

SCREENING-LEVEL HAZARD CHARACTERIZATION

SPONSORED CHEMICAL

**Nonanoic Acid, Sulfohenyl Ester, Sodium Salt (NOBS)
(Nonanonyloxybenzene sulfonate; NOBS)
(CASRN 91125-43-8)**

SUPPORTING CHEMICALS

**C8 AOBS (No CASRN specified)
C10 AOBS (No CASRN specified)**

The High Production Volume (HPV) Challenge Program¹ was conceived as a voluntary initiative aimed at developing and making publicly available screening-level health and environmental effects information on chemicals manufactured in or imported into the United States in quantities greater than one million pounds per year. In the Challenge Program, producers and importers of HPV chemicals voluntarily sponsored chemicals; sponsorship entailed the identification and initial assessment of the adequacy of existing toxicity data/information, conducting new testing if adequate data did not exist, and making both new and existing data and information available to the public. Each complete data submission contains data on 18 internationally agreed to “SIDS” (Screening Information Data Set^{1,2}) endpoints that are screening-level indicators of potential hazards (toxicity) for humans or the environment.

The Environmental Protection Agency’s Office of Pollution Prevention and Toxics (OPPT) is evaluating the data submitted in the HPV Challenge Program on approximately 1400 sponsored chemicals by developing hazard characterizations (HCs). These HCs consist of an evaluation of the quality and completeness of the data set provided in the Challenge Program submissions. They are not intended to be definitive statements regarding the possibility of unreasonable risk of injury to health or the environment.

The evaluation is performed according to established EPA guidance^{2,3} and is based primarily on hazard data provided by sponsors; however, in preparing the hazard characterization, EPA considered its own comments and public comments on the original submission as well as the sponsor’s responses to comments and revisions made to the submission. In order to determine whether any new hazard information was developed since the time of the HPV submission, a search of the following databases was made from one year prior to the date of the HPV Challenge submission to the present: (ChemID to locate available data sources including Medline/PubMed, Toxline, HSDB, IRIS, NTP, ATSDR, IARC, EXTOXNET, EPA SRS, etc.), STN/CAS online databases (Registry file for locators, ChemAbs for toxicology data, RTECS, Merck, etc.) and Science Direct. OPPT’s focus on these specific sources is based on their being

¹ U.S. EPA. High Production Volume (HPV) Challenge Program; <http://www.epa.gov/chemrtk/index.htm>.

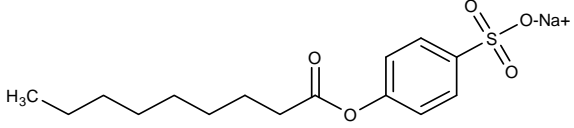
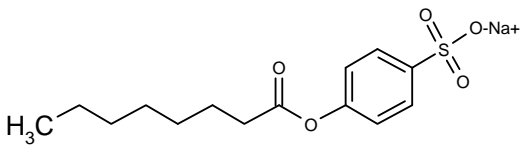
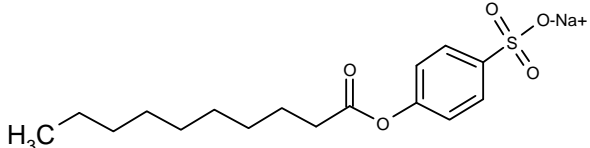
² U.S. EPA. HPV Challenge Program – Information Sources; <http://www.epa.gov/chemrtk/pubs/general/guidocs.htm>.

³ U.S. EPA. Risk Assessment Guidelines; <http://cfpub.epa.gov/ncea/raf/rafguid.cfm>.

of high quality, highly relevant to hazard characterization, and publicly available.

OPPT does not develop HCs for those HPV chemicals which have already been assessed internationally through the HPV program of the Organization for Economic Cooperation and Development (OECD) and for which Screening Initial Data Set (SIDS) Initial Assessment Reports (SIAR) and SIDS Initial Assessment Profiles (SIAP) are available. These documents are presented in an international forum that involves review and endorsement by governmental authorities around the world. OPPT is an active participant in these meetings and accepts these documents as reliable screening-level hazard assessments.

These hazard characterizations are technical documents intended to inform subsequent decisions and actions by OPPT. Accordingly, the documents are not written with the goal of informing the general public. However, they do provide a vehicle for public access to a concise assessment of the raw technical data on HPV chemicals and provide information previously not readily available to the public.

