in Table 2.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes. Variability was reported.

Additional Comments: This evaluation is for the effect of 1,2-dichloroethane on growth inhibition of Platymonas subcordiformis.

Overall Quality Determination High

Study Citation:	Dow Chemical, (1987). Fish toxicity studies.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (brackish); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Cyprinodon variegatus*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	2799638

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	A synonym of the compound name (ethylene dichloride) was reported in place of nomenclature (1,2-Dichloroethane).
	Metric 2:	Test Substance Source	Low	No Source was reported.
	Metric 3:	Test Substance Purity	Low	Purity was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	No negative controls were reported.
	Metric 5:	Negative Control Response	Uninformative	No control response was reported.
	Metric 6:	Randomized Allocation	Low	No random allocation reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The study reports that range finding was performed in a static system and a continuous flow design was used for definitive tests, but no other details are provided (Page 4/6).
	Metric 8:	Consistency of Exposure Administration	Uninformative	The study does not provide enough data to determine if treatments were administered consistently.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	Nothing was reported to indicate if actual or nominal values were used.
	Metric 10:	Exposure Duration and Frequency	Uninformative	The test was over a 96 hour period but nothing is provided to indicate the frequency of renewal in the flow-through systems.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	Treatment concentrations or spacing are not reported for the range finding or definitive bioassay.
	Metric 12:	Testing at or Below Solubility Limit	Low	The estimated LC50 was 113mg/L, which is below the solubility reported in the final scope for this compound (8600 mg/L).
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Source was reported as from a wild population near Freeport TX, which would be inappropriate if previously exposed to chemicals.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	The fish were reported as acclimatized for 2 weeks prior to testing.
	Metric 15:	Number of Organisms and Replicates per Group	Low	10 individuals were reported per treatment concentration. No replication was reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Uninformative	No information was provided to assess animal housing or environmental conditions.

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Study Citation:	Dow Chemical, (1987). Fish toxicity studies.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (brackish); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Cyprinodon variegatus*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	2799638

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	Mortality was the endpoint, however, the study did not report the criteria for mortality or the frequency of checks for this endpoint.
	Metric 18:	Consistency of Outcome Assessment	Uninformative	It is not possible to assess the metric from the study.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Uninformative	It is not possible to assess the metric from the study.
	Metric 20:	Outcomes Unrelated to Exposure	Uninformative	It is not possible to assess the metric from the study.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	The report details that Sprague 1969 was used, however, provides no detail on the statistics used for LC50 estimation.
	Metric 22:	Reporting of Data	Low	LC50 is presented with no variance.
	Metric 23:	Explanation of Unexpected Outcomes	Uninformative	It is not possible to assess this metric for this study.

Additional Comments: Limited methods are presented on page 4/6 for this study. A LC50 value for DCA is presented on page 5/6.

Overall Quality Determination Uninformative

Study Citation:	Heitmuller, P. T., Hollister, T. A., Parrish, P. R. (1981). Acute toxicity of 54 industrial chemicals to sheepshead minnows (Cyprinodon variegatus). Bulletin of Environmental Contamination and Toxicology 27(5):596-604.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (brackish); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Cyprinodon variegatus*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18110; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	Test substance manufacturer was not listed and was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Medium	All chemicals used in this study were >%80 purity analytical grade, but specific purity for each chemical was not given.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The use of measures to minimize loss of test substance was not reported.
	Metric 8:	Consistency of Exposure Administration	Low	The study provided few details on exposure administration.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	96H acute test for sheepshead minnows with 10 /treatment.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	'The concentrations increased in geometrical progression with a ratio of 1.8 or 3.2 as indicated in the results section'
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test replicates was not reported. 10 organisms per container.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate.

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Study Citation:	Heitmuller, P. T., Hollister, T. A., Parrish, P. R. (1981). Acute toxicity of 54 industrial chemicals to sheepshead minnows (Cyprinodon variegatus). Bulletin of Environmental Contamination and Toxicology 27(5):596-604.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (brackish); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Cyprinodon variegatus*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	18110; Linked HERO ID(s): 7508, 18050, 18064, 18110, 628983, 3617735

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcomes of interest.
	Metric 18:	Consistency of Outcome Assessment	Medium	Use of different test volumes across study groups- 3L test solution vs 15L test solution both with 10 organisms.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	Medium	Exposure related findings were reported for all 54 chemicals tested, but little information on control response was reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

Additional Comments: The use of measures to minimize the loss of volatile test substance was not reported. Mortality data for each treatment group were not reported. Only LC 50 values (with no confidence limits) were provided.

Overall Quality Determination Uninformative

Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Correct nomenclature in the abstract, referred to as ethylene dichloride in the abstract and introduction.
	Metric 2:	Test Substance Source	Low	No source reported.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control feeding group was maintained throughout the 2 year study.
	Metric 5:	Negative Control Response	High	The control responses are listed with all outcomes.
	Metric 6:	Randomized Allocation	Medium	Random allocation was described on page 2/7 at the 4 month point of the study.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The fumigated feed preparation was described, however, the authors did report loss of the test compound before feeding. "The losses were about 20% after 1 hour in the feed trough and up to 40% after 2 hr. The average amount of EDC consumed was about 70% of the initial value."
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Concentrations of the test compound are nominal. Although it did appear that the study measured the compound in the diet, the methods and values are not well reported. "In preliminary experiments, the mash was tested for fumigant loss during the different feeding periods."
	Metric 10:	Exposure Duration and Frequency	High	The feeding period was reported to cover two years from chicks to adults.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No justification was provided for the two concentrations in this study other than it was referred to as "less toxic than" ethylene dibromide.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Compound was administered in a diet.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	No source was listed, sex and age of animals was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	No acclimation period was reported. The study began with "chicks".
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each treatment and control group consisted of 10 males and 20 females.

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Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Housing conditions during the 2-year feeding period were not well described.
	Metric 17:	Outcome Assessment Methodology	Medium	No significant differences in in reproduction outcomes associated with artificial fertilization and hatching, however, authors reported significant differences in egg production.
	Metric 18:	Consistency of Outcome Assessment	Medium	The outcome assessment was described but specific methods associated with growth and reproduction endpoints were not well described.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	There is not enough information for a comparison of environmental conditions throughout the study period.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest influences outside of treatment concentrations.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were reported as ANOVA and Duncans post hoc test(s).
	Metric 22:	Reporting of Data	High	Mean -/+ Standard deviation were reported for several timepoints and all treatment and control treatments.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: The authors do not report analytical results that indicate actual versus nominal values of the test compound in treatment diets. No significant differences in in reproduction outcomes associated with artificial fertilization and hatching, however, authors reported significant differences in egg production.

Overall Quality Determination Medium

Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Correct nomenclature in the abstract, referred to as ethylene dichloride in the abstract and introduction.
	Metric 2:	Test Substance Source	Low	No source reported.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control feeding group was maintained throughout the 2 year study.
	Metric 5:	Negative Control Response	High	The control responses are listed with all outcomes.
	Metric 6:	Randomized Allocation	Medium	Random allocation was described on page 2/7 at the 4 month point of the study.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The fumigated feed preparation was described, however, the authors did report loss of the test compound before feeding. "The losses were about 20% after 1 hour in the feed trough and up to 40% after 2 hr. The average amount of EDC consumed was about 70% of the initial value."
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Concentrations of the test compound are nominal. Although it did appear that the study measured the compound in the diet, the methods and values are not well reported. "In preliminary experiments, the mash was tested for fumigant loss during the different feeding periods."
	Metric 10:	Exposure Duration and Frequency	High	The feeding period was reported to cover two years from chicks to adults.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No justification was provided for the two concentrations in this study other than it was referred to as "less toxic than" ethylene dibromide.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Compound was administered in a diet.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	No source was listed, sex and age of animals was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	No acclimation period was reported. The study began with "chicks".
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each treatment and control group consisted of 10 males and 20 females.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Housing conditions during the 2-year feeding period were not well described.

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Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Medium	No adverse outcomes associated with growth were reported within this study.
	Metric 18:	Consistency of Outcome Assessment	Medium	The outcome assessment was described but specific methods associated with growth and reproduction endpoints were not well described.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	There is not enough information for a comparison of environmental conditions throughout the study period.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest influences outside of treatment concentrations.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were reported as ANOVA and Duncans post hoc test(s).
	Metric 22:	Reporting of Data	High	Mean -/+ Standard deviation were reported for several timepoints and all treatment and control treatments.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: No significant differences between treatment and control groups for growth outcomes.

