

I U C L I D

Data Set

Existing Chemical : ID: 70191-75-2
CAS No. : 70191-75-2

Producer Related Part
Company : The Dow Chemical Company
Creation date : 14.08.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 14.08.2001

Memo :

Printing date :
Revision date :
Date of last Update : 22.08.2003

Number of Pages :

Chapter (profile) :
Reliability (profile) :
Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : % w/w
Remark : The substance is generally sold as an approximately 50% aqueous solution containing both the mono and di alkylated disulfonated acids
14.08.2001

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benzenesulfonic acid, decyl(sulfophenoxy)-
14.08.2001

Decyl(sulfophenoxy)benzenesulfonic acid
14.08.2001

Dowfax 3B0 surfactant
14.08.2001

1.3 IMPURITIES

CAS-No : 7664-93-9
EINECS-No : 231-639-5
EINECS-Name : sulphuric acid
Contents : < 4 % w/w
Remark : The commercial product contains both mono and di alkylated disulfonated substances. There is also a small amount of sulfuric acid present in the approximately 50% aqueous commercial solution.
14.08.2001

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Value : = 290 ° C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (2)

2.2 BOILING POINT

Value : = 660° C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (2)

2.3 DENSITY**2.3.1 GRANULOMETRY****2.4 VAPOUR PRESSURE**

Value : 6.66E-19 hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
17.06.2002 (3)

2.5 PARTITION COEFFICIENT

Log pow : = 2.7 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, april 2000) available from aCD Labs (Toronto, Canada). Estimation of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (3)

2.6.1 WATER SOLUBILITY

Value : > 100000 mg/l at 25 ° C
Qualitative : of very high solubility
Pka : at 25 ° C
PH : ca. 5 - 9 at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in environmental pH range of 5 to 9 estimated based on product formulation information. Formulations contain 10 to 50% of surfactant in water. Therefore solubility >100,000 mg/L.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (3)

2.6.2 SURFACE TENSION**2.7 FLASH POINT****2.8 AUTO FLAMMABILITY****2.9 FLAMMABILITY****2.10 EXPLOSIVE PROPERTIES****2.11 OXIDIZING PROPERTIES****2.12 ADDITIONAL REMARKS**

Memo : The pH of the commercial product is 1.5-2.5.
15.08.2001

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : These substances have no hydrolyzable functional groups so hydrolysis is not expected.
Flag :

3.1.3 STABILITY IN SOIL

3.2 MONITORING DATA

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Species : rat
Strain : Fischer 344
Sex : male
Number of animals : 3
Vehicle :
Value : = 1000 - 2000 mg/kg bw
Method : other
Year : 1994
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three male Fischer 344 rats/dose received 1000 or 2000 mg/kg of neat Dowfax 3B0 by single-dose oral gavage. Surviving rats were weighed on days 1, 2, 8 and 15. Daily observations were made.
Result : Two of the three rats dosed at 2000 mg/kg died by test day three. All animals survived the test period at the 1000 mg/kg dose. Clinical signs indicative of systemic toxicity, in the 2000 mg/kg dose level consisted of salivation, lacrimation, decreased activity, loose stool and urine and fecal soiling. The clinical signs began within 3 hours after dosing and persisted through test day two. The surviving animal appeared normal from test day three through the remainder of the two week observation period. Clinical signs indicative of systemic toxicity, in the 1000 mg/kg dose level consisted of salivation, loose stool, and urine and fecal soiling. The clinical signs were noted two hours post dosing. Urine soiling persisted through test day six. All animals appeared normal from test day 7 through the remainder of the two week observation period. All surviving rats gained weight over the duration of the study. The estimated acute oral LD50 of Dowfax 3B0 for male Fischer 344 rats was between 1000 and 2000 mg/kg.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (4)

Type : LD50
Species : rat
Strain : Sprague-Dawley
Sex : female
Number of animals : 6
Vehicle :
Value : = 3011 mg/kg bw
Method : other
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Groups of 6 female Sprague-Dawley rats were given 630, 1300, 2500 or 5000 mg/kg of the undiluted test material by single-dose oral gavage. The rats were observed daily (weekdays), weighed on days 1, 7 and 14 and all survivors were submitted for gross pathologic exam on day 14.
Result : Following dosing, all rats on test were lethargic. In addition, rats of 1300, 2500 and 5000 mg/kg dose groups had piloerection. All surviving rats gained weight during the 2-week post-treatment observation period, and no treatment-related effects were observed upon gross pathological examination of all survivors at 2 weeks. Thus the LD50 was calculated by the moving average method to be 3011 mg/kg (2295-4341 mg/kg, 95% confidence interval).
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (5)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 4 day
Number of animals : 1
PDII :
Result : highly irritating
EC classification : corrosive (causes burns)
Method : Estimation
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted test material was applied to two sites on the shaved belly of a white rabbit. One site was abraded with a needle to penetrate the stratum corneum. Both sites were covered with cotton wool and then stomach was wrapped with cotton cloth held in place with tape to the marginal fur. REadings for irritation were made after 24 hours and then daily. Reapplication was made 3 times to the abraded site (per normal procedure, as the abrasions heal by this time) and 4 times to the intact site (stopped after 4 due to a burn). Readings were then made daily through day 11, on day 14, day 21 and day 23.
Result : Repeated contact with confined skin resulted in marked redness, moderate swelling, very slight exfoliation, and, after 2 applications, a moderate burn which resulted in scar formation.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (6)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time : 10 day
Number of animals : 1
PDII :
Result : irritating
EC classification : not irritating
Method : Estimation
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted test material was applied to the ear of a white rabbit each weekday until 10 applications had been made. Readings were made every day prior to application and on days 14, 21 and 23. This rabbit was the same one used in the occluded test.
Result : Prolonged and repeated contact with the unconfined rabbit skin (ear) resulted in marked redness, slight swelling and very slight exfoliation.
Test substance : A dark brown liquid called Dowfax 3B0.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (5)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	undiluted
Dose	:	
Exposure Time	:	
Comment	:	
Number of animals	:	1
Result	:	highly irritating
EC classification	:	risk of serious damage to eyes
Method	:	other
Year	:	1980
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Undiluted Dowfax 3B0 was instilled into both eyes of one white rabbit. One eye was washed after 30 seconds and the other was unwashed. Readings were made at 1 hr, 24 and 48 hrs, and at 7 and 14 days. The corneal readings were made both before and after staining with fluorescein.
Result	:	Instillation of Dowfax 3B0 into the eyes of a rabbit resulted in slight discomfort, moderate to severe conjunctival redness and swelling, moderate reddening of the iris, and moderate corneal injury. All signs of eye irritation were absent by 14 days.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint
25.04.2002		(5)

5.3 SENSITIZATION

5.4 REPEATED DOSE TOXICITY

Species	:	rat
Sex	:	male/female
Strain	:	no data
Route of admin.	:	oral feed
Exposure period	:	92 days
Frequency of treatment	:	Continuous in feed.
Post obs. period	:	None
Doses	:	125, 250, 500 and 1000 mg/kg/day
Control group	:	yes
NOAEL	:	= 500 mg/kg bw
LOAEL	:	= 1000 mg/kg bw
Method	:	other: early Dow
Year	:	1968
GLP	:	no
Test substance	:	other TS
Method	:	Groups of 10 rats/sex/dose were maintained for 92 days on diets containing 0 (control), 125, 250, 500 or 1000 mg/kg/day of Benax 3B1.

Rats were 51 days old when put on study. Food and water were available ad libitum. The rats were weighed twice weekly and were observed 'frequently' for changes in appearance and behavior. Mortality and food consumption records were kept. Terminal hematology was conducted: from 5 male rats/dose for the top 3 doses and from 5 females from the top 2 doses. Lungs, heart, liver, kidneys, spleen, testes, and brain were weighed. Bone marrow smears were prepared from femurs of 5 rats/sex/dose of control and top 2 doses. SGPT, BUN and AP activities

	<p>were determined at necropsy. A range of tissues was examined histologically.</p>
Result	: There was no effect at doses of 500 mg/kg/day and lower.
	<p>at 1000 mg/kg/day, the liver and kidney effects were noted as increased SGPT values, organ weight increases, and slight but considered-reversible histological changes (fatty liver and cloudy swelling in the kidneys). Body weights were also decreased at this dose.</p>
Test substance	: The test material was Benax 3B1 which contains a mixture of C-9 and C-10 linear alkyl chain ADPOS as sodium salts.
Reliability	: (2) valid with restrictions
Flag	: Material Safety Dataset
14.03.2002	(7)
Species	: dog
Sex	: male/female
Strain	: Beagle
Route of admin.	: oral feed
Exposure period	: 95 days
Frequency of treatment	: Contiuorous in feed.
Post obs. period	: None
Doses	: 0.25, j0.5 and 1.0% in the feed (81, 163 and 279 mg/kg/day for males and 89, 177 and 325 mg/kg/day for females)
Control group	: yes
NOAEL	: = 163 - 177 mg/kg bw
LOAEL	: = 279 - 325 mg/kg bw
Method	: other: early Dow
Year	: 1968
GLP	: no
Test substance	: other TS
Method	: Groups of two Beagle dogs/sex/dose were maintained on diets mixed to provide 0, 250, 500 or 1000 mg/kg/day of Benax 3B1.
	<p>Food and water were available ad libitum. The dogs were weighed weekly and were observed 'frequently' for changes in appearance and behavior. Weekly food consumption records were kept. pre-exposure and 89-day hematology and clinical chemistries (BUN, AP, BSP, SGOT and SGPT) were obtained from all dogs. Lungs, heart, liver, kidneys, spleen, testes, and brain were weighed. Bone marrow smears were prepared from the ribs of all dogs. A selection of tissues was examined histologically.</p>
Result	: There were no adverse effects at 0.5% in the diet and lower.
	<p>At 1% there was growth depression in males and increased portal cellularity in the livers. Some slight cloudy swelling of the hepatic cells was apparent in female dogs that were maintained on the high dose 1% level. All other parameters were within normal variation for the laboratory.</p>
Test substance	: Benax 3B1 is similar to Dowfax 3B0 but it contains a different mix of alkyl chains (C-9 and C-10 linear chains) and it's also a sodium salt ADPOS.
Reliability	: (2) valid with restrictions
Flag	: Material Safety Dataset
14.03.2002	(8)

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VITRO'

5.7 CARCINOGENITY

5.8 TOXICITY TO REPRODUCTION

5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.10 OTHER RELEVANT INFORMATION

5.11 EXPERIENCE WITH HUMAN EXPOSURE

- (1) Amount sold globally
- (2) The Dow Chemical Company, 2001
- (3) The Dow Chemical Company, 2001.
- (4) Gilbert, K.S., Dowfax 3B0: Acute Toxicological Properties, unpublished Dow report, 5 January 1994.
- (5) Henck, J.W., Acute Toxicological Properties and Industrial Handling Hazards of Dowfax* 3B0 Surfactant, unpublished Dow report, February 19, 1980.
- (6) Henck, J.W., Acute Toxicological Properties and Industrial handling Hazards of Dowfax* 3B0 Surfactant, unpublished Dow report, February 19, 1980.
- (7) Copeland, J.R., Olson, K.J., Results of 92 Day Dietary Feeding Studies of Benax 3B1 Surfactant (Dowfax 3B1 Surfactant) in Rats, T61.14-66761-3, May 10, 1968.
- (8) Olson, K.J., Wade, C., Results of 95 Day Dietary Feeding Studies of Benax* 3B1 (Dowfax* 3B1) Surfactant in Beagle Hounds, T61.14-66761-4, July 1, 1968.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 65143-89-7
CAS No. : 65143-89-7

Producer Related Part
Company : The Dow Chemical Company
Creation date : 23.08.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 23.08.2001

Memo :

Printing date :
Revision date :
Date of last Update : 14.08.2003

Number of Pages :

Chapter (profile) :
Reliability (profile) :
Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : solid
Purity : % w/w
Remark : This CAS RN (65143-89-7) represents the monoalkylated/disulfonated/disodium salt. The commercial product is made up of both CAS RN 65143-89-7 and CAS RN 70191-76-3 (dialkylated/disulfonated/disodium salt) with more of the product being the former. The US product MSDS states that 15-35% is CAS 65143-89-7 and 5-10% is CAS 70191-76-3.

NOTE: See letters on file with EPA and the Test Plan for HPV for further explanation of CAS RN usage.

The commercial product is normally about 50% solids in water. Use concentrations may be less. Some toxicity (irritancy) data have been generated on the use concentrations. Most of the tox information is for the 50% aqueous solution and some is for the dry solid.

08.04.2002

Substance type : organic
Physical status : solid
Purity : % w/w
Remark : This CAS RN (96024-29-2) represents the commercial mixture. The commercial product is made up of both CAS RN 65143-89-7 and CAS RN 70191-76-3 (dialkylated/disulfonated/disodium salt) with more of the product being the former. The US product MSDS states that 15-35% is CAS 65143-89-7 and 5-10% is CAS 70191-76-3.

The commercial product is normally about 50% solids in water. Use concentrations may be less. Some toxicity (irritancy) data have been generated on the use concentrations. Most of the tox information is for the 50% aqueous solution and some is for the dry solid.

06.12.2001

1.1.0 DETAILS ON TEMPLATE

1.1.1 SPECTRA**1.2 SYNONYMS**

Benzenesulfonic acid, hexadecyl(sulfophenoxy)-, disodium salt

23.08.2001

Benzenesulfonic acid, oxybis[hexadecyl-, disodium salt (CAS RN 70191-76-3)

23.08.2001

Disodium dihexadecyldiphenyloxide disulfonate (CAS RN 70191-76-3)

23.08.2001

Disodium hexadecyldiphenyloxide disulfonate

23.08.2001

Dowfax Detergent

22.03.2002

Dowfax* 8390 Solution Surfactant

23.08.2001

Dowfax* 8390-D Surfactant (solid)

23.08.2001

Hexadecyl(sulfophenoxy)benzenesulfonic acid, disodium salt

23.08.2001

Oxybis(hexadecylbenzenesulfonic acid), disodium salt (CAS RN 70191-76-3)

23.08.2001

XDS-8390

23.08.2001

XU-040341.00

24.08.2001

1.3 IMPURITIES

CAS-No : 7757-82-6

EINECS-No : 231-820-9

EINECS-Name : sodium sulphate

Contents : <= 1.5 % w/w

23.08.2001

CAS-No : 7647-14-5

EINECS-No : 231-598-3

EINECS-Name : sodium chloride

Contents : < 1 % w/w

Remark : Amounts shown are for the aqueous commercial solution.

23.08.2001

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Decomposition : yes at ca. 230 ° C
Sublimation :
Method : other: both OECD 102 and EEC 84/449
Year : 1988
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The capillary method was used.

Approx 109 g. of the test substance was dried for 10 hrs in a rotary evaporator, then in a stove for 4 days at 60C. This produced a yellow-brown powder which was ground. The weight of ground powder was 40.6g. This substance was put on a petri dis and deried in a stove for another 22 hrs at a temp of approx. 60C. The remaining off-white powder was used for the melting point determination.

The measurement was carried out using a Buechi 512, containing a liquid bath melting point device. A small amount of the substance was charged in a capillary glass tube and packed tightly. The tube was heated together with a thermometer and the temperature rise was adjusted to 3.0 K/min. Changes in consistence of the test subswtance and corresponding temperatures were registered.

Result : A fast rough determination showed consistency changes but no melting below 310C. So the test was repeated in duplicate. Observations were started at 220C with an adjusted temp rise of 3.0 C per minute. The test substance began producing air bubbles at about 230C and continued to turn 'foamy' up to 250C. Discoloration of the test material also took place--changing from off-white to red-brown.

Thus, the melting point/range of Dowfax 8390 could not be determined. The test substance started to disintegrate at approx 230C before reaching a melting point.

Test substance : Dowfax 8390 conmtaining 36.7% active ingredient, but which was evaporated to dryness prior to the test.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

26.04.2002

(1)

Value : = 320 ° C

Sublimation :

Method : other

Year : 2001

GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

30.10.2001

(2)

2.2 BOILING POINT

Value : = 99.6 - 100.1 ° C at 101.325 hPa

Decomposition :
Method : other: both EEC 84/449 and OECD 103
Year : 1988
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The capillary tube method was used.

The measurement was carried out using a Buechi 512 containing a liquid bath melting point device. A capillary glass tube was filled with the test substance to a height of 5-10 mm. The determinations were started at a temperature of approx 92C. At this temp. Dowfax 8390 was in a liquid phase. A boiling capillary was immersed into the test substance, whereafter the capillary glass tube was heated together with a thermometer and the temperature rise was adjusted to 0.5 K/min.

A quick, rough estimate was made and that was followed by a triplicate determination. Measurements started at approx. 92C. At this temperature the test substance was a light red-brown liquid and air bubbles already started to appear. With increasing the temperature, the amount of air bubbles increased and no change in color or viscosity was observed. The stream of air bubbles reached a maximum at 99.6-100.1C. When increasing the temperature to 190C the test substance changed into a white solid substance. All measurements were performed at atmospheric pressure.

Remark : Assumed hPa and kPa are the same (pressure reading at boiling point).

The test substance was not evaporated prior to the test.

It is likely that the boiling observed was the water boiling off (about 100C). The test substance was only heated to about 190C in this test, driving off the water, but not high enough to decompose it. This is as anticipated.

Test substance : The test sample was Dowfax 8390 containing 36.7% active ingredient in water.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002

(3)

Value : = 730 °C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001

(2)

2.3 DENSITY

Type : density
Value : = 1.1011 g/cm³ at 21.3° C
Method : Directive 84/449/EEC, A.3 "Relative Density"
Year : 1988
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Method : A pycnometer of 1 ml was used to determine the density of Dowfax 8390. An analytical balance, Mettler type AE 100, with an accuracy of 0.1 mg was used for the weighings.

All equipment and materials were at stable room temperatures for the test. The experiment was carried out in the traditional way--in duplicate. The density was determined to be 1.1011 g/cm³ at 21.3C. Individual values fall within the 0.001 g/ml range and therefore meet the quality criteria established pre-test.

Test substance : The test substance was Dowfax 8390, containing 36.7% active ingredient in water. The substance was tested 'as is'.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (4)

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : 1.07x10⁻²¹ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 17.06.2002 (2)

2.5 PARTITION COEFFICIENT

Log pow : = 5.9 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 was estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers were based on quantitative structure-activity relationships which account for dissociation as a function of pH.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (2)

2.6.1 WATER SOLUBILITY

Value : ca. 100,000 mg/l at 25 ° C
Qualitative : of very high solubility

Pka : at 25 ° C
PH : at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in the environment pH range of 5 to 9 was estimated based on the product formulation information. Formulations contain 10 to 50% of surfactant in water. Thus, solubility is >100,000 mg/L.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (2)

2.6.2 SURFACE TENSION

Test type : OECD harmonized ring method
Value : = 35.5 mN/m at 25 ° C
Concentration : 36.7 vol%
Method : Directive 84/449/EEC, A.5
Year : 1988
GLP : no data
Test substance : as prescribed by 1.1 - 1.4
Method : The procedure used followed that given in Vol. 27 of the Official J. of the European Communities dated 19.9.84 No. L 251 pages 37 to 43, entitled Part A: Methods for the determination of physico-chemical properties, A.f. Surface Tension.

All measurements were made at 25C on freshly diluted samples (less than one day old) of Dowfax 8390. The method used follows the OECD harmonized ring tensiometer method. Calibration of the equipment Kruess tensiometer Model K10) was carried out with Laboratory deionized water. Readings were repeated until equilibrium values were obtained in a sequence of 5 minute intervals. The measurements were performed by A. Schmitz on 30th September 1988, at the Dow Rheinmuenster Research Laboratory.

Result	:	Dowfax 8390	Surface Tension m N/m

		(36.7% active)	35.5
		100 g/liter	38.6
		10 g/liter	40.6
		1 g/liter	41.9
		0.1 g/liter	45.9
		0.01 g/liter	51.7

Test substance : The commercially available Dowfax 8390 containing 36.7% active ingredient was used in the test. Further dilutions were made using deionized tap water of conductivity less than 1.24 microS/cm.

Flag : Critical study for SIDS endpoint
 26.04.2002 (5)

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Type : abiotic
t1/2 pH4 : at degree C
t1/2 pH7 : at degree C
t1/2 pH9 : at degree C
Deg. Product :
Method : OECD Guide-line 111 "Hydrolysis as a Function of pH"
Year : 1995
GLP : yes
Test substance : other TS: solid powder XD-8390
Method : This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

An accurately weighed amount of the test material (range 222-251 mg) was added to 50.0 ml buffer solution (pH 4.0, 7.0 and 9.0). The filter-sterilized solutions were treated for 5 minutes with nitrogen gas to exclude oxygen. The incubation took place at 50 +/- 0.5C in the dark. The concentration of the test substance was determined by HPLC after 0, 2.4 hours and 5 days. pH values were checked at the beginning and at the end of the test.

Result : Dowfax 8390-D surfactant showed no decrease in concentration for any of its components after incubation at 50C at pH 4.0, 7.0 and 9.0 for up to 5 days. Correspondingly, the material can be termed to be hydrolytically stable.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

26.04.2002

(6)

3.1.3 STABILITY IN SOIL**3.2 MONITORING DATA****3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS****3.3.2 DISTRIBUTION**

Media : water - soil
Method : other (measurement): OECD Guideline 106
Year : 1995

Method	: For the investigation of the adsorption behavior three different soils were used: (I)strong silty sand (pH 4.0, 6.0% clay, 1.4% organic matter), (II)strong sandy loam (pH 7.5, 13.6% clay, 1.8% organic matter) and (III)weak sandy clay (pH 6.0, 17.8% clay, 1.35% organic matter). The soils were first equilibrated with water. To 2 g of each equilibrated soil 10 ml of an aqueous solution of the test material (Dowfax* 8390-D) (94.4 mg/l in 0.01 M CaCl ₂) was added. The following two controls were included: CaCl ₂ solution without test compound and test solution without soil. Incubation took place at room temperature with gentle tumbling over a period of 16 hours. Subsequently, the vials were centrifuged (5 min., 170 x g) and the supernatants pipetted off. The amount of residual test material still present in the supernatant after incubation (adsorption test) was analyzed with the help of HPLC. To follow the desorption of the test material 10 ml of 0.01 M CaCl ₂ solution was added to the treated soil samples. The vials were again tumbled for 16 hours at room temperature followed by centrifugation (5 min., 170 x g) and HPLC analysis of the supernatants.
Result	: This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland : Dowfax 8390-D surfactant attained 99.0, 99.5, and 99.2% adsorption to soil I, II and III, respectively; the corresponding values have been determined to be 1.2, 0.5 and 0.8%. These data correspond to the K _{oc} values (adsorption coefficients as a function of the organic carbon content of the soils) of 392x10 ² , 618x10 ² and 509x10 ² for soil type I, II and III, respectively.
Test substance	: Test material for this test was XD 8390-D, the dry powder version of the product.
Reliability Flag	: (1) valid without restriction : Critical study for SIDS endpoint
26.04.2002	(7)

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Type	: aerobic
Inoculum	: domestic sewage
Concentration	: 1mg/l related to Test substance 5mg/l related to Test substance
Contact time	: 28 day
Degradation	: <= 6 % after 28 day
Result	: under test conditions no biodegradation observed
Deg. Product	:
Method	: Directive 84/449/EEC, C.6 "Biotic degradation - closed bottle test"
Year	: 1990
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: The ready biodegradability of Dowfax 8390 was evaluated with the closed bottle test at concentrations of 1.0 and 5.0 mg/l. The test material was incubated for 28 days in an aerobic, aqueous medium which was inoculated with secondary effluent from a municipal sewage treatment plant. A 2 mg/l solution of sodium acetate served as a positive control. Oxygen concentration was determined at the start of the experiment and at days 5, 15 and 28, in duplicate. Degradation was calculated as the ratio of the biochemical oxygen demand to the chemical oxygen demand.
Result	: Incubation of Dowfax 8390 at 1.0 or 5.0 mg/l for 28 days resulted in 0% and 6% biodegradation, respectively. The same conditions resulted in

3. Environmental Fate and Pathways

Id 65143-89-7

Date 04.10.2002

more than 88% degradation of the sodium acetate control. Thus, Dowfax 8390 appears not to be readily biodegradable under the conditions of the closed bottle test.

Test condition : Temperature medium (after aeration): 20.2C
:)2-concentration of test medium (after aeration): 0.35 mg O2/l
: pH values of different stock solutions: 7.6-7.8
: Temperature of different stock solutions: 20.2C

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
15.08.2002 (8)

Type : aerobic
Inoculum : other: combined activated municipal and industrial sludge and soil microorganisms

Concentration : 22.3mg/l related to DOC (Dissolved Organic Carbon)
: 20.83mg/l related to DOC (Dissolved Organic Carbon)

Contact time : 28 day
Degradation : = 54 % after 28 day
Result : inherently biodegradable
Deg. Product :
Method : Directive 87/302/EEC, part C, p. 99 "Biodegradation: Zahn-Wellens test"
Year : 1996
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : Dowfax 8390 was at a 22.30 mg/l nominal DOC concentration.
: MADS was at a 20.83 mg/l nominal DOC concentration.
: Aniline and LAS were positive controls. Aniline/Dowfax mix was also tested.
: Samples of the reaction mixtures were removed for DOC analysis on days 0 (2.5hrs), 1,2,3,5,9,14,21,27 and 28.

Result : 45% of the dissolved organic carbon (DOC) of MADS and 54% of the DOC of the commercial product Dowfax 8390 (of which MADS is a major component) were removed by biodegradation, which classifies both materials as inherently biodegradable.

Reliability : (1) valid without restriction
26.04.2002 (9)

Type : aerobic
Inoculum : other: surface soil
Concentration : 2mg/l related to Test substance
: 20mg/l related to Test substance

Contact time :
Degradation : > 95 % after 4 day
Result :
Deg. Product : yes
Method : other
Year : 1996
GLP : yes
Test substance : other TS
Method : Microcosms (100-ml serum bottles) containing the subsurface soil were prepared with 20 g of soil and 20 ml of a synthetic groundwater at pH 7.5. The soil/water mixtures were amended with [14C]MADS at concentrations of 2 and 20 ppm. Microcosms containing the surface soil were prepared with 24 g of soil and 16 ml of water. The soil/water mixtures were amended with [14C]MADS at concentrations of 2 and 20 ppm. Microcosms were sparged with oxygen before sealing and then incubation at 99 and 85 days, respectively.

Duplicate microcosms were periodically sacrificed and analyzed (by LSC) to determine the concentrations of [14C]MADS and [14C]products. Distribution between parent and products was determined by PIC-HPLC.

Result : Selected microcosms were acidified, sparged with N₂ and used to collect ¹⁴CO₂ in traps with NaOH. Radioactivity in traps was quantified by LSC.
: Primary biodegradation (>95%) of 2 and 20 ppm [¹⁴C]MADS occurred within 4 days in a surface sandy loam soil.

After 85 days, mineralization to ¹⁴CO₂ ranged from 12% (20 ppm) to 29% (2 ppm) of the initial radioactivity.

In the subsurface soil, primary biodegradation of 2 and 20 ppm [¹⁴C]MADS occurred within 10 and 30 days, respectively.

Mineralization of [¹⁴C]MADS to ¹⁴CO₂ was <1% after 99d days.

Test substance : A disulfodiphenyloxide carboxylate was identified as a major product in both soils.
: The test substance was identified as a linear monoalkylated (C16 Chain length) Di-sulfonated Diphenyl Oxide Surfactant (MADS). This was synthesized as the ¹⁴C-labeled material--uniformly labeled on the disubstituted ring.

Reliability Flag : (1) valid without restriction
: Critical study for SIDS endpoint
26.04.2002

(9)

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20mg/l related to Test substance related to

Deg. Product Method : other: Soap & Detergent Assoc. Confirming Test (Semi-continuous activated sludge)

Year : 1977
GLP : no
Test substance Method : other TS

: Surfactant concentrations in the test were analyzed by the methylene blue, chloroform extraction method. Absorbance of the chloroform extracts were determined on a P-E Spectrophotometer that was calibrated with a standard LAS solution. The apparent LAS concentration is calculated from the absorbance measured.

Result : Return activated sludge was collected from the north basin of the E. Lansing, MI, WWTP for the inoculum. The units were run in duplicate. The sludge was acclimated and equilibrated for 8 days, up to the operational level of 20 mg/l of test and control surfactant. Aeration was maintained at 500 ml/min. Each day, 1 l of effluent was removed for analysis.
: Apparent biodegradability for an average of 7 days operation:

XD 8390-1 (early production) 87.70% (failed to pass 90% min)
XD-8390-2 (late production) 92.99% (passed)
XD 8390 composite 95.35% (passed)
LAS control 99.10%

Test substance : Analysis by HPLC indicated that biodegradability varied inversely with a peak identified as indicative of the presence of Dowfax 2A1.
: Three samples of Dowfax 8390 were used:

Early production
Late production
Composite

Reliability : (2) valid with restrictions
26.04.2002

(11)

Type : aerobic

3. Environmental Fate and Pathways

Id 65143-89-7

Date 04.10.2002

Inoculum : other: river water and sediments
Concentration : 1mg/l related to Test substance related to
Contact time : 7 day
Degradation : ca. 89 % after 7 day
Result :
Deg. Product :
Method : other: biodegradation in river water and sediments under varying redox conditions
Year : 1999
GLP : yes
Test substance : other TS
Method : The biodegradation of a linear, monoalkylated (C16 chain length), di-sulfonated diphenyl oxide surfactant (MADS) was evaluated in an aquatic sediment under different redox conditions. Reaction mixtures were prepared with river water and sediments, amended with 1 ppm [14C]MADS, and incubated in the dark at 21 +/- 1C.

Result : Separate reaction mixtures were incubated under aerobic conditions for 7 days to allow primary biodegradation of [14C]MADS to [14C]products to occur. Oxygen was depleted in the reaction mixtures and incubation continued under anaerobic (methanogenic) conditions. Approximately 89% primary biodegradation of [14C]MADS, defined as partial degradation of the aliphatic carbon side-chain, was observed within 7 days in aerobic sediment. Mineralization of [14C]MADS to 14C)2 reached 5% after 83 days, and 15% after 181 days. Little degradation of [14C]MADS occurred in killed control mixtures prepared with formalin, confirming that the mineralization observed was biologically mediated.

Test substance : Anaerobic: Mineralization of the [14C]products to 14CO2 was less than 2% after 181 days. In addition, no degradation of [14C]MADS was observed in reaction mixtures maintained under anaerobic conditions throughout the study. The test substance was identified as a linear monoalkylated (C16 Chain length) Di-sulfonated Diphenyl Oxide Surfactant (MADS). This was synthesized as the 14C-labeled material--uniformly labeled on the disubstituted ring.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
26.04.2002 (9)

Type : aerobic
Inoculum : activated sludge, industrial
Concentration : 1 mg/l related to Test substance
Contact time : 15 days
Degradation : > 95 % after 15 day
Result :
Deg. Product :
Method : other: biodegradation of 14C MADS in activated sludge
Year : 1996
GLP : yes
Test substance : other TS
Method : Activated sludge from the Dow Chemical Company Michigan Division WWTP was acclimated to 1 mg/l MADS and several co-substrates structurally related to MADS (and known to be biodegradable) prior to the addition of 1 mg/l [14C]MADS.

The acclimation phase lasted for 34 days. The reaction mixtures were maintained on a 3 or 4 day fill and draw cycle. The filtered supernatant was analyzed by HPLC.

3. Environmental Fate and Pathways

Id 65143-89-7

Date 04.10.2002

Result	: Two days after the last addition of synthetic sewage, C14 MADS was added to each of the reaction flasks at a conc. of 1 mg/l (18.9 microCi/flask). CO2 (caustic) traps were fitted on each reaction vessel.
Test substance	: In both municipal and industrial activated sludge following extended exposure to MADS and biodegradable co-substrates, biodegradation of [14C]MADS proceeded to [14C]products with little mineralization to 14CO2.
Reliability Flag	: (1) valid without restriction
26.04.2002	: Critical study for SIDS endpoint (12)
Type	: aerobic
Inoculum	: activated sludge, domestic
Concentration	: 2 to 250mg/l related to Test substance
Contact time	: 8 day
Degradation Result	: > 95 % after 8 day
Deg. Product Method	: other: biodegradation of C14 MADS in activated domestic sludge (activated and non)
Year	: 1996
GLP	: yes
Test substance Method	: other TS
	: The biodegradation of MADS in activated sludge was examined in 3 separate experiments: A: 2 to 250 mg/l [14C]MADS was added to activated sludge from the West Bay County WWTP. No acclimation to MADS was attempted. B: Activated sludge from the same WWTP was acclimated to both 20 mg/l MADS and its biodegradation products prior to the addition of 2 and 20 mg/l [14C]MADS. C: Both municipal and industrial activated sludge were acclimated to 1 mg/l MADS and several co-substrates structurally related to MADS prior to addition of 1 mg/l [14C]MADS. (industrial activated sludge reported in separate record)
Result	: One reaction solution from this experiment was used for direct analysis by LC-MS since it was likely to have the greatest amount of MADS products. In both municipal and industrial activated sludge following extended exposure to MADS and biodegradable co-substrates, biodegradation of [14C]MADS proceeded to [14C]products with little mineralization to 14CO2.
Test substance	: A disulfodiphenyloxide carboxylate was identified as the major product. C14 MADS [monoalkylated (C16 chain length), di-sulfonated diphenyl oxide surfactant] uniformly labeled on the di-substituted aromatic ring.
Reliability Flag	: (1) valid without restriction
26.04.2002	: Critical study for SIDS endpoint (12)
Type	: aerobic
Inoculum	: other: subsurface soil
Concentration	: 2mg/l related to Test substance 20mg/l related to Test substance
Contact time	:
Degradation Result	: > 95 % after 10 day
Deg. Product Method	: other: biodegradation of C14 MADS in subsurface soil
Year	: 1996
GLP	: yes
Test substance	: other TS

Method : Microcosms (100-ml serum bottles) containing the subsurface soil were prepared with 20 g of soil and 20 ml of a synthetic groundwater at pH 7.5. The soil/water mixtures were amended with [14C]MADS at concentrations of 2 and 20 ppm. Microcosms containing the surface soil were prepared with 24 g of soil and 16 ml of water. The soil/water mixtures were amended with [14C]MADS at concentrations of 2 and 20 ppm. Microcosms were sparged with oxygen before sealing and then incubation at 99 and 85 days, respectively.