<p>Chemical Abstract Service Registry Number (CASRN)</p>	<p align="center"><u>Sponsored Chemical</u></p> <p align="center">91125-43-8</p> <p align="center"><u>Supporting Chemicals</u></p> <p align="center">C8 AOBS C10 AOBS (CASRNs Not Specified)</p>
<p>Chemical Abstract Index Name</p>	<p align="center"><u>Sponsored Chemical</u></p> <p align="center">Nonanoic acid, sulfophenyl ester, sodium salt</p>
<p>Structural Formula</p>	<p align="center"><u>Sponsored Chemical</u></p> <p align="center">Nonanoic Acid, Sulfophenyl Ester, Sodium Salt (NOBS)</p> <p align="center">  </p> <p align="center"><u>Supporting Chemicals</u></p> <p align="center">C8AOBS</p> <p align="center">  </p> <p align="center">C10 AOBS</p> <p align="center">  </p>
<p align="center">Summary</p> <p>CASRN 91125-43-8 (1:1) is a solid with high water solubility and negligible vapor pressure. It is expected to have moderate mobility in soil; however, this substance is a salt and therefore may have slightly higher mobility. Volatilization of this chemical is considered negligible since this compound is a salt. The rate of hydrolysis is considered slow. The rate of atmospheric photooxidation is considered moderate; however, this substance is not expected to exist in the vapor phase in the ambient atmosphere. This chemical is expected to have low persistence (P1) and low bioaccumulation potential (B1).</p>	

The acute oral toxicity of CASRN 91125-43-8 in rats is low and the acute dermal toxicity is moderate in rabbits. In a 13-week dietary repeated-dose toxicity study in rats, the supporting chemical, C8AOBS, showed no treatment-related effects at concentrations up to and including 1000 mg/kg/day; the NOAEL for systemic toxicity in rats is ~1000 mg/kg/day (the highest dose tested). A 28-day dermal repeated-dose toxicity study in rabbits with the supporting chemical, C10AOBS, showed no adverse effects at ~400 mg/kg/day; the NOAEL for systemic toxicity in rabbits is ~400 mg/kg/day (the highest dose tested). In a one-generation oral reproductive toxicity study in rats, CASRN 91125-43-8 showed no reproductive or developmental toxicity at doses up to 1000 mg/kg/day; the NOAEL for reproductive/developmental toxicity is 1000 mg/kg/day (highest dose tested). Possible signs of treatment-related mortality and clinical signs of toxicity were observed in the dams at 500 mg/kg/day and greater; the NOAEL for maternal toxicity is 100 mg/kg/day. In an oral prenatal developmental toxicity study in rats, the supporting chemical, C8AOBS, showed maternal mortality at 1500 mg/kg/day. The NOAEL for maternal toxicity is 1000 mg/kg/day. In the same study, no treatment-related effects were observed in the fetuses at doses up to 1500 mg/kg/day (highest dose tested). CASRN 91125-43-8 was not mutagenic in bacteria *in vitro*, and did not induce DNA synthesis in rats *in vivo*. Supporting chemicals C8AOBS and C10AOBS combined, did not induce chromosomal aberrations in rat bone marrow *in vivo*. CASRN 91125-43-8 is irritating to rabbit skin and eyes, and is not a dermal sensitizer in guinea pigs or a dermal sensitizer in mice based on the local lymph node assay.

The potential hazard of CASRN 91125-43-8 to fish and aquatic invertebrates cannot be evaluated because no adequate data were available for these endpoints. The 72-hour EC₅₀s for aquatic plants are 9.3 mg/L (biomass) and 26.3 mg/L (growth rate).

The acute fish and aquatic invertebrate toxicity endpoints were identified as data gaps under the HPV Challenge Program.

The sponsor, the Procter & Gamble Company, submitted a Test Plan and Robust Summaries to EPA for nonanoic acid, sulfophenyl ester, sodium salt (NOBS; C9 AOBS; CASRN 91125-43-8; CA Index Name: nonanoic acid, sulfophenyl ester, sodium salt) dated December 21, 2001. EPA posted the submission on the ChemRTK HPV Challenge website on July 11, 2002 (<http://www.epa.gov/chemrtk/pubs/summaries/nonacdsl/c13831tc.htm>). EPA comments on the original submission were posted to the website on November 8, 2002. Public comments were also received and posted to the website. The sponsor submitted updated/revised documents on January 21, 2003.

Justification for Supporting Chemical

The Sponsor proposed the use of data for sodium octanoyloxybenzene sulfonate (C8 AOBS), sodium decanoyloxybenzene sulfonate (C10 AOBS) and mixtures of these two substances to fill data gaps for SIDS endpoints. These substances are identical in structure to the sponsored chemical with the exception of the length of the alkyl chain. The Sponsor stated that published and unpublished data suggested that this difference in length of the carbon chain (C8, C9 and C10) is not expected to significantly affect the toxicity profile. Based on similar structural and toxicity profiles, EPA agrees with the Sponsor's proposal to use data for these two substances for addressing the human health endpoints.