Overall Quality Determination Medium

Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Mechanistic-Cell signaling/function-Nutritional and Metabolic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Correct nomenclature in the abstract, referred to as ethylene dichloride in the abstract and introduction.
	Metric 2:	Test Substance Source	Low	No source reported.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control feeding group was maintained throughout the 2 year study.
	Metric 5:	Negative Control Response	High	The control responses are listed with all outcomes.
	Metric 6:	Randomized Allocation	Medium	Random allocation was described on page 2/7 at the 4 month point of the study.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The fumigated feed preparation was described, however, the authors did report loss of the test compound before feeding. "The losses were about 20% after 1 hour in the feed trough and up to 40% after 2 hr. The average amount of EDC consumed was about 70% of the initial value."
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Concentrations of the test compound are nominal. Although it did appear that the study measured the compound in the diet, the methods and values are not well reported. "In preliminary experiments, the mash was tested for fumigant loss during the different feeding periods."
	Metric 10:	Exposure Duration and Frequency	High	The feeding period was reported to cover two years from chicks to adults.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No justification was provided for the two concentrations in this study other than it was referred to as "less toxic than" ethylene dibromide.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Compound was administered in a diet.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	No source was listed, sex and age of animals was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	No acclimation period was reported. The study began with "chicks".
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each treatment and control group consisted of 10 males and 20 females.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Housing conditions during the 2-year feeding period were not well described.

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Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Mechanistic-Cell signaling/function-Nutritional and Metabolic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Medium	No adverse outcomes associated with growth were reported within this study.
	Metric 18:	Consistency of Outcome Assessment	Medium	The outcome assessment was described but specific methods associated with growth and reproduction endpoints were not well described.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	There is not enough information for a comparison of environmental conditions throughout the study period.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest influences outside of treatment concentrations.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were reported as ANOVA and Duncans post hoc test(s).
	Metric 22:	Reporting of Data	High	Mean -/+ Standard deviation were reported for several timepoints and all treatment and control treatments.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This form includes mechanistic outcomes associated with Table 7, Enzyme and other blood nutritional markers.

Overall Quality Determination Medium

Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Correct nomenclature in the abstract, referred to as ethylene dichloride in the abstract and introduction.
	Metric 2:	Test Substance Source	Low	No source reported.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control feeding group was maintained throughout the 2 year study.
	Metric 5:	Negative Control Response	High	The control responses are listed with all outcomes.
	Metric 6:	Randomized Allocation	Medium	Random allocation was described on page 2/7 at the 4 month point of the study.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The fumigated feed preparation was described, however, the authors did report loss of the test compound before feeding. "The losses were about 20% after 1 hour in the feed trough and up to 40% after 2 hr. The average amount of EDC consumed was about 70% of the initial value."
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent among treatment and control groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Concentrations of the test compound are nominal. Although it did appear that the study measured the compound in the diet, the methods and values are not well reported. "In preliminary experiments, the mash was tested for fumigant loss during the different feeding periods."
	Metric 10:	Exposure Duration and Frequency	High	The feeding period was reported to cover two years from chicks to adults.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No justification was provided for the two concentrations in this study other than it was referred to as "less toxic than" ethylene dibromide.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Compound was administered in a diet.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	No source was listed, sex and age of animals was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	No acclimation period was reported. The study began with "chicks".
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each treatment and control group consisted of 10 males and 20 females.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Housing conditions during the 2-year feeding period were not well described.

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Study Citation:	Alumot, E., Meidler, M., Holstein, P., Herzberg, M. (1976). Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet. Food and Cosmetics Toxicology 14(2):111-114.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Avian; *Gallus gallus*; domesticus; Juvenile
Health Outcome:	Behavioral
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435200

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Medium	No adverse outcomes associated with growth were reported within this study.
	Metric 18:	Consistency of Outcome Assessment	Medium	The outcome assessment was described but specific methods associated with growth and reproduction endpoints were not well described.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	There is not enough information for a comparison of environmental conditions throughout the study period.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest influences outside of treatment concentrations.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were reported as ANOVA and Duncans post hoc test(s).
	Metric 22:	Reporting of Data	High	Mean -/+ Standard deviation were reported for several timepoints and all treatment and control treatments.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This form includes behavioral outcomes related to feed consumption. The data are presented in table 6

Overall Quality Determination Medium

Study Citation:	Ballering, L. A., Nivard, M. J., Vogel, E. W. (1994). Mutation spectra of 1,2-dibromoethane, 1,2-dichloroethane and 1-bromo-2-chloroethane in excision repair proficient and repair deficient strains of Drosophila melanogaster. Carcinogenesis 15(5):869-875.
Duration:	Overall Duration: Not-reported; Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Soil; Dermal (topical application), Inhalation
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; genotype brown (bw); Adult
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5554041

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,2-Dichloroethane was identified by name and CAS Number.
	Metric 2:	Test Substance Source	High	The manufacturer was identified as Fluka, Buchs, Switzerland.
	Metric 3:	Test Substance Purity	Low	Neither the grade nor purity was reported. Impurities were also not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control was used but not specified as solvent or negative control.
	Metric 5:	Negative Control Response	Medium	Biological responses of the control group were reported for the genetic effects. No control mortality was presented.
	Metric 6:	Randomized Allocation	Low	The study authors did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Authors described the preparation of the test substance and application to the test substrate. No discussion of volatile substance reported.
	Metric 8:	Consistency of Exposure Administration	Medium	The detail of the exposure were reported but the control is not identified as a negative nor solvent control.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measured concentrations were not reported.
	Metric 10:	Exposure Duration and Frequency	High	Drosophila were exposed for 48 hours to examine genetic effects.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	There was only 1 exposure group, either 200 ppm or 192 mM. Number of organisms were not reported nor the number of replicates.
	Metric 12:	Testing at or Below Solubility Limit	Low	The test chemical solubility was not reported in the paper.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source and age of the male organisms were not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation of the test organisms was not reported.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of organisms were not reported nor the number of replicates.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Housing, environmental conditions and feeding were not reported both before and during exposure.

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Study Citation:	Ballering, L. A., Nivard, M. J., Vogel, E. W. (1994). Mutation spectra of 1,2-dibromoethane, 1,2-dichloroethane and 1-bromo-2-chloroethane in excision repair proficient and repair deficient strains of Drosophila melanogaster. Carcinogenesis 15(5):869-875.
Duration:	Overall Duration: Not-reported; Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Soil; Dermal (topical application), Inhalation
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; genotype brown (bw); Adult
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5554041

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Medium	Authors report genetic effects at the same time periods for both control and treated organisms.
	Metric 18:	Consistency of Outcome Assessment	High	Sampling and scoring were consistent across treatments.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	The authors did not report differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	The authors did not provide information on attrition or other outcomes.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Details and methods of statistical analysis were not reported by the study authors.
	Metric 22:	Reporting of Data	Medium	Authors do not report some results for some of the F2 genetic measures.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study authors did not report measures of variability for the genetic measurments.

Additional Comments: None

Overall Quality Determination Uninformative

Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; IS Leiden Standard; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature and CAS number were referenced for the test substance.
	Metric 2:	Test Substance Source	High	The source was listed as from Aldrich.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A solvent control was reported on page 5/12.
	Metric 5:	Negative Control Response	High	The study documents the results of the eye w/w+ assay for the control group as a baseline response in table 1 on page 3/12.
	Metric 6:	Randomized Allocation	Low	No random allocation was reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The solvent vehicle (3 parts ethanol and 1 part Tween 80) was reported but few details were provided to describe the incorporation of the test substance into the growth/feed media.
	Metric 8:	Consistency of Exposure Administration	High	Test substance administration appeared to be consistent among treatment concentrations and control.
	Metric 9:	Measurement of Test Substance Concentration	Low	The test substance was reported as nominal and was not measured analytically.
	Metric 10:	Exposure Duration and Frequency	High	This was a chronic exposure bioassay that covered exposure from embryo through all three instar stages of larval development and ended at newly hatched female flies.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No details or background was provided on the concentrations selected. Concentrations were 50, 100, and 200 mM of DCA.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test compound was administered in the feed/substrate media for embryo, larvae, pupae. This media should not be considered a liquid and solubility limits (86mM) would not apply.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source of the flies were not detailed but the strain was described. Environmental conditions during culture were described (temp and humidity).
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study started with newly fertilized embryos as the female flies were permitted to lay on substrate for 1-4 days. Pretreatment conditions were not detailed.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each concentration and control was conducted twice for a total of two replicates.