Duplicate microcosms were periodically sacrificed and analyzed (by LSC) to determine the concentrations of [14C]MADS and [14C]products. Distribution between parent and products was determined by PIC-HPLC.

Result : Selected microcosms were acidified, sparged with N2 and used to collect 14CO2 in traps with NaOH. Radioactivity in traps was quantified by Primary biodegradation (>95%) of 2 and 20 ppm [14C]MADS occurred within 4 days in a surface sandy loam soil.

After 85 days, mineralization to 14CO2 ranged from 12% (20 ppm) to 29% (2 ppm) of the initial radioactivity.

In the subsurface soil, primary biodegradation of 2 and 20 ppm [14C]MADS occurred within 10 and 30 days, respectively.

Mineralization of [14C]MADS to 14CO2 was <1% after 99 days.

A disulfodiphenyloxide carboxylate was identified as a major product in both soils.

Test substance : The test substance was identified as a linear monoalkylated (C16 Chain length) Di-sulfonated Diphenyl Oxide Surfactant (MADS). This was synthesized as the 14C-labeled material--uniformly labeled on the disubstituted ring.

Reliability Flag : (1) valid without restriction
: Critical study for SIDS endpoint

26.04.2002

(9)

Type : aerobic
Inoculum : other: microorganisms isolated from activated sludge and soil
Deg. Product :
Method : other: biodegradation with microorganisms originating from different sources under C- and N-limitation

Year : 1998
GLP :

Test substance : as prescribed by 1.1 - 1.4
Method : This is a preliminary study.

Result : In a first assay, aqueous solutions of Dowfax* 8390 at concentrations ranging from 0.1 to 0.3 mM were passed through a trickling filter device inoculated with microorganisms isolated from activated sludge and soil. Microbial growth could be observed leading to suppression of effluent foaming and to degradation products which showed an increased polarity in HPLC whereas the UV chromatogram remained unchanged. It was concluded that alkyl chain shortening with no desulfonation would best explain these characteristics. An interesting observation was made indicating that growth only can take place in the presence of a polyester fleece (microorganisms using Dowfax 8390 as C-source seem to grow preferable on suitable surfaces).at

The eluate of the AM trickling filter experiment was treated with solid phase extraction and further purified from residual sulfate. Enrichment cultures growing on this purified eluate as the sole source of sulfur yielded degradation products with increased hydrophobicity and an unchanged UV

3. Environmental Fate and Pathways

Id 65143-89-7

Date 04.10.2002

spectrum which was interpreted as the result of desulfonation leaving the ring system intact. It is expected that desulfonation is a prerequisite for the later ring opening thus finally leading to complete mineralization of the product as has been observed in soil samples.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
26.04.2002 (13)

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20.3mg/l related to Test substance related to
Contact time : 24 hour(s)
Degradation : > 97 % after 24 hour(s)
Result :
Deg. Product : yes
Method : other: generation of biodegradation products for use in aquatic toxicity tests
Year : 1996
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : Activated sludge from a municipal wastewater treatment plant was maintained in 3 semi-continuous activated sludge (SCAS) units fed synthetic sewage on a 24-hour treatment cycle. Two SCAS units were fed only synthetic sewage to provide control effluent while the third unit was fed synthetic sewage amended with 20.3 mg/l (34 micromoles/l) Dowfax 8390 surfactant to provide effluent containing biodegradation products of the surfactant. Previous studies showed that Dowfax 8390 surfactant biodegraded to primarily disulfodiphenyloxide carboxylates.

Result : Reverse phase HPLC analyses of the activated sludge mixed liquor dosed with the test material at the beginning and end of a treatment cycle confirmed >97% degradation of the Dowfax 8390 surfactant. Clarified effluents from the SCAS units were collected in 3 separate composite samples over a 4-day period. Analysis of the 3 composite effluents demonstrated that residual concentrations of Dowfax 8390 surfactant were less than 0.05 mg/l. Strong anion exchange HPLC confirmed the presence of the biodegradation products of Dowfax 8390 surfactant in the composite effluent from the SCAS unit fed the surfactant, at an estimated concentration of 16 mg/l (34 micromoles/l). The chromatographic profile of the biodegradation products was consistent with that of a disulfodiphenyloxide carboxylate, previously identified as a degradation product of a major component of Dowfax 8390 surfactant.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
26.04.2002 (14)

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20mg/l related to Test substance related to
Contact time : 24 hour(s)
Degradation : > 99 % after 24 hour(s)
Result :
Deg. Product : yes
Method : other: generation of biodegradation products for use in aquatic toxicity tests
Year : 2000
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : Activated sludge from a municipal wastewater treatment plant (Midland, MI) was maintained in two semi-continuous activated sludge (SCAS) units fed synthetic sewage on a 24-hour treatment cycle. One SCAS unit was fed sewage amended with 20 mg/l Dowfax 8390 surfactant to provide a test effluent containing biodegradation products of the surfactant, while the

second unit was fed only synthetic sewage to provide a control effluent lacking surfactant or degradation products. Clarified effluents from each SCAS unit were collected as separate composite samples over a 5-day period.

Result : Primary biodegradation of Dowfax 8390 surfactant was observed in the SCAS unit fed the surfactant. Residual concentrations of Dowfax 8390 surfactant in the composite effluent were determined to be less than 0.18 mg/l, thus demonstrating greater than 99% removal of the parent surfactant in the activated sludge. HPLC and dissolved organic carbon analyses confirmed the presence of the biodegradation products of the surfactant in the composite effluent from the SCAS unit fed the surfactant, at an estimated concentration of 16 mg/l (33 micromoles/l). The chromatographic profiles of the biodegradation products were consistent with that of disulfodiphenyloxide carboxylates, previously identified as degradation products of a major component of Dowfax 8390 surfactant.

Reliability Flag : (1) valid without restriction
: Critical study for SIDS endpoint

26.04.2002 (15)

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20mg/l related to Test substance related to

Contact time :
Degradation Result : ca. 95 % after 7 day
Deg. Product Method :
: other: semi-continuous activated sludge test from J. Am. Oil Chemists Soc., 1965.

Year : 1974
GLP : no
Test substance Method : other TS
: Surfactant concentrations in the test were analyzed by the methylene blue chloroform extraction test.

The transmittance of the chloroform extracts were determined on a Beckman Spectrophotometer; from this value, the apparent LAS is calculated.

Settled, activated sludge from the E. Lansing, MI, WWTP was used as the inoculum. Duplicate aeration units were run for each sample to be tested, the LAS control and blank.

The sludge, after being charged into the aeration unit was acclimated over 4 days, up to the operational level of 20 mg/l of test and control surfactant. Daily, each unit was fed 10 ml of synthetic sewage solution to sustain required 2500 mg/l suspended solids.

Aeration was maintained at 500 ml/min over the 23 hr daily test period. Each day, a 1 l aliquot of the effluent liquid was removed from each unit for analysis.

Result : Biodegradation for an average of 7 days operation:

XD 8390 (Lot 10154)	95.84%
XD 8390 (Lot 09254)	94.47%
1:128 L&F	98.13%
1:256 L&F	98.47%
LAS	99.14%

Tube 4 containing 8390, lot 09254, on the 4th day of operation failed to pass the, "difference in percent removal of surfactant on any two consecutive days must not be more than 5%" (test requirement)

3. Environmental Fate and Pathways

Id 65143-89-7

Date 04.10.2002

	<p>The positive control, LAS was confirmed > required 97.5%. Dowfax XD 8390 met the SDA test requirements of >90% for biodegradability. The L&F samples also met the test requirements for biodegradability of >90%.</p>
Test substance	: Two lots of XD 8390 were used in the test (along with 2 disinfectant formulations from Lehn & Fink Products Co.).
Reliability 26.04.2002	: (2) valid with restrictions (16)
Type	: Aerobic and anaerobic
Inoculum	:
Concentration	: 1mg/l related to Test substance related to
Contact time	:
Degradation	: Aerobic 89 % after 7 days; anaerobic – 0% after 181 days
Result	:
Deg. Product	:
Method	: other: biodegradation in river water and sediments under varying redox conditions biodegradation of radiolabeled surfactant in river water and sediments
Year	: 1999
GLP	: yes
Test substance	: other TS
Method	: The biodegradation of a linear, monoalkylated (C16 chain length), di-sulfonated diphenyl oxide surfactant (MADS) was evaluated in an aquatic sediment under different redox conditions. Reaction mixtures were prepared with river water and sediments, amended with 1 ppm [14C]MADS, and incubated in the dark at 21 +/- 1C.
	<p>Separate reaction mixtures were incubated under aerobic conditions for 7 days to allow primary biodegradation of [14C]MADS to [14C]products to occur. Oxygen was depleted in the reaction mixtures and incubation continued under anaerobic (methanogenic) condition</p>
Result	: Approximately 89% primary biodegradation of [14C]MADS, defined as partial degradation of the aliphatic carbon side-chain, was observed within 7 days in aerobic sediment. Mineralization of [14C]MADS to 14CO2 reached 5% after 83 days, and 15% after 181 days. Little degradation of [14C]MADS occurred in killed control mixtures prepared with formalin, confirming that the mineralization observed was biologically mediated.
	<p>Anaerobic: Mineralization of the [14C]products to 14CO2 was less than 2% after 181 days. In addition, no degradation of [14C]MADS was observed in reaction mixtures maintained under anaerobic conditions throughout the study.</p>
Test condition	: The pH of the River water sediment was 8.0 and it contained 0.5% organic matter
Test substance	: The test substance was identified as a linear monoalkylated (C16 Chain length) Di-sulfonated Diphenyl Oxide Surfactant (MADS). This was synthesized as the 14C-labeled material--uniformly labeled on the disubstituted ring.
Reliability Flag 15.08.2002	: (1) valid without restriction : Critical study for SIDS endpoint (9)
Type	: aerobic
Inoculum	: Indigenous microbial populations present in activated sludge, soil and sediment samples
Concentration	: 200 mg/L related to Test substance

Contact time	:	127 days
Degradation	:	3 to 8% mineralization to $^{14}\text{CO}_2$
Deg. Product	:	
Method	:	other
Year	:	2003
GLP	:	No
Test substance	:	Test substance used for enrichment phase prescribed by 1.1-1.4. To measure the extent of mineralization, the test substance was identified as a linear monoalkylated (C16 chain length) di-sulfonated diphenyl oxide surfactant (MADS). This compound was synthesized with uniform carbon-14 labeling on the di-substituted ring.
Method	:	Reaction mixtures were prepared with activated sludge, soil, and sediment in mineral medium and amended with 200 mg/L of test substance as the sole carbon source. Selected mixtures were also prepared and maintained under sulfur-limiting conditions. The mixtures were incubated at $25 \pm 2^\circ\text{C}$ with mixing for approximately 4 months. At selected time intervals, the mixtures were allowed to settle and a portion of the supernatant liquid was replaced with fresh mineral medium and test substance. The purpose was to enrich for a microbial population capable of mineralizing the test substance to carbon dioxide. After 70 and 127 days of operation, portions of the reaction mixtures were transferred to separate flasks equipped with CO_2 traps and amended with 1 mg/L of [^{14}C]MADS. The reaction mixtures were incubated for up to 21 days and the amount of $^{14}\text{CO}_2$ collected in the traps was measured.
Result	:	Mineralization of [^{14}C]MADS to $^{14}\text{CO}_2$ reached 3 to 8% of the radioactivity added after 21 days.
Reliability	:	(2) valid with restrictions Used well established methodology for determination of this endpoint. Results were consistent with other biodegradation studies cited in the EUB IUCLID for DPO (2000).
Flag	:	Critical study for SIDS endpoint
18.08.2003		(10)

3.6

Type	:	aerobic
Inoculum	:	Indigenous microbial populations present in soil and sediment samples
Concentration	:	1 mg/L related to Test substance
Contact time	:	52 weeks
Degradation	:	$51 \pm 19\%$ mineralization to $^{14}\text{CO}_2$ after 52 weeks in 3 surface soils and 6 surficial river sediments
Result	:	
Deg. Product	:	$^{14}\text{CO}_2$ major product; disulfodiphenyloxide carboxylates and other polar products detected.
Method	:	other
Year	:	2003
GLP	:	No
Test substance	:	The test substance was identified as a linear monoalkylated (C16 chain length) di-sulfonated diphenyl oxide surfactant (MADS). This compound was synthesized with uniform carbon-14 labeling on the di-substituted ring.
Method	:	Reaction mixtures were prepared with 25 gram dry weight of soil or sediment and 25 mL of tap water in 500 mL Erlenmeyer flasks. The flasks were equipped with CO_2 traps. The mixtures were amended with 1 mg/L of [^{14}C]MADS and incubated at $21 \pm 1^\circ\text{C}$ with mixing for 52 weeks. Traps were regularly replaced and the amount of $^{14}\text{CO}_2$ collected was measured.

At the conclusion of the study, the reaction mixtures were acidified to recover all [¹⁴C]carbonate as ¹⁴CO₂. Radioactivity remaining in solution was present as disulfodiphenyloxide carboxylates and other polar products. Biologically inhibited controls prepared by heat sterilization combined with the addition of 2% formalin showed no degradation of the [¹⁴C]MADS. Thus, the mineralization of [¹⁴C]MADS to ¹⁴CO₂ was biologically mediated.

Result : After 52 weeks, mineralization of [¹⁴C]MADS to ¹⁴CO₂ was observed in all of the viable reaction mixtures, ranging from 17 to 75% of the radioactivity added. Mineralization in the biologically inhibited controls was less than 0.3%.

Reliability : (2) valid with restrictions
Used well established methodology for determination of this endpoint. Results were consistent with other biodegradation studies cited in the EUB IUCLID for DPO (2000).

Flag : Critical study for SIDS endpoint

18.08.2003

(10)

BOD5, COD OR BOD5/COD RATIO

COD

Method : other: acidic dichromate digestion procedure (Hach)

Year : 1987

GLP : yes

COD : = 2.24 mg/g substance

Result : The resulting COD is calculated on a 100% active basis. COD (part of oxygen/part of product) =2.24.

Test substance : XDS 8390.00 was 35% active ingredient in water.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

26.04.2002

(17)

3.7 BIOACCUMULATION

Elimination :

Method : other: OECD Guidelines for determination of fat solubility EEC Directive 84/449

Year : 1988

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : A commercially available standard fat (HB 307) was used. This fat silulant is a synthetic mixture of saturated triglycerides with a fatty acid and triglyceride distribution similar to that of a coconut fat. The density of the standard fat was measured to be 0.91 g/cm³.

Approx. 109 g test substance was dried for approx 10 hrs in a rotary evaporator. The residue was put in a stove for 4 days at 60 C, resulting in a dry brown powder. This was ground and weighed 40.6 g. This ground material was put on a petri dish and dried in the stove for another 26 hrs at 60 C. The remaining off-white powder was used for the fat solubility determination.

A preliminary range-finding test was conducted. 102 mg of test substance was added to 100 ml standard fat and shaken in a water bath at 37C for about 16 hrs. A 5 ml sample of the fat was taken and accurately weighed. This sample was mixed with Milli-Q water for 2 minutes; the mix was refrigerated to solidify the fat; the clear water phase was diluted 5X with

more Milli-Q water using variable volume pipettes and volumetric flasks; the concentration of the test substance in the diluted water sample was determined spectrophotometrically at 235 nm. A recovery experiment and blank were performed. Recoveries were low and results were not reproducible. Modifications were made without success.

Thus, the main experiment was conducted with a very low concentration of test substance in fat. Four Erlenmeyer flasks were used for the test. approx. 10 mg test substance and 100 ml of liquefied and mixed standard fat were added to each. The flasks were tightly closed; two were shaken in a water bath at 30 C and two at 50 C for one hour; all 4 flasks were then placed in a bath at 37C and stirred for 3 hrs; let rest for 30 minutes; observations of consistency made; returned to bath at 37C and stirred for another 20.5 hrs; rested for 1.5 hrs to equilibrate; another observation for consistency made; flasks left to rest 20 more hours and then observed again. The observations were for finding traces of the solid undissolved material.

Result : After each of the 3 observations, there was still solid test material observed in the flasks.

It was concluded that the test substance did not dissolve in standard fat at the concentration tested. A lower concentration could not be tested due to the limitations of the visual observations. From this, a maximum solubility of test substance in standard fat of <95 mg/1000 ml at a temperature of 37C was calculated.

Test substance : The test substance was Dowfax 8390 containing 36.7% active ingredient in water. The water was evaporated prior to the test.

Reliability : (1) valid without restriction

Flag : Risk Assessment

26.04.2002

(18)

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	: static
Species	: Oncorhynchus mykiss (Fish, fresh water)
Exposure period	: 96 hour(s)
Unit	: mg/l
Analytical monitoring	: no
Method	: other: 40 CFR part 792
Year	: 1996
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Samples of activated sludge effluent were prepared in semi-continuous activated sludge (SCAS) units in the Environmental Chemistry Research Lab, Health and Environmental Sciences, The Dow Chemical Company. Synthetic sewage amended with 20 mg/l Dowfax 8390 surfactant (nominal conc) was treated with municipal activated sludge to generate the biodegradation products. Effluents were provided from 3 SCAS units, designated Unit A, Unit B, and Unit C. Unit A was a post-treatment blank effluent with nominal treatment levels to the test organisms of 6.25, 12.5, 25.0, 50.0 and 100.0%. Unit B was the post-treatment blank effluent levels amended with Dowfax 8390 with nominal concentrations of 0.125, 0.25, 0.5, 1.0 and 2.0 mg/l for rainbow trout and 1.25, 2.5, 5.0, 10.0, and 20.0 mg/l for the daphnid. Unit C was the post-treatment Dowfax 8390 biodegradation product with nominal treatment levels of 6.25, 12.5, 25.0, 50.0 and 100.0% which corresponds to initial concentrations of Dowfax 8390 of 1.25, 2.5, 5.0, 10.0 and 20.0 mg/l. Both studies for the rainbow trout (96 hr) and daphnid (48 hr) were designed as static tests with replicate groups of 10 organisms exposed to each nominal concentration.
Result	: Rainbow Trout-Unit A and C: LC50 >100% with 95% CI >100% EC50 >100% with 95% CI >100%
Test condition	: Rainbow trout-Unit B: Nominal concentration of Dowfax 8390 LC50 0.7 mg/l (0.5-1.0, 95% CI) EC50 0.7 mg/l (0.5-1.0, 95% CI) Water Quality Measurements Laboratory water (Rainbow trout): Hardness (as CaCO ₃) 68 Alkalinity 40 Conductivity 240 pH 7.6 Chlorine 5.0 Daphnid water (Daphnid): Hardness (as CaCO ₃) 180 Alkalinity 45 Conductivity 540 pH 8.1 Chlorine <1 Test Vessel Data Rainbow trout: Temperature range (deg C) 11.6-12.3 pH range 7.0-7.6 Dissolved Oxygen (mg/L) 7.2-11.3 (>70% saturation) Daphnid: Temperature range (deg C) 19.6-20.9 pH range 7.3-7.7 Dissolved Oxygen (mg/L) 7.8-9.6 (>88% saturation) Light Intensity (lux) 2142 +/- 171.5

Conclusion : The non-amended effluent control (Unit A) had no effects on the rainbow trout. However, modified effluent in Unit B elicited toxicity to the trout, demonstrating that Dowfax 8390 added directly to the effluent caused toxicity, where the biodegradation products from activated sludge treatment of Dowfax 8390 (Unit C) did not.

Reliability : (1) valid without restriction
15.08.2002 (19)

Type : static
Species : Pimephales promelas (Fish, fresh water)
Exposure period : 96 hour(s)
Unit : mg/l
Analytical monitoring : no
Method : other: historic Dow test method
Year : 1975
GLP : no
Test substance : other TS
Method : Two Lots, #09254 and #10154, of Dowfax XD-8390 were evaluated for static acute fish toxicity with fathead minnows (*Pimephales promelas Rafinesque*). Groups of ten minnows were exposed to five concentrations of the toxicant (0.36, 0.603, 1.00, 1.67 and 2.79 mg/l--as 35% active) in ten liters of Lake Huron water at 10C for 96 hours. A control exposure with fish, but without toxicant, was included to provide a measure of the health of the test fish and quality of dilution waters.

Result : Lot 09254 (mg/l active ingredient)
 NOEC: <0.36
 Partial Kill: 0.36
 100% Lethal: 1.67
 LC50: 0.86

Lot 10154 (mg/l active ingredient)
 NOEC: 0.36
 Partial Kill: 0.60
 100% Lethal: 1.67
 LC50: 1.03

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (20)

Type : static
Species : *Salmo gairdneri* (Fish, estuary, fresh water)
Exposure period : 96 hour(s)
Unit : mg/l
Analytical monitoring : no
NOEC : m = .1
LC50 : c = .42
LC100 : m = 1
EC50 : c = .36
Method : OECD Guide-line 203 "Fish, Acute Toxicity Test"
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : This study was carried out at the request of Dow Chemical Europe, Horgen, Switzerland.

Test condition : Rainbow trout with a length of about 5 cm are exposed to various concentrations of the test material (0.1, 0.18, 0.32, 0.56, 1.0, 1.8 and 3.2 mg/l) for 96 hrs. Effects were recorded at 24-hr intervals. A range-finding test using 5 fish/dose determined doses for the acute test. Ten fish per dose were used in the acute test (6 fish in 17 l aquarium and 4 fish in 12 l aquarium). All solutions were prepared within 4 hrs of use.

: During the final acute test, the Ph ranged from 8.1 to 8.4 between 0 hours

and 96 hours in the various test concentration vessels. Likewise, the pO₂ levels were between 7.5 and 9.2 mg/l.

Conclusion : It was concluded, based on this study, that XD 8390 has high toxicity to fish.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

15.08.2002 (21)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type : static

Species : Daphnia magna (Crustacea)

Exposure period : 48 hour(s)

Unit : mg/l

Analytical monitoring : no

Method : other: 40 CFR Part 792

Year : 1996

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : Samples of activated sludge effluent were prepared in semi-continuous activated sludge (SCAS) units in the Environmental Chemistry Research Lab, Health and Environmental Sciences, The Dow Chemical Company. Synthetic sewage amended with 20 mg/l Dowfax 8390 surfactant (nominal conc) was treated with municipal activated sludge to generate the biodegradation products. Effluents were provided from 3 SCAS units, designated Unit A, Unit B, and Unit C. Unit A was a post-treatment blank effluent with nominal treatment levels to the test organisms of 6.25, 12.5, 25.0, 50.0 and 100.0%. Unit B was the post-treatment blank effluent levels amended with Dowfax 8390 with nominal concentrations of 0.125, 0.25, 0.5, 1.0 and 2.0 mg/l for rainbow trout and 1.25, 2.5, 5.0, 10.0, and 20.0 mg/l for the daphnid. Unit C was the post-treatment Dowfax 8390 biodegradation product with nominal treatment levels of 6.25, 12.5, 25.0, 50.0 and 100.0% which corresponds to initial concentrations of Dowfax 8390 of 1.25, 2.5, 5.0, 10.0 and 20.0 mg/l. Both studies for the rainbow trout (96 hr) and daphnid (48 hr) were designed as static tests with replicate groups of 10 organisms exposed to each nominal concentration.

Result : Daphnid-Unit A and C:
LC₅₀ >100% with 95% CI >100%
EC₅₀ >100% with 95% CI >100%

Daphnid-Unit B: Nominal conc. of Dowfax 8390
LC₅₀ 14.1 mg/l (11.6-18.2, 95% CI)
EC₅₀ 13.5 mg/l (11.1-17.3, 95% CI)

Test condition : Water Quality Measurements
Laboratory water (Rainbow trout):
Hardness (as CaCO₃) 68
Alkalinity 40
Conductivity 240
pH 7.6
Chlorine 5.0
Daphnid water (Daphnid):
Hardness (as CaCO₃) 180
Alkalinity 45
Conductivity 540
pH 8.1
Chlorine <1

Test Vessel Data
Rainbow trout:
Temperature range (deg C) 11.6-12.3

	pH range	7.0-7.6	
	Dissolved Oxygen (mg/L)	7.2-11.3 (>70% saturation)	
	Daphnid:		
	Temperature range (deg C)	19.6-20.9	
	pH range	7.3-7.7	
	Dissolved Oxygen (mg/L)	7.8-9.6 (>88% saturation)	
	Light Intensity (lux)		
Conclusion	:	The non-amended effluent control (Unit A) had no effects on the daphnia. However, modified effluent in Unit B elicited toxicity on both organisms, demonstrating that Dowfax 8390 added directly to the effluent caused toxicity, where the biodegradation products from activated sludge treatment of Dowfax 8390 (Unit C) did not.	
Reliability	:	(1) valid without restriction	
Flag	:	Critical study for SIDS endpoint	
15.08.2002			(19)
Type	:	static	
Species	:	Daphnia magna (Crustacea)	
Exposure period	:	48 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:	no	
NOEC	:	m = 5.6	
EC50	:	c = 13.9	
LC100	:	m = 56	
Method	:	other: stated as OECD Method 202, 1984 ?	
Year	:	1987	
GLP	:	yes	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The study was carried out at the request of Dow Chemical Europe, Horgen, Switzerland.	
		To assess the acute toxicity of the test material, less than 48 hrs old Daphnia are exposed to various concentrations of the test material (1.0, 1.8, 3.2, 5.6, 10, 18 32 and 56 mg/l) for 48 hrs. Immobility is then scored. About 250 Daphnia were placed into 10 liters of DSW in each of 2 glass vessels. The test was performed in duplicate. A range-finding test in 10 Daphnia determined final concentrations.	
Test condition	:	The DSW water had 84.8 mg/l HCO ₃ right after preparation, hardness was 11.7 deg DH, and the pH was 8.2.	
		During the final test, 0 hour pH ranged from 8.2 to 8.3 and pO ₂ ranged from 8.6 to 8.8 mg/l. At 48 hours, the pH ranged from 8.2 to 8.3 and the pO ₂ ranged from 8.6 to 8.8 in the various concentration vessels.	
Conclusion	:	It was concluded that XD 8390 has low toxicity to Daphnia magna, based on this study.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
15.08.2002			(20)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	Selenastrum capricornutum (Algae)
Endpoint	:	growth rate
Exposure period	:	72 hour(s)
Unit	:	mg/l
Analytical monitoring	:	yes
NOEC	:	c = 10
NOEC (inhibition of biomass formation)	:	c < 10
Method	:	OECD Guide-line 201 "Algae, Growth Inhibition Test"

Year	:	1995
GLP	:	yes
Test substance	:	other TS
Method	:	Subsequent to a range-finding study the cells of <i>S. capricornutum</i> were exposed to triplicate samples of an aqueous nutrient solution (approx. 50 ml) containing 10, 18, 32, 56 and 100 mg/l of the test material over a period of 72 hrs. Additional 6 parallel samples were included as blank controls without addition of the test material. Furthermore, one sample with the highest test substance concentration without algae was incubated. The incubation took place on a laboratory shaker under continuous illumination (7000-8000 lux). Samples of the algae suspensions were taken at 24, 48 and 72 hours and the cell number was determined by turbidity measurements with the use of a spectrophotometer at 720nm. The area under the growth curve and the growth rates were used as a base for the calculation of the concentration leading to 50% growth inhibition: EbC50 and ErC50 referring to the area under the growth curve (biomass) and to the growth rate, respectively.
Result	:	The study was conducted for Dow Chemical Europe, Horgen, Switzerland. The nominal effective 72-hr EbC50 of Dowfax 8390-D surfactant tested with <i>S. capricornutum</i> was 42 mg/l (95% confidence interval 30-68 mg/l). The EC50 value for growth rate reduction (ErC50: 0-72h) was beyond the test concentrations assayed. The NOEC for growth rate reduction and inhibition of biomass formation was 10.0 and <10.0 mg/l, respectively.
Test condition	:	Test medium pH was 0.24 mmol/l (24 mg CaCO ₃ /l). pH levels during the final study were 8.3 in each vessel at the beginning and end.
Test substance	:	The test material was the dry powder material.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
15.08.2002		(23)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

Type	:	aquatic
Species	:	activated sludge, domestic
Exposure period	:	30 minute(s)
Unit	:	mg/l
Analytical monitoring	:	no
EC50	:	c > 284
Method	:	OECD Guide-line 209 "Activated Sludge, Respiration Inhibition Test"
Year	:	1995
GLP	:	yes
Test substance	:	other TS
Method	:	The effect of the test material on the respiration rate of activated sludge from a municipal waste water treatment plant was determined by comparing the oxygen consumption of samples treated with 5 different concentrations of the test material (25, 50, 100, 200 and 284 mg/l) with two untreated control samples (oxygen determination at the start and at the end of the experiment). The oxygen consumption was measured with an oxygen electrode after an incubation period of 30 minutes at 20C. The susceptibility of the activated sludge was evaluated by the addition of 3,5-dinitrophenol (3.2, 10.0 and 32.0 mg/l).
Result	:	The test substance showed a slight inhibitory effect on aerobic waste water bacteria, the inhibition ranging from 11 to 25% at 25 and 200 mg/l, respectively. Since the slowly increasing inhibitory effect seemed to level-off at the highest concentration tested (only 26% inhibition at 284 mg/l) the EC50 value for Dowfax 8390-D surfactant could not be determined (EC50 > 284 mg/l). The control with 3,5-dinitrophenol showed an EC50 value of 6 mg/l indicating suitability of the test conditions.
Test condition	:	The pH of the synthetic sewage feed was 7.1 and the medium temperature

was 20C. Milli-Q water was used.
Test substance : The test material was Dowfax 8390-D surfactant (the dry powder material).
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 15.08.2002 (24)

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

Species : Daphnia magna (Crustacea)
Endpoint : other: survival, reproduction, growth
Exposure period : 21 day
Unit : mg/l
Analytical monitoring : yes
Method : other: OECD Method 211: Daphnia magna Reproduction Test. Adopted 9/21/98.
Year : 2001
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Result : Daphnid Survival:
 Survival in the DDW control and in all effluent treatments was $\geq 80\%$. No significant differences in survival were observed between any test treatment and the culture water control.

Daphnid Reproduction:

The mean number of young produced in each effluent treatment (Dowfax 8390 surfactant-amended or unamended) was not significantly less than the mean number of young produced by daphnids in culture water. The coefficient of variation for reproduction of DDW control animals was 19.5%.

Daphnid Growth:

Growth of daphnia in each effluent treatment (Dowfax 8390 surfactant-amended or unamended) was not significantly reduced relative to growth of daphnids in culture water. Average length of D. magna in the culture water control was 3.9 +/- 0.28 mm, while the average length of daphnids in effluent treatments was 4.2 +/- 0.2 mm with a range of 3.8-4.4 mm.

Test condition : Static-renewal (48-hr renewal): 21-day exposure duration. Ten replicates per treatment, one Daphnia magna/ replicate. The pH of test solutions averaged 7.3 +/- 0.1 (range: 7.1-7.6). The dissolved oxygen concentration averaged 8.8 +/- 0.2 mg/l (range: 8.2-9.2 mg/l); oxygen saturation in test vessels remained above 91%. Temperatures during the exposure period averaged 20.1 +/- 0.3 C (range=19.3-20.9C). The light intensity averaged 61.8 +/- 15.3 ft-candles (range = 30-95 ft-candles), equivalent to 665 +/- 165 lux (range = 323-1023 lux).

0 (DDW control); 6.25, 12.5, 25.0, 50.0 and 100% activated sludge effluent amended with Dowfax 8390 surfactant. Control effluent solutions were prepared with 6.25, 12.5, 25.0, 50.0 and 100% activated sludge effluent to which Dowfax 8390 surfactant was not added.
Conclusion : In summary, Dowfax 8390 surfactant degradation products did not reduce survival, reproduction, or growth of Daphnia magna. These results indicate that the toxicity of Dowfax 8390 surfactant is removed during the wastewater treatment process.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (25)

Species	: Daphnia magna (Crustacea)
Endpoint	: reproduction rate
Exposure period	: 21 day
Unit	: mg/l
Analytical monitoring	: yes
NOEC	: c = 1
NOEC	: m = .7
Method	: OECD Guide-line 202, part 2 "Daphnia sp., Reproduction Test"
Year	: 1996
GLP	: yes
Test substance	: other TS
Method	: Daphnia were exposed to nominal concentrations of the test material of 0.22, 0.46, 1.0, 2.2, 4.6, and 10.0 mg/l in a semi-static system (renewal of the test medium 3-times per week). The corresponding overall mean recovery in dosed solutions of the test compound was 76%, producing mean measured concentrations of 0 (water control), 0.1, 0.35, 0.76 1.67, 3.50, and 7.60 mg/L. Individual neonate Daphnids were put into 100 ml glass vessels containing 50 ml test medium. Ten parallel samples per test material concentration were incubated. The non-treated control consisted of 20 neonate Daphnides which were also individually incubated. The vessels were kept at 20-22C and illuminated for 16 hrs/day (600 lux). These animals were fed with Chlorella pyrenoidosa suspensions. Analytical verifications of the test compound concentrations were performed with HPLC. All LOEC, NOEC, and EC50 values were based on mean measured concentrations of test material. The mean recovery was 76%.
Result	: Complete mortality was observed by exposure day 12 for the 4.6 and 10.0 mg/L dose levels and no young daphnia were produced at either of these two dose levels. For the remaining concentrations, a significant impact on reproduction was only seen at the top average remaining dose level, a concentration of 1.67 mg/L, and a reduction of reproduction of young daphnia of 99.5% was noted over the 21-d exposure period. As shown in Table 1, at the remaining dose levels, either an insignificant reduction or a stimulation of reproduction was noted. The reproduction dose/response curve for the study is presented in Figure 1 and the calculated EC50 value (i.e. the dose level responsible for a chronic 50% reduction in daphnid reproduction) was 1.1 mg/L, based on mean measured concentrations. For the study, the LOEC was 1.67 mg/L and the NOEC value was 0.76 mg/L. The spread of the effect endpoints is due to the use of hypothesis testing to determine the LOEC and the NOEC values (P0.05) and is not due to a fault in the study design or conduct; the results are valid based on the experimental data.

Table 1. Chronic daphnid reproduction study with Dowfax 8390-D: Nominal and mean measured concentrations and reproduction data over the 21-day exposure period.