1. Chemical Identity

1.1 Identification and Purity

The following description is taken from the revised Test Plan (2003): NOBS can be made by reacting nonanoyl chloride (CASRN 764-85-2) and sodium phenol sulfonate (CASRN 1300-51-2). The alkyl chain of NOBS is generally linear and saturated. Purity of commercial production ranges from 90-99%.

1.2 Physical-Chemical Properties

The physical-chemical properties of nonanoic acid, sulfophenyl ester, sodium salt (1:1) are summarized in Table 1, while its environmental fate properties are provided in Table 2. Nonanoic acid, sulfophenyl ester, sodium salt (1:1) is a solid with high water solubility and negligible vapor pressure.

Table 1. Physical-Chemical Properties of Nonanoic acid, sulfophenyl ester, sodium salt (1:1)¹	
Property	Value
CASRN	91125-43-8
Molecular Weight	336.38
Physical State	Solid
Melting Point	>360°C (slowly decomposed over the range 191–350 °C)
Boiling Point	>360°C (slowly decomposed over the range 191–350 °C)
Vapor Pressure	1.28×10 ⁻⁹ mm Hg at 25°C (measured)
Water Solubility	245,000 mg/L at 20°C (measured)
Dissociation Constant (pK _a)	Not applicable
Henry's Law Constant	<1.0×10 ⁻¹⁰ atm·m ³ /mole (estimated) ²
Log K _{ow}	-0.572 (measured)

¹The Procter & Gamble Company. 2003. Revised Robust Summary and Test Plan for Nonanoic acid, sulfophenyl ester, sodium salt CASRN 91125-43-8 available online at <http://www.epa.gov/chemrtk/pubs/summaries/nonacdsl/c13831tc.htm> as of June 14, 2010.

²U.S. EPA. 2010. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at <http://www.epa.gov/opptintr/exposure/pubs/episuitedl.htm> as of June 14, 2010.

2. General Information on Exposure

2.1 Production Volume and Use Pattern

CASRN 91125-43-8 had an aggregated production and/or import volume in the United States between 10 and 50 million pounds during calendar year 2005.

Non-confidential information in the IUR indicated that the industrial processing and uses of the chemical include other basic organic chemical manufacturing as “other.” Commercial and consumer uses were claimed confidential.

2.2 Environmental Exposure and Fate

Nonanoic acid, sulfophenyl ester, sodium salt (1:1) is expected to have moderate mobility in soil. Nonanoic acid, sulfophenyl ester, sodium salt (1:1) was shown to be readily biodegradable, achieving 87% of its theoretical CO₂ production using a modified Sturm test (OECD 301B). Nonanoic acid, sulfophenyl ester, sodium salt (1:1) was also shown to be inherently biodegradable over 7 days with 99.7% degradation using the Semi-Continuous Activated Sludge (SCAS) test (OECD 302A). The rate of hydrolysis is expected to be slow under environmental pH and temperature. The rate of volatilization is considered negligible since this compound is a salt. Nonanoic acid, sulfophenyl ester, sodium salt (1:1) is expected to have low persistence (P1) and low bioaccumulation potential (B1).

The environmental fate properties are provided in Table 2.

Table 2. Environmental Fate Characteristics of Nonanoic acid, sulfophenyl ester, sodium salt (1:1)¹	
Property	Value
Photodegradation Half-life	14.1 hours at 25°C (estimated) ²
Hydrolysis Half-life	27% degradation at pH 6.4 and 20°C after 192 hours 11% degradation at pH 5.3 and 20°C after 192 hours 4% degradation at pH 4.2 and 20°C after 168 hours
Biodegradation	87% biodegradation in 28 days (readily biodegradable) 99.7% biodegradation in 7 days (inherently biodegradable)
Bioaccumulation Factor	BAF = 1.0 (estimated) ²
Log K _{oc}	2.5 (estimated) ²
Fugacity (Level III Model) ²	
Air (%)	<0.1
Water (%)	17.3
Soil (%)	82.4
Sediment (%)	0.2
Persistence ³	P1 (low)
Bioaccumulation ³	B1 (low)

¹The Procter & Gamble Company. 2003. Revised Robust Summary and Test Plan for Nonanoic acid, sulfophenyl ester, sodium salt CASRN 91125-43-8 available online at <http://www.epa.gov/chemrtk/pubs/summaries/nonacdsl/c13831tc.htm> as of June 14, 2010.

²U.S. EPA. 2010. Estimation Programs Interface Suite™ for Microsoft® Windows, v4.00. U.S. Environmental Protection Agency, Washington, DC, USA. Available online at <http://www.epa.gov/opptintr/exposure/pubs/episuitedi.htm> as of June 14, 2010.