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Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; IS Leiden Standard; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	The only conditions provided or reported during the exposures was the temperature and humidity.
	Metric 17:	Outcome Assessment Methodology	High	The developmental outcome assessment for this experiment was the formation of spots on the eyes of newly emerged flies that were exposed to the test compound since fertilization.QC note: Induced gene expression ruled as mechanistic in EN2REG discussion.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently among treatments.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	conditions other than temperature and humidity were not well described. Actual measurements (mean -/+ SD) for these two conditions were not reported.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest that health outcomes or animal attrition was from anything other than the test compound.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Chi-Square analysis was used to examine potential significant differences among treatment groups, however, the assignment of conclusions from test responses (+, w+, i, -) was not detailed.
	Metric 22:	Reporting of Data	High	All values of flies and the categories of eye spot number and size was reported for each concentration and control.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This study was conducted on a strain of insecticide susceptible (IS) Drosophila and two insecticide resistant (IR) strains.

Overall Quality Determination Medium

Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; Hikone-R; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature and CAS number were referenced for the test substance.
	Metric 2:	Test Substance Source	High	The source was listed as from Aldrich.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A solvent control was reported on page 5/12.
	Metric 5:	Negative Control Response	High	The study documents the results of the eye w/w+ assay for the control group as a baseline response in table 1 on page 3/12.
	Metric 6:	Randomized Allocation	Low	No random allocation was reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The solvent vehicle (3 parts ethanol and 1 part Tween 80) was reported but few details were provided to describe the incorporation of the test substance into the growth/feed media.
	Metric 8:	Consistency of Exposure Administration	High	Test substance administration appeared to be consistent among treatment concentrations and control.
	Metric 9:	Measurement of Test Substance Concentration	Low	The test substance was reported as nominal and was not measured analytically.
	Metric 10:	Exposure Duration and Frequency	High	This was a chronic exposure bioassay that covered exposure from embryo through all three instar stages of larval development and ended at newly hatched female flies.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No details or background was provided on the concentrations selected. Concentrations were 50, 100, and 200 mM of DCA.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test compound was administered in the feed/substrate media for embryo, larvae, pupae. This media should not be considered a liquid and solubility limits (86mM) would not apply.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source of the flies were not detailed but the strain was described. Environmental conditions during culture were described (temp and humidity).
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study started with newly fertilized embryos as the female flies were permitted to lay on substrate for 1-4 days. Pretreatment conditions were not detailed.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each concentration and control was conducted twice for a total of two replicates.
Domain 5: Outcome Assessment				

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Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; Hikone-R; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	The only conditions provided or reported during the exposures was the temperature and humidity.
	Metric 17:	Outcome Assessment Methodology	High	The developmental outcome assessment for this experiment was the formation of spots on the eyes of newly emerged flies that were exposed to the test compound since fertilization.QC note: Induced gene expression ruled as mechanistic in EN2REG discussion.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently among treatments.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	conditions other than temperature and humidity were not well described. Actual measurements (mean -/+ SD) for these two conditions were not reported.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest that health outcomes or animal attrition was from anything other than the test compound.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Chi-Square analysis was used to examine potential significant differences among treatment groups, however, the assignment of conclusions from test responses (+, w+, i, -) was not detailed.
	Metric 22:	Reporting of Data	High	All values of flies and the categories of eye spot number and size was reported for each concentration and control.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This study was conducted on a strain of insecticide susceptible (IS) Drosophila and two insecticide resistant (IR) strains.

Overall Quality Determination Medium

Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; Haag 79-R; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The correct nomenclature and CAS number were referenced for the test substance.
	Metric 2:	Test Substance Source	High	The source was listed as from Aldrich.
	Metric 3:	Test Substance Purity	Low	No purity was reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A solvent control was reported on page 5/12.
	Metric 5:	Negative Control Response	High	The study documents the results of the eye w/w+ assay for the control group as a baseline response in table 1 on page 3/12.
	Metric 6:	Randomized Allocation	Low	No random allocation was reported.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The solvent vehicle (3 parts ethanol and 1 part Tween 80) was reported but few details were provided to describe the incorporation of the test substance into the growth/feed media.
	Metric 8:	Consistency of Exposure Administration	High	Test substance administration appeared to be consistent among treatment concentrations and control.
	Metric 9:	Measurement of Test Substance Concentration	Low	The test substance was reported as nominal and was not measured analytically.
	Metric 10:	Exposure Duration and Frequency	High	This was a chronic exposure bioassay that covered exposure from embryo through all three instar stages of larval development and ended at newly hatched female flies.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	No details or background was provided on the concentrations selected. Concentrations were 50, 100, and 200 mM of DCA.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test compound was administered in the feed/substrate media for embryo, larvae, pupae. This media should not be considered a liquid and solubility limits (86mM) would not apply.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The source of the flies were not detailed but the strain was described. Environmental conditions during culture were described (temp and humidity).
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study started with newly fertilized embryos as the female flies were permitted to lay on substrate for 1-4 days. Pretreatment conditions were not detailed.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Each concentration and control was conducted twice for a total of two replicates.
Domain 5: Outcome Assessment				

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Study Citation:	Rodriguez-Arnaiz, R. (1998). Biotransformation of several structurally related 2B compounds to reactive metabolites in the somatic w/w+ assay of Drosophila melanogaster. Environmental and Molecular Mutagenesis 31(4):390-401.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Drosophila melanogaster*; Haag 79-R; Embryo
Health Outcome:	Mechanistic-Genotox (including DNA repair)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	732100

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	The only conditions provided or reported during the exposures was the temperature and humidity.
	Metric 17:	Outcome Assessment Methodology	High	The developmental outcome assessment for this experiment was the formation of spots on the eyes of newly emerged flies that were exposed to the test compound since fertilization.QC note: Induced gene expression ruled as mechanistic in EN2REG discussion.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently among treatments.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	conditions other than temperature and humidity were not well described. Actual measurements (mean -/+ SD) for these two conditions were not reported.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Nothing was provided to suggest that health outcomes or animal attrition was from anything other than the test compound.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Chi-Square analysis was used to examine potential significant differences among treatment groups, however, the assignment of conclusions from test responses (+, w+, i, -) was not detailed.
	Metric 22:	Reporting of Data	High	All values of flies and the categories of eye spot number and size was reported for each concentration and control.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This study was conducted on a strain of insecticide susceptible (IS) Drosophila and two insecticide resistant (IR) strains.

Overall Quality Determination Medium

Study Citation:	Neuhauser, E. F., Loehr, R. C., Malecki, M. R., Milligan, D. L., Durkin, P. R. (1985). The toxicity of selected organic chemicals to the earthworm Eisenia fetida. Journal of Environmental Quality 14(3):383-388.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Eisenia fetida*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3625226

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name and by CASRN.
	Metric 2:	Test Substance Source	Low	The test substances came from three different sources, but it does not appear that they were analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	All the test substances were reported as having a purity of 98% or greater.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	The study reported the use of a concurrent negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the organisms were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental test methods were described in adequate detail. The preparation of the filter paper was reported and it was determined gravimetrically that organic did not volatilize with the organic solvents.
	Metric 8:	Consistency of Exposure Administration	High	All exposures were for 48h at 20C in the dark with one adult earthworm per vessel.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured, though gravimetric analysis was used to determine if there was chemical loss due to solvent loss.
	Metric 10:	Exposure Duration and Frequency	High	A 48h acute exposure appeared to be sufficient.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	There were 5 exposure groups plus a negative control.
	Metric 12:	Testing at or Below Solubility Limit	Low	Test substance concentrations were not reported and thus it could not be determined if exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and obtained from an in laboratory culture.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Pretreatment culture conditions appeared to be the same as test conditions. Culturing conditions were described and similar to the test conditions.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	10 replicates or more were used for each test concentration.
Domain 5: Outcome Assessment				

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Study Citation:	Neuhauser, E. F., Loehr, R. C., Malecki, M. R., Milligan, D. L., Durkin, P. R. (1985). The toxicity of selected organic chemicals to the earthworm Eisenia fetida. Journal of Environmental Quality 14(3):383-388.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Worms (e.g., Annelids, Nematodes); *Eisenia fetida*; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3625226

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Organisms housing was adequate to maintain organism health during the test.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–mortality was assessed after 48h and LC50s were determined.
	Metric 18:	Consistency of Outcome Assessment	High	Mortality was assessed for after the 48h exposure by gentle prodding of each organism.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No differences in environmental conditions among study groups were reported.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50s were determined using the Litchfield and Wilcoxon method.
	Metric 22:	Reporting of Data	Medium	LC50s were reported, but there was no control data reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified as Ethylene Dichloride, a common name that was historically used for 1,2-Dichlorethane, no other details given.
	Metric 2:	Test Substance Source	Low	Source was not reported
	Metric 3:	Test Substance Purity	Low	Authors indicated that "The fumigants [test substances]used were of highest technical grade quality." However, the purity was not explicitly specified.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group (i.e. all conditions equal except chemical exposure). There are no limitations that would result in a substantial impact on results.
	Metric 5:	Negative Control Response	High	Control mortality was reported and at all timepoints, the mortality was <10%.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Authors exposed the test organisms to the solvent in a closed environment, which is appropriate given that it is volatile. The test concentrations are reported in terms of aqueous concentrations (mg/l) and the airborne exposure concentration is not quantified.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results. Lack of quantification of test concentration and lack of detail about the exposure methodology means that there may be differences in exposure concentrations among the replicates.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured and nominal values are highly uncertain due to the nature of the test substance. The nominal concentrations are reported in terms of aqueous concentrations, which are not appropriate to quantify an airborne exposure.
	Metric 10:	Exposure Duration and Frequency	Low	Exposure duration was only 1-5 hours which was sufficient to observe mortality, but substantially different than normal toxicity studies with insects.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	Only one exposure concentration per chemical.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source (and sex if relevant) of the test animals was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.