Nominal (mg/L)	Measured ^a (mg/L)	Number of mortalities	Day 0-21	Day 0-21	Day 0-21 Percent Reduction
			Mean Cumulative Young	SD ^b Cumulative Young	
0.00	0.00	1/10	191.9	13.8	
0.22	0.17	2/10	230.3	16.0	-20.0
0.46	0.35	1/10	233.4	9.6	-21.6
1.0	0.76	1/10	176.6	20.0	8.0
2.2	1.67	1/10	0.89	2.3	99.5
4.6	3.50	10/10 ^c	0		
10.0	7.60	10/10 ^d	0		

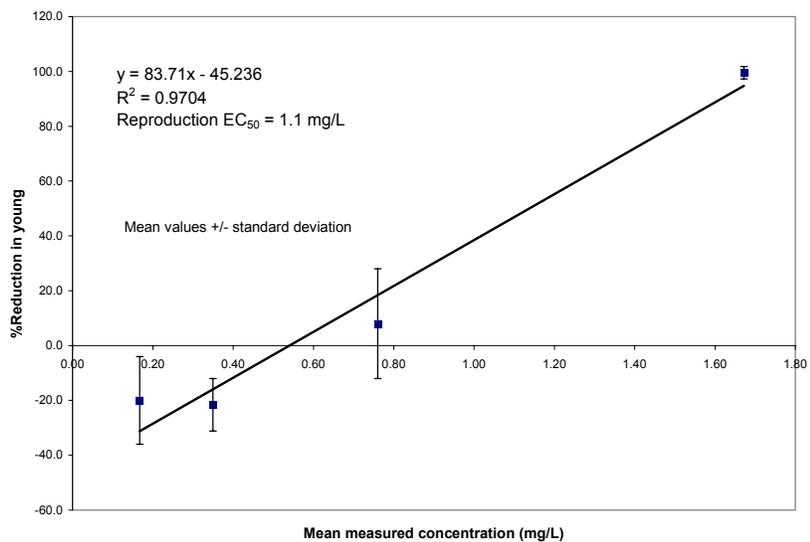
^a Based on an average recovery of 76% of fresh solutions

^b SD = Standard deviation

^c All adult and young daphnia dead by exposure day 12

^d All adult and young daphnia dead by exposure day 5

Figure 1. Daphnia reproduction dose/response curve for Dowfax 8390-D in the 21-day chronic daphnid reproduction study.



Test condition : After aeration the hardness of the medium M4 was 250 mg CaCO₃/l and the pH was 8.0.

During the test, the pH ranged from 7.8-8.3. Oxygen concentrations as mg O₂/l ranged from 7.1 to 9.5. The temperature of the medium ranged from 20.2 to 21.1 C.

Test substance : Dowfax 8390-D was used (that is the dry form of the product).

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

15.08.2002

(26)

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Species : rat
Strain : Sprague-Dawley
Sex : male/female
Number of animals : 5
Vehicle : water
Value : > 5000 mg/kg bw
Method : OECD Guide-line 401 "Acute Oral Toxicity"
Year : 1991
GLP : yes
Test substance : other TS
Method : Subsequent to a range-finding study, five male and five female Sprague-Dawley rats were given a single gavage dose of the test material as a solution in distilled water at a dose level of 5000 mg/kg body weight. Animals were observed at 0.5, 1, 2 and 4 hours after dosing and then once daily for 14 days. Individual body weights were recorded on the day of treatment and on days 7 and 14. Animals were examined for gross pathological changes at the termination of the study.

Result : The study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.
 : There were no deaths. One male rat had a hunched posture at 4 hrs after dosing. No other clinical signs were noted. There were no significant effects on body weights during the study and there were no treatment-related post-mortem observations at the termination of the study.

Test substance : The acute, oral median lethal dose (LD50) of Dowfax 8390 surfactant was >5000 mg/kg in the S-D rat.
 : The test material was a powdered (solid) sample of Dowfax 8390, with a purity of 91.6%.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (27)

Type : LD50
Species : rat
Strain : Wistar
Sex : male/female
Number of animals : 5
Vehicle : other: undiluted
Value : > 5000 mg/kg bw
Method : OECD Guide-line 401 "Acute Oral Toxicity"
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Dowfax* XD 8390 (primarily C-16 alkylated sodium sulfonated diphenyl oxide) was given undiluted by gavage to groups of 5 male and 5 female Wistar rats at a dose of 5000 mg/kg. The rats were observed immediately after dosing, at 2, 4, and 6 hrs after dosing and on days 1-6 and 14. The rats were weighed on days 0, 7 and 14 and were submitted for gross pathologic exams on day 14.
 : There were no mortalities during the 14-day observation period. Although diarrhea and reduced defecation were noted, the weekly group mean body gain of these animals was normal.

No treatment-related macroscopic abnormalities were observed at necropsy.

Since there were no mortalities, the LD50 is estimated to be >5000 mg/kg.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (28)

Type : LD50
Species : rat
Strain : Fischer 344
Sex : male
Number of animals : 3
Vehicle : other: undiluted commercial liquid
Value : > 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1995
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three male F344 rats received 2000 mg/kg of neat Dowfax 8390 by single-dose oral gavage. The rats were weighed on days 1,2, 8 and 15.
Result : All rats survived the 14-day observation period. Fecal soiling and salivation were observed from 3 hours after dosing through test day 3. Administration of Dowfax 8390 had no effect on body weight during the two week observation period. Therefore, under the conditions of this study, the estimated acute oral LD50 of Dowfax 8390 for male F344 rats was >2000 mg/kg.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (29)

Type : LD50
Species : rat
Strain : Fischer 344
Sex : female
Number of animals : 3
Vehicle : water
Value : ca. 1500 mg/kg bw
Method : other: Dow range-finding
Year : 1987
GLP : no
Test substance : other TS
Method : Three female Fischer 344 rats/dose were fed 20% aqueous solutions of XU-040341.00 by oral gavage in doses of 1000, 1500 and 2000 mg/kg. The rats were weighed on days 0, 1, 7 and 14 and were observed several times on day 0 and then daily on days 1-4, 7-11 and 14.
Result : Dead/Dose

1 dead/2000 mg/kg
 1 dead/1500 mg/kg
 0 dead/1000 mg/kg

Thus, the estimated LD50 for female F344 rats is 1500 mg/kg.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (30)

Type : LD50
Species : rat
Strain : Sprague-Dawley
Sex : female
Number of animals : 6

Vehicle	:	other: undiluted liquid dosed	
Value	:	= 7744 mg/kg bw	
Method	:	other: Dow range-finding	
Year	:	1980	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Groups of 6 female S-D rats/dose were fed the undiluted XD-8390 by oral gavage in doses of 1.3, 2.5, 5.0 10.0, 6.3 and 8.0 g/kg. The rats were weighed on days 0, 17 and 14. The rats were observed periodically the day of dosing and daily on weekdays until the end of the study. The survivors were submitted for gross necropsy at day 14	
Result	:	Dose (g/kg) and deaths:	
		1.3 0/6	
		2.5 0/6	
		5.0 0/6	
		6.3 0/6	
		8.0 5/6	
		10.0 6/6	
		Following dosing, all rats were lethargic and had diarrhea. In addition, rats of the 5000, 6300, 8000 and 10,000 mg/kg groups had piloerection. Upon gross pathological examination 2 weeks post-treatment, rats of the 5000 mg/kg dose group had a slight, pale discoloration of the mucosal surface of the glandular portion of the stomach. This was not observed upon examination of surviving rats of the 6300 and 8000 mg/kg groups. All surviving rats gained weight during the 2-week post-treatment observation period.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(31)
Type	:	LD50	
Species	:	rat	
Strain	:	no data	
Sex	:	female	
Number of animals	:	3	
Vehicle	:	other: undiluted liquid	
Value	:	> 3980 mg/kg bw	
Method	:	other: Dow range-finding	
Year	:	1974	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Three female rats/dose were fed the undiluted liquid by oral gavage in doses of 252, 500, 1000, 2000 and 3980 mg/kg. The rats were weighed on days 0, 1, 7 and 14. They were observed daily for signs of toxicity. (No recording of effects unless it was 'something'.)	
Result	:	There were no signs of toxicity other than 'slight urine soaked' on the day after dosing. There were no deaths. One rat of each dose was evaluated grossly at necropsy. There were no visible lesions except for some slight fecal abnormalities.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(32)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

Type : LD50
Species : rat
Strain : Sprague-Dawley
Sex : male/female
Number of animals : 5
Vehicle : other: undiluted
Value : > 2000 mg/kg bw
Method : OECD Guide-line 402 "Acute dermal Toxicity"
Year : 1991
GLP : yes
Test substance : other TS
Method : Five Sprague-Dawley rats/sex were treated with a single, occluded, dermal application of the undiluted test material to the intact skin which was moistened with distilled water. The material was applied at a dose of 2000 mg/kg to an area of shorn skin which approximated 10% of the total body surface area. Twenty-four hours after application, the dressing and residual test material were removed. The rats were observed for signs of toxicity and death at 0.5, 1, 2 and 4 hours after dosing and subsequently at least once/day for 14 days. Body weights were recorded on the day of dosing and on days 7 and 14. The rats were examined for gross pathologic changes at the termination of the study.

Result : This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

: There were no deaths, signs of systemic toxicity nor skin irritation. No significant effects on body weight were noted and there were no treatment-related post mortem observations at the termination of the study.

Test substance : The acute dermal median lethal dose (LD50) of Dowfax 8390 was >2000 mg/kg in the S-D rat.

Reliability : The test material was a powdered sample of Dowfax 8390, 91.6% pure.

Flag : (1) valid without restriction

26.04.2002 : Critical study for SIDS endpoint

(33)

Type : LD50
Species : rat
Strain : Wistar
Sex : male/female
Number of animals : 5
Vehicle : other: undiluted
Value : > 2000 mg/kg bw
Method : OECD Guide-line 402 "Acute dermal Toxicity"
Year : 1987
GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : Five Wistar rats/sex were treated with a single, occluded, dermal application of the undiluted test material to the intact skin. The material was applied at a dose of 2000 mg/kg to an area of shorn skin which approximated 10% of the total body surface area. Twenty-four hours after application, the dressing and residual test material were removed. The rats were observed for signs of toxicity and death immediately after dosing and at 2 and 4 hours and subsequently at least once/day for 14 days. Body weights were recorded on the day of dosing and on days 7 and 14. The rats were examined for gross pathologic changes at the termination of the study.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland

Result : There were no deaths nor signs of systemic toxicity. The treated skin surface showed spots with erythema; these skin abnormalities disappeared during the second week of observations. No significant effects on body weight were noted and there were no treatment-related post mortem observations at the termination of the study.

The acute dermal median lethal dose (LD50) of Dowfax 8390 was >2000 mg/kg in the Wistar rat.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002

(34)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : 10 % active substance
Exposure : Occlusive
Exposure time : 4 hour(s)
Number of animals : 6
PDII :
Result : not irritating
EC classification : not irritating
Method : OECD Guide-line 404 "Acute Dermal Irritation/Corrosion"
Year : 1997
GLP : yes
Test substance : other TS
Method :

The day prior to study start, an area approximately 10 x 10 cm on the back of 9 male and 9 female New Zealand White rabbits, was clipped free of fur. On test day 1, a 0.5 ml aliquot of each respective test material was applied to an intact site on the backs of 6 rabbits/test material and covered with a gauze patch with cotton backing. The gauze patch was held in place with an elastic rabbit jacket. The jacket and patch were removed after 4 hours and the back was wiped with a damp disposable towel to remove any residue. The application sites were graded for erythema and edema within 30 minutes, 24, 48 and 72 hours, and when necessary, at 7 days after test material removal. Animals were weighed on the day of treatment and at study termination.

Result : There were no signs of dermal irritation of the test site in any of the 6 rabbits that were dosed with Dowfax 8390.

In contrast, slight irritation was noted in several rabbits treated with the other two surfactants.

Test substance : The test material was a 10% aqueous solution prepared by the sponsor. Also tested, for comparison, were two other surfactants: VISTA C-550 SLURRY and STEOL CS-370 (also supplied as 10% aqueous solutions).

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002

(35)

Species : rabbit
Concentration : other: moistened with water
Exposure : Semioclusive
Exposure time : 4 hour(s)
Number of animals : 3
PDII :
Result : slightly irritating

EC classification : not irritating
Method : OECD Guide-line 404 "Acute Dermal Irritation/Corrosion"
Year : 1991
GLP : yes
Test substance : other TS
Method : The day prior to study start, an area on the back of 1 female and 2 male New Zealand White rabbits, was clipped free of fur. On test day 1, 0.5 g of the test material was applied to an intact site on the backs of the rabbits and covered with a gauze patch with cotton backing. The gauze patch was held in place with an elastic rabbit corset. The corset and patch were removed after 4 hours and the back was wiped with a damp disposable towel to remove any residue. The application sites were graded for erythema and edema within 1, 24, 48 and 72 hours after test material removal. Animals were weighed on the day of treatment.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Very slight erythema was noted at the treatment site of all animals one hour after patch removal; the erythema persisted in two animals at the 24-hour observation and in one animal at the 48-hour observation. Very slight edema was noted at the treatment site of one animal only at the 1-hour observation. The treatment site of all animals appeared normal at the 72-hour observation. No corrosive effects were noted. The primary irritation index was 0.3 on a 1 to 8 scale and was classified as a slight irritant to rabbit skin according to the Draize classification scheme.

Test substance : The test material was the powdered/solid material, with a purity of 91.6%.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

26.04.2002

(36)

Species : rabbit
Concentration : undiluted
Exposure : Semiocclusive
Exposure time : 4 hour(s)
Number of animals : 3
PDII :
Result : slightly irritating
EC classification : not irritating
Method : OECD Guide-line 404 "Acute Dermal Irritation/Corrosion"
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The day prior to study start, an area approximately 10 x 10 cm on the back of 3 female New Zealand White rabbits, was clipped free of fur. A volume of 0.5 ml aliquot of the test material was applied to a 6 cm² gauze patch, which was attached with a drop of petrolatum to aluminum foil and mounted on permeable tape. This was applied to the left flank of each animal, the right flank being covered with the same dressing without test material. Finally the rabbits were wrapped in flexible bandage. The wrappings and patch were removed after 4 hours and the flanks wiped dry and then moistened tissues. The application sites were graded for erythema and edema within 30-60 minutes, 24, 48 and 72 hours after test material removal.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Slight, immediate edema and erythema resulted from contact with the test substance; the erythema persisted for 2 days in 2 of the animals.

Test substance : The test material was Dowfax XD 8390, a brown liquid.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

26.04.2002

(37)

Species : rabbit
Concentration : other: undiluted commercial liquid
Exposure : Occlusive
Exposure time : 2 day
Number of animals : 1
PDII :
Result : highly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1995
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Two applications were made and no more due to severe irritation.
Result : Very slight erythema was observed at both abdominal test sites, after one application. After two applications, slight erythema was observed at the intact abdominal test site, and severe erythema and burns were observed at the abraded abdominal test site. The test was terminated and the animal was humanely euthanized.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (29)

Species : rabbit
Concentration : other: applied dry in one rabbit and moistened with water on the other
Exposure : Occlusive
Exposure time : 5 day
Number of animals : 2
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1987
GLP : no
Test substance : other TS
Method : The skin irritation test included topical application of solid XU-040341.00 to intact and abraded skin on the abdomen (0.5 g each) of 2 male New Zealand White rabbits--one with dry applications and one with moistened (water). Five applications were made on the intact abdominal site and 3 to the abraded. No ear applications were made since the material is a powder. The rabbits were weighed on days 1 and 8.
Result : Under dry conditions, no irritation was seen.
 Under water-moistened conditions slight erythema was observed after prolonged and repeated contact. The dermal response was attributed to mechanical injury, since the test material appeared to glue the cotton patch to the skin when moisture was present, making removal difficult.
Test substance : The test material was the solid/powdered form of XD-8390, called XU-040341.00.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (30)

Species : rabbit
Concentration : other: undiluted commercial liquid (45% aqueous)
Exposure : Occlusive
Exposure time : 10 day
Number of animals : 1
PDII :
Result : slightly irritating

EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1980	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Ten daily applications were made to the ear and intact abdominal site and 3 to the abraded abdominal site. The rabbit was weighed on days 1, 7 14, and 23. It was evaluated daily on weekdays through day 14 and on day 23.	
Result	:	Contact on confined rabbit skin resulted in moderate redness. This irritation may have been mechanical because the cotton patches under which the test material was applied adhered to the skin.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(31)
Species	:	rabbit	
Concentration	:	other: undiluted 45% aqueous commercial material	
Exposure	:	Open	
Exposure time	:	10 day	
Number of animals	:	1	
PDII	:		
Result	:	not irritating	
EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1980	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Ten daily applications were made to the ear and intact abdominal site and 3 to the abraded abdominal site. The rabbit was weighed on days 1, 7 14, and 23. It was evaluated daily on weekdays through day 14 and on day 23.	
Result	:	Contact with this 45% aqueous XD 8390 material on unconfined rabbit skin resulted in no irritation.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(31)
Species	:	rabbit	
Concentration	:	other: undiluted 45% commercial liquid used	
Exposure	:	Occlusive	
Exposure time	:	10 day	
Number of animals	:	1	
PDII	:		
Result	:	slightly irritating	
EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1974	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Ten daily applications were made to the ear and intact abdominal site and 3 to the abraded abdominal site. The rabbit was weighed on days 1, 6, 15 and 18. It was evaluated daily on weekdays through day 11 and on days	

Result	:	15 and 18.	
	:	Very slight to slight erythema and sporadic exfoliation from superficial burning was observed upon prolonged, repeated contact with intact or abraded abdominal skin.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(32)
Species	:	rabbit	
Concentration	:	other: undiluted 45% commercial liquid	
Exposure	:	Open	
Exposure time	:	10 day	
Number of animals	:	1	
PDII	:		
Result	:	not irritating	
EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1974	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Ten daily applications were made to the ear and intact abdominal site and 3 to the abraded abdominal site. The rabbit was weighed on days 1, 7 14, and 23. It was evaluated daily on weekdays through day 14 and on day 23.	
Result	:	There was no irritation observed on the ear site at any time.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
26.04.2002			(32)
Species	:	rabbit	
Concentration	:	other: undiluted commercial liquid	
Exposure	:	Open	
Exposure time	:	2 day	
Number of animals	:	1	
PDII	:		
Result	:	not irritating	
EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1995	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The skin irritation test included topical application of neat Dowfax 8390 to the inner surface of the left ear (0.1 ml) (open) and to intact and abraded skin on the abdomen (0.5 ml each) of 1 male New Zealand White rabbit. Two applications were made and no more due to severe irritation.	
Result	:	No irritation was observed at the ear application site.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
26.04.2002			(29)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	5 % active substance
Dose	:	.1 ml
Exposure Time	:	24 hour(s)
Comment	:	

Number of animals	: 6
Result	: moderately irritating
EC classification	: not irritating
Method	: OECD Guide-line 405 "Acute Eye Irritation/Corrosion"
Year	: 1998
GLP	: yes
Test substance	: other TS
Method	: The eyes of 6 adult New Zealand white rabbits were examined with 2% aqueous fluorescein stain and established as being free of defects/irritation the day prior to study start. A 0.1 ml aliquot of the 5% aqueous Dowfax 8390 was instilled into the conjunctival sac of the right eye of 3 male and 3 female rabbits. The eyelid of each rabbit was held closed for approximately one second after dosing. The left eye remained untreated and served as a control. The eyes of all rabbits remained unwashed for 24 hrs after dosing. The behavior of each rabbit was observed immediately post treatment for indications of pain or discomfort. An ocular anesthetic was used for both eyes of each rabbit after discomfort was observed in the first rabbit. Both eyes of the rabbits were examined with a binocular loupe and a white halogen light at 1, 24, 48 and 72 hrs and also 7 days post-instillation for conjunctival redness and chemosis, discharge, corneal opacity and reddening of the iris. The study was completed 7 days post-treatment. Rabbits were weighed on the day of treatment and at study termination.
Result	: Slight or moderate conjunctival redness, slight or moderate chemosis, and slight or moderate ocular discharge were present in the treated eyes of all rabbits one hour after dosing. Twenty-four hours after dosing, all rabbits had moderate conjunctival redness, all rabbits had slight or moderate chemosis, 5 rabbits had slight or moderate ocular discharge, 5 rabbits had opacity of the cornea, and 1 rabbit had reddening of the iris. Forty-eight hours after dosing, all rabbits had slight or moderate conjunctival redness, 4 rabbits had slight or moderate chemosis, 2 rabbits had slight ocular discharge, and 5 rabbits had corneal opacity. Seventy-two hours after dosing, 3 rabbits had slight or moderate conjunctival redness, 3 rabbits had slight chemosis, 1 rabbit had slight ocular discharge, and 4 rabbits had corneal opacity. The ocular lesions were resolved in all animals 7 days after instillation of the test material and the study was terminated.
Test substance	: The test material was a 5% (5% active) aqueous solution of Dowfax 8390.
Reliability	: (1) valid without restriction
Flag	: Critical study for SIDS endpoint
26.04.2002	(38)
Species	: rabbit
Concentration	: 100 % active substance
Dose	: 50 other: mg
Exposure Time	:
Comment	: not rinsed
Number of animals	: 1
Result	: highly irritating
EC classification	: irritating
Method	: OECD Guide-line 405 "Acute Eye Irritation/Corrosion"
Year	: 1991
GLP	: yes
Test substance	: other TS
Method	: The eyes of 1 adult New Zealand white rabbit were examined with an ophthalmoscope and established as being free of defects/irritation the day prior to study start. A 0.1 ml (50 mg) amount of the solid Dowfax 8390 was instilled into the conjunctival sac of the right eye of the rabbit. The eyelid was held closed for approximately one second after dosing. The left eye remained untreated and served as a control. The eyes of the rabbit remained unwashed. The behavior of the rabbit was observed immediately post treatment for indications of pain or discomfort. Both eyes of the rabbit were examined at 1, 24, 48 and 72 hrs and also 7 and 14 days post-

instillation for conjunctival redness and chemosis, discharge, corneal opacity and reddening of the iris. The study was completed 14 days post-treatment. The rabbit was weighed at the start of the study.

No additional animals were tested due to the adverse reaction.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : A single application of the test material produced opalescent corneal opacity, iridial inflammation and severe conjunctival irritation. Other adverse ocular effects were vascularization of the cornea and pale areas over the nictitating membrane. The test material produced a maximum total score of 53 and was considered at least a severe irritant (Class 6 on a 1 to 8 scale) to the rabbit eye according to a modified Kay and Calandra classification system.

Test substance : The test material was the solid/powdered Dowfax 8390.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

26.04.2002

(39)

Species : rabbit

Concentration : other: undiluted commercial liquid product

Dose : .1 ml

Exposure Time :

Comment : not rinsed

Number of animals : 3

Result : moderately irritating

EC classification : not irritating

Method : Directive 84/449/EEC, B.5 "Acute toxicity (eye irritation)"

Year : 1987

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : The eyes of 3 female New Zealand white rabbits were examined for defects the day prior to study start. A 0.1 ml aliquot of the aqueous Dowfax 8390 was instilled into the conjunctival sac of the left eye of each rabbit. The eyelid of each rabbit was held closed for approximately two seconds after dosing. The right eye remained untreated and served as a control. The behavior of each rabbit was observed immediately post treatment for indications of pain or discomfort. Both eyes of the rabbits were examined at 1, 24, 48 and 72 hrs and also 7, 14 and 21 days post-instillation for conjunctival redness and chemosis, discharge, corneal opacity and reddening of the iris. The study was completed 21 days post-treatment.

The study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Instillation of Dowfax XD 8390 into the eyes of 3 adult female rabbits resulted in corneal epithelial erosion which healed within 7 days, as well as moderate conjunctival reddening after initial marked chemosis. Except for slight conjunctival redness persisting in one animal, the effects were reversible within 21 days.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

26.04.2002

(40)

Species : rabbit

Concentration : other: undiluted commercial liquid

Dose : .1 ml

Exposure Time :

Comment : other: one eye was washed after 30 seconds and the other after 1 hr

Number of animals : 1

Result : moderately irritating

EC classification :

Method : other: Dow range-finding
Year : 1995
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml of neat Dowfax 8390 was instilled into each conjunctival sac of a female NZW rabbit. One eye was washed with water after 30 seconds, while the other eye was washed with water after one hr. The animal was evaluated immediately (for pain and other effects), at 1, 24, 48, and 72 hrs and 7, 14 and 21 days.

Result : The animal survived the test period and there were no clinical signs of systemic toxicity. Moderate discomfort was exhibited by the animal immediately after instillation of the test material in the first eye. Then, Ophthaine ocular anesthetic was instilled both eyes prior to dosing the second eye. Slight to moderate conjunctival redness and swelling was observed in both eyes from immediately after dosing through the 72 hr read. The 30-second exposure eye had very slight conjunctival response at the 7 and 14 day checks. The 30-second exposure eye had very slight irritation of the iris immediately after dosing through 72 hrs and the 1 hr eye had very slight irritation of the iris from 1 hr after dosing through 48 hrs. The 30-second eye had very slight to slight corneal opacity after staining with fluorescein, from the 1 hr read through the 14 day read. The hour eye had very slight corneal opacity after staining from 1 hr after dosing through 72 hrs. Ocular irritation was resolved in both eyes by 21 days and the study terminated.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (29)

Species : rabbit
Concentration : other: solid material as is
Dose :
Exposure Time :
Comment : other: one eye washed after 30 seconds the other after one hr
Number of animals : 1
Result : moderately irritating
EC classification :
Method : other: Dow range-finding
Year : 1987
GLP : no
Test substance : other TS
Method : 0.1 g of neat XU-40341.00 Dowfax* 8390 was instilled into each conjunctival sac of a male NZW rabbit. One eye was washed with water after 30 seconds, while the other eye was washed with water after one hr. The animal was evaluated immediately (for pain and other effects), at 1, 24, 48, and 72 hrs and 7, and 14 days.

Result : Ophthalmic anesthetic was administered to alleviate discomfort experienced by the rabbit.
 : A single exposure of NZW rabbit eyes to the test material resulted in moderate discomfort, moderate conjunctival redness and swelling, moderate reddening of the iris, and moderate corneal injury. Ocular effects, which included corneal injury, were absent at day 14 of the test in the eye washed at 30 seconds. The rabbit was inadvertently euthanized prior to day 21 so no further information was available.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002 (30)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :

Comment : other: one eye washed after 30 seconds and the other after 1 hr
Number of animals : 1
Result : moderately irritating
EC classification :
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml of neat Dowfax 8390 was instilled into each conjunctival sac of a female NZW rabbit. One eye was washed with water after 30 seconds, while the other eye was washed with water after one hr. The animal was evaluated immediately (for pain and other effects), at 1, 24, 48, and 72 hrs and 7, and 14 days.
Result : Instillation of this material into the eyes of a rabbit resulted in slight discomfort, moderate conjunctival redness and swelling, moderate reddening of the iris, and moderate corneal injury. All signs of eye irritation were absent by 14 days post-exposure.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 26.04.2002 (31)

Species : rabbit
Concentration : other: undiluted 45% commercial liquid
Dose : .1 ml
Exposure Time :
Comment : other: one eye washed after 30 seconds and the other after 1 hr
Number of animals : 1
Result : highly irritating
EC classification :
Method : other: Dow range-finding
Year : 1974
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml of neat Dowfax 8390 was instilled into each conjunctival sac of a female NZW rabbit. One eye was washed with water after 30 seconds, while the other eye was washed with water after one hr. The animal was evaluated immediately (for pain and other effects), at 1, 24, 48, and 72 hrs and 7, and 14 days.
Result : Instillation of the undiluted 45% aqueous solution into the eyes of a rabbit resulted in pain, severe conjunctival inflammation, moderate iritis, and moderate corneal injury.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 26.04.2002 (32)

5.3 SENSITIZATION

Type : Guinea pig maximization test
Species : guinea pig
Concentration : Induction .5 % intracutaneous
 Induction 50 % other: not stated
 Challenge 50 % occlusive epicutaneous
Number of animals : 10
Vehicle : water
Result : not sensitizing
Classification : not sensitizing
Method : OECD Guide-line 406 "Skin Sensitization"
Year : 1998
GLP : yes
Test substance : other TS

Method	: The concentration of the test material used in the main study was based on the results of a pretest. Ten test and 5 control female Dunkin-Hartley guinea pigs were used for the main study. Intradermal induction consisted of two injections (0.1 ml per site) of the test material (0.5% w/v in water), with and without Freund's Complete Adjuvant, and a control with Adjuvant alone. After one week, the scapular area between the two intradermal injection sites (one day before the topical treatment the skin was rubbed with 10% w/v sodium dodecyl sulfate to increase sensitivity) was treated topically for 48 hours with 0.5 ml of a 50% (w/v) dilution of the test material in water. Induction readings were made at day 3 (after intradermal injection) and day 10 (after epidermal exposure).
	Challenge on day 22 consisted of a single, 24-hour, topical application (0.5 ml) of the test material at concentrations of 20 and 50% w/v in water on two separate sites on the right flank of each test and control animal under an occlusive dressing. Observations for any dermal reaction were made approximately 24 and 48 hrs after removal of the dressing. A rechallenge was conducted approximately one week after the first challenge with a 5 and 10% (w/v) of the test material.
	The study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.
Result	: During the induction phase, severe erythema was noted at all intradermal injection sites treated with Adjuvant and test material including signs of necrosis with 3 animals. Well defined to moderate erythema was observed in most cases of the epidermally treated induction sites of the experimental animals. Between the controls and the experimental animals there was no significant difference noted at the challenge sites 24 and 48 hrs after removal of the dressings with corresponding test material concentrations of 5, 10, 20 and 50%.
Test substance	: Test material was Dowfax* 8390-D, which is the powdered material. It was used as dilutions in water, as noted elsewhere.
Reliability Flag	: (1) valid without restriction
26.04.2002	: Critical study for SIDS endpoint
	(41)
Type	: Guinea pig maximization test
Species	: guinea pig
Concentration	: Induction .1 % intracutaneous Induction 5 % occlusive epicutaneous Challenge 2 % occlusive epicutaneous
Number of animals	: 20
Vehicle	: water
Result	: not sensitizing
Classification	: not sensitizing
Method	: Directive 84/449/EEC, B.6 "Acute toxicity (skin sensitization)"
Year	: 1991
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Concentrations of the test material were selected based on the results of sighting tests. Twenty test animals and ten control animals were used for the main study. Induction of the test animals was carried out with intradermal injections (0.1 ml) of (i) Freund's Complete adjuvant in distilled water, (ii) 0.1% active ingredient (w/v) in distilled water and (iii) 0.1% active ingredient (w/v) in a preparation of Freund's Complete Adjuvant plus distilled water. One week later, the same skin area was treated with a topical application of 0.2-0.3 ml of the test material (5% active ingredient v/v in distilled water) under an occlusive dressing which remained in place for 48 hrs. Control animals were treated with identical intradermal injections except without test material; also, the topical application for the controls consisted of the vehicle alone.

Test animals were challenged on day 21 with 0.1-0.2 ml of a 2% solution of Dowfax 8390 (v/v in distilled water) applied to the skin under occlusive dressing for 24 hrs. The vehicle alone was applied as a control. Dermal reactions were evaluated at 24 and 48 hrs after the dressings were removed.

One test animal died of undetermined causes.

Study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Dowfax 8390 did not result in any skin sensitisation (0 of 19 animals) after induction with a solution which contained 5% active ingredient.

Test substance : Dowfax 8390 surfactant solution was submitted as the 35% aqueous solution. Application amounts are stated as percent of active ingredient.

Reliability Flag : (1) valid without restriction
: Critical study for SIDS endpoint

26.04.2002 (42)

Type : Buehler Test
Species : guinea pig
Concentration : Induction 75 % occlusive epicutaneous
: Challenge 75 % occlusive epicutaneous

Number of animals : 20
Vehicle : water
Result : not sensitizing
Classification : not sensitizing
Method : Directive 84/449/EEC, B.6 "Acute toxicity (skin sensitization)"
Year : 1991
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The study was also conducted in conformance with OECD Guideline Method B6, as well as Method 406.

The concentrations of the test material for the main study were based on preliminary topical studies. Twenty treated and 10 control Dunkin-Hartley guinea pigs were used for the main study. Induction consisted of 3 topical applications (0.5 ml) of 75% w/w concentration of the test material in distilled water (or distilled water alone for the controls) on days 0, 7 and 14. The 6-hour applications were on the same site under an occlusive dressing; the test sites were evaluated for any irritation response 24 hrs after each induction.

Challenge on day 28 consisted of a single, 6-hour, topical application (0.5 ml) of the test material at a concentration of 75% w/w in distilled water under occlusive dressing. Observations for any dermal reaction were made approximately 24 and 48 hrs after removal of the patches.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Induction with the test material did not produce any adverse reaction. Challenge with the test material did not result in a sensitization reaction in any of the treated animals. Thus, the test material was a non-sensitizer to the skin of guinea pigs.

Test substance : The test material was Dowfax 8390 surfactant, a 35% solution in water. Dosing concentrations were (w/w), implying that 75% is 75% of 35% active ingredient (i.e., not calculated based on active ingredient).

Reliability Flag : (1) valid without restriction
: Critical study for SIDS endpoint

26.04.2002 (43)

Type : Buehler Test
Species : guinea pig

Concentration : Induction undiluted occlusive epicutaneous
 Induction 50 % occlusive epicutaneous
 Challenge 20 % occlusive epicutaneous

Number of animals : 10

Vehicle : water

Result : sensitizing

Classification : sensitizing

Method : EPA OPP 81-6

Year : 1991

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : This study was conducted in conformance with EPA guideline 81-6, but described as a modified Buehler method.

Ten male Hartley albino guinea pigs received two dermal application of 0.4 ml of undiluted Dowfax 8390 during the 3 week induction period. All applications were made using 'Hill-Top Chambers'. The concentration of the test material used for the third induction application was decreased to 50% in distilled water due to erythema observed at the application site of two animals following the second induction application. Guinea pigs were challenged with 0.4 ml of 20% aqueous Dowfax 8390 two weeks after the last induction application. The concentrations of the test material used for the challenge application was decreased due to erythema observed at the application sites of 3 animals exposed to the test material following the third induction application. The condition of the test sites was assessed approximately 24 and 48 hours after the challenge application.

Result : Challenge application with 0.4 ml of Dowfax 8390 caused slight erythema at the test site in 9 of 10 animals. Therefore, under the conditions of this study, Dowfax 8390 has the potential to cause delayed contact hypersensitivity in guinea pigs.

Test substance : The Dowfax 8390 used in this study was 35% solids/active in water.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

26.04.2002

(44)

Type : Buehler Test

Species : guinea pig

Concentration : Induction 2.9 % occlusive epicutaneous
 Induction 1.5 % occlusive epicutaneous
 Challenge 1.5 % occlusive epicutaneous

Number of animals : 10

Vehicle : water

Result : not sensitizing

Classification : not sensitizing

Method : other: none stated other than 'modified Buehler'

Year : 1991

GLP : yes

Test substance : other TS

Method : A modified Buehler method was used. This method was the same as one described in Berdasco, 1991, in which the Data Requirement was 'Guideline Reference No. 81-6 --40 CFR Part 158.135'.