³Federal Register. 1999. Category for Persistent, Bioaccumulative, and Toxic New Chemical Substances. *Federal Register* 64, Number 213 (November 4, 1999) pp. 60194–60204.

Conclusions: Nonanoic acid, sulfophenyl ester, sodium salt (1:1) is solid with high water solubility and negligible vapor pressure. It is expected to have moderate mobility in soil; however, this substance is a salt and therefore may have slightly higher mobility. Volatilization of nonanoic acid, sulfophenyl ester, sodium salt (1:1) is considered negligible since this compound is a salt. The rate of hydrolysis is considered slow. The rate of atmospheric photooxidation is considered moderate; however, this substance is not expected to exist in the vapor phase in the ambient atmosphere. Nonanoic acid, sulfophenyl ester, sodium salt (1:1) is expected to have low persistence (P1) and low bioaccumulation potential (B1).

3. Human Health Hazard

A summary of health effects data submitted for SIDS endpoints is provided in Table 3.

Acute Oral Toxicity

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

Sprague-Dawley rats (5/sex/dose) were administered a single dose of nonanoic acid, sulfophenyl ester, sodium salt (40% w/v aqueous suspension) at 5100, 5780, 6460 or 7140 mg/kg-bw by oral

gavage. All animals were observed for clinical signs and mortality at 0.5, 1, 2, 3, and 4 hours after dosing and daily thereafter for 14 days. At the three highest doses, mortalities occurred within the first two days: 5780 mg/kg-bw (one male and five females), 6460 mg/kg-bw (two males and four females), 7140 mg/kg-bw (one male and two females on day one and three males and three females on day two).

LD₅₀ (combined) = 6030 mg/kg-bw

Acute Dermal Toxicity

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

New Zealand White rabbits (3/sex/dose) were exposed dermally to 2 mL/kg-bw (approximately 800 mg/kg-bw) nonanoic acid, sulfophenyl ester, sodium salt (40% w/v aqueous solution) in two groups of three animals each, for 24 hours and observed for 14 days after dosing. The shaved skin of the backs of three animals was left intact and the skin of the other three animals was abraded. The test material was spread evenly over the prepared skin and immediately covered with 8-ply gauze, held in place by an impermeable dressing covering the entire trunk. One rabbit from the abraded group died on day 7 of non-treatment-related causes.

LD₅₀ > ~800 mg/kg-bw

Repeated-Dose Toxicity

Sodium octanoyloxybenzene sulfonate (C8 AOBS) (CASRN not specified for supporting chemical)

Sprague-Dawley rats (20/sex/dose) were administered C8 AOBS in the diet daily for 13 weeks at 0, 0.001, 0.01 or 1% (approximately 0, 10, 100 or 1000 mg/kg/day). Concentration levels were adjusted to provide a constant dose level in relation to increasing body weight. Parameters assessed included body weight, food consumption, clinical signs, ophthalmic examination, hematology, blood and urine clinical chemistry (performed on 10/sex/dose at weeks 12 and 13), organ weights, gross pathology, histopathology (adrenals, brain, pancreas, thymus, stomach, thyroid, liver, heart, lungs, spleen, urinary bladder, etc) and survival. Mortalities were not reported. Statistically significant increases in lymphocytes, neutrophils and blood urea nitrogen (BUN) levels were seen at 1000 mg/kg/day in males and a significant increase in creatinine and sodium were observed in females at 1000 mg/kg/day, but were reportedly within the historical control range. Complete necropsies were performed on all animals. All tissues from control and 1000 mg/kg/day animals, lung and liver tissue and gross lesions from the 10 and 100 mg/kg/day animals were examined histopathologically. No treatment-related body weight or histopathological changes were seen.

NOAEL ~ 1000 mg/kg/day (highest dose tested)

50% sodium octanoyloxybenzene sulfonate (C8 AOBS) and 50% sodium decanoyloxybenzene sulfonate (C10 AOBS), (CASRNs not specified for supporting chemicals)

In a 28-day study, New Zealand White rabbits (5/sex/dose) were applied 2.0 mL/kg combined mixture of C8/C10 AOBS at 0, 1.5 or 20% (approximately 0, 30 or 400 mg/kg/day) on abraded skin for 7 hours/day, 5 days/week for 4 weeks and observed daily. All test sites were washed with tepid water approximately 7 hours after application. No mortalities or clinical signs of toxicity, other than diarrhea were observed. Skin responses at the test site, both gross and

microscopic, increased with test substance concentration. Slight erythema and desquamation were seen at 30 and 400 mg/kg/day. At 400 mg/kg/day, microscopic evaluation of the skin revealed inflammation, skin thickening and blistering. Thirty-three tissues (lung, heart, liver, urinary bladder, spleen thymus, heart, stomach, adrenals etc.) were examined microscopically. No adverse histopathological effects were observed.