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Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Approximately 600 larvae (500-mg batches) were included in each concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing and/or environmental conditions and/or food, water, and nutrients and/or biomass loading was not sufficiently reported to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (e.g., timing of assessment across groups) were confusing, limited, or not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Statistical analysis was not needed for the mortality assessment.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

Additional Comments: Study did not utilize the proper methodology to characterize the toxicity of 1,2-Dichloroethane to insects. The doses were not reported in the correct units or verified in a way that could be used to characterize an air concentration of concern for any of the endpoints in this study.

Overall Quality Determination Low

Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mechanistic-Oxidative stress (including redox biology)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified as Ethylene Dichloride, a common name that was historically used for 1,2-Dichlorethane, no other details given.
	Metric 2:	Test Substance Source	Low	Source was not reported
	Metric 3:	Test Substance Purity	Low	Authors indicated that "The fumigants [test substances]used were of highest technical grade quality." However, the purity was not explicitly specified.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Negative control group was reported.
	Metric 5:	Negative Control Response	High	Negative control group did not show elevated GST activity compared to treatment groups, as expected.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Authors exposed the test organisms to the solvent in a closed environment, which is appropriate given that it is volatile. The test concentrations are reported in terms of aqueous concentrations (mg/l) and the airborne exposure concentration is not quantified.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results. Lack of quantification of test concentration and lack of detail about the exposure methodology means that there may be differences in exposure concentrations among the replicates.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured and nominal values are highly uncertain due to the nature of the test substance. The nominal concentrations are reported in terms of aqueous concentrations, which are not appropriate to quantify an airborne exposure.
	Metric 10:	Exposure Duration and Frequency	Low	Exposure duration was 5 hours which was sufficient to observe mortality, and appears to be sufficient to produce the desired induction of GST levels, but substantially different than normal toxicity studies with insects.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	Only one exposure concentration per chemical.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source (and sex if relevant) of the test animals was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.

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Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mechanistic-Oxidative stress (including redox biology)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Approximately 600 larvae (500-mg batches) were included in each fumigation batch. "For each fumigation and for each time period exposure, fumigation was done in duplicate and mortality wasassessed after 15 days."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing and/or environmental conditions and/or food, water, and nutrients and/or biomass loading was not sufficiently reported to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.GST methodology: "Gluthathione S-transferase activity wasassayed according to Booth et al. (17) asmodified by Moron et al. (16) with 1-chloro-2,4-dinitrobenzene as the substrate.In a total reaction mixture of 2 ml, the finalconcentrations of GSH and CDNB were 5and 1 rnM, respectively. The reaction wasmonitored at room temperature by recordingthe increase in absorbance at 340nm every 30 sec in a Bausch & Lomb UVVisspectrophotometer. The enzyme activityexpressed as nanomoles of CDNBconjugated per minute was calculated bythe extinction coefficient (E340 = 9.6 mM-1cm - 1) for S-2,4-dinitrophenyl glutathione(18). A correction for the spontaneous reactionwas made by measuring and subtractingthe rate of absorbance change inthe absence of enzyme."
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (e.g., timing of assessment across groups) were confusing, limited, or not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	"The data of various treatments were compared with those ofthe control group by Student's t test at 5, 1, and 0 .1 % level of significance."
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

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Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mechanistic-Oxidative stress (including redox biology)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric	Rating	Comments

Additional Comments: Study did not utilize the proper methodology to characterize the toxicity of 1,2-Dichloroethane to insects. The doses were not reported in the correct units or verified in a way that could be used to characterize an air concentration of concern for any of the endpoints in this study.

Overall Quality Determination Low

Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mechanistic-Oxidative stress (including redox biology)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Chemical was identified as Ethylene Dichloride, a common name that was historically used for 1,2-Dichlorethane, no other details given.
	Metric 2:	Test Substance Source	Low	Source was not reported
	Metric 3:	Test Substance Purity	Low	Authors indicated that "The fumigants [test substances]used were of highest technical grade quality." However, the purity was not explicitly specified.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group (i.e. all conditions equal except chemical exposure). There are no limitations that would result in a substantial impact on results.
	Metric 5:	Negative Control Response	High	Control showed no reduction in GSH levels, compared to treatment groups, as to be expected.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Authors exposed the test organisms to the solvent in a closed environment, which is appropriate given that it is volatile. The test concentrations are reported in terms of aqueous concentrations (mg/l) and the airborne exposure concentration is not quantified.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results. Lack of quantification of test concentration and lack of detail about the exposure methodology means that there may be differences in exposure concentrations among the replicates.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured and nominal values are highly uncertain due to the nature of the test substance. The nominal concentrations are reported in terms of aqueous concentrations, which are not appropriate to quantify an airborne exposure.
	Metric 10:	Exposure Duration and Frequency	Low	Exposure duration was 1,3 or 5 hours which was sufficient to observe mortality, and appears to be sufficient to produce the desired depletion of GSH levels, but substantially different than normal toxicity studies with insects.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	Only one exposure concentration per chemical.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source (and sex if relevant) of the test animals was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.

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Study Citation:	Shivanandappa, T., Rajendran, S. (1987). Induction of glutathione S-transterase by fumigants in larvae of the Khapra beetle, Trogoderma granarium (E.). Pesticide Biochemistry and Physiology 28(1):121-126.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Khapra beetle, Trogoderma granarium*; Larvae
Health Outcome:	Mechanistic-Oxidative stress (including redox biology)
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1010079

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Approximately 600 larvae (500-mg batches) were included in each fumigation batch. "For each fumigation and for each time period exposure, fumigation was done in duplicate and mortality wasassessed after 15 days."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing and/or environmental conditions and/or food, water, and nutrients and/or biomass loading was not sufficiently reported to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.GSH determination methodology: "GSH in the filtrate was determined by Ellman' s reagent by recording the absorbance of the yellow anion produced at 412nm in a Bausch & Lomb UV-Vis spectrophotometer (16). The values were calculated from a standard curve."
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (e.g., timing of assessment across groups) were confusing, limited, or not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was not described.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

Additional Comments: Study did not utilize the proper methodology to characterize the toxicity of 1,2-Dichloroethane to insects. The doses were not reported in the correct units or verified in a way that could be used to characterize an air concentration of concern for any of the endpoints in this study.

Overall Quality Determination Low

Study Citation:	Punj, G. K. (1970). The effect of nutrition on the susceptibility of larvae of Trogoderma granarium Everts (Coleoptera, Dermestidae) to certain fumigants. Journal of Stored Products Research 6(2):181-185.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Trogoderma granarium*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348263

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as ethylene dichloride, which is a synonym for 1,2 dichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported and was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	No details given regarding the type and use of control but it was stated in the materials and methods section that there was no mortality of the larvae in the control.
	Metric 5:	Negative Control Response	High	It was stated that there was no mortality of the larvae in the control.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	Test media preparation methods and details about experimental set up for the fumigation experiments were not given in the paper. The cited reference for fumigation technique (Pradhan and Govindan, 1953) needed to assess this metric was unavailable, therefore this metric score reflects the amount of details provided in the study being reviewed.
	Metric 8:	Consistency of Exposure Administration	Low	Details on exposure administration were very limited.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was for 24 hours and seems appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposure via air.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the larvae was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Low	It was stated that four batches of 100 insects were exposed to different concentrations of fumigants. Since the number of exposure groups were not given, one cannot determine whether the experiment was replicated.