Ten male Hartley albino guinea pigs received two dermal applications of 0.4 ml of 2.9% Dowfax 8390 in distilled water during the three week induction period. The concentration of the test material used for the third induction application was decreased to 1.5% due to erythema observed at the application site of one animal following the second induction application. Guinea pigs were challenged with 0.4 ml of 1.5% Dowfax 8390 two weeks after the last induction application. The condition of the test sites was assessed approximately 24 and 48 hours after the challenge application.

Result : Challenge application with 0.4 ml of 1.5% Dowfax 8390 caused no

erythema or edema at the application site in any animal tested. Therefore, under the conditions of this study, 2.9% Dowfax 8390 does not cause delayed contact hypersensitivity in guinea pigs.

Test substance : The test material was a use dilution of Dowfax 8390 containing 2.9% (does not state 2.9% of what--active ingredient or 2.9% of normal 35% Dowfax 8390).

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (45)

Type : Buehler Test
Species : guinea pig
Concentration : Induction undiluted occlusive epicutaneous
 Challenge undiluted occlusive epicutaneous

Number of animals : 20
Vehicle :
Result : sensitizing
Classification : sensitizing
Method : other: stated 'Buehler'
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : In this Buehler test, 20 female guinea pigs were exposed to 0.5 ml of undiluted test substance, by topical application to the same site on the scapula region during the induction phase. These induction applications were made on 9 separate occasions during a 3 week period; each induction exposure was for 6 hours duration using an occlusive patch.

Ten days after the last induction exposure, the animals were challenged by application of 0.5 ml of undiluted test substance to the contralateral flank. The challenge sites were then examined at 24, 48 and 72 hours after removal of dressings. A second challenge application was carried out three weeks after the first one.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : Evidence of a skin sensitization reaction was observed for 14 animals after the first challenge, and for 9 animals after the second challenge. It was concluded that the test substance induced delayed contact hypersensitivity in the guinea pig.

Test substance : The test material was Dowfax* XD 8390, used undiluted.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (46)

5.4 REPEATED DOSE TOXICITY

Species : rat
Sex : male/female
Strain : Sprague-Dawley
Route of admin. : oral feed
Exposure period : 90 days
Frequency of treatment : continuous
Post obs. period : None
Doses : 0, 50, 100, 200 or 600 mg/kg/day
Control group : yes
NOAEL : = 100 mg/kg
LOAEL : = 200 mg/kg

Method	: other: Dow historic
Year	: 1976
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Method	: Groups of 15 Sprague-Dawley rats/sex/dose were maintained for 90-91 days on diets containing sufficient Dowfax surfactant XD-8390 to provide doses of 0, 50, 100, 200 or 600 mg/kg/day to assess the toxicological effects that might be associated with daily ingestion by rats for 90 days.
	<p>Doses were chosen on the basis of a 2-week tolerance study. Liver and kidney 'injury' was observed at doses of 1000 mg/kg/day and higher but no discernible changes in appearance, demeanor or gross examination of tissues and organs were observed at 300 mg/kg/day.</p> <p>Parameters examined were weekly body weights, twice weekly clinical observations, hematology (RBC, WBC & diff, PCV, Hgb) on 10 rats/sex of control and high dose during the final week of study, urinalysis on 10 rats/sex/dose on last day of study (pH, sp. gr., glucose, ketones, bilirubin, occult blood, protein, specific gravity), clinical chemistry (UN, AP, SGOT, SGPT) on all rats in last week of study, complete gross exam of all rats at necropsy, organ weights (brain, heart, liver, kidneys and testes), microscopic examination of a broad range of tissues from all ten rats/sex of the control and high dose. The following organs were examined histologically: testes, adrenals, epididymes, thyroids, parathyroids, pituitaries, prostates, mammary tissues, ovaries, uterus and thymus. Similar sections of liver and kidney were also prepared from 10 rats/sex of the group receiving 200 mg/kg/day. Also the livers from 4-5 rats/sex of the high dose and control were cut on a freezing microtome and stained with Oil Red O to evaluate lipid content. The eyes of 10 rats/sex/dose were examined at necropsy and also histologically.</p>
Result	: Morphological manifestations which could be associated with ingestion of the test material were observed only at the two higher dose levels, 200 and 600 mg/kg/day and were limited to effects on the kidneys. The weights of the kidneys were significantly increased at the two higher dose levels among the females and at the highest dose level among the males. The kidneys of these groups of rats appeared swollen at the time of necropsy and among the females, a slight dilatation in the renal tubules was observed microscopically at the highest dose level. The kidney morphology and function was not different from that of control rats at the two lower dose levels. The SGPT activity was increased at all dose levels in the male rats in the absence of any histological or other biochemical evidence of liver change. Except for these changes no alterations in other parameters were observed at any dose level.
Test substance	: The test material submitted was XD-8390, composed of 37.6% active ingredient.
	<p>Attempts to incorporate the formulated liquid into the ground laboratory chow were unsatisfactory; thus, the solution of XD-8390 was dried to a fine powder for incorporation in the diets. The dry powder was kept in air-tight containers until used because of its hygroscopic nature. So, the doses were based on amount of active ingredient. This was a different lot than that used in the 90-day dog study.</p>
Reliability	: (2) valid with restrictions
Flag	: Critical study for SIDS endpoint
26.04.2002	(47)
Species	: rat
Sex	: male/female
Strain	: other: CD, remote Sprague-Dawley
Route of admin.	: gavage
Exposure period	: 28 days

Frequency of treatment : daily
Post obs. period : None
Doses : 50, 250, 1000 mg active ingredient/kg body weight/day
Control group : yes, concurrent vehicle
NOAEL : = 250 mg/kg
LOAEL : = 1000 mg/kg
Method : other: none particularly specified
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : Male and female CD rats were given Dowfax XD 8390 (primarily C-16 alkylated sodium sulfonated diphenyl oxide) by oral gavage at doseage levels of 0, 50, 250 or 1000 mg/kg/day for 28 consecutive days. Doses were not checked analytically.

Necropsy of all surviving animals was performed on day 29. Observations included 3x daily clinical observations, weekly food consumption, visual water consumption, 2x weekly body weights, weekly food conversion calculations, hematology (PCV, Hb, RBC, WBC, platelets, WBC diff, MCHC, MCV, MCH) on day 25, clinical chemistries (AP, ALT, AST, BUN, creatinine, glucose, total bilirubin, total protein, electrophoretic protein fraction, Na, K) on day 25, urinalysis (appearance, volume, pH, sp.gr., protein, total reducing substances, glucose, ketones, bilirubin, urobilin, nitrite, blood, sed.) on day 21, macroscopic pathology of all animals, organ weights (adrenals, heart, kidneys, liver, spleen, testes), histopathology of all rats (adrenals, heart, kidneys, liver, spleen, stomach).

Result : Appropriate statistical methods were used.
 : There were no differences in the food consumption of control and treated animals, but body weight gains and food utilization efficiency of male rats in the 1000 mg/kg/day group were lower than for controls. Post-dosing salivation and loose feces were observed throughout the study in the 1000 mg/kg/day group. There were changes in several clinical chemistry parameters for rats in the 1000 mg/kg/day group, and at necropsy the absolute and relative liver and kidney weights of high dose females were higher than for controls. There were no internal macroscopic changes observed at necropsy which were related to treatment, but histopathologic examinations revealed microscopic changes in the livers of some of the animals in the 1000 mg/kg/day group. There were no adverse treatment-related effects in either male or female rats in the 250 mg/kg/day or 50 mg/kg/day groups.

Test substance : The test material was XD 8390, a brown liquid with 36.7% active ingredient. The doses were mg active ingredient.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint

26.04.2002

(48)

Species : dog
Sex : male/female
Strain : Beagle
Route of admin. : oral feed
Exposure period : 90-days
Frequency of treatment : continuous
Post obs. period : None
Doses : 0, 50, 100 or 200 mg/kg/day
Control group : yes
NOAEL : = 200 mg/kg
Method : other: historic Dow method
Year : 1976
GLP : no

Test substance Method	: as prescribed by 1.1 - 1.4 : Male and female beagle dogs (4/sex/dose) were maintained for 90 days on diets containing sufficient Dowfax surfactant XD-8390 to provide doses of 0, 50, 100 or 200 mg/kg/day to assess the toxicological effects that might be associated with daily ingestion of this material by dogs for 90 days. Doses for this study were chosen subsequent to a tolerance study using doses of 250, 450 and 650 mg/kg. The lowest dose (250 mg/kg) caused a decrease in food consumption and approximately 5% loss in body weight--with greater decreases at the higher doses.
Result	Parameters examined were body weights weekly for the first month and then every 2 weeks, twice weekly food consumption/pen, daily clinical observations, hematology (RBC, WBC & diff, PCV, Hgb) prior to start of study and at 30, 84 and 90 days, urinalysis (pH, glucose, ketones, bilirubin, occult blood, protein, specific gravity and sed) on all dogs prior to study start and in last week of study, clinical chemistry (UN, AP, SGOT, SGPT) on all dogs prior to start of study and in last week of study, complete gross exam of all dogs at necropsy, organ weights (brain, heart, liver, kidneys and testes), microscopic examination of a broad range of tissues from all dogs in control and high dose, microscopic examination of kidneys from low and middle dose dogs, microscopic examination of additional sections of kidney from all dogs from all doses, and ophthalmologic examination of all dogs prior to study start and again prior to termination of the study. Also the livers from all high dose and control dogs were cut on a freezing microtome and stained with Oil Red O to evaluate lipid content. : Effects which could be related to ingestion of the test material in the diet were limited to male and female dogs at the high dose level of test material, 200 mg/kg/day. Among these dogs, the weights of the kidneys and liver were slightly higher than that of control dogs. The difference was not statistically significant and there was no evidence of histological alterations among these organs in these dogs. No other parameters were significantly affected among dogs of either sex at any dose level of test material. Therefore, changes of toxicological significance which could be associated with ingestion of Dowfax surfactant XD-8390 were not observed in male or female beagle dogs at any dose level in this study.
Test substance	: XD-8390 was submitted for this test. It was characterized as being 37.6% active material in water. Attempts to incorporate the formulated liquid into the ground laboratory chow were unsatisfactory; thus, the solution of XD-8390 was dried to a fine powder for incorporation in the diets. The dry powder was kept in air-tight containers until used because of its hygroscopic nature. So, the doses were based on amount of active ingredient.
Reliability Flag 26.04.2002	: (2) valid with restrictions : Critical study for SIDS endpoint

(49)

5.5 GENETIC TOXICITY 'IN VITRO'

Type	: Ames test
System of testing	: Salmonella typhimurium strains TA1535, TA1537, TA1538 TA98 and TA100
Concentration	: 10-500 micrograms/plate
Cycotoxic conc.	: 500 micrograms/plate
Metabolic activation	: with and without
Result	: negative
Method	: OECD Guide-line 471 "Genetic Toxicology: Salmonella thyphimurium Reverse Mutation Assay"
Year	: 1987
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4

Method : Eleven serial dilutions of the test substance, in approximately half-log steps, were plated with an appropriately diluted TA100 culture (equal numbers of bacterial cells/plate) onto non-selective agar. The percent survival of the TA100 culture was determined by comparing the number of colonies on the solvent control plate with those on the plates containing the test substance. The survival of strain TA100 was reduced at test substance concentrations from 100 micrograms/plate upwards and was eliminated at test substance concentrations from 3330 micrograms/plate upwards. Based on these data, the test substance was tested up to a concentration of 500 micrograms/plate.

This study was conducted at the request of Dow Chemical Europe, Horgen, Switzerland.

Result : In the first two experiments with some strains several plates were infected with other bacteria. Thus, these parts of the test were repeated. All bacterial strains showed negative responses over the entire dose range of the test substance, i.e., no statistically significant dose-related increase in the number of revertants in two independently repeated experiments. The negative and strain-specific positive control values fell within the lab's historical ranges indicating that the test conditions were optimal and that the metabolic activation system functioned properly.

Based on these results, the test substance was considered as nonmutagenic in the Ames Salmonella/microsome assay.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002

(50)

Type : Cytogenetic assay
System of testing : Cultured Peripheral Human Lymphocytes
Concentration : 100, 333, 1000 and 3330 micrograms/ml
Cycotoxic conc. : 1000 micrograms/ml (in absence of S-9) and 3330 micrograms/ml (presence of S-9)
Metabolic activation : with and without
Result : negative
Method : OECD Guide-line 473 "Genetic Toxicology: In vitro Mammalian Cytogenetic Test"
Year : 1987
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The test was carried out in duplicate. Aroclor-1254 induced rat liver S9-mix was used as the metabolic activation system.

Based on a dose selection study, the following doses were used in the main study:

Without S-9: 100, 333, 1000 micrograms/ml
 Positive control MMC-C: 0.1 micrograms/ml

With S-9: 333, 1000 and 3330 micrograms/ml
 Positive control CP: 20 micrograms/ml

Result : There were no statistically significant increases in the numbers of chromosome aberrations at any of the concentrations tested, either in the presence or the absence of the metabolic activation system. Positive control chemicals, mitomycin C and cyclophosphamide, both produced a statistically significant increase in the incidence of chromosome aberrations.

It was concluded that the test substance was no clastogenic in human lymphocytes under the conditions of the assay.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 26.04.2002

(51)

Type : Cytogenetic assay
System of testing : Rat lymphocytes
Concentration : 0, 16.7, 50, 75, 100, 150, and 166.7 micrograms/ml of culture medium
Cycotoxic conc. : 500 micrograms/ml
Metabolic activation : with and without
Result : negative
Method : other: UK EMS (1990); OECD (Final Draft, 1997); EEC (1992); US EPA (1990)
Year : 1998
GLP : yes
Test substance : other TS
Method : Approximately 48 h after the initiation of whole blood cultures, cells in the absence and presence of rat liver S-9 activation were treated for 4 h with concentrations ranging from 0 (negative control), 50, 166.7, 500, 1000, 1667, 2500 and 5000 micrograms Dowfax 8390D Surfactant per ml of culture medium. The treated cultures were harvested approximately 20 h after the termination of the treatments. Mitotic indices data from this experiment indicated excessive toxicity at dose levels of 500 micrograms/ml. Hence, the experiment was repeated using dose levels of 1.7, 5, 16.7, 50, 100, 166.7, 500 and 1000 micrograms/ml. Based upon the mitotic indices, cultures treated with concentrations of 0, 50, 100 and 166.7 micrograms/ml in the absence of S-9 activation and cultures treated with targeted doses of 0, 16.7, 50 and 100 micrograms/ml in the presence of S-9 activation were selected for determining the incidence of chromosomal aberrations.

In a confirmatory assay with S-9, rat lymphocytes were treated as described above and harvested at 20 h and 44 h after treatment termination. In the absence of S-9, the treatment time was increased to 24 h and the treated cultures were harvested either at the end of the treatments or 24 h later. The incidence of chromosomal abnormalities was determined from cultures treated with 0, 25, 50 and 100 micrograms/ml in the absence of S-9 at the first harvest time, and from cultures treated with 0 and 150 micrograms/ml at the second harvest. In the presence of S-9, cultures treated with 0, 16.7, 50 and 75 micrograms/ml were used for evaluation at the first harvest and 0 and 150 micrograms/ml at the second harvest.

Result : In both assays, initial and confirmatory, there was no significant increase in the incidence of aberrant cells noticed at any of the treatment levels when compared to the corresponding negative control values.

Significant increases in the frequency of cells with aberrations were observed in cultures treated with the positive control chemicals, 0.075 micrograms/ml of MMC (without S-9) and 6 micrograms/ml of CP (with S-9).

Test substance : The test material was Dowfax* 8390-D which is the powdered form of the product. It is 97.5% active ingredient.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

26.04.2002

(52)

Type : HGPRT assay
System of testing : Chinese Hamster Ovary
Concentration : 2.5 to 300 micrograms/ml
Cycotoxic conc. :
Metabolic activation : with and without
Result : negative
Method : OECD Guide-line 476 "Genetic Toxicology: In vitro Mammalian Cell Gene Mutation Tests"
Year : 2001
GLP : yes

Test substance	:	other TS
Method	:	The genotoxic potential of the test material was assessed in two independent assays in the absence and presence of an externally supplied metabolic activation (S-9) system with concentrations ranging from 2.5 to 300 micrograms/ml. The adequacy of the experimental conditions for detection of induced mutation was confirmed by employing positive control chemicals, ethyl methanesulfonate for assays without S-9 and 20-methylcholanthrene for assays with S-9. Negative control cultures were treated with the solvent used to dissolve the test material.
Result	:	Dowfax 8390-D exhibited a steep dose response for cytotoxicity with an apparent threshold separating total cytotoxicity and compatibility with cell survival--a phenomenon typical to a number of detergents and surfactants. Because of this, the test material could be evaluated for mutagenicity only at non-cytotoxic concentrations.
		Based upon the frequency of TGr mutants recovered in cultures treated with the test material, it was concluded that Dowfax 8390-D surfactant did not induce a mutagenic response in the assay system employed.
Test substance	:	The test material was the dry powder version of Dowfax* 8390, called Dowfax* 8390-D. It is 98% active ingredient.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
26.04.2002		(53)

5.6 GENETIC TOXICITY 'IN VITRO'

Type	:	Cytogenetic assay
Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	oral feed
Exposure period	:	90 days
Doses	:	0, 50, 100, 200 or 600 mg/kg/day
Result	:	negative
Method	:	other: scoring according to WHO, Buckton and Evans, 1973
Year	:	1977
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Five groups of 5 Sprague-Dawley (Spartan substrain) rats/sex were fed diets containing amounts of XD-8390 calculated to provide doses of 0, 50, 100, 200 or 600 mg/kg body weight per day for 90 days. After the 90-day treatment, bone marrow cells from all the rats were processed to capture cells in metaphase and plate them on glass slides. The chromosome analysis was similar to that described in WHO, Buckton and Evans, 1973. The slides were coded for blind scoring. The plan was to score 50 metaphase spreads per animal and only diploid (2n=42) or 2n-1 cells were scored.
Result	:	Analysis of 50 metaphase spreads from each of the 25 male rats revealed no chromosomal aberrations among the 1250 cells examined. Analysis of 1244 spreads from the 25 female rats revealed only one aberration (a chromatid break) in one animal at the 100 mg/kg dose level.
		Although this abnormality was found in a treated animal, it was judged as 'probably inconsequential' because in similar studies with this strain of rats, 27 of 3750 cells (0.72%) from 100 untreated control rats contained one or more abnormalities. When this strain of rats was treated with a potent mutagen (triethylenemelamine), 55% of the bone marrow cells contained abnormal chromosomes.
Test substance	:	The test substance was submitted as a 36% aqueous solution. This was then dried to a 'fine hydroscopic powder' which contained 92.5% active

Reliability : ingredient. Test doses are based on this active ingredient.
Flag : (2) valid with restrictions
26.04.2002 : Critical study for SIDS endpoint

(54)

5.7 CARCINOGENITY**5.8 TOXICITY TO REPRODUCTION****5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY****5.10 OTHER RELEVANT INFORMATION****5.11 EXPERIENCE WITH HUMAN EXPOSURE**

- (1) Cardinaals, J.M., Determination of the Melting Point/Melting Range of Dowfax 8390, RCC NOTOX Study Ref. No. 0910/C598, July 1988 for Dow Chemical Rheinwerk, Rheinmunster, Germany, unpublished report created for Dow.
- (2) The Dow Chemical Company, 2001.
- (3) Cardinaals, J.M., Determination of the Boiling Point/Boiling Range of Dowfax 8390, RCC NOTOX Study Ref. No. 0910/C599, July 1988, for Dow Chemical Rheinwerk, Rheinmunster, Germany, unpublished report created for Dow.
- (4) Cardinaals, J.M., Determination of the Density of Dowfax 8390, RCC NOTOX Study Ref. No. 0910/C600, July, 1988, for Dow Chemical Rheinwerk, Rheinmunster, Germany, unpublished report created for Dow.
- (5) Corbett, P., Schmitz, A., Determination of the Surface Tension of Aqueous Solution of Dowfax 8390, Separation System & Process Products Report 222/88, October, 1988, Dow Chemical Europe, Rheinmuenster, Germany, unpublished Dow report.
- (6) Gladdines, M.M., NOTOX, The Netherlands, Dowfax* 8390-D Anionic Surfactant: Determination of the Hydrolysis as a Function of pH, DET 2295, 21 July, 1995, unpublished Dow report.
- (7) Gladdines, Ir. M. M., TNO (Delft), The Netherlands, Dowfax* 8390-D Surfactant: Soil Adsorption/Desorption Screening Test (OECD 106), DET 2297, 25 July 1995, unpublished Dow report.
- (8) Coenen, Ir.T.M.M., Ready Biodegradability: Closed Bottle Test with Dowfax* 8390, DET 1330, 25 January, 1990, XD-8390-023, unpublished report created for Dow.
- (9) Gonsior, S.J., Goodwin, P.A., Biodegradation of a Linear Monoalkylated (C16 Chain Length) Di-Sulfonated Diphenyl Oxide Surfactant (MADS) in Aquatic Sediments, HET T3.02-000-000-304, 22 November, 1999, 981136, unpublished Dow report.
- (10) Gonsior, S.J., Evaluation of the Degradation and Mineralization of a Linear Monoalkylated (C16 Chain Length) Di - Sulfonated Diphenyl Oxide Surfactant (MADS) in Soils, Sediments, and Activated Sludge, HET DR-0140-7814-009. February 3, 2003, unpublished Dow report.
- (11) Rhinehart, W.L., and Bailey, R.E., Biodegradability of Dowfax XD 8390 by the Soap & Detergent Association Confirming Test (Semi-Continuous Activated Sludge), Report ES-128, July 11, 1977, unpublished Dow report.
- (12) Gonsior, S.J., Markham, D.A., The Biodegradation of a Linear Monoalkylated (C16 Chain Length) Di-Sulfonated Diphenyl Oxide Surfactant (MADS), ES-2811, July 10, 1996, T3.02-000-000-006, unpublished Dow report.
- (13) Schleheck, D., Cook, A., University of Konstanz, Germany, Dowfax* 8390: Side-Chain Oxidation and Desulfonation, DET 2656, 20 November, 1998, DR-0140-7814-008, unpublished report created for Dow.
- (14) Gonsior, S.J., Generation of Activated Sludge Effluent Containing Dowfax* 8390 Surfactant Biodegradation Products, ES-3082, September 17, 1996, unpublished Dow report.
- (15) Gonsior, S.J., Radtke, B.J., Stock, M.K., Generation of Activated Sludge Effluent Containing Dowfax 8390 Surfactant Biodegradation Products, HET XD-008390-032, 19 December, 2000, 001187, unpublished Dow report.
- (16) Rhinehart, W.L., Biodegradability of Dowfax XD 8390 (lots 09254 and 10154), 1:128 and 1:256 Desinfectant [sic] Formulations by the Soap and Detergent Association Confirming Test. (Semicontinuous Activated Sludge), ES-8, Nov. 26, 1974, unpublished Dow report.

- (17) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactants XDS 8174.00, XDS 8292.00, and Dowfax 2A1, ES-932, January 8, 1987, T3.02-000-000-008, unpublished Dow report.
- (18) Cardinaals, J.M., Determination of the Fat Solubility of Dowfax 8390, RCC NOTOX Study Ref. No. 0910/C601, August 5, 1988, for Dow Chemical Rheinwerk, Rheinmuenster, Germany, unpublished report created for Dow.
- (19) Miller, J.A., Brown R.P., Landre, A.M., Evaluation of the Acute Toxicity from the Generation of Activated Sludge Effluent Containing Representative Aquatic Organisms, ES-3097, May 14, 1996, unpublished Dow report.
- (20) Alexander, H.C., Rhinehart, W.L., Static Acute Fish Toxicity of Dowfax* XD-8390 to Fathead Minnows, March 17, 1975, XD-8390-010. (unpublished Dow letter report)
- (21) Bogers, M., Welboren, G.T.C., Dowfax* XD 8390: Acute Toxicity Study with Rainbow Trout, DET 981, November 25, 1987, XD-008390-017, unpublished report created for Dow.
- (22) Bogers, M., Welboren, G.T.C., NOTOX, The Netherlands, Dowfax* XD 8390: Assessment of the Acute Effects on the Mobility of Daphnia magna, DET 982, 25 Nov., 1987, XD-008390-018, unpublished report created for Dow.
- (23) Bogers, NOTOX, The Netherlands, Dowfax 8390-D: Acute Toxicity to Selenastrum capricornutum (OECD Algae Growth Inhibition Test), DET 2293, 11 July, 1995, unpublished report created for Dow.
- (24) Koopmans, M.J.E., NOTOX, The Netherlands, Dowfax 8390-D Surfactant: Activated Sludge Respiration Inhibition Test, DET 2271, May 22, 1995, unpublished report created for Dow.
- (25) Henry, K.S., Dowfax 8390 Surfactant Degradation Products: 21-Day Chronic Toxicity Study with the Daphnid, Daphnia magna Straus, unpublished Dow report, 27 February, 2001, 001162.
- (26) Bogers, M., NOTOX, The Netherlands, Dowfax 8390-D: Daphnia Magna Reproduction Test, DET 2389, 5 March, 1996, unpublished report created for Dow.
- (27) Coles, R.J., Safepharm Laboratories, UK, Dowfax* 8390 Surfactant: Acute Oral Toxicity (Limit Test) in the Rat, DET 1620, 15 March, 1991, XD-8390-025, unpublished report created for Dow.
- (28) Zucker, A.M.M., Reijnders, J.B.J., Dowfax XD 8390: Evaluation of Acute Oral Toxicity in the Rat, DET 977, November 25, 1987, XD-8390-013, unpublished report created for Dow.
- (29) Gilbert, K.S., Dowfax 8390: Acute Toxicological Properties, HET DR-008390-009, 16 March, 1995, unpublished Dow report.
- (30) Wall, J.M., XU-40341.00 Dowfax* 8390, Powder Form: Acute Toxicologic Properties, HET XD-008390-006, August 3, 1987, unpublished Dow report.
- (31) Henck, J.W., Acute Toxicological Properties and Industrial Handling Hazards of XD 8390, HET-XD-8390-(5), February 19, 1980, unpublished Dow report.
- (32) Rampy, L.W., Keeler, P.A., Yakel, H.O., Toxicological Properties and Industrial Handling Hazards of XD-8390, HET XD-8390-(1), August 12, 1974, unpublished Dow report.
- (33) Coles, R.J., SafePharm Laboratories, UK, Dowfax* 8390 Surfactant: Acute Dermal Toxicity (Limit Test) in the Rat, DET 1686, 23 April, 1991, XD-8390-029, unpublished report created for Dow.

- (34) Reijnders, J.B.J., Zucker-Keizer, A.M.M., NOTOX, The Netherlands, Dowfax* XD 8390: Evaluation of Acute Dermal Toxicity in the Rat, DET 978, November 25, 1987, XD-8390-014, unpublished report created for Dow.
- (35) Brooks, K.J., Dowfax* 8390: Primary Dermal Irritation Study in New Zealand White Rabbits, unpublished Dow report, 11 August, 1997, 971134.
- (36) Coles, R.J., SafePharm Laboratories, UK, Dowfax* 8390 Surfactant: Acute Dermal Irritation Test in the Rabbit, DET 1621, 15 March, 1991, XD-8390-026, unpublished report created for Dow.
- (37) Weterings, P.J.J.M., Daamen, P.A.M., NOTOX, The Netherlands, Dowfax* XD 8390: Assessment of Primary Skin Irritation/Corrosion Potential in the Rabbit, DET 980, November 25, 1987, XD-8390-016, unpublished report created for Dow.
- (38) Brooks, K.J., Dowfax* 8390 Surfactant (5% Aqueous Solution): Acute Primary Eye Irritation Study in New Zealand White Rabbits, unpublished Dow report, 2 February, 1998, 971196.
- (39) Coles, R.J., SafePharm Laboratories, UK, Dowfax* 8390 Surfactant: Acute Eye Irritation Test in the Rabbit, DET 1622, 15 March, 1991, XD-8390-027, unpublished report created for Dow.
- (40) Weterings, P.J.J.M., Daamen, P.A.M., NOTOX, The Netherlands, Dowfax* XD 8390: Assessment of Acute Eye Irritation/Corrosion Potential in the Rabbit, DET 979, November 25, 1987, XD-8390-015, unpublished report created for Dow.
- (41) Busschers, M., NOTOX B.V., The Netherlands, Assessment of Contact Hypersensitivity to Dowfax* 8390-D in the Albino Guinea Pig (Maximisation Test), DET 2637, 20 August, 1998, unpublished report created for Dow.
- (42) Coles, R.J., SafePharm Laboratories Ltd., Dowfax* 8390 Surfactant Solution: Magnusson & Kligman Maximisation Study in the Guinea Pig, DET 1545, 2 February, 1991, XD-8390-024, unpublished report created for Dow.
- (43) Coles, R.J., SafePharm Laboratories, UK, Dowfax* 8390 Surfactant: Buehler Delayed Contact Hypersensitivity Study in the Guinea Pig, DET 1623, 15 March, 1991, XD-8390-028, unpublished report created for Dow.
- (44) Berdasco, N.M., Dowfax* 8390: Dermal Sensitization Potential in the Hartley Albino Guinea Pig, HET XD-008390-007, March 21, 1991, unpublished Dow report.
- (45) Berdasco, N.M., 2.9% Dowfax* 8390: Dermal Sensitization Potential in the Hartley Albino Guinea Pig, HET XD-008390-008, March 26, 1991, unpublished Dow report.
- (46) Weterings, P.J.J.M., Debets, F.M.H., NOTOX, The Netherlands, Dowfax XD 8390: Assessment of Skin Sensitization Potential in the Guinea Pig, DET 976, November 25, 1987, XD-008390-012, unpublished report created for Dow.
- (47) Schwetz, B.A., Humiston, C.G., Kociba, R.J., Dowfax* Surfactant XD-8390: Results of a 90Day Dietary Feeding Study in Rats, HET XD-8390-(3), February 11, 1976, unpublished Dow report.
- (48) Cummins, H.A., Ashby, R., Fowler, J.S.L., Life Sciences Research, Dowfax* XD 8390: Four Week Toxicity Study by Oral Administration to CD Rats, DET 985, November 26, 1987, XD-008390-022, unpublished report created for Dow.
- (49) Schwetz, B.A., Humiston, C.G., Wade, C.E., Kociba, R.J., Kalnins, R.V., LeBeau, J.E., Dowfax* Surfactant XD-8390: Results of a 90-Day Dietary Feeding Study in Dogs, HET XD-8390-(4), February 10, 1976, unpublished Dow report.