NOAEL (systemic toxicity) ~ 400 mg/kg/day (highest dose tested)

Reproductive Toxicity

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

In a one-generation reproductive toxicity study, Sprague-Dawley rats (38/sex/dose) were administered 0, 100, 500 or 1000 mg/kg/day by oral gavage for 70 days, including prior to mating and pre-mating until termination, either on gestation day 13 (for uterine observations) or lactation day 21. Weekly body weights and food consumption were recorded on gestation days 0, 7, 13, and 20 and lactation days 0, 7, 14, and 21. F₁ offsprings were exposed *in utero* and/or as neonates during lactation, but not directly. At gestation day 13, ovaries and uterine horns were examined for number of corpora lutea, number of implantations, number and distribution of viable and nonviable fetuses, and early resorptions. Tissues and organs from all F₀ animals were macroscopically observed, with special attention to reproductive organs. Delivered litters, were examined for litter size, number of still and live births, and gross abnormalities. On postnatal day 4, groups of 10 pups were pooled to evaluate nursing, survival and body weight. Pups were weighed on postnatal day 0, 4, 7, 14, and 21. Clinical observations in the mid and high dose groups included excessive salivation and respiratory rales. Mortalities occurred at 0(1), 100(1), 500(2) and 1000(10) mg/kg/day in the dams; there was some evidence presented to suggest that three of these deaths could have been due to gavage errors (dose level not reported); however, since limited information was provided in the Robust Summary for this endpoint, it is unclear if the maternal mortality is treatment related. Five males died at 1000 mg/kg/day with pulmonary lesions suggestive of pneumonia; the test substance was not directly implicated in the deaths. There were no significant adverse effects on adult body weights when compared to control animals throughout the study. No treatment related effects were observed on the estrous cycle. Examinations of the uterus showed no differences in the number of viable fetuses, post-implantation loss, total implantations or number of corpora lutea. There were no treatment related effects on F₀ or F₁ male or female fertility indices, copulatory indices, gestation length, mean number of live/dead pups. No effects were observed on pup survival, weaning, or pup body weight throughout lactation.

NOAEL (reproductive toxicity) = 1000 mg/kg/day (highest dose tested)

Developmental Toxicity

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

In the one-generation reproductive toxicity study previously described, Sprague-Dawley rats (38/sex/dose) were administered 0, 100, 500 or 1000 mg/kg/day by oral gavage for 70 days pre-mating until termination, either on gestation day 13 (for uterine observations) or lactation day 21. There were no treatment related effects on F₀ or F₁ male or female fertility indices, copulatory indices, gestation length, mean number of live/dead pups. No effects were observed on pup survival, weaning, or pup body weight throughout lactation.

LOAEL (maternal toxicity) = 500 mg/kg/day (based on mortality and clinical signs of toxicity)

NOAEL (maternal toxicity) = 100 mg/kg/day

NOAEL (developmental toxicity) = 1000 mg/kg/day (highest dose tested)

Sodium octanoyloxybenzene sulfonate (C8 AOBS)
(CASRN not specified for supporting chemical)

In a prenatal developmental toxicity study, pregnant Sprague-Dawley rats (25/dose) were administered a single dose of sodium octanoyloxybenzene sulfonate at 0, 500, 1000 or 1500 mg/kg/day by oral gavage on gestation days 6 through 15. Maternal body weights and food consumption were recorded on days 0, 6, 9, 12, 16, and 20. Cesarean sections were performed on surviving females on gestation day 20. Fetuses were individually weighed, sexed and examined for external malformations and variations. Fifty percent of the fetuses were examined for soft tissue malformations and the other fifty percent for skeletal malformations. Three dams died on gestation day 13 or 15 at 1500 mg/kg/day. Necropsies of these animals showed reddened stomach mucosa and distended intestines. Clinical observations in surviving dams at 1000 and 1500 mg/kg/day included rales and wet matted haircoat. Decreased maternal body weights were seen at all dose levels during the first two measured intervals of treatment (observation days 6 to 9 and 9 to 12); and only at 1500 mg/kg/day on observation days 12 to 16 (significance not reported). No treatment related effects were observed on ovulation, implantation, intrauterine development and embryogenesis. No treatment-related effects were reported in the fetuses for visceral and skeletal examinations or for any other fetal parameters.