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Study Citation:	Punj, G. K. (1970). The effect of nutrition on the susceptibility of larvae of Trogoderma granarium Everts (Coleoptera, Dermestidae) to certain fumigants. Journal of Stored Products Research 6(2):181-185.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Trogoderma granarium*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5348263

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	Low	Mortality assessment methodology was not described. The cited reference for outcome assessment (Pradhan and Govindan, 1954) needed to assess this metric was unavailable, therefore this metric score reflects the amount of details provided in the study being reviewed.
	Metric 18:	Consistency of Outcome Assessment	Medium	Mortality assessment was conducted on the seventh day after treatment but gives no details on the protocol for outcome assessment.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	No information was provided to compare environmental conditions across study groups and controls.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Probit analysis was used to calculate LD50 values.
	Metric 22:	Reporting of Data	Low	Mortality data for each treatment group was not reported. Only LD 50 values without confidence intervals were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability to determine if excessive variability or unexpected outcomes occurred.

Additional Comments: Source, purity and grade of the test substance, fumigation experiment details, fumigant concentrations and mortality data were not reported in the paper.

Overall Quality Determination Uninformative

Study Citation:	Bowley, C. R., Bell, C. H. (1981). The toxicity of twelve fumigants to three species of mites infesting grain. Journal of Stored Products Research 17(2):83-87.
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Tyrophagus longior, Acarus siro, Glycyphagus destructor*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3676086

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as ethylene dichloride, which is a synonym for 1,2 dicholoroethane.
	Metric 2:	Test Substance Source	Low	The source was not reported and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	It was not clear whether negative control was used. There is a mention of the use of control under fumigation technique. "After the withdrawal of the last exposure, controls and cells exposed to 10 or 15°C were returned to 20°C by hourly steps of 2.5oC to avoid condensation" but no mention of use of controls elsewhere.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Test media preparation methods were not reported. It only states that "the desired concentration was reached by evaporating a weighed amount of liquid fumigant". But the fumigation technique was described fairly well and steps were taken to minimize the gas loss. Concentration of test substance in the fumigation chamber was measured during the study.
	Metric 8:	Consistency of Exposure Administration	Low	Details regarding exposure administration across study groups are limited.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured during insertion and withdrawal of test samples but only average concentrations were reported.
	Metric 10:	Exposure Duration and Frequency	Uninformative	The duration of exposure and exposure frequency were not reported. The only detail given was "For each fumigant several exposure periods at one or more chosen concentration levels were tested"
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	The number of exposure groups were not reported. Only the concentration range tested were reported (Table 1).
	Metric 12:	Testing at or Below Solubility Limit	N/A	Fumigation experiment; exposure via air.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test animals was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	No details given to assess whether acclimatization and pretreatment conditions were the same for control and exposed groups.

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Study Citation:	Bowley, C. R., Bell, C. H. (1981). The toxicity of twelve fumigants to three species of mites infesting grain. Journal of Stored Products Research 17(2):83-87.
Duration:	Overall Duration: Not-reported; Exposure Duration: Not-reported
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Tyrophagus longior, Acarus siro, Glycyphagus destructor*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	3676086

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and replicates was not reported. It was stated that 0.2 g of infested medium from an active mite culture was placed in each cell but the number of eggs in each cell were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	No details given on environmental conditions to evaluate if adequate and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not appropriate. It was stated that after exposure, "each cell was examined under microscope within 5 mins and after 24 hours to assess survival of moving stages". Then the cells were examined weekly to assess survival of eggs (via hatching of larvae) and some cells were monitored for 14-16 weeks. Mould developed in some of the cells that could have affected outcome assessment.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment was confusing.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Low	It was reported that mould developed in some of the cells after exposure and mortalities in some cells were associated with mould.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was not reported.
	Metric 22:	Reporting of Data	Low	Mortality data was not reported for each study group and controls. The dosage was expressed as concentration time product, which was obtained by multiplying average concentration by period of exposure.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: Source and purity of the test substance, biological response of the control, number of exposure groups, exposure duration, use of replicates and mortality data for each treatment group and control were not reported. Mould was observed in some of the cells and authors report mortalities associated with mould.

Overall Quality Determination Uninformative

Study Citation:	Schubert, U., Wisanowsky, L., Kull, U. (1995). Determination of phytotoxicity of several volatile organic compounds by investigating the germination pattern of tobacco pollen. Journal of Plant Physiology 145(4):514-518.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Nicotiana tabacum L.*; (var. xanthi nc); Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1022795

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	Test substance was identified as 1,2-dichloroethane. No other information (CASRN, structure, etc.) was provided.
	Metric 2:	Test Substance Source	Low	Test substance was obtained from Merck-Darmstadt. No other details or analytical verification was provided.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Concurrent negative and solvent control group (acetone) were used. The solvent was used with other chemicals in the test.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and/or test media preparation methods were adequately reported but did not completely account for physical-chemical properties. The test material was injected into a sealed container and the concentrations were estimated based on the volume of the test material and the volume of the container. No analytical verification was carried out to confirm that this was an accurate estimation, but based on the clear dose-response this did not seem to have an effect on the results.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were not measured but based on professional judgment of experimental design and nature of test substance, actual concentrations are likely to be similar to nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	Medium	This is an atypical study design, so it is impossible to tell if this is reasonable for this type of study, but the 2 hour exposure duration is very short. This was sufficient to establish a dose and effect relationship, so this exposure duration was sufficient for the goals of this study.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Exposure groups are not explicitly specified and are difficult to determine from the tables due to inconsistent spacing in the X axis.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposure via vapor, so solubility limit is not relevant.
Domain 4: Test Organism				

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Study Citation:	Schubert, U., Wisanowsky, L., Kull, U. (1995). Determination of phytotoxicity of several volatile organic compounds by investigating the germination pattern of tobacco pollen. Journal of Plant Physiology 145(4):514-518.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Nicotiana tabacum L.*; (var. xanthi nc); Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1022795

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	Low	The source of the test plants was not reported. They appeared to be from an in-house collection.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Pollen was placed into 3.5 cm Petri dishes and held in a water saturated atmosphere for one hour. This pre-treatment ensured even hydration of the pollen grains.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of pollen grains in each replicate was not reported. Authors used 0.5 mg of pollen in each replicate. Given the small size of pollen, this was likely an adequate measure of test organisms except that the paper indicated the grains were counted but this count was not reported in the final report.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Housing conditions for the pollen appear to be adequate. This study is not typical so there is no basis for comparison.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (i.e. exposure concentrations) were confusing, limited, or not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed to calculate a dose response curve but not described adequately.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the text. Data (Inhibition of germination) were presented as percentage of control. ED 50 and ED 25 values were presented without measures of variability.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: While pollen germination is not typically considered an apical endpoint, this study indicated that pollen germination could serve as a potential benchmark dose for plant germination.

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Study Citation:	Schubert, U., Wisanowsky, L., Kull, U. (1995). Determination of phytotoxicity of several volatile organic compounds by investigating the germination pattern of tobacco pollen. Journal of Plant Physiology 145(4):514-518.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; Air; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Nicotiana tabacum L.*; (var. xanthi nc); Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	1022795

Domain	Metric	Rating	Comments
Overall Quality Determination		**Medium**	

Study Citation:	Rama, M. V., Narasimham, P. (1982). A comparative study on the effect of gibberellic acid, Ethrel and Ethylene Chloride on potato (Solanum tuberosum Linn.) sprouting. Journal of Food Science and Technology 19(4):144-147.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Dermal (topical application)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Solanum tuberosum Linn.*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435067

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance identified as 1,2 dichloroethane and ethylene dichloride in the paper.
	Metric 2:	Test Substance Source	Low	The source was not reported and test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade of test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A negative control (potato tubers dipped in water) was used.
	Metric 5:	Negative Control Response	High	Biological response of the control was reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	No details were given regarding test media preparation methods and concentration of test substance was not measured during the study.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	Potato tubers were dipped in test solution for 10 mins, then air dried and stored in polyethylene bags. Growth outcome assessment was done after 4 weeks.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	3 exposure concentrations (10, 100 and 1000 ppm) were used for the experiment and were adequate to show results relevant to growth outcome.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentration was below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Potato tubers were obtained from local market and was reported to be 5 weeks old after harvest.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether potato tubers were acclimatized and whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The experimental group was based on weight (1 kilo tuber in each group) and each treatment was triplicated.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate whether differences occurred between control and exposed populations.