- (50) Enninga, I.C., NOTOX, The Netherlands, Dowfax* XD 8390: Evaluation of the Mutagenic Activity in the Ames Salmonella Reverse Mutation Assay, DET 984, November 26, 1987, XD-008390-021, unpublished report created for Dow.
- (51) Enninga, I.C., NOTOX, The Netherlands, Dowfax* XD 8390: Chromosomal Aberration Assay with Cultured Peripheral Human Lymphocytes in vitro, DET 983, November 26, 1987, XD-008390-020, unpublished report created for Dow.
- (52) Linscombe, V.A., Day, S.J., Evaluation of Dowfax* 8390D Surfactant in an In Vitro Chromosomal Aberration Assay Utilizing Rat Lymphocytes, unpublished Dow report, 12 June, 1998, 971201.
- (53) Linscombe, V.A., Shisler, M.R., Evaluation of Dowfax* 8390-D Surfactant in the Chinese Hamster Ovary Cell/Hypoxanthine-Guanine-Phosphoribosyl Transferase (CHO/HGPRT) Forward Mutation Assay, unpublished Dow report, 5 February, 2001, 001106.
- (54) Johnston, R.V., Schwetz, B.A., Mensik, D.C., Lisowe, R.W., Cytogenetic Effects of Dowfax* Surfactant XD-8390 on Rat Bone Marrow Cells, HOM-77-3, July 20, 1977, unpublished Dow report.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 36445-71-3
CAS No. : 36445-71-3

Producer Related Part
Company : The Dow Chemical Company
Creation date : 15.08.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 15.08.2001

Memo :

Printing date :
Revision date :
Date of last Update : 22.08.2003

Number of Pages :

Chapter (profile) :
Reliability (profile) :
Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

Name of Plant : Pilot Chemical
Street : 3439 Yankee Road
Town : 45042 Middletown, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : % w/w
Remark : The commercial product contains both the mono and di-alkylated disulphonated diphenyloxyde and is sold as an approximately 50% aqueous solution.
15.08.2001

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benzenesulfonic acid, decyl(sulfophenoxy)-, disodium salt
15.08.2001

Benzx 3B2
16.08.2001

Decyl(sulfophenoxy)benzenesulfonic acid disodium salt
15.08.2001

Decyl(sulfophenoxy)benzenesulfonic acid, disodium salt

15.08.2001

Disodium decyl(sulphonatophenoxy)benzenesulphonate
15.08.2001

Dowfax 3B2 Surfactant Solution
15.08.2001

XD 30081.02
28.08.2001

1.3 IMPURITIES

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Value : = 290 ° C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 29.10.2001 (1)

2.2 BOILING POINT

Value : = 660 ° C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 29.10.2001 (2)

2.3 DENSITY**2.3.1 GRANULOMETRY****2.4 VAPOUR PRESSURE**

Value : 6.66 x10⁻¹⁹ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 17.06.2002 (2)

2.5 PARTITION COEFFICIENT

Log pow : = 2.7 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD labs (Toronto, Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (2)

2.6.1 WATER SOLUBILITY

Value : > 100000 mg/l at 25 ° C
Qualitative : of very high solubility
Pka : at 25 ° C
PH : ca. 5 - 9 at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in environmental pH range of 5 to 9 estimated based on product formulation information. Formulations contain 10 to 50% of surfactant in water. Therefore, solubility is >100,000 mg/L.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (2)

2.6.2 SURFACE TENSION**2.7 FLASH POINT****2.8 AUTO FLAMMABILITY****2.9 FLAMMABILITY****2.10 EXPLOSIVE PROPERTIES****2.11 OXIDIZING PROPERTIES****2.12 ADDITIONAL REMARKS**

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : These substances have no hydrolyzable functional groups so hydrolysis is not expected.
Flag :

3.1.3 STABILITY IN SOIL**3.2 MONITORING DATA****3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS****3.3.2 DISTRIBUTION****3.4 MODE OF DEGRADATION IN ACTUAL USE****3.5 BIODEGRADATION**

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 16.77mg/l related to DOC (Dissolved Organic Carbon)
 17.2mg/l related to DOC (Dissolved Organic Carbon)
Contact time : 28 day
Degradation : Approx. 10 % after 28 day
Result : under test conditions no biodegradation observed
Control substance : Benzoic acid, sodium salt
Kinetic : %
 %
Deg. Product :
Method : Directive 84/449/EEC, C.3 "Biotic degradation - modified OECD screening test"
Year : 1993
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Result : According to the preliminary study the test compound Dowfax 3B2 showed

	neither bactericidal effects at the used concentrations nor any adsorption to the surface of the glass vessels. In the definitive study Dowfax 3B2 attained a mean DOC decrease of -10.5% after 28 days. Based on these results the test material must be classified as being not readily biodegradable (no DOC decrease detected during the whole incubation period of 28 days). The positive control, sodium benzoate, reached 96.3% biodegradation after 28 days which confirms suitability of inoculum and test conditions.
Test condition	: The initial dissolved oxygen content of the nutrient solution was 7.5 mg/l. The dissolved oxygen content in the flasks ranged from 7.47 to 8.14 mg/l throughout the course of the study. The initial pH of the nutrient solution was 7.4. The temperature during this study was within the range of 19.2 - 23.8C.
Test substance	: A 45% solution of disodium mono and didecylphenyloxide disulfonic acid in water--called Dowfax 3B2.
Reliability Flag	: (1) valid without restriction
15.08.2002	: Critical study for SIDS endpoint (3)
Type	: aerobic
Inoculum	: other
Concentration	: 22mg/l related to DOC (Dissolved Organic Carbon) related to
Contact time	: 28 day
Degradation	: = 4 % after 28 day
Result	: under test conditions no biodegradation observed
Control substance	: Benzoic acid, sodium salt
Kinetic	: % %
Deg. Product	:
Method	: Directive 84/449/EEC, C.4 "Biotic degradation - modified AFNOR test NF T90/302"
Year	: 1993
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Remark	: The inoculum was secondary effluent from the settling tank of a biological waste water treatment plant, filtered through a coarse filter paper; not adapted, not pre-conditioned.
Result	The concentration was 0.5 ml/l of final test suspension. : Dowfax 3B2 attained 4% decrease in DOC after 28 days. Prolongation of the incubation period up to 42 days didn't lead to a detectable increase in biodegradability. Based on these results the test material cannot be classified as being readily biodegradable. The positive control, sodium benzoate, reached 98% biodegradation under the same test conditions which confirms suitability of inoculum and test conditions. The second positive control, Marlon* A 375, reached a maximum biodegradation of 58% after 16 days; the 28 day value was 50%.
Test condition	: The temperature of the test system was 22C. Conductivity was <1.5 microS/cm; DOC: <0.3 mg/l. During the test, the oxygen concentration was assured to be > 2 mg/l. The pH was checked and adjusted periodically to 7.4 with acid or base.
Reliability Flag	: (1) valid without restriction
15.08.2002	: Critical study for SIDS endpoint (4)
Type	: aerobic
Inoculum	:
Deg. Product	:
Method	: OECD Guide-line 303 A "Simulation Test - Aerobic Sewage Treatment: Coupled Unit Test"
Year	: 1994

GLP	:	yes	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The aerobic biodegradability of Dowfax 3B2 was assessed in a continuous laboratory sludge treatment plant for primary and ultimate biodegradability according to OECD Guidelines Number 303A.	
		<p>Two OECD Confirmatory Test units were run in parallel. The test material was dissolved in OECD synthetic sewage at a concentration of approx. 10 mg/l. Dissolved Organic Carbon (DOC) was continuously fed to the aeration vessel of the first unit. A second unit where only synthetic sewage was continuously added served as a control. The two units were coupled by interchanging half of the volume of each aeration vessel once a day. Both units contained activated sludge at a concentration of approximately 2.5 g/l (dry weight). Incubation took place at 18-25C with normal day-night cycles (diffuse day light). The hydraulic residence time (HRT) was kept at 6 h until the 33rd day of operation and was then raised to 10.4 h. Effluents of both units were collected and aliquots used for DOC determination as well as for analysis with HPLC. Ultimate biodegradation was calculated based on the percentage DOC removal by comparing influent and effluent DOC concentrations corrected by the effluent DOC concentration of the control unit. Primary biodegradation is based on the disappearance of the parent compound.</p>	
Remark	:	The inoculum was secondary effluent from the settling tank of a biological municipal waste water treatment plant, not adapted, not pre-conditioned.	
		<p>The concentration was 3 ml/test unit.</p>	
Result	:	The DOC based ultimate biodegradability measured between days 13 and 50 was low and reached only a mean value of 7.4% (95% confidence limits +/- 10%; 30 determinations). However, the HPLC chromatograms of the analyzed effluent samples indicate that after 15 days of adaptation complete primary degradation occurs: already after 4 days of operation the HPLC peaks characteristic for the test material were significantly reduced before they completely disappeared as from day 15. This finding was confirmed with effluent samples taken at later stages up to day 50 of operation. No further investigations were undertaken to identify the degradation products which seem to be stable as shown by the lack of a significant DOC decrease over the whole period of operation.	
Test condition	:	The temperature of the test system was room temp. (18-25C). During the test, the test unit pH ranged from 7.5-8.2. The oxygen content was 6.1 on Day 2.	
Reliability Flag	:	(1) valid without restriction	
15.08.2002	:	Critical study for SIDS endpoint	(5)
Type	:	aerobic	
Inoculum	:		
Contact time	:		
Degradation Result	:	ca. 90 % after 17 day	
Deg. Product	:		
Method	:	other: EEC Directive 82/243/EEC and NF.T.73-265	
Year	:	1987	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	There are no methods described in this 'certificate'.	
Result	:	Dowfax 3B2 has a bio-degradability of 90% in this test. The test data shown have 75.4% biodegradation in 8 days up to 92.2% biodegradation in 17 and 38 days.	
Reliability Flag	:	(2) valid with restrictions	
25.04.2002	:	Critical study for SIDS endpoint	(6)

3. Environmental Fate and Pathways

Id 36445-71-3

Date 04.10.2002

Type : aerobic
Inoculum :
Contact time :
Degradation : = 77 % after 19 day
Result :
Deg. Product :
Method : other: OECD screening test
Year : 1979
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
20.08.2001

(7)

Type : aerobic
Inoculum : activated sludge, domestic
Contact time : 7 day
Degradation : % after
Result :
Deg. Product :
Method : other: Soap and Detergent Association semi-continuous activated sludge test
Year : 1982
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The study objective was to determine how much Dowfax 2A1 could be in Dowfax 3B2 in order to reduce the biodegradation in the SDA semi-continuous activated sludge test to 90% or less. The results would be used for determination of product specs.

Biodegradability was determined by the reduction in concentration of methylene blue active substance (MBAS) on exposure to activated sludge operating semi-continuously. The daily operating cycle was 23 hr.

A C-13 NMR method was developed for determination of Dowfax 2A1 surfactant in the presence of 3B2.

Result : Apparent Biodegradability:

Dowfax 3B2 surfactant	98.7%
3B2 with 4.5% 2A1	98.0%
3B2 with 10% 2A1	95.9%
3B2 with 25% 2A1	90.8%
LAS (standard)	99.1%

Test substance : The study was carried out on Dowfax 3B2 solution surfactant (45% solids) and Dowfax 3B2 containing 4.5, 10 and 25% Dowfax 2A1 surfactant.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
25.04.2002

(8)

Type : aerobic
Inoculum : activated sludge, domestic
Concentration : 20mg/l related to related to
Contact time : 7 day
Degradation : = 96.9 - 98.3 % after 7 day
Result : Biodegradable according to SDA guidelines
Control substance : other
Kinetic : %
%
Deg. Product :
Method :
Year : 1979

GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : This procedure involved exposing the samples under study to acclimated activated sludge and measuring the loss of methylene blue activity after one day. The loss of methylene blue activity is interpreted as biodegradation sufficient to destroy the surfactant properties.
Remark : The control was Linear Alkylbenzene Sulfonate. It had a biodegradation of 99.2% in this test.
Result : The three samples (first batch, last batch, composite) had 96.9%, 98.3% and 98.0% reduction in the methylene blue active substances, respectively.
Test substance : Three samples were tested: the first and last batches of the production run and a composite of Dowfax 3B2.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (9)

3.6 BOD5, COD OR BOD5/COD RATIO

COD
Method :
Year : 1982
GLP : yes
COD : mg/g substance
Method : This study was conducted to compare a new (1982) COD System from the Hach Company to a standard COD test historically used in the Dow Laboratory. Apparently both tests use a chemical reflux digestion, using sulfuric acid, potassium dichromate, and silver and mercuric sulfates as reagents. The difference is that the Hach system used smaller amounts of the same reagents in a screw cap vial.
Result : The ThOD (TOD) was 2.11 p/p.
 The ESR was 0.84 p/p.
 The Hach Low and High ranges were 0.85 and 0.91, respectively.
Test substance : Dowfax 3B2 containing 45% solids in water.
 25.04.2002 (10)

COD
Method :
Year : 1987
GLP : yes
COD : mg/g substance
Method : The COD for Dowfax 3B2 was determined using an acidic dichromate digestion procedure.
Result : The COD for Dowfax 3B2 was determined to be 2.04 p/p (100% basis).
 (The actual product is about 50% in water.)
Test substance : Dowfax 3B2 containing 45% active ingredient (in water).
 15.08.2001 (11)

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	flow through	
Species	:	Pimephales promelas (Fish, fresh water)	
Exposure period	:	96 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:	no	
LC50	:	c = 3.66	
Method	:	other: Fish-Pesticide Acute Toxicity Test Guideline, 1972	
Year	:	1975	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The flow-through system was thoroughly cleaned and rinsed with the appropriate toxicant concentration. The toxicant (Dowfax 3B-2) stock solution was made up in water and placed in a Mariotte bottle immediately prior to the test. The system was activated at least 3 hrs before the fish were added so that equilibrium could be reached. Ten fathead minnows were placed in each 8 l aquarium with a discharge rate of the diluter being approximately once every 8 min, or a turnover rate/aquarium of about 1/hr. This maintained sufficient D.O. Ten fish were exposed to each concentration (2.82, 3.75 and 5.00 mg/l). The LC50 was calculated using Finney's method of probit analysis.	
Test condition	:	The water used in the static test exhibited characteristics in the following ranges: dissolved oxygen (D.O.) 7.8 to 8.1 mg/l; pH 7.2 - 7.6; total alkalinity 30 to 32 mg/l as CaCO ₃ ; total hardness 32 mg/l as CaCO ₃ ; and specific conductivity, 140-150 micromhos/cm.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
15.08.2002			(12)
Type	:	static	
Species	:	Lepomis macrochirus (Fish, fresh water)	
Exposure period	:	96 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:	no	
LC50	:	c = 4.99	
Method	:	other: Fish -Pesticide Acute Toxicity Test Guideline, 1972.	
Year	:	1975	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	To each vessel, 16 liters of reconstituted water were added, the water aerated and then the fish were added. After 24 hours the test compound (Dowfax 3B-2) was added at a loading of 1.0 gm fish/liter water--which limited the number of fish/vessel to 10. The test material was added with 1.5 l of water. Twenty fish were exposed to each concentration (7.50 to 18.00 mg/l). Observations were made and recorded and dead fish removed daily at the same time for 4 days (96 hrs). All test solutions were prepared in water on a w/v basis immediately prior to administering. The LC50 was calculated using Finney's method of probit analysis.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
25.04.2002			(12)
Type	:	static	
Species	:	Pimephales promelas (Fish, fresh water)	
Exposure period	:	96 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:		
LC50	:	c ca. 3	

Method	:	other: Soap and Detergent Assoc. method	
Year	:	1978	
GLP	:	no	
Test substance	:	other TS	
Method	:	A 5-liter semicontinuous acitvated sludge unit was acclimated to 30 mg/l with Dowfax 3B2, raising the concentration from 5 mg/l to 30 mg/l over 6 days. After this, each days effluent was collected, filtered and refrigerated at 40F until enough was accumulated for toxicity testing. Total suspended solids in the units were 825 and 1135 mg/l for the blank and Dowfax 3B2. The fish were exposed to the effluent at 12C for 96 hrs.	
		The concentration of soluble organics in the effluent were determined by TOD.	
Result	:	Fathead minnow (96 hr): 90 % Alive MBAS 4.5 mg/l TOD 181.0 mg/l	
		About 65% of the surfactant metabolites are believed to be associated with the sludge solids from work with C-14 labeled test material. Analysis by the methylene blue method indicated 5 mg/l surfactant in this solution.	
Test substance	:	The test substance is the activated sludge biodegradation products of Dowfax 3B2 and not 3B2 itself.	
Reliability 25.04.2002	:	(2) valid with restrictions	(13)
Type	:	static	
Species	:	Salmo gairdneri (Fish, estuary, fresh water)	
Exposure period	:	96 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:	no	
LC50	:	c = 5.02	
Method	:	other: Fish-Pesticide Acute Toxicity Test Guideline, 1972.	
Year	:	1975	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	To each vessel, 16 liters of reconstituted water were added, the water aerated and then the fish were added. After 24 hours the test compound (Dowfax 3B-2) was added at a loading of 1.0 gm fish/liter water--which limited the number of fish/vessel to 10. The test material was added with 1.5 l of water. Twenty fish were exposed to each concentration (7.50 to 18.00 mg/l). Observations were made and recorded and dead fish removed daily at the same time for 4 days (96 hrs). All test solutions were prepared in water on a w/v basis immediately prior to administering. The LC50 was calculated using Finney's method of probit analysis.	
Reliability 25.04.2002	:	(2) valid with restrictions	(12)
Flag	:	Critical study for SIDS endpoint	

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	static
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
Analytical monitoring	:	
LC50	:	c ca. 1
Method	:	other: Soap and Detergent Association method
Year	:	1978
GLP	:	no
Test substance	:	other TS

Method : A 5-liter semicontinuous acitvated sludge unit was acclimated to 30 mg/l with Dowfax 3B2, raising the concentration from 5 mg/l to 30 mg/l over 6 days. After this, each days effluent was collected, filtered and refrigerated at 40F until enough was accumulated for toxicity testing. Total suspended solids in the units were 825 and 1135 mg/l for the blank and Dowfax 3B2. The daphnia were exposed to 100% effluent and dilutions of 56% and 33% at 17C for 48 hrs.

The concentration of soluble organics in the effluent were determined by TOD.

Result : The 48 hr LC50 was about 1 mg/l (metabolites, activated sludge)

About 65% of the surfactant metabolites are believed to be associated with the sludge solids from work with C-14 labeled surfactant. Analysis by the methylene blue method indicated 5 mg/l surfactant in this solution.

Dowfax 3B2 surfactant is biotransformed to a much less toxic chemical on exposure to activated sludge.

Daphnia (48 hr) % survival

Effluent 100% 96%

Effluent 56% 100%

Effluent 33% 100%

MBAS 4.5 mg/l
TOD 181.0 mg/l

Test substance : The test was conducted on the activated sludge biodegradation products of Dowfax 3B2 rather than on the surfactant itself.

Reliability : (2) valid with restrictions

02.05.2002

(13)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : no
LC50 : c = 1.5
LC10 : c = .59
LC90 : c = 3.19
Method : other: see freetext
Year : 1978
GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : The standard static acute daphnid toxicity test method was used to exposue Daphnia magna to Dowfax 3B2 surfactant. The concentrations reported are as 100% active. The Daphnia were exposed for 48 hrs in dechlorinated Lake Huron water at 17C. Concentrations ranged from 0.56 to 10.00 mg/l. The LCs were calculated using the Finney probit analysis method.

Test substance : The Dowfax 3B2 was an 80/20 mixture of linear C10, mono/di alkylated diphenyl oxide, sulfonated to an average degree of 2.00.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

02.05.2002

(14)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50	
Species	:	rat	
Strain	:	Fischer 344	
Sex	:	male	
Number of animals	:	3	
Vehicle	:		
Value	:	> 2000 mg/kg bw	
Method	:	other: Dow range-finding	
Year	:	1993	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Three male F344 rats received doses of 2000 mg/kg of Dowfax 3B2 by single-dose oral gavage.	
Result	:	Clinical signs observed in the rats at the 2000 mg/kg dose level consisted of fecal soiling. The clinical signs began 2 hrs post dose and persisted through the day after dosing. The estimated acute oral LD50 for male F344 rats was >2000 mg/kg.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
25.04.2002			(15)
Type	:	LD50	
Species	:	rat	
Strain	:	Fischer 344	
Sex	:	female	
Number of animals	:	3	
Vehicle	:	water	
Value	:	ca. 1500 - 2000 mg/kg bw	
Method	:	other: Dow range-finding	
Year	:	1987	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Three/dose female NZ white rabbits were given the powder form of Dowfax 3B2 by gavage as a 20% solution in water at doses of 1500 and 2000 mg/kg. The rats were observed for up to 14 days. All rats were submitted for gross necropsy when dead or at day 14.	
Result	:	No rats died at 1500 mg/kg and 2/3 rats died at the 2000 mg/kg level.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
25.04.2002			(16)
Type	:	LD50	
Species	:	rat	
Strain	:	no data	
Sex	:	female	
Number of animals	:	3	
Vehicle	:	water	
Value	:	ca. 2000 mg/kg bw	
Method	:	other: Dow range-finding	
Year	:	1970	
GLP	:	no	
Test substance	:	other TS	
Method	:	Three female rats per dose received single oral gavage doses of Dowfax 3B2 as a 10% solution in water (0.126, 0.252, 0.50, 1.0 and 2.0 g/kg). The rats were observed for 2 weeks, weighed on days 1, 7 and 14 and all submitted for gross pathology.	
Result	:	The only death was of one rat at the 2.00 g/kg dose.	

Test substance : The test material was Dowfax 3B2, a yellow liquid, containing 45% disodium salt of monododecylated disulfonated phenyl ether. This sample also contained 0.8% sodium sulfate and 1.5% sodium chloride with the balance being water. A synonym for the test material is Benax 3B2.

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

14.03.2002

(17)

Type : LD50

Species : rat

Strain :

Sex : male

Number of animals : 3

Vehicle :

Value : ca. 1000 - 2000 mg/kg bw

Method : other: Dow range-finding

Year : 1965

GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : Three male rats per dose received single oral gavage doses of Dowfax 3B1, a 44% solution in water diluted to 20% solids in water (0.252, 0.50, 1.0, 2.0, and 3.98 g/kg). The rats were observed for 2 weeks, weighed on days 1, 7 and 14 and all submitted for gross pathology.

Result : No rats receiving 1.0 g/kg or lower died; all rats receiving 2.0 g/kg died the night after dosing.

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

25.04.2002

(18)

Type : LD50

Species : rat

Strain : no data

Sex : male

Number of animals : 5

Vehicle : water

Value : = 1420 mg/kg bw

Method : other: Dow range-finding

Year : 1967

GLP : no

Test substance : other TS

Method : Five male rats/dose were fed 0.126, 0.252, 0.50, 1.0, or 2.0 g/kg of a 10% solution of powdered Benax 3B1 by oral gavage. The rats were observed daily, weighed on days 1, 7 and 14 and submitted for gross pathologic examination either when found dead or at day 14.

Result : No rats died at the 1000 mg/kg dose or lower; all rats receiving 2000 mg/kg or more died either on the day of dosing or by the next day.

Test substance : A solid sample of Benax 3B1 was submitted and used for acute oral tests (after diluting to 10% with water) and for use in a proposed feeding study. The second sample of Benax 3B1 was determined by analysis to contain 44.63% active ingredient or 46.87% solids. The active ingredient is a fully sulfonated, alkylated (mix of C-9 and C-10 linear chain) diphenyl oxide sodium salt.

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

25.04.2002

(19)

Type : LD50

Species : rat

Strain : Sprague-Dawley

Sex : female

Number of animals : 6

Vehicle : other: undiluted

Value : = 3562 mg/kg bw
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Six female Sprague-Dawley rats/dose were fed 630, 1300, 2500, 5000 or 10,000 mg/kg of the undiluted test material (Dowfax* 3B2/also known as XD 30081.02) by single-dose oral gavage. The rats were observed daily, weighed on days 1, 7 and 14. Survivors were submitted for gross necropsy exams.
Result : Following dosing, all rats on test were lethargic and had diarrhea. In addition, rats of the 2500, 5000 and 10,000 mg/kg dose groups had piloerection. All survivors gained weight during the 2-week post-treatment observation period, and no treatment-related effects were observed upon gross pathological examination of all survivors 2 weeks post-treatment.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (20)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

Type : LD50
Species : rabbit
Strain : New Zealand white
Sex : male
Number of animals : 2
Vehicle :
Value : > 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : A single application of 2000 mg/kg of neat Dowfax 3B2 was applied to the clipped trunks of 2 male NZ white rabbits under an impervious, occlusive bandage.
Result : Erythema, edema and burns were observed, at the application site, immediately after removing the wrap. These observations were observed through test day 4. By test day 8, both animals were observed with swcaling, which persisted through the end of the study (2 weeks?). Both animals survived the test period and so the estimated acute dermal LD50 for male NZ white rabbits was >2000 mg/kg.
Test substance : The Dowfax 3B2 was pH 6.5.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (15)

Type : other: range-finding estimate
Species : rabbit
Strain :
Sex : male/female
Number of animals : 6
Vehicle :
Value : > 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1965
GLP : no
Test substance : other TS

Method : The undiluted Benax 3B1 containing 44% solids in water was applied in doses of 0.50, 1.0 and 2.0 g/kg to the trunks of 2 rabbits/dose under an occlusive plastic sleeve for 24 hours.

Result : No rabbits died at any dose.

Test substance : Benax 3B1 is similar to 3B2 but contains a different mix of alkyl chains (both C9 and C-10 linear chains).

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

25.04.2002 (21)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit

Concentration : undiluted

Exposure : Occlusive

Exposure time :

Number of animals : 1

PDII :

Result : slightly irritating

EC classification : not irritating

Method : other: Dow range-finding

Year : 1993

GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Five consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site. The study was terminated 72 hrs after the final dose.

Result : Very slight to slight erythema was observed at the intact site after two, three and four applications. Very slight to moderate erythema was observed at the abraded site.

Test substance : Dowfax 3B2 was pH 6.5.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

25.04.2002 (15)

Species : rabbit

Concentration : undiluted

Exposure : Open

Exposure time :

Number of animals : 1

PDII :

Result : not irritating

EC classification : not irritating

Method : other: Dow range-finding

Year : 1993

GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Five consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site. The study was terminated 72 hrs after the final dose.

Result : No irritation was observed on the ear.

Test substance : Dowfax 3B2 was pH 6.5.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (15)

Species : rabbit
Concentration : other: moistened and dry
Exposure : Occlusive
Exposure time :
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1987
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : One rabbit received 5 daily topical applications of the powder (dry) on intact abdominal skin and 3 daily dry applications on abraded abdominal skin. The sites were covered by a cloth wrap taped to the marginal fur. Another rabbit received the same number of applications but these were moistened with water.
Result : Moisture made the patches 'glue' to the skin and these patches had redness upon removal which was deemed to be mechanical irritation. When the patches did not adhere to the skin (dry patch and non-abraded skin), there was no irritation observed.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (16)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 9 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1970
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Nine consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site. The study was terminated 10 days after the final dose.
Result : Questionable to slight redness was noted on the intact abdominal site through day 14. Questionable to slight exfoliation was seen from application 4 through day 14 also on the intact abdominal site.

On the abraded abdominal site, marked redness and slight to questionable edema, necrosis, exfoliation and scab formation were noted.

All effects were absent in both the abraded and intact sites by day 21.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 16.08.2001 (17)

Species : rabbit
Concentration : undiluted

Exposure : Open
Exposure time : 9 day
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1970
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Nine consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site. The study was terminated 10 days after the final dose.
Result : The only effect on the ear was questionable to slight redness during the application period.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 16.08.2001 (17)

Species : rabbit
Concentration : other: 44, 5 and 5% solids in water
Exposure : Occlusive
Exposure time : 9 day
Number of animals : 1
PDII :
Result : highly irritating
EC classification : corrosive (causes burns)
Method : other: Dow range-finding
Year : 1965
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : One rabbit received 9 daily applications of 44% solids Benax 3B1 on the intact ear; 2 daily applications on the intact abdominal skin; and 2 daily applications to an abraded site on the abdominal skin.

 A second rabbit received 9 daily applications of a sample of Benax 3B1 diluted to 5% solids to the ear and intact abdominal skin and 3 daily applications of the 5% material to an abraded site on the abdomen.

 The ears were open and the belly sites were occluded by wrapping in cotton cloth. Observations were made daily thru day 10 and on day 14 and day 21.
Result : 44% solids (intact): Moderate skin redness followed each application; slight to moderate edema. Moderate burn followed second application. Slight scar in 21 days.

 44% solids (abraded): Essentially the same as above.

 5% solids (intact): No response followed first application; slight redness thereafter; slight exfoliation. Skin normal in 21 days.

 5% solids (abraded): Essentially the same as above. Skin healed with no scab or scar in 21 days.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (21)

Species : rabbit
Concentration : other: 44% solids in water and 5% solids in water

Exposure	:	Open	
Exposure time	:	9 day	
Number of animals	:	1	
PDII	:		
Result	:	highly irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1965	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	One rabbit received 9 daily applications of 44% solids Benax 3B1 on the intact ear; 2 daily applications on the intact abdominal skin; and 2 daily applications to an abraded site on the abdominal skin.	
		A second rabbit received 9 daily applications of a sample of Benax 3B1 diluted to 5% solids to the ear and intact abdominal skin and 3 daily applications of the 5% material to an abraded site on the abdomen.	
		The ears were open and the belly sites were occluded by wrapping in cotton cloth. Observations were made daily thru day 10 and on day 14 and day	
Result	:	44% solids: Slight to moderate hyperemia throughout experiment. Slight necrosis after fourth application; some redness in 21 days.	
		5% solids: Slight to moderate redness subsided after fifth application; skin essentially normal in 21 days.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
25.04.2002			(21)
Species	:	rabbit	
Concentration	:	45 %	
Exposure	:	Occlusive	
Exposure time	:	2 day	
Number of animals	:	1	
PDII	:		
Result	:	highly irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1967	
GLP	:	no	
Test substance	:	other TS	
Method	:	The undiluted 45% solids sample of Benax 3B1 was applied to two sites on the abdomen of a rabbit--one intact and one abraded. Two applications were made on each site. The abdominal sites were wrapped in cotton cloth.	
		10 daily applications of the undiluted 45% solids test material were applied to the ear of a rabbit. The ear site was left open.	
		Readings were made daily for 11 days and on days 14 and 21.	
Result	:	45% solids (intact): Marked hyperemia, slight edema, and marked necrosis after 2nd application. The skin healed normally without a scar.	
		45% solids (abraded): Marked hyperemia, slight edema, moderate necrosis. The skin healed normally without a scar.	
Test substance	:	A solid sample of Benax 3B1 was submitted and used for acute oral tests (after diluting to 10% with water) and for use in a proposed feeding study. The second sample of Benax 3B1 was determined by analysis to contain 44.63% active ingredient or 46.87% solids. The active ingredient is a fully sulfonated, alkylated (mix of C-9 and C-10 linear chain) diphenyl oxide sodium salt.	

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (22)

Species : rabbit
Concentration : 45 %
Exposure : Open
Exposure time : 10 day
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1967
GLP : no
Test substance : other TS
Method : The undiluted 45% solids sample of Benax 3B1 was applied to two sites on the abdomen of a rabbit--one intact and one abraded. Two applications were made on each site. The abdominal sites were wrapped in cotton cloth.

10 daily applications of the undiluted 45% solids test material were applied to the ear of a rabbit. The ear site was left open.

Result : Readings were made daily for 11 days and on days 14 and 21.
Test substance : No irritation occurred on the open ear after 10 applications.
 : A solid sample of Benax 3B1 was submitted and used for acute oral tests (after diluting to 10% with water) and for use in a proposed feeding study. The second sample of Benax 3B1 was determined by analysis to contain 44.63% active ingredient or 46.87% solids. The active ingredient is a fully sulfonated, alkylated (mix of C-9 and C-10 linear chain) diphenyl oxide sodium salt.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (22)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 10 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Ten consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site.

The rabbit was observed/graded daily on weekdays for 2 weeks and then on days 14, 21 and 23. The study was terminated 13 days after the final dose.

Result : Repeated daily contact of rabbit skin under an occluded patch caused slight to moderate redness, very slight exfoliation, and a very slight superficial burn (at the abraded site).

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset

25.04.2002

(20)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time : 10 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included topical application of 0.5 ml of neat Dowfax 3B2 to the ear, and to intact and abraded skin on the abdomen of a male NZ white rabbit. Nine consecutive daily doses of Dowfax 3B2 were applied to the intact abdominal skin, and apex of the left pinna, and 3 consecutive daily applications to the abraded abdominal site. The study was terminated 10 days after the final dose.
Result : Repeated daily contact of open rabbit ear skin caused slight redness, very slight exfoliation, and a very slight superficial burn.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (20)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : undiluted
Dose :
Exposure Time : 1 hour(s)
Comment : rinsed after (see exposure time)
Number of animals : 1
Result : highly irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The eye irritation test included instillation of 0.1 ml of neat Dowfax 3B2 into each conjunctival sac of a female NZ white rabbit. One eye was washed with water after a 30-second exposure, while the other eye was washed with water after 1 hr.
Result : The rabbit survived the test period. Moderate discomfort was noted immediately after dosing, therefore, ophthalmic anesthetic solution was administered prior to dosing the next eye. The conjunctiva, iris and cornea of the eyes were examined using a pen light at all time points. After a one hour exposure the cornea was also observed with a cobalt blue light after fluorescein stain had been administered. At the time of dosing, both eyes exhibited a slight conjunctival response. The 30-second exposure eye also exhibited very slight corneal response and very slight irritation of the iris, at the time of dosing. Both eyes were observed with very slight to moderate conjunctival redness and swelling throughout the 21 day observation period. Transient very slight irritation of the iris was seen in both eyes. From one hr after dosing through the 21 day observation period, both eyes were observed with very slight to moderate corneal response before staining, and a slight to moderate corneal response after staining.
Test substance : The Dowfax 3B2 had a pH of 6.5.
Reliability : (2) valid with restrictions

Flag 25.04.2002	:	Critical study for SIDS endpoint	(15)
Species	:	rabbit	
Concentration	:	undiluted	
Dose	:		
Exposure Time	:		
Comment	:	other: rinsed after 30 seconds	
Number of animals	:	1	
Result	:	highly irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1993	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The eye irritation test included instillation of 0.1 ml of neat Dowfax 3B2 into each conjunctival sac of a female NZ white rabbit. One eye was washed with water after a 30-second exposure, while the other eye was washed with water after 1 hr.	
Result	:	The rabbit survived the test period. Moderate discomfort was noted immediately after dosing, therefore, ophthalmic anesthetic solution was administered prior to dosing the next eye. The conjunctiva, iris and cornea of the eyes were examined using a pen light at all time points. After a one hour exposure the cornea was also observed with a cobalt blue light after fluorescein stain had been administered. At the time of dosing, both eyes exhibited a slight conjunctival response. The 30-second exposure eye also exhibited very slight corneal response and very slight irritation of the iris, at the time of dosing. Both eyes were observed with very slight to moderate conjunctival redness and swelling throughout the 21 day observation period. Transient very slight irritation of the iris was seen in both eyes. From one hr after dosing through the 21 day observation period, both eyes were observed with very slight to moderate corneal response before staining, and a slight to moderate corneal response after staining.	
Test substance	:	The Dowfax 3B2 had a pH of 6.5.	
Reliability	:	(2) valid with restrictions	
Flag 25.04.2002	:	Critical study for SIDS endpoint	(15)
Species	:	rabbit	
Concentration	:	other: powder instilled into eye	
Dose	:		
Exposure Time	:	hour(s)	
Comment	:	other: one eye of each rabbit was rinsed after 30 seconds and the other after 1 hr	
Number of animals	:	2	
Result	:	highly irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1987	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The eye irritation test included instillation of 0.1 ml of neat Dowfax 3B2 (powder form) into each conjunctival sac of two male NZ white rabbits. One eye of each rabbit was washed with water after a 30-second exposure, while the other eye was washed with water after 1 hr. Ophthalmic anesthetic was administered to alleviate discomfort of the rabbits.	
Result	:	A single exposure of the eyes of 2 NZ white rabbits to the powdered test material resulted in moderate discomfort, moderate conjunctival redness and swelling, moderate reddening of the iris, and moderate corneal injury. Ocular effects were still present in both eyes at day 21 of the test and included slight to moderate conjunctival irritation, slight corneal injury, and	

slight reddening of the iris.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (16)

Species : rabbit
Concentration : undiluted
Dose :
Exposure Time :
Comment : other: one eye washed after 30 seconds the other washed after 1 hr
Number of animals : 1
Result : moderately irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1970
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Undiluted Dowfax 3B2 was instilled into both eyes of a female rabbit. One eye was washed after 30 seconds and the other after 1 hr. The eyes were graded for effects at instillation, at 1 hr, 24 hrs, 48 hrs and 7 days.
Result : The effects in both eyes were essentially the same. They included up to moderate conjunctival redness, corneal injury and iritis. At day 7, the corneal effects were gone but there was still very slight conjunctival redness and iritis noted.

Reliability : (2) valid with restrictions
 16.08.2001 (17)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :
Comment :
Number of animals : 6
Result : moderately irritating
EC classification : irritating
Method : EPA OPP 81-4
Year : 1986
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The study was conducted for shipping purposes according to EPA Guidelines 81-4, 1982.

0.1 ml of the test material was instilled into the right eye of one male and five female New Zealand white rabbits. The eyes were graded (scored) for effect at 1, 24, 48 and 72 hrs and 7, 14 and 21 days. No overall score was calculated.

Result : Examination of the conjunctivae post-treatment revealed slight to marked redness and slight to moderate chemosis. The treated eyes had a slight to marked amount of discharge as well as reddening of the iris. Scattered or diffuse areas of opacity and/or slight opacity were observed on the corneas. Signs of eye irritation were observed in all animals at study termination (day 21).

Test substance : The test material was identified as sodium disulfonated decyl diphenyl oxide at pH 9.0 (Dowfax 3B2 at pH 9.0). Analysis of the test material revealed 45.65% Dowfax* 3B2.