LOAEL (maternal toxicity) = 1500 mg/kg/day (based on mortality)

NOAEL (maternal toxicity) = 1000 mg/kg/day

NOAEL (developmental toxicity) = 1500 mg/kg/day (highest dose tested)

Genetic Toxicity – Gene Mutation

In vitro

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

Salmonella strains TA98, TA100, TA 1535, TA1537, TA1538 and *Escherichia coli* WP2 and WP uvrA were tested with and without metabolic activation at 50 to 20,000 µL/ plate for 48 hours. Positive and negative controls were used but the response was not stated. Cytotoxicity was not indicated.

Nonanoic acid, sulfophenyl ester, sodium salt was not mutagenic in this assay.

Genetic Toxicity – Chromosomal Aberrations

In vivo

50% sodium octanoyloxybenzene sulfonate (C8 AOBS) and 50% sodium decanoyloxybenzene sulfonate (C10 AOBS) (CASRNs not specified for supporting chemicals)

An *in vivo* cytogenetic assay was performed in which Sprague-Dawley rats (3/sex/dose/sacrifice time point) were administered the test chemical at 320, 1100, and 3100 mg/kg/day with sacrifice times of 6, 24 or 48 hours. Additional groups were administered 160, 500, and 1600 mg/kg/day for 5 days. Negative and positive controls showed appropriate responses. Bone marrow samples were collected and analyzed. There was no statistically significant increase in chromosomal aberrations in any treatment group.

C8 AOBS/ C10 AOBS did not induce chromosomal aberrations in this assay.

Genetic Toxicity – Other Endpoints

In vivo

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

An unscheduled DNA synthesis assay was performed using Sprague-Dawley male rats (10/dose) administered a single dose of the test chemical via oral gavage at 500, 1000 and 2000 mg/kg/day. Hepatocytes were isolated at 2 – 4 hours or 12 – 16 hours after dosing. Negative and positive controls were included. There were no treatment related effects after 2- 4 hours or 12-16 hours.

Nonanoic acid, sulfophenyl ester, Na salt did not induce unscheduled DNA synthesis in this assay.

Additional Information

Skin Irritation

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

Rabbits (five male and one female) received 0.5 mL of the test material (40% w/v suspension) applied to unabraded skin for 4 hours (group 1). In a second group of three male and three female rabbits, 500 mg/kg of undiluted test material was applied to unabraded skin for 4 hours. Group 1 animals had average dermal irritation scores of 0.54 for erythema and 0 for edema at 4 hours. Scores at 48 hours were 1.3 for erythema and 0 for edema. The primary dermal irritation index was 0.9. Group 2 animals had average dermal irritation scores of zero at 4 and 48 hours.

Nonanoic acid, sulfophenyl ester, sodium salt was irritating but not corrosive in this assay.

Eye Irritation

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

(1) Nine rabbits (Group 1= two males and one female, Group 2 = two males and one female, Group 3= 1 male and 2 females) received the following conjunctival instillations of test substance. The right eye of group one was administered 3 mg/kg without rinsing and held closed for one second. The right eye of group two was administered 3 mg/kg and rinsed with 20 mL of water after 4 seconds. The right eye of group 3 was administered 0.1 mL of a 10% w/v solution without rinsing and held closed for one second. Their eyes were examined for corneal opacity, iritis and conjunctivitis. Group 1 rabbit eyes had a maximum average score of 16.7 (day 1). Corneal and iridial effects were seen in two of three rabbits and conjunctival irritation (redness, swelling) was mild. Group 2 rabbit eyes had a maximum average score of 5.3 (day 1) with no corneal effects and mild iritis and conjunctivitis. Group 3 rabbit eyes had a maximum average score of 28 at day 1. Corneal involvement, mild iritis and mild to severe conjunctival irritation were seen in all animals.

Nonanoic acid, sulfophenyl ester, sodium salt was irritating in this assay.

(2) Nine rabbits (Group 1= three males and three females, Group 2= one male and 2 females) received 0.01 mL of the test substance directly on the cornea of one eye without rinsing (group 1) and rinsing (group 2) with 20 mL of water. The rabbit eyes were examined for corneal

opacity, iritis and conjunctivitis. Group 1, unrinsed eyes had a maximum average score of 33.7 (day 2). Corneal and iridial effects were seen in all rabbits and conjunctival irritation ranged from mild to severe. Group 2, rinsed eyes had a maximum average score of 20 (day 1). Effects included mild corneal involvement in one rabbit, mild iridial effects and mild to severe conjunctival irritation.

Nonanoic acid, sulfophenyl ester, sodium salt was irritating in this assay.

Skin Sensitization

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

(1) Hartley albino guinea pigs (10/sex/dose-treated; 5/sex/dose-control) were exposed to a 20% aqueous solution applied under a dermal patch, for 6 hours/day, 1 day/week for 3 weeks (induction). A 20% aqueous solution was also used for the challenge. The skin was removed after 19, 24 and 48 hours post challenge.