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Study Citation:	Rama, M. V., Narasimham, P. (1982). A comparative study on the effect of gibberellic acid, Ethrel and Ethylene Chloride on potato (Solanum tuberosum Linn.) sprouting. Journal of Food Science and Technology 19(4):144-147.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Dermal (topical application)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Solanum tuberosum Linn.*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435067

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	Growth outcome (no. of tubers sprouted, no. sprouts/tuber, length of sprouts and sprout yield) assessment methodology were not reported. Also, the experiment group was based on weight but outcome was assessed based on the number of tubers.
	Metric 18:	Consistency of Outcome Assessment	High	Growth outcome (no. of tubers sprouted, no. sprouts/tuber, length of sprouts and sprout yield) assessment was done each week for 4 weeks in total and appears to be consistent across study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure in the study.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	Medium	The data for number of tubers sprouted each week was presented for all treatment groups and control but the measure of variability reported was not specified. The data for number of sprouts/tuber/week was presented for all treatment groups and control but standard deviation was not given for each group. The Sprout length and sprout yield were presented via figures for all treatment groups and control but without measures of variability.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The source of the test substance, percent purity/grade and test media preparation methods were not given. The experiment group was based on weight but it was not clear whether equal number of tubers were assessed across study groups and controls to report on number of sprouts/week/tuber and number of tubers sprouted

Overall Quality Determination NEED TO FIX

Study Citation:	Rama, M. V., Narasimham, P. (1982). A comparative study on the effect of gibberellic acid, Ethrel and Ethylene Chloride on potato (Solanum tuberosum Linn.) sprouting. Journal of Food Science and Technology 19(4):144-147.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Dermal (topical application)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Solanum tuberosum Linn.*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435067

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance identified as 1,2 dichloroethane and ethylene dichloride in the paper.
	Metric 2:	Test Substance Source	Low	The source was not reported and test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	Purity and grade of test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A negative control (potato tubers dipped in water) was used.
	Metric 5:	Negative Control Response	High	Biological response of the control was reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	No details were given regarding test media preparation methods and concentration of test substance was not measured during the study.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration appears to be consistent.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	Potato tubers were dipped in test solution for 10 mins, then air dried and stored in polyethylene bags. Growth outcome assessment was done after 4 weeks.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	3 exposure concentrations (10, 100 and 1000 ppm) were used for the experiment and were adequate to show results relevant to growth outcome.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentration was below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	Potato tubers were obtained from local market and was reported to be 5 weeks old after harvest.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether potato tubers were acclimatized and whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The experimental group was based on weight (1 kilo tuber in each group) and each treatment was triplicated.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate whether differences occurred between control and exposed populations.

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Study Citation:	Rama, M. V., Narasimham, P. (1982). A comparative study on the effect of gibberellic acid, Ethrel and Ethylene Chloride on potato (Solanum tuberosum Linn.) sprouting. Journal of Food Science and Technology 19(4):144-147.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Terrestrial; N/A (e.g., injection); Dermal (topical application)
Taxa, Species, Age:	Vegetation; Vascular Plants; *Solanum tuberosum Linn.*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloroethane-Parent compound
HERO ID:	5435067

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	Low	Growth outcome (no. of tubers sprouted, no. sprouts/tuber, length of sprouts and sprout yield) assessment methodology were not reported. Also, the experiment group was based on weight but outcome was assessed based on the number of tubers.
	Metric 18:	Consistency of Outcome Assessment	High	Growth outcome (no. of tubers sprouted, no. sprouts/tuber, length of sprouts and sprout yield) assessment was done each week for 4 weeks in total and appears to be consistent across study groups and controls.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information on outcomes unrelated to exposure in the study.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	Medium	The data for number of tubers sprouted each week was presented for all treatment groups and control but the measure of variability reported was not specified. The data for number of sprouts/tuber/week was presented for all treatment groups and control but standard deviation was not given for each group. The Sprout length and sprout yield were presented via figures for all treatment groups and control but without measures of variability.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This Reproduction form represents the metric of germination reported by the authors for each of the 4 weeks of the study. . The source of the test substance, percent purity/grade and test media preparation methods were not given. The experiment group was based on weight but it was not clear whether equal number of tubers were assessed across study groups and controls to report on number of sprouts/week/tuber and number of tubers sprouted

Overall Quality Determination NEED TO FIX

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Biological response of the control group was reported for the screening test and appeared adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The experimental system and test media preparation for the screening test was not described in detail.
	Metric 8:	Consistency of Exposure Administration	Low	Details regarding exposure administration were not reported for the screening test.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported and it is expected that actual concentrations differed significantly from nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The 48-hour exposure duration was appropriate for a screening immobilization test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	Three concentrations (nominal 55-1200 mg/L) and a control group were included in the screening water-only test. This is fewer concentrations than typical for an immobilization test, but adequate for the purpose of selecting doses for the preliminary sediment test.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below the limit of solubility of 4590 mg/L.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test organisms for the screening test was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	For the screening test there were 4 replicates of 10 midges per treatment level and control (40 midges total per treatment level) which is more than the minimum typically required for acute immobilization tests.
Domain 5: Outcome Assessment				

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Low	Details of test conditions were not reported for the screening test.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported for the screening test.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the outcome assessment were not reported for the screening test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The report did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups for the screening test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was not conducted for the screening test but sufficient data were provided to conduct an independent statistical analysis.
	Metric 22:	Reporting of Data	High	Data were presented for each treatment group and the control.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This evaluation is for the immobilization outcome from the water-only screening test.

Overall Quality Determination Uninformative

Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Radiolabeled test substance identified by name and chemical structure. Non-radiolabeled test substance identified by name and CASRN.
	Metric 2:	Test Substance Source	High	The test substance source was reported for both the radiolabeled and non-radiolabeled test substance.
	Metric 3:	Test Substance Purity	High	The purity of the radiolabeled test substance was reported to be 100% and the non-radiolabeled test substance purity was reported to be 99.6%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate concurrent negative control was tested.
	Metric 5:	Negative Control Response	High	The negative control biological response was adequate.
	Metric 6:	Randomized Allocation	Medium	Organisms were impartially added to intermediate vessels, and intermediate vessels were subsequently impartially added to exposure vessels.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The static experimental system was described in detail. Glass test vessels were filled completely, eliminating headspace, and a closed system was created with tightly fitted plastic screw caps.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured at 0-hour, 24-hour, and 48-hour intervals. Volatility of the chemical yielded test concentrations approximately 50% of nominal concentrations. The EC50 was based on mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Six concentrations were tested in addition to a control, with 2x spacing between nominal concentrations. The number and spacing were appropriate and allowed for identification of endpoint values.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were described in detail and were obtained from the laboratory culture. C. riparius is the primary guideline species for this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Pretreatment conditions were adequately described and were the same for the control and exposed organisms.

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Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain		Metric	Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Replication and the number of test organisms were consistent with guidelines.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were described in detail and were adequate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest: the EC50 for combined mortality and immobilization.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted but described in little detail. However, sufficient data were provided that independent statistical analysis could be conducted if needed.
	Metric 22:	Reporting of Data	High	Immobilization data were reported for each group and replicate and were adequate to determine the EC50 in conjunction with mortality data.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the EC50 outcome for the definitive trial exposing Chironomus riparius to 1,2-dichloropropane. Combined immobilization and mortality data were used to determine the EC50.

Overall Quality Determination High

Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Radiolabeled test substance identified by name and chemical structure. Non-radiolabeled test substance identified by name and CASRN.
	Metric 2:	Test Substance Source	High	The test substance source was reported for both the radiolabeled and non-radiolabeled test substance.
	Metric 3:	Test Substance Purity	High	The purity of the radiolabeled test substance was reported to be 100% and the non-radiolabeled test substance purity was reported to be 99.6%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate concurrent negative control was tested.
	Metric 5:	Negative Control Response	High	The negative control biological response was adequate.
	Metric 6:	Randomized Allocation	Medium	Organisms were impartially added to intermediate vessels, and intermediate vessels were subsequently impartially added to exposure vessels.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The static experimental system was described in detail. Glass test vessels were filled completely, eliminating headspace, and a closed system was created with tightly fitted plastic screw caps.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured at 0-hour, 24-hour, and 48-hour intervals. Volatility of the chemical yielded test concentrations approximately 50% of nominal concentrations. The EC50 was based on mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Six concentrations were tested in addition to a control, with 2x spacing between nominal concentrations. The number and spacing were appropriate and allowed for identification of endpoint values.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were described in detail and were obtained from the laboratory culture. C. riparius is the primary guideline species for this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Pretreatment conditions were adequately described and were the same for the control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Replication and the number of test organisms were consistent with guidelines.