Reliability : (2) valid with restrictions
 25.04.2002 (23)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :

Comment	:		
Number of animals	:	6	
Result	:	moderately irritating	
EC classification	:	irritating	
Method	:	EPA OPP 81-4	
Year	:	1986	
GLP	:	yes	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The study was conducted for shipping purposes according to EPA Guidelines 81-4, 1982.	
		0.1 ml of the test material was instilled into the right eye of three male and three female New Zealand white rabbits. The eyes were graded (scored) for effect at 1, 24, 48 and 72 hrs and 7, 14 and 21 days. No overall score was calculated.	
Result	:	Examination of the conjunctivae post-treatment revealed slight to marked redness and slight to moderate chemosis. The treated eyes had a slight to marked amount of discharge as well as reddening of the iris. Scattered or diffuse areas of opacity and slight opacity were observed on the corneas. Signs of eye irritation persisted in four animals at study termination (day 21).	
Test substance	:	The test material was identified as sodium disulfonated decyl diphenyl oxide at pH 9.5 (Dowfax 3B2 at pH 9.5). Analysis of the test material revealed 44.9% Dowfax* 3B2.	
Reliability 25.04.2002	:	(2) valid with restrictions	(24)
Species	:	rabbit	
Concentration	:	undiluted	
Dose	:	.1 ml	
Exposure Time	:		
Comment	:		
Number of animals	:	6	
Result	:	moderately irritating	
EC classification	:	irritating	
Method	:	EPA OPP 81-4	
Year	:	1986	
GLP	:	yes	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	The study was conducted for shipping purposes according to EPA Guidelines 81-4, 1982.	
		0.1 ml of the test material was instilled into the right eye of three male and three female New Zealand white rabbits. The eyes were graded (scored) for effect at 1, 24, 48 and 72 hrs and 7, 14 and 21 days. No overall score was calculated.	
Result	:	Examination of the conjunctivae post-treatment revealed slight to marked redness and slight to moderate chemosis. The treated eyes had a slight to marked amount of discharge as well as reddening of the iris. Opacity was observed on the corneas and ranged from scattered or diffuse areas of opacity to moderate opacity. Signs of eye irritation persisted in two animals at study termination (day 21).	
Test substance	:	The test material was identified as sodium disulfonated decyl diphenyl oxide at pH 10.0 (Dowfax 3B2 at pH 10.0). Analysis of the test material revealed 44.9% Dowfax* 3B2	
Reliability 25.04.2002	:	(2) valid with restrictions	(25)
Species	:	rabbit	
Concentration	:	undiluted	
Dose	:		
Exposure Time	:		

Comment	:	other: one eye washed after 30 seconds and the other after 1 hr	
Number of animals	:	1	
Result	:	moderately irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1965	
GLP	:	no	
Test substance	:	other TS	
Method	:	The 44% aqueous solution of Benax 3B1 was instilled into the eyes of a female rabbit. One eye was washed after 30 seconds and the other after 1 hr. The eyes were graded for effect immediately and at 1, 24 and 48 hrs and at 7 days.	
Result	:	Moderate pain and conjunctivitis with slight to moderate corneal injury not completely subsided in one week in the eye washed after 1 hr. Essentially the same in the eye washed after 30 seconds; however, the effects subsided in one week.	
Test substance	:	Benax 3B1 is a mixture of C-9 (30%) and C-10 (70%) straight chain alpha-olefins. It was tested as a 44% aqueous solution and also diluted down to 5% solids in water for comparison purposes.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
25.04.2002			(18)
Species	:	rabbit	
Concentration	:	5 % active substance	
Dose	:		
Exposure Time	:		
Comment	:	other: one eye was washed after 30 seconds and the other after 1 hr	
Number of animals	:	1	
Result	:	slightly irritating	
EC classification	:	not irritating	
Method	:	other: Dow range-finding	
Year	:	1965	
GLP	:	no	
Test substance	:	other TS	
Method	:	The 44% aqueous solution of Benax 3B1 was diluted to 5% solids and then this 5% solution was instilled into the eyes of a male rabbit. One eye was washed after 30 seconds and the other after 1 hr. The eyes were graded for effect immediately and at 1, 24 and 48 hrs and at 7 days.	
Result	:	Moderate pain with slight to moderate conjunctival redness and swelling--very slight transient corneal injury all subsided in 48 hrs.	
Test substance	:	Benax 3B1 is a mixture of C-9 (30%) and C-10 (70%) straight chain alpha-olefins. It was tested as a 44% aqueous solution and also diluted down to 5% solids in water for comparison purposes.	
Reliability	:	(2) valid with restrictions	
Flag	:	Material Safety Dataset	
25.04.2002			(18)
Species	:	rabbit	
Concentration	:	45 % active substance	
Dose	:		
Exposure Time	:	hour(s)	
Comment	:	other: one eye was washed after 30 seconds and the other after 1 hr	
Number of animals	:	1	
Result	:	slightly irritating	
EC classification	:	irritating	
Method	:	other: Dow range-finding	
Year	:	1967	
GLP	:	no	
Test substance	:	other TS	
Method	:	Two drops of the liquid sample of Benax 3B1 (45% solids) was placed into the eyes of a male rabbit. One eye was washed after 30 seconds and the	

Result : other after 1 hr. Readings were made at washing, at 1, 24 and 48 hrs and at 7 days.
 : Washed 30 seconds: Slight initial pain, moderate conjunctival irritation, slight iritis and slight transient corneal injury which cleared within 7 days.

Test substance : Washed 1 hr: Moderate initial pain and conjunctival irritation, moderate corneal injury and slight iritis. The cornea was essentially normal 7 days postinstillation but some slight conjunctival redness remained.
 : A solid sample of Benax 3B1 was submitted and used for acute oral tests (after diluting to 10% with water) and for use in a proposed feeding study. The second sample of Benax 3B1 was determined by analysis to contain 44.63% active ingredient or 46.87% solids. The active ingredient is a fully sulfonated, alkylated (mix of C-9 and C-10 linear chain) diphenyl oxide sodium salt.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (26)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :
Comment : other: one eye was washed after 30 seconds and the other after 1 hr
Number of animals : 1
Result : highly irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted Dowfax 3B2 was instilled into both eyes of one rabbit. One eye was washed after 30 seconds and the other after 1 hr. The rabbit's eyes were graded when washed, after 24 and 48 hrs and 7, 14 and 21 days.

Result : Instillation of Dowfax 3B2 undiluted into both eyes of a rabbit resulted in moderate discomfort; severe conjunctival redness, swelling, and discharge; moderate reddening of the iris; and severe corneal injury, including vascularization. Signs of eye irritation were still present 21 days post-exposure.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (20)

5.3 SENSITIZATION

5.4 REPEATED DOSE TOXICITY

Species : rat
Sex : male/female
Strain : no data
Route of admin. : oral feed
Exposure period : 92 days
Frequency of treatment : Continuous in feed.
Post obs. period : None
Doses : 0.125, 0.25, 0.5, 1.0 g/kg/day
Control group : yes
NOAEL : = 500 mg/kg

LOAEL	:	= 1000 mg/kg	
Method	:	other: early Dow	
Year	:	1968	
GLP	:	no	
Test substance	:	other TS	
Method	:	Groups of 10 rats/sex/dose were maintained for 92 days on diets containing 0 (control), 1.0, 0.5, 0.25, or 0.125 g/kg/day of Benax 3B1.	
		Rats were 51 days old when put on study. Food and water were available ad libitum. The rats were weighed twice weekly and were observed 'frequently' for changes in appearance and behavior. Mortality and food consumption records were kept. Terminal hematology from 5 controls, 5 male rats/dose for the top 3 doses and from 5 females from the top 2 doses. Lungs, heart, liver, kidneys, spleen, testes, and brain were weighed. Bone marrow smears were prepared from femurs of 5 rats/sex/dose of control and top 2 doses. SGPT, BUN and AP activities were determined at necropsy. A range of tissues was examined histologically.	
Result	:	There was no effect at doses of 0.5 g/kg/day and lower.	
		At 1.0 g/kg/day, the liver and kidney effects were noted as increased SGPT values, organ weight increases, and slight but considered-reversible histological changes (fatty liver and cloudy swelling in the kidneys). Body weights were also decreased at this dose.	
Test substance	:	The test material was Benax 3B1 which contains a mixture of C-9 and C-10 linear alkyl chains.	
Reliability	:	(2) valid with restrictions	
Flag	:	Critical study for SIDS endpoint	
02.05.2002			(27)
Species	:	dog	
Sex	:	male/female	
Strain	:	Beagle	
Route of admin.	:	oral feed	
Exposure period	:	95 days	
Frequency of treatment	:	Continuous in feed.	
Post obs. period	:	None	
Doses	:	0.25, 0.5 and 1.0% in the feed: 81, 163 and 279 mg/kg/day for males and 89, 177 and 325 mg/kg/day for females	
Control group	:	yes	
NOAEL	:	= 163 - 177 mg/kg	
LOAEL	:	= 279 - 325 mg/kg	
Method	:	other: early Dow	
Year	:	1968	
GLP	:	no	
Test substance	:	other TS	
Method	:	Groups of two Beagle dogs/sex/dose were maintained on diets mixed to provide Benax 3B1 at levels of 0, 0.25, 0.5 or 1.0 %.	
		Food and water were available ad libitum. The dogs were weighed weekly and were observed 'frequently' for changes in appearance and behavior. Weekly food consumption records were kept. Pre-exposure and 89-day hematology and clinical chemistries (BUN, AP, BSP, SGOT and SGPT) were obtained from all dogs. Lungs, heart, liver, kidneys, spleen, testes, and brain were weighed. Bone marrow smears were prepared from the ribs of all dogs. A selection of tissues were examined histologically.	
Result	:	There were no adverse effects at 0.5% or lower.	
		At 1.0% there was growth depression in males and increased portal cellularity in the livers. Some slight cloudy swelling of the hepatic cells was apparent in female dogs that were maintained on the high dose (1.0% level). All other parameters were within normal variation for the laboratory.	

Test substance : Benax 3B1 is similar to Dowfax 3B2 but it contains a different mix of alkyl chains (a mix of C-9 and C-10 linear chains).
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
25.04.2002 (28)

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VITRO'

5.7 CARCINOGENITY

5.8 TOXICITY TO REPRODUCTION

5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.10 OTHER RELEVANT INFORMATION

5.11 EXPERIENCE WITH HUMAN EXPOSURE

- (1) The Dow Chemical Company, 2001
- (2) The Dow Chemical Company, 2001.
- (3) McLaughlin, S.P., Springborn Laboratories (Europe), Switzerland for Dow Europe, Horgen, Switzerland, Dowfax* 3B2: Assessment of Ready Biodegradability (Modified OECD Screening Test), DET 2130, 23 November 1993.
- (4) Scholtz, R., MBT Umwelttechnik, Switzerland, for Dow Europe, Horgen, Switzerland, DET 2137, 10 December 1993.
- (5) Scholtz, MBT Umwelttechnik, Switzerland, for Dow Chemical Europe, Horgen, Switzerland, Dowfax* 3B2: Investigation of Aerobic Biodegradation in a Continuous Activated Sludge Test, DET 2169, 25 February, 1994.
- (6) Lepailleur, H., Hervouet, G., Test Certificate, 23 March 1987, IRCHA Study B.7949.
- (7) Lepailleur, H., IRCHA report, Etude B.7614 - Biodegradabilite, 30 October, 1979.
- (8) Rhinehart, W.L., Maier, W.J., Biodegradability of Dowfax* 3B2 and 3B2/2A1 Surfactant by the Soap and Detergent Association (SDA) Confirming Test (Semi-Continuous Activated Sludge), ES-507, April 28, 1982, unpublished Dow report.
- (9) Rhinehart, W.L., Biodegradability of Dowfax* 3B2 Surfactant by the Soap and Detergent Association Confirming Test (Semi-Continuous Activated Sludge), ES-282, May 17, 1979, unpublished Dow report.
- (10) Batchelder, T.L., A Comparison of Potassium Dichromate Chemical Oxygen Demand (COD) Methods, ES-474, October 18, 1982, unpublished Dow report.
- (11) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactants XDS 8174.00, XDS 8292.00, and Dowfax* 2A1, ES-932, January 8, 1987.
- (12) Batchelder, T.L., Acute Static and Flow-Through Fish Toxicity of Dowfax 3B-2, Lot # 04183, ES-10, March 6, 1975, unpublished Dow report.
- (13) Rhinehart, W.L., Bailey, R.E., Toxicity of Dowfax* 2A1 Surfactant and Dowfax* 3B2 Surfactant Metabolites to Aquatic Organisms, ES-243, July 25, 1978, unpublished Dow report.
- (14) Rhinehart, W.L., Dowfax* 3B2 Surfactant Toxicity to Daphnia Magna, Letter Report ES-62L, February 6, 1978, unpublished Dow report.
- (15) Gilbert, K.S., Berdasco, N.M., Dowfax 3B2: Acute Toxicological Properties, unpublished Dow report, May 14, 1993.
- (16) Wall, J.M., XU-40340.00 Dowfax* 3B2, Powder Form: Acute Toxicologic Properties, unpublished Dow report, August 3, 1987.
- (17) Norris, J.M., Toxicological Properties and Industrial handling Hazards of Dowfax 3B-2, 8/27/70, BC T61.14-14-(13).
- (18) Olson, K.J., Toxicological Properties and Industrial handling Hazards of 44% Aqueous Solution of Benax 3B1 (Phenyl Ether: Alkylated, Sulfonated, Sodium Salt), unpublished Dow report, March 8, 1965.
- (19) Taylor, Y., Olson, K.J., Toxicological Properties and Industrial handling Hazards of Benax 3B1 (Alkylated Sulfonated Phenyl Ether Sodium Salt), unpublished Dow report, September 26, 1967.

- (20) Henck, J.W., Acute Toxicological Properties and Industrial Handling of Dowfax* 3B2 Surfactant, unpublished Dow report, February 18, 1980.
- (21) Olson, K.J., Toxicological Properties and Industrial Handling Hazards of 44% Aqueous Solution of Benax 3B1 (Phenyl Ether: Alkylated, Sulfonated, Sodium Salt), unpublished Dow report, March 8, 1965.
- (22) Taylor, Y., Olson, K.J., Toxicological Properties and Industrial Handling Hazards of Benax 3B1 (Alkylated Sulfonated Phenyl Ether Sodium Salt), unpublished Dow report, September 26, 1967.
- (23) Jeffrey, M.M., Sodium Disulfonated Decyl Diphenyl Oxide (pH 9.0): Primary Eye Irritation Study in New Zealand White Rabbits, unpublished Dow report, 9 July, 1986.
- (24) Jeffrey, M.M., Sodium Disulfonated Decyl Diphenyl Oxide (pH 9.5): Primary Eye Irritation Study in New Zealand White Rabbits, unpublished Dow report, 9 July, 1986.
- (25) Jeffrey, M.M., Sodium Disulfonated Decyl Diphenyl Oxide (pH 10.0): Primary Eye Irritation Study in New Zealand White Rabbits, unpublished Dow report, 1 August, 1986.
- (26) Taylor, Y., Olson, K.J., Toxicological Properties and Industrial handling Hazards of Benax 3B1 (Alkylated Sulfonated Phenyl Ether Sodium Salt), unpublished Dow report, September, 26, 1967.
- (27) Copeland, J.R., Olson, K.J., Results of 92 Day Dietary Feeding Studies of Benax 3B1 Surfactant (Dowfax 3B1 Surfactant) in Rats, unpublished Dow report, May 10, 1968.
- (28) Olson, K.J., Wade, C., Results of 95 Day Dietary Feeding Studies of Benax* 3B1 (Dowfax* 3B1) Surfactant in Beagle Hounds, unpublished Dow report, July 1, 1968.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 149119-20-0
CAS No. : 149119-20-0

Producer Related Part
Company : The Dow Chemical Company
Creation date : 03.12.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 03.12.2001

Memo :

Printing date :
Revision date :
Date of last Update : 25.08.2003

Number of Pages :

Chapter (profile) :
Reliability (profile) :
Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

Name of Plant : Pilot Chemical
Street : 3439 Yankee Road
Town : 45042 Middletown, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : ca. 47 % w/w
Remark : CAS # 149119-20-0 is the number under which the commercial product is sold in the US by Dow. CAS # 28519-02-0 was the CAS # for the same product on the EPA HPV List. CAS # 28519-02-0 is also the CAS # for the Dow product in the EU and for the Dow Dowfax 2A1 product in the EU.

The commercial material is sold as a 47% aqueous solution. This CAS Number (149119-20-0) represents the so-called 'linear' isomer. The Commercial material XD-8174 is deemed to be the linear alkyl sodium salt and Dowfax 2A1 is the name for the branched alkyl sodium salt.

None of these products has totally linear alkyl groups. Normal chemical reactivity dictates that the products are attached at the 2nd carbon.

25.02.2002

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benzenesulfonic acid, dodecyl (sulfophenoxy)-, disodium salt
17.08.2001

Benzenesulfonic Acid, Dodecyl(Sulfophenoxy)-, Disodium Salt
17.08.2001

Benzenesulfonic acid, dodecyl(sulfophenoxy)-, disodium salt
17.08.2001

Disodium dodecyl(sulphonatophenoxy)benzenesulphonate
17.08.2001

Dodecyl(sulfophenoxy)benzenesulfonic acid disodium salt
17.08.2001

Dowfax XDS-8174 experimental surfactant
17.08.2001

Sodium dodecyldiphenyl oxide disulfonate
17.08.2001

XD-8174
17.08.2001

XDS-8174.00
17.08.2001

1.3 IMPURITIES

CAS-No : 7757-82-6
EINECS-No : 231-820-9
EINECS-Name : sodium sulphate
Contents : <= 1 % w/w
17.08.2001

CAS-No : 7647-14-5
EINECS-No : 231-598-3
EINECS-Name : sodium chloride
Contents : <= 1 % w/w
17.08.2001

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Value : = 298 ° C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

Value : = 300 ° C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

2.2 BOILING POINT

Value : = 660 ° C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

Value : = 680 ° C at
Decomposition :
Method : other
Year : 2001
GLP : no

Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 29.10.2001 (1)

2.3 DENSITY

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : 8.0x10⁻²⁰ hPa. at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 17.06.2002 (1)

Value : 5.32x10⁻¹⁵ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 07.11.2001 (1)

2.5 PARTITION COEFFICIENT

Log pow : = 3.3 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using

ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.

Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

Log pow : = 3.8 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.

Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

2.6.1 WATER SOLUBILITY

Value : ca. 100000 mg/l at 25 ° C
Qualitative : of very high solubility
Pka : at 25 ° C
PH : at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in environmental pH range of 5 to 9 estimated based on product formulation information. Formulations contain 10 to 50% of surfactant in water. Therefore solubility is >100,000 mg/L.

Remark : Based on linear or branched products.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 ADDITIONAL REMARKS

In this report, Dowfax 2A1 was not biodegradable but XDS 8174.00 was.

XDS-8174.00 is considered to be the 'linear' material and Dowfax 2A1 considered to be the 'branched' member of the group.

Test substance : This test was of XDS 8174.00.

Reliability : (2) valid with restrictions

25.04.2002

(2)

3.6 BOD5, COD OR BOD5/COD RATIO

COD

Method : other: acidic dichromate digestion procedure (Hach)

Year : 1987

GLP : yes

COD : = 2.1 mg/g substance

Method : Chemical oxygen demand (COD) determinations using the Hach method which is accepted by the US EPA (1980) were conducted on the experimental surfactants XDS 8174.00, XDS 8292.00, XDS 8390.00, and Dowfax 3B2. This procedure uses a high temperature acidic dichromate digestion of an aqueous solution of the test material followed by a spectrophotometric determination of unreacted dichromate. The latter value allows calculation of the COD.

Remark : COD is reported as part of oxygen per part of product (p/p, 100% basis).

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset

25.04.2002

(3)

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	flow through
Species	:	Pimephales promelas (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
Analytical monitoring	:	yes
NOEC	:	c = .62
LC50	:	c = .93
Method	:	other: EPA-660/3-75-009, 1975; ASTM E729-80
Year	:	1988
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Testing was conducted with an intermittent-flow proportional diluter with an automatic pipette for delivery of the test material. Fish were acclimated to light/dark and observed for 14 days before testing; and acclimated for >7 days to test temp. The test lot was held without food for 48 hr before testing. The test was conducted in 6L glass and silicone adhesive aquaria. Groups of 10 (2 groups/conc.) fish were exposed to nominal concentrations of 3.87, 2.52, 1.64, 1.06 and 0.69 mg/l and a water dilution.
Result	:	3.68 mg/l 100 % mortality at 24 hr 2.44 mg/l 75% mortality at 24 hr; 100% mortality at 48 hr 1.59 mg/l 45% mortality at 24 hr; 100% mortality at 48 hr 0.96 mg/l 0% mortality at 24 hr; 30% at 48 hr; 40% at 72 hr; 55% at 96 hr 0.62 mg/l 0% mortality at all times 0 mg/l 5% mortality at 72/96 hr
		24-h LC50 1.80(1.57-2.05) mg/l 48-h LC50 1.08 (0.62-1.59) mg/l 72-h LC50 1.02 (0.62-1.59) mg/l 96-h LC50 0.93 (0.62-1.59) mg/l
Test condition	:	Throughout the test the dissolved oxygen measurements were all >93% saturation (range: 9.1 to 10.7 mg/l). The pH and temperature measurements ranged from 7.7 to 7.9 and 17.1 to 17.4C, respectively. The range of water quality measurements determined during the test were: hardness 79-81 mg/l(as CaCO3), alkalinity 46-48 mg/l (as CaCO3), and conductivity 130-181 micromhos/cm.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint
15.08.2002		(4)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	flow through
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
Analytical monitoring	:	yes
NOEC	:	c = 1.36
LC50 (24 hr)	:	c = 5.1
LCF50 (48 hr)	:	c = 4.6
Method	:	other: ASTM E729-80; EPA-660/3/75-009, 1975
Year	:	1988
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Testing was conducted with an intermittent-flow proportional diluter, with an automatic pipette for injection of the test material. There were 3 replicate

chambers (400 ml glass beakers) for each concentration. The concentrations were 4.77, 2.53, 1.36, 0.70, 0.33 and 0 mg/l. Twenty-four hr old neonates were used in the test. There were 10 neonates/dose/replicate. The test duration was 48 hrs; however, the LC50's were calculated for both 24 and 48 hrs using the probit analysis method.

Result : 4.77 mg/l 43% mortality at 24 hrs; 53% mortality at 48 hrs
 2.53 mg/l 7% mortality at 24 hrs; 10% mortality at 48 hrs
 1.36 mg/l no mortality
 0.70 mg/l no mortality
 0.33 mg/l no mortality
 0 mg/l no mortality

Test condition : 24 hr LC50 5.1 (4.3-7.6) mg/l
 48 hr LC50 4.6 (3.9-6.0) mg/l
 Throughout the test the dissolved oxygen measurements were all >90% saturation (range 9.0 to 9.3 mg/l). The pH and temperature measurements ranged from 7.4 to 7.7 and 20.0 to 20.7C, respectively. The water quality measurements determined for the week of this study were hardness 80 mg/l (as CaCO₃), alkalinity 46 mg/l (as CaCO₃), and conductivity 140 micromhos/cm.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 15.08.2002 (5)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species : Selenastrum capricornutum (Algae)
Endpoint : other: cell volume and cell count
Exposure period : 5 day
Unit : mg/l
Analytical monitoring : yes
NOEL : c = 297.5
Method : other: EPA 540/9-86-134, 1986; EPA-600/9-78-018, 1978
Year : 1988
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The definitive test consisted of a series of 6 concentrations each replicated 3 times and a control replicated 6 times. Each concentration was at least 60% of the next higher concentration. Each vessel contained an initial cell density of 20,000 cells/ml. The initial and final pH of the control, low, middle, and high concentrations were measured and recorded. In addition, pH measurements were taken at the termination of the test in a variety of concentrations in the presence of the algae to determine whether the latter had had any effect on the initial hydrogen ion concentration. A counting blank containing the growth medium, no algae, but test material was included with each concentration series. Flasks containing algae (N=24) were monitored daily for growth. The definitive test was carried out for 5 days.

Result : Day 3 EC50 value > highest measured dose level
 Day 5 Cell Count/ml: 872(644-1101) mg/l
 Day 5 Cell Volume x 10⁴ micrometers³/ml: 1016 (103-1928) mg/l
 Day 4 Cell Count/ml: 840(-37, 1717) mg/l
 Day 4 Cell Volume x 10⁴ micrometers³/ml: 949(198-1701) mg/l
 Complete (100%) recovery of dose concentrations was noted after 5 days of exposure, so the algal cells were exposed to 100% of their nominal dose levels after day 3 as well.

Test condition : Test conditions were

Temperature range 25.0-25.4 deg C
 Light Range 3210-5350 lux (continuous photoperiod)
 pH (1010.2 mg/l): 7.4 without growth and 7.6 with growth
 pH (64.93 mg/l): 7.6 without growth and 7.4 with growth
 control: 7.9 without growth and 7.6 with growth.
 Other concentrations were 7.4--7.5 without growth and 7.2-7.6 with growth.

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 15.08.2002

(6)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

Species : Pimephales promelas (Fish, fresh water)
Endpoint : other: embryo-larval survival
Exposure period : 32 day
Unit :
Analytical monitoring : yes
NOEC : c = 25
MATC : c ca. 36.2 - 25
Method : other: EPA 40CFR Part 797.1600 Fish Early Life Stage Toxicity, 1987
Year : 1990
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : The chronic toxicity of Dowfax XDS-8174 experimental surfactant was assessed by conducting a flow-through embryo-larval test. Indices of chronic toxicity are the no observed effect concentration (NOEC) and the maximum acceptable toxicant concentration (MATC). The MATC is the theoretical toxic threshold concentration falling between the NOEC and the next highest concentration exhibiting an effect when compared to controls. Fathead minnow embryos, less than 24 h post fertilization, were used to start the test. The embryos and larvae were exposed to mean analyzed concentrations of 17.5, 25.0, 36.2, 61.9, 95.3 and 151.5 micrograms/l. The test was terminated after 32 days of exposure.

Remark : Units were Micrograms/liter.
Result : Statistical analysis of the data showed no significant reduction ($p \leq 0.05$) in the percent of embryos that hatched, the number of normal larvae at hatch, mean wet weight or mean standard length of survivors. There was a statistically significant ($p = 0.05$) reduction in larval survival at 36.2 micrograms/l and above. The NOEC was 25.0 micrograms/l. The maximum acceptable toxicant concentration (MATC), based on larval survival, lies between 36.2 and 25.0 micrograms/l, and is 30.1 micrograms/l expressed as the geometric mean of these two values.

Test condition : Water Quality Measurements: (dilution water)
 Hardness (as CaCO₃) 68-83 mg/l
 Alkalinity (as CaCO₃) 36 to 57 mg/l
 Conductivity 160 to 200 micromhos/cm
 pH 7.6-7.9
 Light intensity 156-165 ft-candles

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 15.08.2002

(7)

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type	: LD50
Species	: rat
Strain	: Fischer 344
Sex	: male
Number of animals	: 3
Vehicle	: other: undiluted aqueous commercial solution
Value	: > 2000 mg/kg bw
Method	: other: Dow range-finding
Year	: 1988
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Method	: Three male F344 rats were fed undiluted XDS 8174 by oral gavage at a dose of 2000 mg/kg.
Result	: Diarrhea and perineal soiling were the only in-life signs of toxicity observed in the test animals--no rats died. All rats gained weight during the 2-week observation period. Therefore the acute oral LD50 is >2000 mg/kg.
Test substance	: The test material (XDS 8174) was characterized on the report as benzene sulfonic acid sodium salt of mono/di alkylated dodecyl mono/di sulfonic acid.
Reliability	: (2) valid with restrictions
Flag	: Critical study for SIDS endpoint
25.04.2002	(8)

5.1.2 ACUTE INHALATION TOXICITY**5.1.3 ACUTE DERMAL TOXICITY**

Type	: LD50
Species	: rabbit
Strain	: New Zealand white
Sex	: female
Number of animals	: 2
Vehicle	: other: applied as the commercial aqueous solution/undiluted further
Value	: > 2000 mg/kg bw
Method	: other: Dow range-finding
Year	: 1988
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Method	: Two female New Zealand white rabbits received a single, 24-hour, dermal application of 2000 mg/kg of the undiluted test material. The material was placed between rubber bands inside a plastic cuff and wrapped with cotton cloth taped to the marginal hair.
Result	: No in-life signs of toxicity were observed in the test animals. Erythema and edema were observed on the application sites of the rabbits. The rabbits eventually gained weight during the 2-week observation period. The estimated acute dermal LD50 for female NZ white rabbits was >2000 mg/kg.
Reliability	: (2) valid with restrictions
Flag	: Critical study for SIDS endpoint
25.04.2002	(8)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 5 day
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1988
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted test material was applied to the ear (open) and two sites on the abdomen of one male rabbit. The ear and intact abdominal site got 5 applications and the abraded abdominal site got 3. The rabbit was observed for 7 days and weighed at the beginning (day 0) and day 7.
Result : No irritation was observed after prolonged contact (24 hrs) with the test material. Repeated contact resulted in very slight to slight erythema and, on the intact application site only, very slight edema.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (8)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time : 5 day
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1988
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted test material was applied to the ear (open) and two sites on the abdomen of one male rabbit. The ear and intact abdominal site got 5 applications and the abraded abdominal site got 3. The rabbit was observed for 7 days and weighed at the beginning (day 0) and day 7.
Result : There was only very slight redness on the ear site after repeated applications.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (8)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :
Comment : other: one eye was rinsed after 30 seconds and the other after 1 hr
Number of animals : 1

Result	:	corrosive
EC classification	:	risk of serious damage to eyes
Method	:	other: Dow range-finding
Year	:	1988
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	.1 ml of the undiluted test material was instilled into each conjunctival sac of a female New Zealand white rabbit. One eye was washed with water after a 30 sec. exposure, while the other eye was washed with water after 1 hr. Readings were made at 30 sec, 1 hr, 24, 48 and 72 hr, and 7, 14 and 21 days.
Result	:	The single exposure resulted in similar effects in both eyes, which included slight discomfort, marked conjunctival redness and swelling, marked reddening of the iris, and moderate corneal injury, as indicated by fluorescein stain. Ocular effects were still present in both eyes 21 days after exposure and included very slight to slight conjunctival irritation and corneal injury. In addition, corneal vascularization was observed at day 21 in the eye where washing was delayed.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint
25.04.2002		(8)

5.3 SENSITIZATION**5.4 REPEATED DOSE TOXICITY****5.5 GENETIC TOXICITY 'IN VITRO'****5.6 GENETIC TOXICITY 'IN VITRO'****5.7 CARCINOGENITY****5.8 TOXICITY TO REPRODUCTION****5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY****5.10 OTHER RELEVANT INFORMATION****5.11 EXPERIENCE WITH HUMAN EXPOSURE**

- (1) The Dow Chemical Company, 2001.
- (2) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactats XDS 8174.00, XDS 8292.00 and Dowfax* 2A1, ES-932, January 8, 1987, unpublished Dow report.
- (3) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactants XDS 8174.00, XDS 8292.00, and Dowfax* 2A1, ES-932, January 8, 1987, unpublished Dow report.
- (4) Dill, D.C., Alvesteffer, B.K., Bartlett, E.A., XDS-8174.00 Experimental Surfactant: Evaluation of the Flow-Through Acute Toxicity to the Fathead Minnow, Pimephales promelas Rafinesque, ES-1021, November 29, 1988, unpublished Dow report.
- (5) Gersich, F.M., Alvesteffer, B., Bartlett, E.A., Milazzo, D.P., XDS-8174.00 Experimental Surfactant: Evaluation of the Flow-Through Acute Toxicity Test to Daphnia magna Straus, ES-1098, November 10, 1988, unpublished Dow report.
- (6) Cowgill, U.M., Milazzo, D.P., Alvesteffer, B.K., XDS-8174.00 Experimental Surfactant: Evaluation of the 5-Day Toxicity to the Green Alga Selenastrum capricornutum, ES-2004, November 8, 1988, unpublished Dow report.
- (7) Dill, D.C., Galobardes, J.F., Gorzinski, S.J., Richardson, C.H., Dowfax* XDS-8174 Experimental Surfactant: Embryo-Larval Toxicity Test with Fathead Minnow, Pimephales promelas Rafinesque, ES-2175, March 12, 1990, unpublished Dow report.
- (8) Wall, J.M., Dowfax XDS 8174: Acute Toxicologic Properties, unpublished Dow report, June 24, 1988.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 119345-03-8
CAS No. : 119345-03-8

Producer Related Part
Company : The Dow Chemical Company
Creation date : 17.08.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 17.08.2001

Memo :

Printing date :
Revision date :
Date of last Update : 25.08.2003

Number of Pages :

Chapter (profile) :
Reliability (profile) :
Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : ca. 43 % w/w
Remark : This product is also described by CAS RN: 149119-19-7 which is Benzene, 1,1'-oxybis-, sec-dodecyl derivs., sulfonated.

A sample used in 1994 for a tox test had a pH of 1.0.