Nonanoic acid, sulfophenyl ester, sodium salt is not a skin sensitizer in this assay.

(2) Hartley albino guinea pigs (10/sex/dose-treated; 5/sex/dose-control; 5/sex/dose-naïve control) were exposed to a 5% aqueous solution applied under a dermal patch, for 6 hours/day, 1 day/week for 3 weeks (induction). A 2.5% aqueous solution was used for the challenge and animals were re-challenged with a 1% solution for six hours. The test sites were graded for responses at 24 and 48 hours following patch removal. Following the primary challenge, 6/20 test animals showed signs of sensitization and following the re-challenge, 2/20 animals showed signs of sensitization.

Nonanoic acid, sulfophenyl ester, sodium salt is a skin sensitizer in this assay.

(3) Hartley albino guinea pigs (10/sex/dose-treated; 5/sex/dose-control) were exposed to a 10% aqueous solution applied 6 hours/day, 1 day/week for 3 weeks (induction). A 0.5% aqueous solution was used for the challenge (similarly applied). Test sites were graded at 24 and 48 hours following patch removal. Irritation was noted during induction. At 24 and 48 hours, a skin sensitization was observed in 1/20 test animals.

Nonanoic acid, sulfophenyl ester, sodium salt was not a skin sensitizer in this assay.

(4) A local lymph node assay was performed in mice in which five mice/dose (sex not specified) were treated daily for 3 days by direct epicutaneous application of 25 µL test article to each ear. Test concentrations were 0.5, 1, 5, and 10%. Mice were injected with a label approximately 71 hours after the final application, to label proliferating cells. The stimulation indices for all treated animals from day 1 through day 6 were 0.7, 0.9, 0.6, and 0.5 for 0.5, 1, 5, and 10% concentrations, respectively.

Nonanoic acid, sulfophenyl ester, sodium salt did not significantly increase lymph node proliferation in this assay.

Absorption, Distribution, Metabolism and Excretion (ADME)

Nonanoic acid, sulfophenyl ester, sodium salt (CASRN 91125-43-8)

Sprague-Dawley male rats (4/dose) received a single dose of nonanoic acid, sulfophenyl ester, sodium salt via oral gavage at 10 mg/kg/day or dermal application of 100 mg/kg/day solution, of

[¹⁴C] nonanoyloxybenzene sulphonate (uniformly ring-labeled). Fecal and urine samples were collected at 24, 48 and 72 hours after dosing. Carbon dioxide samples were collected at 8-hour intervals for 72 hours. Less than 1% of the dermal dose of the test substance was absorbed. Approximately 80% of the oral gavage dose was excreted in urine, 1.6% in feces, <0.22% as carbon dioxide and 20% in acid wash of the metabolic cage.

Nonanoic acid, sulfophenyl ester, sodium salt was rapidly metabolized via the oral route and slowly metabolized via the dermal route in this assay.

Conclusions: The acute oral toxicity of CASRN 91125-43-8 in rats is low and the acute dermal toxicity is moderate in rabbits. In a 13-week dietary repeated-dose toxicity study in rats, the supporting chemical, C8AOBS, showed no treatment-related effects at concentrations up to and including 1000 mg/kg/day; the NOAEL for systemic toxicity in rats is ~1000 mg/kg/day (the highest dose tested). A 28-day dermal repeated-dose toxicity study in rabbits with the supporting chemical, C10AOBS, showed no adverse effects at ~400 mg/kg/day; the NOAEL for systemic toxicity in rabbits is ~400 mg/kg/day (the highest dose tested). In a one-generation oral reproductive toxicity study in rats, CASRN 91125-43-8 showed no reproductive or developmental toxicity at doses up to 1000 mg/kg/day; the NOAEL for reproductive/developmental toxicity is 1000 mg/kg/day (highest dose tested). Possible signs of treatment-related mortality and clinical signs of toxicity were observed in the dams at 500 mg/kg/day and greater; the NOAEL for maternal toxicity is 100 mg/kg/day. In an oral prenatal developmental toxicity study in rats, the supporting chemical, C8AOBS, showed maternal mortality at 1500 mg/kg/day. The NOAEL for maternal toxicity is 1000 mg/kg/day. In the same study, no treatment-related effects were observed in the fetuses at doses up to 1500 mg/kg/day (highest dose tested). CASRN 91125-43-8 was not mutagenic in bacteria *in vitro*, and did not induce DNA synthesis in rats *in vivo*. Supporting chemicals C8AOBS and C10AOBS combined, did not induce chromosomal aberrations in rat bone marrow *in vivo*. CASRN 91125-43-8 is irritating to rabbit skin and eyes, and is not a dermal sensitizer in guinea pigs or a dermal sensitizer in mice based on the local lymph node assay.