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Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were described in detail and were adequate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest: the EC50 for combined mortality and immobilization.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted but described in little detail. However, sufficient data were provided that independent statistical analysis could be conducted if needed.
	Metric 22:	Reporting of Data	High	Mortality data were reported for each group and replicate and were adequate to determine the EC50 in conjunction with immobilization data.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the mortality outcome of the definitive trial exposing Chironomus riparius to 1,2-dichloropropane. Combined mortality and immobilization were used to determine the EC50.

Overall Quality Determination High

Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.6%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate concurrent negative control was tested.
	Metric 5:	Negative Control Response	High	The negative control biological response was adequate.
	Metric 6:	Randomized Allocation	Medium	Organisms were impartially added to intermediate vessels, and intermediate vessels were subsequently impartially added to exposure vessels.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The static experimental system was described in detail. Glass test vessels were filled completely, eliminating headspace, and a closed system was created with tightly fitted plastic screw caps.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Test concentrations were not measured during the preliminary test.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The number and spacing of exposure levels were wider than typical but appropriate for a preliminary dose range-finding test.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were described in detail and were obtained from the laboratory culture. C. riparius is the primary guideline species for this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Pretreatment conditions were not described for the preliminary test.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Replication and the number of test organisms were lower than typical for this study type but appropriate for a preliminary range-finder test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were described in detail and were adequate.
	Metric 17:	Outcome Assessment Methodology	Medium	The only reporting of behavioral effects was a footnote stating that all surviving midges were observed to be lethargic. Onset of lethargy and whether lethargy was observed prior to mortality or immobilization for non-surviving midges was not reported.

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Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details of the outcome assessment protocol were not clearly reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Behavioral effects are not typically statistically evaluated.
	Metric 22:	Reporting of Data	Low	Behavioral effects were only described generally for all surviving midges in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the combined percent mortality and immobilization observed in the preliminary trial exposing Chironomus riparius to 1,2-dichloropropane.

Overall Quality Determination High

Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.6%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate concurrent negative control was tested.
	Metric 5:	Negative Control Response	High	The negative control biological response was adequate.
	Metric 6:	Randomized Allocation	Medium	Organisms were impartially added to intermediate vessels, and intermediate vessels were subsequently impartially added to exposure vessels.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The static experimental system was described in detail. Glass test vessels were filled completely, eliminating headspace, and a closed system was created with tightly fitted plastic screw caps.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Test concentrations were not measured during the preliminary test.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The number and spacing of exposure levels were wider than typical but appropriate for a preliminary dose range-finding test.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were described in detail and were obtained from the laboratory culture. C. riparius is the primary guideline species for this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Pretreatment conditions were not described for the preliminary test.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Replication and the number of test organisms were lower than typical for this study type but appropriate for a preliminary range-finder test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were described in detail and were adequate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest: the percent effect for combined mortality and immobilization.

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Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details of the outcome assessment protocol were not clearly reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was not performed, but adequate data is available to conduct independent statistical analysis.
	Metric 22:	Reporting of Data	High	Percent effect data were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the combined percent mortality and immobilization observed in the preliminary trial exposing Chironomus riparius to 1,2-dichloropropane.

Overall Quality Determination High

Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Radiolabeled test substance identified by name and chemical structure. Non-radiolabeled test substance identified by name and CASRN.
	Metric 2:	Test Substance Source	High	The test substance source was reported for both the radiolabeled and non-radiolabeled test substance.
	Metric 3:	Test Substance Purity	High	The purity of the radiolabeled test substance was reported to be 100% and the non-radiolabeled test substance purity was reported to be 99.6%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate concurrent negative control was tested.
	Metric 5:	Negative Control Response	High	The negative control biological response was adequate.
	Metric 6:	Randomized Allocation	Medium	Organisms were impartially added to intermediate vessels, and intermediate vessels were subsequently impartially added to exposure vessels.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The static experimental system was described in detail. Glass test vessels were filled completely, eliminating headspace, and a closed system was created with tightly fitted plastic screw caps.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured at 0-hour, 24-hour, and 48-hour intervals. Volatility of the chemical yielded test concentrations approximately 50% of nominal concentrations. The EC50 was based on mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Six concentrations were tested in addition to a control, with 2x spacing between nominal concentrations. The number and spacing were appropriate and allowed for identification of endpoint values.
	Metric 12:	Testing at or Below Solubility Limit	High	All exposure concentrations were below the solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were described in detail and were obtained from the laboratory culture. C. riparius is the primary guideline species for this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Pretreatment conditions were adequately described and were the same for the control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Replication and the number of test organisms were consistent with guidelines.

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Study Citation:	Smithers, (2024). [14C]1,2-Dichloropropane – Acute toxicity to midges (Chironomus riparius) under static conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Other Invertebrate (e.g., sea urchins, ciliates, rotifers); *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane-Parent compound
HERO ID:	11424404

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were described in detail and were adequate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest: abnormal behavior.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Behavioral observations are not typically statistically analyzed.
	Metric 22:	Reporting of Data	High	Behavioral observations were reported for each group and replicate.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This evaluation is for the behavioral outcome of the definitive trial exposing Chironomus riparius to 1,2-dichloropropane.

Overall Quality Determination High

Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.5%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control was reported in table 4 and figure 2 and met acceptability criteria.
	Metric 6:	Randomized Allocation	Medium	Test organisms were allocated to test vessels impartially.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system was described in adequate detail. A closed static-renewal system was used. A single stock solution was used to prepare all exposure solutions. New exposure solutions were prepared at 24-hours after the start of exposure. Test organisms were transferred at that time to the vessels containing the new solutions.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test substance concentrations were analytically verified via GC-MSD at 0-hour, 24-hour (aged and new solutions), and 48-hour (aged solutions). Endpoints were based on geometric mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The 48-hour exposure duration was appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five exposure concentrations were selected for the definitive test based on results from the preliminary test. The selected doses were sufficient to derive an EC50 for combined immobilization and mortality.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were at or below solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were 3-day post-hatch larvae obtained from the laboratory culture and were appropriate for use in this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Test organisms were acclimatized appropriately.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates were reported and sufficient.

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Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Reported test conditions were appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, the EC50 for combined immobilization and mortality.
	Metric 18:	Consistency of Outcome Assessment	High	Observations for immobilization and mortality occurred at exposure initiation and every 24 hours thereafter for all study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described and were appropriate for the dataset.
	Metric 22:	Reporting of Data	High	Immobilization and mortality data were reported in table 4 and the concentration-response curve was reported in figure 2. 24 and 48-hour EC50 values for combined immobilization and mortality were reported in table 5.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is for the definitive acute toxicity test exposing Chironomus riparius to 1,1-dichloroethane over 48-hours. Number of immobilized organisms were presented in table 4

Overall Quality Determination High

Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.5%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control was reported in table 4 and figure 2 and met acceptability criteria.
	Metric 6:	Randomized Allocation	Medium	Test organisms were allocated to test vessels impartially.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system was described in adequate detail. A closed static-renewal system was used. A single stock solution was used to prepare all exposure solutions. New exposure solutions were prepared at 24-hours after the start of exposure. Test organisms were transferred at that time to the vessels containing the new solutions.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test substance concentrations were analytically verified via GC-MSD at 0-hour, 24-hour (aged and new solutions), and 48-hour (aged solutions). Endpoints were based on geometric mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The 48-hour exposure duration was appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five exposure concentrations were selected for the definitive test based on results from the preliminary test. The selected doses were sufficient to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were at or below solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were 3-day post-hatch larvae obtained from the laboratory culture and were appropriate for use in this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Test organisms were acclimatized appropriately.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates were reported and sufficient.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Reported test conditions were appropriate.

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Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, behavioral observations.
	Metric 18:	Consistency of Outcome Assessment	High	Observations for abnormal behavioral activity occurred at exposure initiation and every 24 hours thereafter for all study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	Behavioral observations are not typically statistically analyzed for this test.
	Metric 22:	Reporting of Data	High	Behavioral observation data were reported in table 4.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is for the behavioral health outcome for the definitive acute toxicity test exposing Chironomus riparius to 1,1-dichloroethane over 48-hours.

Overall Quality Determination High

Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.5%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control was reported in table 4 and figure 2 and met acceptability criteria.
	Metric 6:	Randomized Allocation	Medium	Test organisms were allocated to test vessels impartially.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system was described in adequate detail. A closed static-renewal system was used. A single stock solution was used to prepare all exposure solutions. New exposure solutions were prepared at 24-hours after the start of exposure. Test organisms were transferred at that time to the vessels containing the new solutions.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test substance concentrations were analytically verified via GC-MSD at 0-hour, 24-hour (aged and new solutions), and 48-hour (aged solutions). Endpoints were based on geometric mean measured concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The 48-hour exposure duration was appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five exposure concentrations were selected for the definitive test based on results from the preliminary test. The selected doses were sufficient to derive an EC50 for combined immobilization and mortality.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were at or below solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were 3-day post-hatch larvae obtained from the laboratory culture and were appropriate for use in this test.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Test organisms were acclimatized appropriately.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates were reported and sufficient.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Reported test conditions were appropriate.