17.08.2001

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benzene, 1,1'-oxybis-, tetrapropylene derivs., sulfonated
17.08.2001

Dowfax 2A0 solution surfactant
17.08.2001

1.3 IMPURITIES

CAS-No : 7664-93-9
EINECS-No : 231-639-5
EINECS-Name : sulphuric acid
Contents : <= 2 % w/w
17.08.2001

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Value : = 298 ° C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
30.10.2001 (1)

2.2 BOILING POINT

Value : = 660 ° C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
30.10.2001 (1)

2.3 DENSITY**2.3.1 GRANULOMETRY****2.4 VAPOUR PRESSURE**

Value : 5.33x10⁻¹⁹ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure were estimated using Estimation Programs Interface (EPIWIN, Version 2, February, 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
17.06.2002 (1)

2.5 PARTITION COEFFICIENT

Log pow : = 3.3 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental Ph range of 5 to 9 was estimated using the ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers were based on quantitative structure-activity relationships which account for dissociation as a function of pH.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
30.10.2001 (1)

2.6.1 WATER SOLUBILITY

Value : ca. 100000 mg/l at 25 ° C
Qualitative : of very high solubility
Pka : at 25 ° C
PH : at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in environmental pH range of 5 to 9 was estimated based on product formulation information. Formulations contain 10 to 50% surfactant in water. Thus, solubility is >100,000 mg/L.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
30.10.2001 (1)

2.6.2 SURFACE TENSION**2.7 FLASH POINT****2.8 AUTO FLAMMABILITY****2.9 FLAMMABILITY****2.10 EXPLOSIVE PROPERTIES****2.11 OXIDIZING PROPERTIES****2.12 ADDITIONAL REMARKS**

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : These substances have no hydrolyzable functional groups so hydrolysis is not expected.
Flag :

3.1.3 STABILITY IN SOIL

3.2 MONITORING DATA

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Species : rat
Strain : Fischer 344
Sex : female
Number of animals : 3
Vehicle :
Value : > 500 mg/kg bw
Method : other
Year : 1994
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three female F344 rats/dose received 500 or 2000 mg/kg of neat Dowfax 2A0 by single-dose oral gavage. The rats were weighed on test days 1, 2, 8 and 15.
Remark : The test material, Dowfax 2A0, had a pH of 1.0 and so eye and skin irritation and dermal toxicity tests were not conducted.
Result : All rats at the 500 mg/kg dose level, and two of the three at 2000 mg/kg survived the fourteen day observation period. Clinical signs noted at both dose levels were chromodacryorrhea and fecal soiling. Salivation and lacrimation were also noted on the one 2000 mg/kg dose rat that was found dead on test day 2. Clinical signs began within 2 hours after dosing. All surviving animals were normal by test day 3. There was no effect on body weights during the two week observation period.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (2)

Type : LD50
Species : rat
Strain : no data
Sex : female
Number of animals : 3
Vehicle : other: the 50% product was diluted to 20% with water for oral admin.
Value : ca. 1000 - 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1960
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three female rats/dose were fed Dowfax 2A0 by oral gavage at doses of 0.252, 0.50, 1.0, 2.0 and 3.98 g/kg (based on solids in test sample). One rat/dose was sent for gross pathologic examination on test day X (not stated). The rats were weighed on days 1, 7 and 14.
Result : 3.98 g/kg 3/3 dead
 2.0 g/kg 2/3 dead
 1.0 g/kg 0/3 dead
 0.5 g/kg 0/3 dead
 0.252 g/kg 0/3 dead

 Rats at the 1.0 and 2.0 g/kg doses that didn't die overnight after dosing had diarrhea on day 1.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 02.05.2002 (3)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : other: undiluted 41% commercial material
Exposure : Occlusive
Exposure time : 4 day
Number of animals : 1
PDII :
Result : moderately irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml doses of the undiluted product (41% solids in water) was applied to the ear (open) and two abdominal sites--one intact and one abraded (confined/occluded). The sites on the abdomen were covered with cotton wool and wrapped in cotton cloth taped to marginal fur. Ten 24-hr applications were made on the ear; 4 on the intact abdominal site; and 3 on the abraded abdominal site. The rabbit was observed daily, skin graded daily and weighed on days 1, 7, 14, and 21. The test continued until day 23.
Result : Contact on confined rabbit skin resulted in moderate redness, very slight exfoliation, and, after 4 applications, a moderate burn which resulted in scar formation.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (4)

Species : rabbit
Concentration : other: undiluted 41% aqueous commercial material
Exposure : Open
Exposure time : 10 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml doses of the undiluted product (41% solids in water) was applied to the ear (open) and two abdominal sites--one intact and one abraded (confined/occluded). The sites on the abdomen were covered with cotton wool and wrapped in cotton cloth taped to marginal fur. Ten 24-hr applications were made on the ear; 4 on the intact abdominal site; and 3 on the abraded abdominal site. The rabbit was observed daily, skin graded daily and weighed on days 1, 7, 14, and 21. The test continued until day 23.
Result : Prolonged contact with this material on unconfined rabbit skin resulted in

<p>Reliability Flag 25.04.2002</p>	<p>marked redness, very slight swelling, and slight exfoliation. : (2) valid with restrictions : Material Safety Dataset</p>	<p>(4)</p>
<p>Species Concentration Exposure Exposure time Number of animals PDII Result EC classification Method Year GLP Test substance Method</p>	<p>: rabbit : other: applied undiluted as submitted and as 10% of submitted solution : Occlusive : 9 day : 2 : : slightly irritating : not irritating : other: Dow range-finding : 1960 : no : as prescribed by 1.1 - 1.4 : Nine daily applications were made to the ear (open) and 2 applications to the abdomen (one intact site and one abraded) of one rabbit of the undiluted 50% aqueous solution. The same applications were made on a second rabbit under the same conditions but these were of a 10% aqueous solution of the submitted sample (10% of 50% solids). The rabbits were evaluated on days 1-11, 14, 16, 18 and 21. They were weighed on days 0, 7, 14 and 21.</p>	
<p>Result</p>	<p>: Undiluted (intact) belly: Slight hyperemia and edema; moderate necrosis after 2nd application; skin normal in 21 days.</p> <p>Undiluted (abraded) belly: Same as above only a slight scar at end of 21 days.</p> <p>10% solution in water (intact) belly: Very slight hyperemia and exfoliation only.</p> <p>10% solution in water (abraded) belly: Slight hyperemia and exfoliation; skin normal in 21 days.</p>	
<p>Reliability Flag 25.04.2002</p>	<p>: (2) valid with restrictions : Material Safety Dataset</p>	<p>(3)</p>
<p>Species Concentration Exposure Exposure time Number of animals PDII Result EC classification Method Year GLP Test substance Method</p>	<p>: rabbit : other: applied undiluted as submitted and as 10% of that : Open : 9 day : 2 : : slightly irritating : not irritating : other: Dow range-finding : 1960 : no : as prescribed by 1.1 - 1.4 : Nine daily applications were made to the ear (open) and 2 applications to the abdomen (one intact site and one abraded) of one rabbit of the undiluted 50% aqueous solution. The same applications were made on a second rabbit under the same conditions but these were of a 10% aqueous solution of the submitted sample (10% of 50% solids). The rabbits were evaluated on days 1-11, 14, 16, 18 and 21. They were weighed on days 0, 7, 14 and 21</p>	
<p>Result</p>	<p>: Undiluted (Intact) Ear: Slight hyperemia and necrosis; skin normal in 21 days leaving a slight scar.</p> <p>10% solution in water (intact) Ear: No irritation observed.</p>	

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (3)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : other: undiluted 41% aqueous commercial material
Dose : .1 ml
Exposure Time : hour(s)
Comment : other: one eye was washed after 30 seconds and the other after 1 hr
Number of animals : 1
Result : moderately irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted aqueous material (41% solids in water) was instilled into both eyes of a rabbit. One eye was washed after 30 seconds and the other after 1 hr. The rabbit was evaluated at washing, at 1, 24 and 48 hrs, and after 7 and 14 days.
Result : Instillation of Dowfax 2A0 surfactant into the eyes of a rabbit resulted in slight discomfort, moderate conjunctival redness and swelling, moderate reddening of the iris and moderate corneal injury. All signs of irritation were essentially absent in the washed (30 sec) eye by 48 hrs, while signs of irritation were absent in the unwashed eye (1 hr) by 14 days.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (4)

Species : rabbit
Concentration : other: instilled undiluted as submitted and as 10% solution of that (in water)
Dose : .1 ml
Exposure Time :
Comment : other: one eye of each rabbit washed after 30 seconds and the other after 1 hr
Number of animals : 2
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1960
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : 0.1 ml amounts of the undiluted material as submitted and a 10% solution of that were instilled into both eyes of 2 rabbits (one concentration/rabbit). One eye of each rabbit was washed after 30 seconds and the other after 1 hr. The eyes were evaluated when washed, at 1, 24 and 48 hrs and after 7 days.
Result : Undiluted (30 sec wash): Slight conjunctivitis--subsided in 48 hrs.
 Undiluted ('unwashed'): Slight corneal damage and internal effects which subsided in 1 week; slight to extensive conjunctivitis--not subsided in 1 week.
 10% solution in water (washed and unwashed): Slight conjunctivitis--subsided in 48 hrs.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset

25.04.2002

(5)

5.3 SENSITIZATION

5.4 REPEATED DOSE TOXICITY

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VITRO'

5.7 CARCINOGENITY

5.8 TOXICITY TO REPRODUCTION

5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.10 OTHER RELEVANT INFORMATION

5.11 EXPERIENCE WITH HUMAN EXPOSURE

- (1) The Dow Chemical Company, 2001.
- (2) Gilbert, K.S., Dowfax 2A0: Acute Toxicological Properties, unpublished Dow report, 19 December, 1994.
- (3) Olson, K.J., Results of Range Finding Toxicological Tests on Sulfonic Acid of Dowfax 2A1 (Di-sulfonic Acid of Dodecyl Diphenyl Oxide)-Water Solution Dowfax 2A0, unpublished Dow report, Feb. 23, 1960.
- (4) Henck, J.W., Acute Toxicological Properties and Industrial handling Hazards of Dowfax* 2A0 Surfactant, unpublished Dow report, March 5, 1980.
- (5) Olson, K.J., Results of Range Finding Toxicological Tests on Sulfonic Acid of Dowfax 2A1 (Di-Sulfonic Acid of Dodecyl Diphenyl Oxide)-Water Solution Dowfax 2A0, unpublished Dow report, Febr. 23, 1960.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 119345-04-9
CAS No. : 119345-04-9

Producer Related Part
Company : The Dow Chemical Company
Creation date : 30.10.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 30.10.2001

Memo :

Printing date :

Revision date :

Date of last Update : 25.08.2003

Number of Pages :

Chapter (profile) :

Reliability (profile) :

Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

Name of Plant : Pilot Chemical
Street : 3439 Yankee Road
Town : 45042 Middletown, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : ca. 47 % w/w
Remark : The commercial material is sold as a 47% aqueous solution. This CAS Number represents the branched isomer of the C12 ADPOS salt.

In the EU, this product has the CAS # 28519-02-0.

25.02.2002

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benax 2A1
05.11.2001

Benzenesulfonic acid, dodecyl (sulfophenoxy)-, disodium salt
17.08.2001

Benzenesulfonic Acid, Dodecyl(Sulfophenoxy)-, Disodium Salt
17.08.2001

Benzenesulfonic acid, dodecyl(sulfophenoxy)-, disodium salt
17.08.2001

Disodium dodecyl(sulphonatophenoxy)benzenesulphonate
17.08.2001

Dodecyl(sulfophenoxy)benzenesulfonic acid disodium salt
17.08.2001

Dowfax 2A-1
20.08.2001

Dowfax 2A1
07.11.2001

Dowfax 2A1 Surfactant
20.08.2001

Dowfax* 2A1 Surfactant Solution
20.08.2001

Dowfax* 2EP

Remark : Dowfax 2EP Solution Surfactant: This is a neutralized, unbleached, filtered version of Dowfax 2A1. There are two daphnia studies using Dowfax* 2EP which are included in this Robust Summary.

28.08.2001

Sodium dodecyldiphenyl oxide disulfonate
17.08.2001

04.12.2001

04.12.2001

04.12.2001

1.3 IMPURITIES

CAS-No : 7757-82-6
EINECS-No : 231-820-9
EINECS-Name : sodium sulphate
Contents : <= 1 % w/w
17.08.2001

CAS-No : 7647-14-5
EINECS-No : 231-598-3
EINECS-Name : sodium chloride
Contents : <= 1 % w/w
17.08.2001

1.4 ADDITIVES

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Value : = 298 °C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

Value : = 300 °C
Sublimation :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

2.2 BOILING POINT

Value : = 660 °C at
Decomposition :
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
29.10.2001 (1)

Value : = 680 °C at
Decomposition :
Method : other
Year : 2001
GLP : no

Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 29.10.2001 (1)

2.3 DENSITY

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : 5.33x10⁻¹⁹ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 17.06.2002 (1)

Value : 5.32x10⁻¹⁵ hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point, and Vapor Pressure estimated using Estimation programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.
Remark :
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 07.11.2001 (1)

2.5 PARTITION COEFFICIENT

Log pow : = 3.3 at 25° C
Method : other (calculated)
Year : 2001
GLP : no

Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.
Remark : Calculated for the branched product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

Log pow : = 3.8 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto, Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.
Remark : Calculated for the linear product.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

2.6.1 WATER SOLUBILITY

Value : ca. 100000 mg/l at 25 ° C
Qualitative : of very high solubility
Pka : at 25 ° C
PH : at and ° C
Method : other
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Water solubility in environmental pH range of 5 to 9 estimated based on product formulation information. Formulations contain 10 to 50% of surfactant in water. Therefore solubility is >100,000 mg/L.
Remark : Based on linear or branched products.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 30.10.2001 (1)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : These substances have no hydrolyzable functional groups so hydrolysis is not expected.
Flag :

3.1.3 STABILITY IN SOIL

3.2 MONITORING DATA

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Type : aerobic
Inoculum : activated sludge
Concentration : 40mg/l related to DOC (Dissolved Organic Carbon)
related to
Contact time : 28 day
Degradation : = 21 % after 28 day
Result : inherently biodegradable
Deg. Product : yes
Method : OECD Guide-line 302 B Zahn-Wellens/EMPA Test
Year : 1998
GLP : yes

3. Environmental Fate and Pathways

Id 119345-04-9

Date 04.10.2002

Test substance	: as prescribed by 1.1 - 1.4
Remark	: Primary biodegradation after 28 days was 58% based on HPLC measurements of the test surfactant.
	<p>Modifications in the test procedure were necessary due to the inhibitory effects of the surfactant to activated sludge, and the tendency of the surfactant to rapidly adsorb to biosolids in the test system. The ratio of biosolids to test material concentration was increased to minimize the inhibitory effects and maintain analytical sensitivity. To differentiate between adsorption and biodegradation of the test material, the concentrations of Dowfax 2A1 surfactant and its biodegradation products were determined by HPLC.</p>
Result	: Substantial primary biodegradation (degradation of parent compound) of Dowfax 2A1 Surfactant to unidentified products was observed in the test mixtures containing activated sludge. The concentration of the test surfactant measured by HPLC decreased from 34.6 to 14.5 mg/l after 28 days, corresponding to a primary biodegradation of 58%. Since only a 3% loss of the test material was measured in a chemically sterilized control (HgCl ₂ added) over 28 days, the degradation observed in the viable reaction mixtures was biologically mediated. Biodegradation based on loss of dissolved organic carbon (DOC) reached 21% after 28 days. This level of DOC degradation, coupled with the 58% primary biodegradation, is consistent with an "inherently biodegradable" classification according to OECD test guidelines.
Reliability	: (1) valid without restriction
Flag	: Critical study for SIDS endpoint
25.04.2002	(2)
Type	: aerobic
Inoculum	:
Contact time	: 56 day
Degradation	: = 49 % after 21 day
Result	:
Deg. Product	:
Method	: other: OECD 'Confirmatory Test'
Year	: 1979
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Reliability	: (2) valid with restrictions
20.08.2001	(3)
Type	: aerobic
Inoculum	: activated sludge, domestic
Concentration	: 20mg/l related to Test substance related to
Contact time	: 7 day
Degradation	: ca. 51 % after 7 day
Result	:
Control substance	: other: linear alkylbenzene sulfonate (LAS)
Kinetic	: % %
Deg. Product	:
Method	: other: Soap and Detergent Assoc. Subcommittee on Biodegradation Test Methods, 1965.
Year	: 1987
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: The procedure involved addition of the test surfactants at a nominal concentration of 20 mg/l to SCAS cylinders operated on a 24-hour fill and drain cycle. A 90% reduction in methylene blue active substance (MBAS) following 23 hrs of aeration is required to classify an anionic surfactant as biodegradable.

3. Environmental Fate and Pathways

Id 119345-04-9

Date 04.10.2002

Result : The observed apparent reductions in MBAS for Dowfax 2A1 as well as for a standard linear alkylbenzene sulfonate (LAS), expressed as percent reduction, were as follows:

LAS standard	99.2
Dowfax 2A1	51.0

Thus, Dowfax 2A1 did not meet the criteria for being classified as biodegradable, under these conditions.

Test substance : Dowfax 2A1 was described as a branched, 12 carbon alkylated sulfonated diphenyl oxide, 45% active ingredient in water.

Reliability : (2) valid with restrictions

25.04.2002

(4)

Type : aerobic

Inoculum : activated sludge, domestic

Concentration : 20mg/l related to Test substance related to

Contact time : 7 day

Degradation :

Result :

Deg. Product :

Method : other: Soap and Detergent Assoc. semi-continuous activated sludge test

Year : 1982

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : Dowfax 3B2 alone, and with varying amounts (4.5%, 10% and 25%) of Dowfax 2A1, was tested in the Soap and Detergent Associations's semi-continuous activated sludge test. A 90% reduction in methylene blue active substances (NBAS) in this test is required for designation as 'biodegradable'.

A C-13 NMR method for determination of Dowfax 3B2 and 2A1 surfactant concentrations was also developed for use in developing product specifications.

Result : The observed apparent reductions in MBAS of the mixtures and a standard linear alkylbenzene sulfonate, LAS, were

LAS	99.1%
Dowfax 3B2	98.7%
Dowfax 3B2 + 4.5% 2A1	98.0%
Dowfax 3B2 + 10% 2A1	95.9%
Dowfax 3B2 + 25% 2A1	90.8%

Test substance : This study was conducted to find out how varying amounts of Dowfax 2A1 added to Dowfax 3B2 would reduce the biodegradability of 3B2.

Reliability : (2) valid with restrictions

25.04.2002

(5)

Type : aerobic

Inoculum : activated sludge, domestic

Deg. Product :

Method :

Year : 1998

GLP : yes

Test substance : as prescribed by 1.1 - 1.4

Method : Activated sludge effluent containing biodegradation products of Dowfax 2A1 surfactant was generated for acute aquatic toxicity studies. Activated sludge from a municipal wastewater treatment plant (Midland, MI) was maintained in two semi-continuous activated sludge (SCAS) units fed synthetic sewage on a 24-hr treatment cycle. One SCAS unit was fed sewage amended with 20 mg/l Dowfax 2A1 Surfactant to provide a test effluent containing biodegradation products of the surfactant while the second unit was fed only synthetic sewage to provide an effluent lacking

Result : surfactant or degradation products. Clarified effluents from each SCAS unit were collected as separate composite samples over a four to five day period.
: HPLC analyses indicated that the composite test effluent contained approximately 12 mg/l biodegradation products from Dowfax 2A1 surfactant and a residual concentration of approximately 7 mg/l as 'parent-like' surfactant components. Daily analyses of the test effluents demonstrated that the SCAS units were at a 'sgteady state' with respect to generation of biodegradation products during collection of the composite samples. These analyses included the measurement of the concentrations of parent surfactant and biodegradation products by both HPLC and dissolved organic carbon analysis.

Test substance : The test material was 45.4% active ingredient in water.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

25.04.2002

(6)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type : static
Species : Oncorhynchus mykiss (Fish, fresh water)
Exposure period : 96 hour(s)
Unit : mg/l
Analytical monitoring : no
Method : EPA OTS 797.1400
Year : 1998
GLP : yes
Test substance : other TS
Method :

Samples of the activated sludge effluent were prepared in semi-continuous activated sludge (SCAS) units in the Environmental Chemistry Research Laboratory, Health and Environmental Research Laboratories, The Dow Chemical Company. Synthetic sewage amended with 20 mg/L Dowfax 2A1 surfactant (nominal) was aerobically treated for 24 hrs with municipal activated sludge to generate the Dowfax 2A1 biodegradation products. Effluents were provided from two SCAS units designated unit A (primary activated sludge effluent), and unit B (primary activated sludge effluent containing Dowfax 2A1 and biodegradation products); the measured concentration of Dowfax 2A1 in unit B following 24 hrs of aerobic treatment had fallen from an initial dose level of 20 mg/l to approx. 7 mg/l as 'parent-like' surfactant.

Unit A effluent was a post-treatment blank effluent with nominal treatment levels to the trout of 100%, 50, 25, 12.5 and 6.25% effluent and will be referred to as the negative control. Unit B was the post-treatment primary activated sludge effluent containing Dowfax 2A1 biodegradation products with nominal treatment levels 100%, 50, 25, 12.5, and 6.25% effluent, which corresponded to measured Dowfax 2A1 surfactant concentrations of approx. 7, 3.5, 1.75, 0.875 and 0.438 gm/l. Primary activated sludge effluent was obtained from SCAS unit A and spiked with varying amounts of Dowfax 2A1 surfactant to act as a positive effluent control for the study. Lab water was also spiked with varying amounts of Dowfax 2A1 surfactant to act as a positive water control for the study. This study was designed as a 96-hr acute static test with replicate groups of 5 trout exposed to the post-treatment Dowfax 2A1/biodegradation products, and one replicate of 5 trout exposed to the negative and positive control effluents and positive water controls.

Result : LC50 Value (mg/l or % Effluent)

 Negative Effluent Control

24 hr: >100%
 48 hr: >100%
 72 hr: >100%
 96 hr: >100%

Positive Effluent Control (Dowfax 2A1)

24 hr: 9.2 mg/l
 48 hr: 1.8 mg/l
 72 hr: 1.8 mg/l
 96 hr: 1.8 mg/l

Positive Water Control (Dowfax 2A1)

24 hr: 1.8 mg/l
 48 hr: 1.6 mg/l
 72 hr: 1.6 mg/l
 96 hr: 1.6 mg/l

	Dowfax 2A1 and its Biodegradation Products 24 hr: >100% 48 hr: >100% 72 hr: >100% 96 hr: >100%	
Test condition	: Dowfax 2A1 was toxic to trout but its biodegradation products from activated sludge are not. : During the 96-h exposure period the dissolved oxygen levels ranged from 7.2 to 10.4 mg/l and were >69% of saturation. All test vessels were aerated after 48 hrs at a rate of ~ 100 bubbles/min due to readings in some tanks of 69% air saturation. Temperature in the test vessels ranged from 13.1 to 13.9C and the pH ranged from 7.1 to 7.8.	
Test substance	: This study was of the biodegradation effluent of Dowfax 2A1 and not the material itself.	
Reliability Flag 15.08.2002	: (1) valid without restriction : Critical study for SIDS endpoint	(7)
Type	: flow through	
Species	: Pimephales promelas (Fish, fresh water)	
Exposure period	: 96 hour(s)	
Unit	: mg/l	
Analytical monitoring	: no	
LC50	: c = 3.85	
Method	: other: EPA 'Fish-Pesticide Acute Toxicity Test Guideline,' 1972.	
Year	: 1975	
GLP	: no	
Test substance	: as prescribed by 1.1 - 1.4	
Method	: Dechlorinated Lake Huron water was used for the flow-through study with fathead minnows. The system was activated at least 3 hrs prior to adding fish so that equilibrium could be reached. Ten fish were placed in each 8 l aquaria with a discharge rate of the diluter being approximately once every 8 minutes, giving the turnover rate/aquarium of about 1/hr. Ten fish were exposed to each concentration. A reference p,p'DDT toxicity was run as a static acute only.	
Result	: 24 hrs: LC10 3.78 (0.78-4.87) mg/l LC50 7.38 (5.78-29.08) mg/l LC90 14.41 (9.00-824) mg/l 48 hrs: LC10 3.09 (1.46-3.90) mg/l LC50 5.21 (4.26-6.66) mg/l LC90 8.78 (6.81-20.83) mg/l 72 hrs: LC10 2.69 (1.13-3.47) mg/l LC50 4.54 (3.55-5.55) mg/l LC90 7.65 (6.07-16.24) mg/l 96 hrs: LC10 2.45 (1.02-3.15) mg/l LC50 3.85 (2.87-4.56) mg/l LC90 6.07 (5.03-10.64) mg/l	
Test condition	: Water Characteristics: D.O. 7.7 pH 7.5 Alkalinity 30 mg/l as CaCO3 Hardness 32 mg/l as CaCO3 Specific Conductivity 140-150 micromhos/cm	
Reliability Flag 15.08.2002	: (2) valid with restrictions : Critical study for SIDS endpoint	(8)
Type	: static	
Species	: Lepomis macrochirus (Fish, fresh water)	
Exposure period	: 96 hour(s)	
Unit	: mg/l	

Analytical monitoring	:	no
LC50	:	c = 6.81
Method	:	other: EPA 'Fish-Pesticide Acute Toxicity Test Guideline,' 1972.
Year	:	1975
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Fish were acclimated for at least 10 days. Feeding was stopped 3 days prior to the test to empty the digestive tract. The fish were placed into the bioassay vessels 24 hrs before adding the test compound. Fish loading requirements limited the number of trout to 10/vessel but 20 bluegill could be used. Test material was added in 1500 mls of water, bringing each vessel to 17.5 l. Twenty fish were exposed to each concentration. Observations were made and recorded and dead fish removed daily at the same time for 96 hrs. All test solutions were prepared in water on a w/v basis immediately prior to administering. A reference p, p'DDT toxicity was run for both species of fish.
Result	:	24 hrs: LC10 4.60 (1.99-5.52) mg/l LC50 8.12 (7.19-12.38) mg/l LC90 14.33 (10.47-69.10) mg/l 48 hrs: LC10 4.65 (3.25-5.32) mg/l LC50 6.89 (6.34-7.64) mg/l LC90 10.22 (8.77-15.43) mg/l 72 hrs: LC10 4.75 (3.55-6.30) mg/l LC50 6.81 (6.30-7.45) mg/l LC90 9.76 (8.54-13.54) mg/l 96 hrs: LC10 4.75 (3.55-5.37) mg/l LC50 6.81 (6.30-7.45) mg/l LC90 9.76 (8.54-13.54) mg/l
Test condition	:	Water Characteristics: D.O. 7.7 pH 7.5 Alkalinity 30 mg/l as CaCO ₃ Hardness 32 mg/l as CaCO ₃ Specific Conductivity 140-150 micromh
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint
15.08.2002		(8)
Type	:	static
Species	:	Pimephales promelas (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
Analytical monitoring	:	
Method	:	
Year	:	1978
GLP	:	no
Test substance	:	other TS
Method	:	A semicontinuous activated sludge unit was acclimated to 30 mg/l of Dowfax 2A1 in its feed over a period of 8 days following procedures of the Soap and Detergent Assoc. Five liter chambers, having aeration and recycle capabilities, were operated in parallel, a blank unit with nutrients only, a unit with Dowfax 2A1 and one with Dowfax 3B2 added. After 6 days acclimation period, during which the surfactant concentration was raised from 5 mg/l to 30 mg/l, the units were allowed to equilibrate for 3 days. After this time, each days effluent was collected, filtered and refrigerated at 40F until enough was accumulated for toxicity testing. Total suspended solids in the units were 825, 825, and 1135 mg/l for the blank, Dowfax 2A1 and Dowfax 3B2, resp. The fish were exposed at 12C for 96 hrs.
Result	:	The blank had 90% fish alive after 96 hrs; Dowfax 2A1 had no lethal effect

at all (100% alive at 96 hrs). MBAS was 4.7 mg/l and TOD was 168.0 mg/l.

C14-labeled Dowfax was used to determine adsorption and showed that 95% of the activity remains in solution after 24 hrs exposure to activated sludge. Thus, no adsorption. The metabolites are believed to be end-chain carboxylates which retain methylene blue activity but which are less toxic to aquatic organisms. Similar properties have been observed in the alkylbenzene sulfonate series (Kimerle, R.A., Swisher, R.D., Reduction of Aquatic Toxicity of Linear Alkylbenzene Sulfonate (LAS) by Biodegradation., Water Research, 11, 31 (1977)).

Test substance	:	Fish toxicity was measured on the metabolites of 2A1, in order to compare metabolite toxicity to that of 2A1 itself.	
Reliability Flag	:	(2) valid with restrictions	
25.04.2002	:	Critical study for SIDS endpoint	(9)
Type	:	static	
Species	:	Salmo gairdneri (Fish, estuary, fresh water)	
Exposure period	:	96 hour(s)	
Unit	:	mg/l	
Analytical monitoring	:	no	
LC50	:	c = 7.66	
Method	:	other: EPA Fish-Pesticide Acute Toxicity Test Guideline', 1972.	
Year	:	1975	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Fish were acclimated for at least 10 days. Feeding was stopped 3 days prior to the test to empty the digestive tract. The fish were placed into the bioassay vessels 24 hrs before adding the test compound. Fish loading requirements limited the number of trout to 10/vessel but 20 bluegill could be used. Test material was added in 1500 mls of water, bringing each vessel to 17.5 l. Twenty fish were exposed to each concentration. Observations were made and recorded and dead fish removed daily at the same time for 96 hrs. All test solutions were prepared in water on a w/v basis immediately prior to administering. A reference p, p'DDT toxicity was run for both species of fish.	
Result	:	24 hrs: LC10 6.70 mg/l LC50 11.58 mg/l LC90 19.99 mg/l 48 hrs: LC10 6.26 mg/l LC50 9.16 mg/l LC90 13.40 mg/l 72 hrs: LC10 5.60 (3.80-6.23) mg/l LC50 7.31 (6.66-8.99) mg/l LC90 9.53 (8.17-18.56) mg/l 96 hrs: LC10 4.09 (2.68-4.83) mg/l LC50 6.20 (5.42-7.25) mg/l LC90 9.42 (7.85-15.23) mg/l	
Reliability Flag	:	(2) valid with restrictions	
25.04.2002	:	Critical study for SIDS endpoint	(10)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	static
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
Analytical monitoring	:	no
Method	:	EPA OTS 797.1300

Year	: 1998
GLP	: yes
Test substance	: other TS
Method	: Samples of the activated sludge effluent were prepared in semi-continuous activated sludge (SCAS) units in the Environmental Chemistry Research Laboratory, Health and Environmental Research Laboratories, The Dow Chemical Company. Synthetic sewage amended with 20 mg/l Dowfax 2A1 surfactant (nominal) was aerobically treated for 24 hrs with municipal activated sludge to generate the Dowfax 2A1 biodegradation products. Effluents were provided from two SCAS units designated unit A (primary activated sludge effluent), and unit B (primary activated sludge effluent containing Dowfax 2A1 and its biodegradation products); the measured concentration of Dowfax 2A1 in unit B following 24 hrs of aerobic treatment had fallen from an initial dose level of 20 mg/l to approx. 7 mg/l as 'parent-like' surfactant.
Result	<p>Unit A effluent was a post-treatment blank effluent with nominal treatment levels to the daphnia of 100%, 50, 25, 12.5, 6.25 3.13 and 1.56% effluent and was referred to as the negative control. Unit B was the post-treatment primary activated sludge effluent containing Dowfax 2A1 biodegradation products with nominal treatment levels 100%, 50, 25, 12.5, 6.25, 3.13 and 1.56% effluent, which corresponded to measured Dowfax 2A1 surfactant concentrations of 7, 3.5, 1.75, 0.875, 0.438, 0.219 and 0.110 mg/l. Primary activated sludge effluent was obtained from SCAS unit A and spiked with varying amounts of Dowfax 2A1 surfactant to act as a positive control for the study. This study was designed as a 48-hr acute static test with replicate groups of 10 daphnia exposed to the post-treatment Dowfax 2A1 biodegradation products, and replicate groups fo 10 daphnia exposed to the negative and positive control effluents.</p> <p>Negative Control LC50 24 hr: >100% LC50 48 hr: >100% EC50 24 hr: >100% EC50 48 hr: >100%</p> <p>Positive Control (Dowfax 2A1) LC50 24 hr: 8.9 mg/l LC50 48-hr: 5.8 mg/l EC50 24 hr: 8.9 mg/l EC50 48-hr: 5.8 mg/l</p> <p>Dowfax 2A1 and its Biodegradation Products LC50 24 hr: >100% LC50 48 hr: >100% EC50 24 hr: >100% EC50 48 hr: >100%</p>
Test condition	: Dowfax 2A1 surfactant added directly to effluent caused toxicity, where the biodegradation products from activated sludge treatment did not. : During the test: The temperature ranged from 20.0 to 22.3 C. Dissolved oxygen ranged from 7.7 to 8.2 mg/l (>91% of saturation). Before autoclaving the water hardness was ~ 170 mg/l (as CaCO3). The pH ranged from 7.0 to 8.0.
Test substance	<p>Control Laboratory WAtEr: Hardness (mg/l CaCO3) 186 Alkalinity (mg/l CaCO3) 34 pH 7.6 Conductivity (micromhos/cm) 375</p> : This toxicity test was of the biodegradation products of Dowfax 2A1 and not of the test material itself.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 15.08.2002 (11)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : no
LC50 (45% active ingredient) : c = 3.63
LC50 (100% active ingredient) : c = 1.64
Method : other: ASTM and EPA-660/3-75-009, 1975
Year : 1988
GLP : yes
Test substance : other TS: Dowfax* 2EP
Method : The test was carried out using the test material, Dowfax* 2EP, as received. Nominal concentrations were 100, 60, 36, 21.6, 13, 7.8, 2, 0.5 mg/l and a control. The dilution water was Lake Huron water adjusted to a hardness of 170 mg/l and autoclaved.
Result : LC50 Value: 48 Hours

Test condition : Sample as formulated: 3.63 (2.65-4.73) mg/l
 100% active ingredient: 1.64 (1.19-4.73) mg/l
 Dilution Water Quality:
 Temperature range deg C 19.4-21.0
 pH range 7.9-8.3
 Dissolved oxygen range 8.3-10.4
 Hardness 154 mg/l (as CaCO₃)
 Alkalinity 45 mg/l (as CaCO₃)
 Conductivity 360 micromhos/cm

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 15.08.2002 (12)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : no
EC50 (168 h based on progeny) : c = 3.4
LC50 (48 h based on survival) : c = 5.3
Method : other: not stated
Year : 1990
GLP : yes
Test substance : other TS: Dowfax* 2EP
Method : This study was conducted as a baseline test by agreement with a state agency concerning the effluent of a production plant. Dowfax* 2EP was only one of the substances tested. The method is referenced but not described; the method was standard.
Result : Based on survival:

48 h LC50: 5.3 (4.3-6.7) mg/l
 216 h LC50: 4.0 (3.0-5.4) mg/l

Based on progeny:

168 h EC50: 3.4 (0-8.7) mg/l
 NOEL: 1.08 mg/l

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (13)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : no
LC10 : c = .15
LC50 : c = .58
LC90 : c = 2.19
Method : other: standard Dow method
Year : 1978
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Daphnia were exposed for 48 hrs in dechlorinated Lake Huron water at 17C under static conditions. The concentrations are reported as 100% active ingredient. Doses used were 0.10, 0.32, 1.00, 3.20 and 10.0 mg/l.
Result : Observed Data
 No Kill Level >0.10 mg/l
 Partial Kill 0.10 mg/l
 100% Kill 10.0 mg/l

Calculated LCx Data

LC10 0.15 mg/l (0.08-0.23)
 LC50 0.58 mg/l (0.42-0.78)
 LC90 2.19 mg/l (1.49-3.93)
 Slope 2.21 (1.61-2.80)

Test substance : The test material was supplied as 46.3% active.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (14)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring :
Method :
Year : 1978
GLP : no
Test substance : other TS
Method : A semicontinuous activated sludge unit was acclimated to 30 mg/l of Dowfax 2A1 in its feed over a period of 8 days following procedures of the Soap and Detergent Assoc.