Table 3: Summary of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program – Human Health Data

Endpoints	SPONSORED CHEMICAL	SUPPORTING CHEMICAL	SUPPORTING CHEMICAL	SUPPORTING CHEMICALS
	Nonanoic acid, sulfophenyl ester, sodium salt (NOBS) (91125-43-8)	Sodium octanoyloxybenzene sulfonate (C8 AOBS; CASRN not specified)	Sodium decanoyloxybenzene sulfonate (C10 AOBS; CASRN not specified)	50% C8AOBS/ 50% C10AOBS (CASRN not specified)
Acute Oral Toxicity LD₅₀ (mg/kg-bw)	6030	–	–	–
Acute Dermal Toxicity LD₅₀ (mg/kg-bw)	> 800	–	–	–
Repeated-Dose Toxicity NOAEL/LOAEL Oral (mg/kg/day)	No Data NOAEL ~ 1000 (RA)	NOAEL ~ 1000 (highest dose tested)	–	–
Repeated-Dose Toxicity NOAEL/LOAEL Dermal (mg/kg/day)	No Data NOAEL ~ 400 (RA)	–	NOAEL ~ 400 (highest dose tested)	–
Reproductive Toxicity NOAEL/LOAEL Oral (mg/kg/day)	NOAEL = 1000 (highest dose tested)	–	–	–
Developmental Toxicity NOAEL/LOAEL Oral (mg/kg/day)				
Maternal	LOAEL = 500 NOAEL = 100	LOAEL = 1500 NOAEL = 1000	–	–
Developmental	NOAEL = 1000 (highest dose tested)	NOAEL = 1500 (highest dose tested)		

Table 3: Summary of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program – Human Health Data

Endpoints	SPONSORED CHEMICAL	SUPPORTING CHEMICAL	SUPPORTING CHEMICAL	SUPPORTING CHEMICALS
	Nonanoic acid, sulfophenyl ester, sodium salt (NOBS) (91125-43-8)	Sodium octanoyloxybenzene sulfonate (C8 AOBS; CASRN not specified)	Sodium decanoyloxybenzene sulfonate (C10 AOBS; CASRN not specified)	50% C8AOBS/ 50% C10AOBS (CASRN not specified)
Genetic Toxicity – Gene Mutation <i>In vitro</i>	Negative	–	–	–
Genetic Toxicity – Chromosomal Aberrations <i>In vivo</i>	No Data Negative (RA)	–	–	Negative
Genetic Toxicity– DNA Synthesis	Negative	–	–	–
Additional Information Skin irritation (Rabbit) Eye irritation (Rabbit) Skin sensitization (Guinea Pig & Mice) ADME (Oral) (Dermal)	Irritating Irritating Negative Rapid Slow	– – – –	– – – –	Irritating

Measured data in bold text; – indicates that endpoint was not addressed for this chemical.

4. Hazard to the Environment

A summary of aquatic toxicity data submitted for SIDS endpoints is provided in Table 4. There were precipitates in the acute fish and aquatic invertebrate toxicity tests; therefore, these data were not adequate for the evaluation of the toxicity of CASRN 91125-43-8.

Acute Toxicity to Fish

No adequate data were provided for this endpoint.

Acute Toxicity to Aquatic Invertebrates

No adequate data were provided for this endpoint

Toxicity to Aquatic Plants

Pseudokirchneriella subcapitata were exposed to CASRN 91125-43-8 (98.3% purity) at nominal concentrations of 0, 2, 4.5, 10, 23 or 50 mg/L for 72 hours under static conditions. The corresponding mean measured concentrations were 0, 0.05, 0.19, 0.38, 0.91, 4.6 or 35.5 mg/L.

72-h EC₅₀ (growth rate) = 26.3 mg/L

72-h EC₅₀ (biomass) = 9.3 mg/L

Conclusions: The potential hazard of CASRN 91125-43-8 to fish and aquatic invertebrates cannot be evaluated because no adequate data were available for these endpoints. The 72-hour EC₅₀s for aquatic plants are 9.3 mg/L (biomass) and 26.3 mg/L (growth rate).

Table 4. Summary of the Screening Information Data Set as Submitted under the U.S. HPV Challenge Program – Aquatic Toxicity Data	
Endpoints	Nonanoic acid, sulfophenyl ester, sodium salt (NOBS) (91125-43-8)
Fish 96-h LC₅₀ (mg/L)	No adequate data
Aquatic Invertebrates 48-h EC₅₀ (mg/L)	No adequate data
Aquatic Plants 72-h EC₅₀ (mg/L) (growth rate) (biomass)	26.3 9.3

bold = measured data (i.e., derived from testing)