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Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, the EC50 for combined immobilization and mortality.
	Metric 18:	Consistency of Outcome Assessment	High	Observations for immobilization and mortality occurred at exposure initiation and every 24 hours thereafter for all study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described and were appropriate for the dataset.
	Metric 22:	Reporting of Data	High	Immobilization and mortality data were reported in table 4 and the concentration-response curve was reported in figure 2. 24 and 48-hour EC50 values for combined immobilization and mortality were reported in table 5.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is for the definitive acute toxicity test exposing Chironomus riparius to 1,1-dichloroethane over 48-hours. 24h and 48h EC50 values for combined immobilization and mortality were obtained. EC0 and EC100 effect values were also reported.

Overall Quality Determination High

Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

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 Source	High	The test substance source was reported.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99.5%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control was reported in table 1 and met acceptability criteria.
	Metric 6:	Randomized Allocation	Medium	Test organisms were allocated to test vessels impartially.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system was described in adequate detail. A closed static-renewal system was used. A single stock solution was used to prepare all exposure solutions. New exposure solutions were prepared at 24-hours after the start of exposure. Test organisms were transferred at that time to the vessels containing the new solutions.
	Metric 8:	Consistency of Exposure Administration	High	Exposure administration was consistent across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured for the preliminary test.
	Metric 10:	Exposure Duration and Frequency	High	The 48-hour exposure duration was appropriate.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five exposure concentrations were tested during the preliminary test and were sufficient to determine appropriate definitive test concentrations.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were at or below solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The age of the test organisms used in the preliminary test was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Acclimation of test organisms for the preliminary test was not clearly reported.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and replicates for the preliminary test were lower than typically used in guideline studies, but were sufficient to determine appropriate definitive test concentrations.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Reported test conditions were appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, the cumulative percent effect for combined immobility and mortality.

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Study Citation:	Smithers, (2024). Acute toxicity to midges (Chironomus riparius) under static-renewal conditions.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane-Parent compound
HERO ID:	11589134

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Medium	Details of the outcome assessment were not clearly reported for the preliminary test, but percent effects were reported for 24-hour and 48-hour intervals.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Percent effect data were not statistically analyzed but sufficient data was provided so that an independent statistical analysis could be conducted.
	Metric 22:	Reporting of Data	High	Percent effect data for combined immobility and mortality were reported in table 1.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is for the preliminary acute toxicity test exposing Chironomus riparius to 1,1-dichloroethane over 48-hours. Percent effect for combined immobility and mortality was reported for each exposure group and the control.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Control male, female, and combined developmental rates are shown in Table 10 and are adequate.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms were impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining developmental rate was well described in Section 2.13.1 and complied with OECD 233.
	Metric 18:	Consistency of Outcome Assessment	High	Development rate was assessed consistently among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data were well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This data evaluation is for the developmental rate outcome for the parent generation (M/F/Combined).

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Control male, female, and combined developmental rates are shown in Table 19 and are adequate.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms were impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining developmental rate was well described in Section 2.13.1 and complied with OECD 233.
	Metric 18:	Consistency of Outcome Assessment	High	Development rate was assessed consistently among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data were well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This data evaluation is for the developmental rate outcome for the F1 Generation (M/F/Combined).

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent female of the emerged control adults was 42% which is within the guideline range of 40 to 60%.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The protocol for distinguishing male from female midges was described in Section 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Sex ratio was assessed consistently among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This data evaluation is for the male/female sex ratio outcome (% females in emerged midges) for the parent generation.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent emergence in controls was 77% which is greater than the guideline required minimum of 70%.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms were impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining emergence was well described in Section 2.10.2 and complied with OECD 233.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence observations reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This data evaluation is for the percent emergence outcome for the F1 generation.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Biological response of the control group was reported and appeared adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The report indicated that the details of test media preparation reported in Section 2.8.1 applied to both the preliminary exposure and the definitive exposure. Concentrations of the test substance were not measured during the preliminary study.
	Metric 8:	Consistency of Exposure Administration	High	The report indicated that the details of exposure administration reported in Section 2.8.1 applied to both the preliminary exposure and the definitive exposure. Exposures appear to have been administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported and it is expected that actual concentrations differed significantly from nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 8.1-1000 mg/kg) and a control group were included in the preliminary test. The spacing was appropriate for a range-finding test.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test organisms for the preliminary test was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 2 replicate breeding cages per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Details of test conditions were not reported for the preliminary test.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported for the preliminary test.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the outcome assessment were not reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The report did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was not conducted for the preliminary test but sufficient data were provided to conduct an independent statistical analysis.
	Metric 22:	Reporting of Data	High	Data were presented for each treatment group and the control.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This evaluation is for the reproductive end points measured in parent and F 1 generation in the preliminary range-finding test.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	Medium	Biological response of the control group was reported for the preliminary test. Mean percent emergence and mean development rates (male/female/combined) in the parent generation appeared to be lower than guideline minimums for definitive tests. The control response in the F1 generation appeared adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The report indicated that the details of test media preparation reported in Section 2.8.1 applied to both the preliminary exposure and the definitive exposure. Concentrations of the test substance were not measured during the preliminary study.
	Metric 8:	Consistency of Exposure Administration	High	The report indicated that the details of exposure administration reported in Section 2.8.1 applied to both the preliminary exposure and the definitive exposure. Exposures appear to have been administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported and it is expected that actual concentrations differed significantly from nominal concentrations.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 8.1-1000 mg/kg) and a control group were included in the preliminary test. The spacing was appropriate for a range-finding test.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test organisms for the preliminary test was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	For the preliminary test there were 6 replicate beakers (20 midges) per treatment level and control for the parent generation (120 midges total per treatment level), and 4 replicate beakers (20 midges) per treatment level and control for the F1 generation (80 midges total per treatment level).

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Details of test conditions were not reported for the preliminary test.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported for the preliminary test.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the outcome assessment were not reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The report did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was not conducted for the preliminary test but sufficient data were provided to conduct an independent statistical analysis.
	Metric 22:	Reporting of Data	High	Data were presented for each treatment group and the control.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This evaluation is for the developmental/growth endpoints measured in parent and F 1 generation in the preliminary range-finding test.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent emergence in controls was 81% which is greater than the guideline required minimum of 70%.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms were impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements were obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining emergence was well described in Section 2.10.2 and complied with OECD 233.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data were well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This data evaluation is for the percent emergence outcome for the parent generation.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent female of the emerged control adults was 46% which is within the guideline range of 40 to 60%.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms impartially distributed. Vessels were randomly positioned in water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The protocol for distinguishing male from female midges was described in Section 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Sex ratio was assessed consistently among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data were well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This evaluation is for the male/female sex ratio (% females in emerged midges) outcome for the F1 generation.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of test substance stated in Section 2.2.2.
	Metric 2:	Test Substance Source	High	Source stated as Sigma Aldrich. Certificates of Analysis provided in Appendix 2.
	Metric 3:	Test Substance Purity	High	Purity stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Fecundity and fertility of the control group is shown in Table 11 and all outcomes met guideline criteria.
	Metric 6:	Randomized Allocation	Medium	Report stated that test organisms were impartially distributed. Test vessels were randomly positioned in a water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental methods were well described in Section 2.8. Measures were taken to minimize loss of the volatile test substance. Substantial loss still occurred over the total course of the study. The test concentrations were measured at multiple time points.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported in Section 2.8 and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Measurements obtained at several timepoints during study for sediment, pore water, and overlying water. Time-weighted mean presented in addition to individual measurements.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study.
	Metric 12:	Testing at or Below Solubility Limit	N/A	The test material was incorporated into sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported. Chironomus riparius is a standard test species.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The pretreatment conditions and methods were conducted according to OECD 233.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 8 replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Test conditions were adequately described.
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining fecundity and fertility was described in Section 2.10.3.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane-Parent compound
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Fecundity and fertility were assessed consistently among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Details regarding test organism attrition and outcomes unrelated to exposure were reported for each study group. There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13 and Appendix 9.
	Metric 22:	Reporting of Data	High	Data were well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes reported.

Additional Comments: This evaluation is for the number of egg masses per female (fecundity) and the number of fertile egg masses (fertility) for the parent generation.

Overall Quality Determination High