Five liter chambers, having aeration and recycle capabilities, were operated in parallel, a blank unit with nutrients only, a unit with Dowfax 2A1 and one with Dowfax 3B2 added. After 6 days acclimation period, during which the surfactant concentration was raised from 5 mg/l to 30 mg/l, the units were allowed to equilibrate for 3 days. After this time, each days effluent was collected, filtered and refrigerated at 40F until enough was accumulated for toxicity testing. Total suspended solids in the units were 825, 825, and 1135 mg/l for the blank, Dowfax 2A1 and Dowfax 3B2, resp.

The daphnia were exposed to 100% effluent and dilutions of 56% and 33% at 17C for 48 hrs.
Result : The toxicity of Dowfax 2A1 surfactant to Daphnia magna has been decreased by 100-fold as a result of exposure to activated sludge.

Test substance : The blank had 93% daphnia alive in 100% Effluent at 48-hr.
Dowfax 2A1 had 100% daphnia alive in 56% effluent at 48-hr.
Dowfax 2A1 had 100% daphnia alive in 33% Effluent at 48-hr.
: The toxicity testing was conducted with the metabolites of Dowfax 2A1, for comparison purposes.

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

25.04.2002 (9)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE**4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA****4.5.1 CHRONIC TOXICITY TO FISH****4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES****4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS****4.6.2 TOXICITY TO TERRESTRIAL PLANTS****4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES****4.7 BIOLOGICAL EFFECTS MONITORING****4.8 BIOTRANSFORMATION AND KINETICS****4.9 ADDITIONAL REMARKS**

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Species : rat
Strain : Fischer 344
Sex : female
Number of animals : 3
Vehicle : other: neat commercial material (approx. 50% solids in water)
Value : > 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three female F344 rats received 2000 mg/kg of the neat Dowfax 2A1 by single-dose gavage. The rats were observed daily, weighed days 1, 7 and 14.
Result : All rats survived the test period at the 2000 mg/kg dose. Clinical signs indicative of systemic toxicity in the 2000 mg/kg dose level consisted of fecal and urine soiling, salivation, chromorrhinorrhea, decreased activity, and thin appearance. The clinical signs were first observed 2 hrs post dosing and persisted through test day 4. While one of the rats initially lost weight, all animals gained weight over the two week observation period. Thus, the estimated acute oral LD50 for female F344 rats was >2000 mg/kg in this study.
Test substance : Dowfax 2A1 surfactant
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (15)

Type : LD50
Species : rat
Strain : Sprague-Dawley
Sex : female
Number of animals : 6
Vehicle : other: fed undiluted
Value : = 1976 mg/kg bw
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Six female S-D rats per dose were fed 0.63, 1.3, 2.5 or 5.0 g/kg of undiluted Dowfax 2A1 (approx 50% solids in water) by oral gavage. The rats were observed daily and weighed on days 1, 7 and 14. All surviving rats were submitted for gross necropsy on day 14.
Result : Following dosing, all rats on test were lethargic and had severe diarrhea. In addition, rats of the 2500 and 5000 mg/kg dose groups had piloerection and surviving rats of the 2500 mg/kg dose group were hypersensitive to external stimuli. All survivors gained weight during the 2-week post-treatment observation period, and no treatment related effects were observed upon gross pathological examination of all survivors 2 weeks post-treatment. No rats died at 0.63 g/kg; one died at 1.3 g/kg; 4 died at 2.5 g/kg; and all died at 5.0 g/kg.
 The single-dose oral LD50 for female rats is 1976 mg/kg (1348-3050 mg/kg, 95% conf. interval) when calculated by the moving average method of analysis.
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 25.04.2002 (16)

Type : LD50
Species : rat
Strain : no data
Sex : no data
Number of animals : 2
Vehicle : water
Value : ca. 1000 - 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1955
GLP : no
Test substance : other TS
Method : Two rats per dose were fed 1.0 or 2.0 g/kg as a 10% solution in water.
Result : 1.0 g/kg: None died; slight initial weight loss.

Test substance : 2.0 g/kg: Both rats died; death occurred in 24 hrs.
 : In this study, the powdered material was used, sometimes diluted with water to 10%.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset

26.04.2002

(17)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

Type : LD50
Species : rabbit
Strain : New Zealand white
Sex : male
Number of animals : 2
Vehicle : other: neat Dowfax 2A1 applied (approx. 50% solids in water)
Value : > 2000 mg/kg bw
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : A single application of 2000 mg/kg of neat Dowfax 2A1 was applied to the clipped trunks of two male New Zealand White rabbits under an impervious, occlusive bandage. The rabbits were observed daily and weighed periodically. The test was concluded on day 14.

Result : Erythema, edema and burns were observed, at the application site, immediately after removing the wrap. This severe skin reaction was in contrast to the effect in the skin irritation test also included in this report. It was believed that the burns here were due to the drastic test methods in the absorption study including preparation of the rabbit skin prior to testing. These observations were noted through test day 4 in one rat, and test day 8 in the other. By day 8, both animals were observed with scaling, which persisted through the end of the study. Administration of Dowfax 2A1 at 2000 mg/kg had no apparent effect on body weight during the two week observation period. Thus, the estimated acute dermal LD50 for male NZ white rabbits was >2000 mg/kg.

Reliability : (2) valid with restrictions
Flag : Directive 67/548/EEC

25.04.2002

(15)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 5 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included daily topical application of 0.5 ml of neat Dowfax 2A1 to the ear (5x), and to intact (5x) and abraded (3x) skin on the abdomen of a male New Zealand White (NZW) rabbit. The study was terminated 72 hrs after the final dose.
Result : Very slight erythema was observed at the intact site after the last application. Very slight erythema was observed at the abraded site on test day two through test day 5.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (15)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time : 5 day
Number of animals : 1
PDII :
Result : not irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1993
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The skin irritation test included daily topical application of 0.5 ml of neat Dowfax 2A1 to the ear (5x), and to intact (5x) and abraded (3x) skin on the abdomen of a male New Zealand White (NZW) rabbit. The study was terminated 72 hrs after the final dose.
Result : No irritation was observed on the ear.
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
 25.04.2002 (15)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 10 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1980
GLP : no

Test substance : as prescribed by 1.1 - 1.4
Method : Ten daily 0.1 ml applications of the undiluted Dowfax 2A1 were made to the ear (open) and intact abdominal skin of a rabbit. Three daily 0.1 applications were also made on an abraded abdominal site on the same rabbit. The abdominal sites were covered with cotton wool and wrapped in cotton cloth taped to marginal hair. The rabbit was observed on days 1-10, 11, 14, 21 and 23. The rabbit was weighed on days 1, 7, 14 and 21.

Result : Contact with this material on confined/occluded rabbit skin resulted in moderate redness, slight swelling, slight exfoliation, and, upon repeated contact, an irreversible burn which resulted in scar formation (at the abraded site). The irritation observed may have been partially mechanical because the cotton patches, under which the test material was applied, adhered to the skin.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 26.04.2002 (16)

Species : rabbit
Concentration : undiluted
Exposure : Open
Exposure time : 3 day
Number of animals : 1
PDII :
Result : slightly irritating
EC classification : not irritating
Method : other: Dow range-finding
Year : 1980
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Ten daily 0.1 ml applications of the undiluted Dowfax 2A1 were made to the ear (open) and intact abdominal skin of a rabbit. Three daily 0.1 applications were also made on an abraded abdominal site on the same rabbit. The abdominal sites were covered with cotton wool and wrapped in cotton cloth taped to marginal hair. The rabbit was observed on days 1-10, 11, 14, 21 and 23. The rabbit was weighed on days 1, 7, 14 and 21.

Result : Contact with this material on unconfined rabbit skin resulted in slight redness and, upon repeated contact (10 applications), a superficial burn which healed completely by day 21.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 26.04.2002 (16)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 10 day
Number of animals : 1
PDII :
Result : moderately irritating
EC classification : irritating
Method : other: Dow range-finding
Year : 1959
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : One rabbit was used. Ten daily 0.1 ml applications were made to the ear (open) and intact abdominal sites. Another site on the abdomen was abraded and then 3 daily applications made to it. Abdominal application sites were covered with cotton wool and then wrapped in cotton cloth taped to marginal fur. The rabbit was evaluated daily during dosing and then on days 14, 16, 18 and 21. The rabbit was weighed on days 0, 7, 14 and 21.

Result : Intact Site: Slight hyperemia after 1st 5 applications--then subsided--skin essentially normal in 14 days.

	Abraded Site: Moderate hyperemia with slight edema and necrosis after 1st application--skin essentially normal in 11 days.
Test substance	: This sample is probably not representative of current material since it was dark amber in color and viscous, like syrup.
Reliability	: (2) valid with restrictions
Flag	: Material Safety Dataset
26.04.2002	(18)
Species	: rabbit
Concentration	: undiluted
Exposure	: Open
Exposure time	: 3 day
Number of animals	: 1
PDII	:
Result	: not irritating
EC classification	: not irritating
Method	: other: Dow range-finding
Year	: 1959
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Method	: One rabbit was used. Ten daily 0.1 ml applications were made to the ear (open) and intact abdominal sites. Another site on the abdomen was abraded and then 3 daily applications made to it. Abdominal application sites were covered with cotton wool and then wrapped in cotton cloth taped to marginal fur. The rabbit was evaluated daily during dosing and then on days 14, 16, 18 and 21. The rabbit was weighed on days 0, 7, 14 and 21.
Result	: Ear: Material coats the ear--essentially non-irritating.
Test substance	: This sample is probably not representative of current material since it was dark amber in color and viscous, like syrup.
Reliability	: (2) valid with restrictions
Flag	: Material Safety Dataset
26.04.2002	(18)
Species	: rabbit
Concentration	:
Exposure	:
Exposure time	:
Number of animals	: 1
PDII	:
Result	:
EC classification	:
Method	: other: Dow range-finding
Year	: 1955
GLP	: no
Test substance	: as prescribed by 1.1 - 1.4
Method	: Small (0.1 ml) amounts of the solutions and a small spatula tip full of the powder were applied as follows:
	Solid: 10 daily applications to intact belly 3 daily applications to abraded belly
	10% in water: 10 daily applications to ear 9 daily applications to intact belly 3 daily applications to abraded belly
	1% in water: 9 daily applications to ear 9 daily applications to intact belly 3 daily applications to abraded belly
	The ear represented open application/contact and the belly represent occluded contact.

Result	: Solid/intact belly: No response developing to slight reddening of the skin and a trace of exfoliation after 7 applications. More repeated applications gave rise to necrosis with slight scab and scar formation. Solid/abraded: Slight reddening of the skin developing to slight edema and a trace of exfoliation. 10% in water/ear: Essentially no response. 10% in water/intact belly: Essentially no response. 10% in water/ abraded belly: No response developing to slight reddening of the skin and a trace of necrosis. 1% in water/ear: No response. 1% in water/intact belly: No response. 1% in water/abraded belly: A very questionable irritation; no other response noted.
Test substance	: The test material (Dowfax 2A1) was submitted as the powder/solid. It was tested as the powder and as dilutions in water.
Reliability Flag 26.04.2002	: (2) valid with restrictions : Material Safety Dataset
Species	: human
Concentration	: 1 %
Exposure	: no data
Exposure time	:
Number of animals	: 50
PDII	:
Result	: not irritating
EC classification	: not irritating
Method	: other: Repeated Insult Patch Test, Shelanski and Shelanski, Proc. of the Sci. Sec. of the Toilet Goods Assoc., May 1953.
Year	: 1957
GLP	: no
Test substance	: other TS
Method	: The test material (15% Dowfax 2A1 in water) was applied 5 times/week for 3 weeks to a group of 50 human subjects, 25 males and 25 females. Two to 3 weeks after this routine a challenge application was made to each person at the same site. A response after the initial application indicated primary irritation; an increase in intensity of irritation response upon repeated exposures indicates the ability fo the material to cause fatiguing of the skin; and a response after the challenge application greater in intensity than that observed initially indicated the potential of the material to produce an allergic response.
Result	: Number of subjects negative throughout.....12 Number of subjects reacting.....38 Number of subjects showing 1+ maximum reactions...37 Number of subjects showing 2+ maximum reactions....1 Morris Shelanski stated in the report that, "it is a milder fatiguing agent than 5% weight by volume solution of ordinary commercial soap." Tests with Dowfax 2A1 as a 15% aqueous solution on the skin of 50 human subjects using the repeated insult procedure revealed that the material was neither a primary irritant nor a sensitizer, but that it was a mild fatiguing agent.
Test substance	: This test was conducted on a 15% aqueous solution of Dowfax 2A1.
Reliability	: (2) valid with restrictions

(19)

Flag : Material Safety Dataset
26.04.2002 (20)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : 5 % active substance
Dose : .1 ml
Exposure Time : 24 hour(s)
Comment : rinsed after (see exposure time)
Number of animals : 6
Result : moderately irritating
EC classification : not irritating
Method : OECD Guide-line 405 "Acute Eye Irritation/Corrosion"
Year : 1998
GLP : yes
Test substance : other TS
Method : The eyes of 6 adult New Zealand white rabbits were examined with 2% aqueous fluorescein stain and established as being free of defects/irritation the day prior to study start. A 0.1 ml aliquot of Dowfax 2A1 (5% aqueous solution) was instilled into the conjunctival sac of the right eye of 3 male and 3 female rabbits. The eyelid of each rabbit was held closed for approximately one second after dosing. The left eye remained untreated and served as a control. The eyes of all rabbits remained unwashed for 24 hours after dosing. The behavior of each rabbit was observed immediately post treatment for indications of pain or discomfort. An ocular anesthetic was used for both eyes of each rabbit after discomfort was observed in the first rabbit. Both eyes of the rabbits were examined with a binocular loupe and a white halogen light at approximately 1, 24, 48 and 72 hours and also 7 days post-instillation for conjunctival redness and chemosis, discharge, corneal opacity and reddening of the iris. The study was completed 7 days post-treatment. Rabbits were weighed on the day of treatment and at study termination.

Result : Slight or moderate conjunctival redness and slight or moderate ocular discharge were present in the treated eyes of all rabbits one hour after dosing. Four of the 6 rabbits had slight or moderate chemosis and 1 rabbit had reddening of the iris at the one hour observation, as well. Twenty-four hours after dosing, all rabbits had slight or moderate conjunctival redness, all rabbits had slight or moderate chemosis, all rabbits had slight or moderate ocular discharge, and 4 rabbits had opacity of the cornea. Forty-eight hours after dosing, all rabbits had slight or moderate conjunctival redness, 5 rabbits had slight or moderate chemosis, 1 rabbit had moderate ocular discharge, and 4 rabbits had opacity of the cornea. Seventy-two hours after dosing, 4 rabbits had slight or moderate conjunctival redness, 4 rabbits had slight chemosis, 2 rabbits had slight ocular discharge, and 3 rabbits had opacity of the cornea. The ocular lesions were resolved in all animals 7 days after instillation of the test material, and the test was terminated.

There was no effect on body weight.

Test substance : The test material was a 5% aqueous solution of Dowfax* 2A1 surfactant.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 26.04.2002 (21)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure Time :
Comment : other: one eye was washed after 30 seconds and the other after 1 hr

Number of animals	: 1	
Result	: highly irritating	
EC classification	: irritating	
Method	: other: Dow range-finding	
Year	: 1993	
GLP	: no	
Test substance	: as prescribed by 1.1 - 1.4	
Method	: The eye irritation test included instillation of 0.1 ml of neat Dowfax 2A1 into each conjunctival sac of a female New Zealand White rabbit. One eye was washed with water after a 30-second exposure, while the other eye was washed with water after one hour. Moderate discomfort was noted immediately after dosing, thus, ophthaine anesthetic solution was administered prior to dosing the next eye. The conjunctiva, iris and cornea were examined using a pen light at all time points. After the 1-hr exposure the cornea was also observed with a cobalt blue light after fluorescein stain had been administered. The test was terminated 21 days after instillation of Dowfax 2A1.	
Result	: Both eyes were observed with slight to moderate conjunctival redness and swelling from the time of dosing through the 7 day observation period, for the hour exposure eye, and through 21 days for the 30-second eye. The hour exposure eye was observed with very slight to slight irritation of the iris from one hour after dosing through the 7 day observation period. The 30-second exposure eye had very slight to moderate irritation of the iris from the dosing through the 21 day observation period. Both eyes were observed with very slight corneal response before staining, and slight to moderate corneal response after staining, from one hour after dosing. The hour exposure eye's corneal response was resolved after the 7 days, while the 30-second eye's response lasted through the 21 day observation period.	
Reliability	: (2) valid with restrictions	
Flag	: Critical study for SIDS endpoint	
26.04.2002		(15)
Species	: rabbit	
Concentration	: undiluted	
Dose	: .1 ml	
Exposure Time	:	
Comment	: other: one eye was washed after 30 seconds and the other after 1 hr	
Number of animals	: 1	
Result	: moderately irritating	
EC classification	: irritating	
Method	: other: Dow range-finding	
Year	: 1980	
GLP	: no	
Test substance	: as prescribed by 1.1 - 1.4	
Method	: 0.1 ml of the undiluted Dowfax 2A1 was instilled into both conjunctival sacs of a rabbit. One eye was washed after 30 seconds and the other after 1 hr. The rabbit was evaluated at washing time, at 24 and 48 hrs, and at 7 and 14 days.	
Result	: Instillation of Dowfax 2A1 into the eyes of a rabbit resulted in slight discomfort, slight conjunctival redness and swelling, slight reddening of the iris, and moderate corneal injury. All signs of irritation were absent by 14 days post-exposure.	
Reliability	: (2) valid with restrictions	
Flag	: Material Safety Dataset	
26.04.2002		(16)
Species	: rabbit	
Concentration	: undiluted	
Dose	: .1 ml	
Exposure Time	:	
Comment	: other: one eye was washed after 30 seconds and the other after 1 hr	

Number of animals	:	3
Result	:	highly irritating
EC classification	:	irritating
Method	:	other: Dow range-finding
Year	:	1980
GLP	:	no
Test substance	:	other TS
Method	:	0.1 ml of Dowfax 2A1 was instilled into both conjunctival sacs of rabbits. One eye was washed after 30 seconds and the other after 1 hr. The rabbits were evaluated at washing, at 24 and 48 hrs and at 7, 14 and 21 days. The number of rabbits used were
		7.5 pH: 3
		9.0 pH: 3
		10.5 pH: 1
Remark	:	This study was conducted in order to determine the eye effects of Dowfax 2A1 at 3 different pH's.
Result	:	7.5 pH: Slight (2/3) to moderate (1/3) discomfort, severe conjunctival redness and swelling (3/3), discharge (3/3), slight reddening of the iris (3/3) and moderate corneal injury (3/3). All signs of eye irritation were absent by 14 days (2/3) to 21 days (1/3) post-exposure.
		9.0 pH: Slight (2/3) to moderate (1/3) discomfort, moderate (1/3) to severe (2/3) conjunctival redness and swelling, discharge (2/3), very slight (1/3) to moderate (2/3) reddening of the iris and moderate corneal injury (3/3). All signs of eye irritation were essentially absent by 7 (1/3), 14 (1/3), or 21 (1/3) days post-exposure.
		10.5 pH: Moderate discomfort, severe conjunctival redness and swelling, discharge, moderate reddening of the iris, and severe corneal injury. Corneal damage was still present 21 days post-exposure.
Test substance	:	The test substances were Dowfax 2A1 at pH 7.5 Dowfax 2A1 at pH 9.0 Dowfax 2A1 at pH 10.5
Reliability	:	(2) valid with restrictions
Flag	:	Material Safety Dataset
26.04.2002		(22)
Species	:	rabbit
Concentration	:	undiluted
Dose	:	.1 ml
Exposure Time	:	
Comment	:	other: one eye was washed after 30 seconds and the other after 1 hr
Number of animals	:	1
Result	:	moderately irritating
EC classification	:	irritating
Method	:	other: Dow range finding
Year	:	1959
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Dowfax 2A1 was instilled (0.1 ml per eye) into the conjunctival sacs of a rabbit. One eye was washed after 30 seconds and the other after 1 hr. The eyes were evaluated at washing and at 24 and 48 hrs and at 7 days.
Result	:	30-sec eye: Moderate to extensive conjunctivitis with moderate corneal damage and slight iritis--not completely subsided in one week.
		1 hr eye: Moderate conjunctival irritation with slight corneal damage and iritis--essentially subsided in 1 week.
Test substance	:	NOTE: This test material was dark amber in color and viscous/syrup-like. This material was probably not like current commercial material.
Reliability	:	(2) valid with restrictions

Flag 26.04.2002	:	Material Safety Dataset	(23)
Species	:	rabbit	
Concentration	:		
Dose	:		
Exposure Time	:		
Comment	:	other: material instilled 'as is' (solid) and at 10% and 1% solutions in water (one conc/animal); one eye washed after 30 seconds and the other after 1 hr	
Number of animals	:	3	
Result	:		
EC classification	:		
Method	:	other: Dow range-finding	
Year	:	1955	
GLP	:	no	
Test substance	:	other TS	
Method	:	Three (?) rabbits each received 0.1 ml (or small spatula full) of the test material (Dowfax 2A1) in the conjunctival sac of each eye. One eye of each rabbit was washed after 30 seconds and the other after 1 hr. One rabbit received the material as the solid; one the 10% aqueous solution; and one the 1% aqueous solution. The rabbits were observed at washing, at 24 and 48 hrs and at 7 days.	
Result	:	100%, 1 hr wash: Marked pain, moderate conjunctival irritation and corneal injury. Essentially all healed in 7 days.	
		100%, 30-sec wash: Trace of pain, moderate conjunctival irritation and corneal injury. Almost completely healed in 48 hrs.	
		10% in H2O, 1 hr wash: Trace of pain, slight conjunctival irritation and moderate corneal injury. Almost completely healed in 48 hrs.	
		10% in H2O, 30-sec wash: Slight conjunctival irritation, moderate corneal injury. Almost completely healed in 48 hrs.	
		1% in H2O, 1 hr wash: Slight pain, slight conjunctival irritation. No corneal injury. Completely healed in 48 hrs.	
		1% in H2O, 30-sec wash: Trace of pain, slight conjunctival irritation which completely healed in 48 hrs.	
Test substance	:	The test material was supplied as a solid (powder). It was tested as the powder and also as dilutions in water.	
Reliability	:	(2) valid with restrictions	
Flag 26.04.2002	:	Material Safety Dataset	(17)

5.3 SENSITIZATION

Type	:	Patch-Test
Species	:	human
Concentration	:	Induction 1 % other: patch Challenge 1 % other: patch
Number of animals	:	50
Vehicle	:	water
Result	:	not sensitizing
Classification	:	not sensitizing
Method	:	other: Repeated Insult patch Test, Shelanski and Shelanski, Proc. of the Sci. Sec. of the Toilet Goods Assoc., may 1953.
Year	:	1957

GLP	:	no
Test substance	:	other TS
Method	:	The test material (15% Dowfax 2A1 in water) was applied 5 times/week for 3 weeks to a group of 50 human subjects, 25 males and 25 females. Two to 3 weeks after this routine a challenge application was made to each person at the same site. A response after the initial application indicated primary irritation; an increase in intensity of irritation response upon repeated exposures indicates the ability for the material to cause fatiguing of the skin; and a response after the challenge application greater in intensity than that observed initially indicated the potential of the material to produce an allergic response.
Result	:	Number of subjects negative throughout.....12 Number of subjects reacting.....38 Number of subjects showing 1+ maximum reactions...37 Number of subjects showing 2+ maximum reactions....1
		Morris Shelanski stated in the report that, "it is a milder fatiguing agent than 5% weight by volume solution of ordinary commercial soap."
		Tests with Dowfax 2A1 as a 15% aqueous solution on the skin of 50 human subjects using the repeated insult procedure revealed that the material was neither a primary irritant nor a sensitizer, but that it was a mild fatiguing
Test substance	:	This test was conducted on a 15% aqueous solution of Dowfax 2A1.
Reliability	:	(2) valid with restrictions
Flag	:	Material Safety Dataset
14.03.2002		(24)

5.4 REPEATED DOSE TOXICITY

Species	:	rat
Sex	:	male/female
Strain	:	no data
Route of admin.	:	oral feed
Exposure period	:	90 days
Frequency of treatment	:	Continuous
Post obs. period	:	None
Doses	:	0.01, 0.03, 0.1, 0.3 and 1% in feed (approx. 5, 15, 50, 150, 500 mg/kg/day - taken from 1950 FAD conversion table)
Control group	:	yes, concurrent vehicle
NOAEL	:	= 150 mg/kg bw
LOAEL	:	= 500 mg/kg bw
Method	:	other: historical
Year	:	1957
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Groups of male and female rats (10/sex/group) were maintained on diets containing 0.0 (control), 1.0, 0.3, 0.1, 0.03, and 0.01 % Dowfax 2A1.

After weaning, the rats were maintained on Purina Lab Chow pellets until the age of 52 days, when they were divided according to body weight into well matched groups of each sex and started on the experimental diets. The stock diet for this experiment was composed of ground Purina Laboratory Chow. Two rats were housed together in a wire bottom cage. Food and water were available at all times.

During the course of the experiment, the animals were weighed twice weekly for the first month, and once a week thereafter. They were observed frequently for gross changes in appearance and behavior.

- Whenever possible failing animals were autopsied when moribund in an effort to ascertain the cause of impending death. In addition, records were kept of mortality, and food consumption was recorded for the first month. At autopsy, the animals were fasted overnight, weighed, and killed by decapitation. The lungs, heart, liver, kidney, spleen, and testes were removed and weighed. Portions of these organs, as well as pancreas and adrenals, were preserved and hematoxylin-eosin stained sections were prepared for histological examination.
- Result** : Neither male nor female rats at the 0.3, 0.1, 0.03 or 0.01 % levels showed any evidence of adverse effects when judged by gross appearance and behavior, growth, food consumption, mortality, average organ and body weights, and gross and microscopic examination of the tissues.
- Male rats showed a statistically significant decrease in the average weight of the spleen at 0.1 %, and an increase in the weight of the lung at the 0.01% level. However, these weight changes appear [sic] to be artifacts, since no changes were observed at the higher dose levels, or in any of the female rats.
- Livers of male rats at the 1% level showed central lobular necrosis of the parenchymal cells, and fatty degeneration and early but slight fibrosis with some slight bile duct epithelium proliferation in the portal areas when examined microscopically.
- Female rats at the 1% level shoed a retardation of growth together with a statistically significant increase in the average weight of the liver and the kidneys. Grossly, the livers were light in color with a mottled appearance. Upon microscopic examination, effects similar to those noted above in males were observed.
- Test substance** : The test material, Dowfax 2A1, was submitted for testing as a white powder. Therefore, when a dose is % in feed, it is reasonable to assume that the dose is w/w. (There is no need to calculate amount of 'active' based on a solution.)
- Reliability** : (2) valid with restrictions
- Flag** : Critical study for SIDS endpoint
- 26.04.2002 (25)
- Species** : dog
- Sex** : male/female
- Strain** : Beagle
- Route of admin.** : oral feed
- Exposure period** : 95 days
- Frequency of treatment** : Continuous
- Post obs. period** : None
- Doses** : 0, 0.1, 0.3 and 1.0% (approx. 40, 131 and 350 mg/kg/day based on feed consumption)
- Control group** : yes, concurrent vehicle
- NOAEL** : = 131 mg/kg bw
- LOAEL** : = 350 mg/kg bw
- Method** : other: Historic
- Year** : 1963
- GLP** : no
- Test substance** : as prescribed by 1.1 - 1.4
- Method** : Groups of male and female beagle hounds (2/sex/dose) were maintained for 95 days on diets containing 0.0 (control), 1.0, 0.3 and 0.1 % Benax 2A1. Food consumption data indicated that the dietary concentrations given above administered the experimental substance in amounts of 0, 350, 131 and 40 mg/kg/day, respectively.

The dogs were approximately 7 months of age at the start of the experiment. The stock diet was ground Purina Laboratory Chow. The

	<p>dogs were caged separately and had free access to food and water at all times.</p> <p>During the course of the experiment, the animals were weighed weekly. They were observed frequently for any changes in appearance or behavior. Records were kept of body weights, mortality, and average daily food consumption.</p> <p>Hematological values were obtained from all the dogs on each dietary level before the beginning of the experiment, at 45 days, and at 80 days on the diet.</p> <p>All animals were weighed before examination at autopsy. The lungs, heart, liver, kidneys, spleen, and testes were removed and weighed. Portions of each organ, as well as stomach, small intestine, large intestine, aorta, thyroid, pituitary, three sections of brain, pancreas, and adrenals, were preserved, and hematoxylin-eosin stained sections were prepared for microscopic examination.</p> <p>Samples of blood serum were obtained at autopsy for the determination of urea nitrogen content and alkaline phosphatase and transaminase activities</p>
Result	<p>: No evidence of adverse effect was observed in male or female beagle hounds when maintained for 95 days on diets containing 0.3 or 0.1 % Benax 2A1 (131 and 40 mg/kg/day, resp.).</p> <p>The dogs which received the 1.0% or 350 mg/kg/day level did not accept their diet to the same degree as the dogs on the lower diets. This decreased food consumption was found to be on average 73% of the quantity of food consumed by the control group. The corresponding failure to gain weight in the dogs on this level was proportional to the decrease in food consumption in comparison with the controls.</p> <p>Indirectly some organ to body weight ratios were affected in the dogs on this level. However, there was no difference in organ weights when considered on the absolute basis in grams, and the variation in the ratios may be attributed to the decrease in body weight when compared to controls.</p> <p>There was an increase in the serum alkaline phosphatase values in the dogs which received 1.0 % Benax 2A1 in their diet. However, there were no accompanying pathological changes in the liver nor any significant difference in the liver/body weight ratio when compared with the controls.</p>
Test substance	<p>There were no other effects attributed to treatment.</p> <p>: The test material, Benax 2A1, was submitted as an off-white powder. Thus, when the dietary dose is stated at percent, one can assume that it would be w/w (rather than having to figure out 'active' from an aqueous solution).</p>
Reliability Flag	<p>: (2) valid with restrictions</p> <p>: Critical study for SIDS endpoint</p>
26.04.2002	(26)
Species	: dog
Sex	: male/female
Strain	: Beagle
Route of admin.	: oral feed
Exposure period	: 2 years
Frequency of treatment	: Continuous
Post obs. period	: None

Doses	:	0.125, 0.25, 0.5 or 1.0% Benax 2A1 (34, 65, 128 and 319 mg/kg/day as determined using feed consumption)
Control group	:	yes, concurrent vehicle
NOAEL	:	= 128 mg/kg bw
LOAEL	:	= 319 mg/kg bw
Method	:	other: Historic
Year	:	1963
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Male and female beagle hounds of approximately 3 months of age were obtained from a commercial kennel and housed at the Biochemical Research laboratory. The pups remained in the lab 3 months prior to the beginning of the experiment, during which time they were vaccinated for distemper, hepatitis, and leptospira. On October 17, 1961, the dogs were divided into matched groups and started on diets containing 0.0 (control), 1.0, 0.5, 0.25, or 0.125% Benax 2A1. Four males and four females comprised each group, except for the 1.0% level, which consisted of two males and 4 females. The percentage levels given above were approximately equivalent to the administration of 0, 319, 128, 65, and 34 mg/kg/day Benax 2A1, respectively, over the two-year period. The stock diet for the first two months was Famo Laboratory Chow; it was then changed to Purina Laboratory Chow for the remaining time. Dogs of each sex per level were housed together and had free access to food and water at all times.
		Each dog was weighed weekly for the first 3 months of the experiment and twice a week thereafter. Food consumption was recorded during the first, 12th, and 16th months, and one week out of each month from 18 months to the end of the experiment. Hematological studies and determinations of serum urea nitrogen content and alkaline phosphatase activity were made before the beginning of the experiment and at 3, 6, 9, 12, 18 and 24 months. Transaminase activity (SGPT) was determined at one and two years and BSP dye retention at one year. The Technicon Autoanalyzer was used in determining urea nitrogen content and transaminase and AP activities. Pre-exposure liver biopsies were performed on one dog of each sex per level, as well as at 6, 12, and 18 months on test.
		At the end of the two-year period the animals were fasted overnight and weighed before examination at autopsy. The lungs, heart, liver, kidney, spleen, testes, and brain were removed and weighed. Portions of each organ, as well as spinal cord, peripheral nerve, pituitary, thyroid, adrenal, aorta, lymph node, thymus, esophagus, stomach, small and large intestine, pancreas, urinary bladder, ovary, uterus, and skeletal muscle were preserved. The tissues were then sent to the International Research and Development Corporation in Mattawan, Michigan, for preparation of H-E stained sections and microscopic examination.
Result	:	No evidence of adverse effect whatsoever was observed in the dogs on the 0.5% level or below as judged by general appearance and behavior, growth, food consumption, hematology, clinical chemistry, BSP retention, final body and organ weights, and gross and microscopic examination of tissues.
		The two males and 4 females which received 1.0% Benax 2A1 in the diet showed growth retardation. Because one dog of each sex lost approximately 1/3 of their original weights, they were sacrificed after 14 months of the experiment. The final weight of the remaining male was essentially the same as his original weight, while two of the remaining females lost weight and the third gained. Thus, the 1.0% level was not readily acceptable to the dogs. Persistent scratching at the feeders was noted during the early months of the experimental period. This was noted to some extent also in the group receiving the 0.5% level. Food consumption records indicate high spillage and wastage. So, decreased

food intake was linked to growth retardation. Also, gastrointestinal irritation, evidenced by loose stools and diarrhea which these dogs exhibited for the first 45 days on the test, also may have contributed to their failure to gain weight.

AP determinations at various intervals throughout the 2-year period showed a slight increase in activity in both of the males and in 2/4 females on the 1.0% diets. However, the determination of BSP retention at 1 year and transaminase activity at 12 and 2 years, gave normal results in comparison with the controls.

An increased liver/body weight ratio was found in the male dog which was sacrificed after 14 months. The organ/body weight ratio of the kidney of the 1.0% male which was carried through to the end of the 2-year period was also increased. However, these variations are due to decreased body weights, since there was no increase in the organ weights when considered on the absolute basis in grams.

There were no other effects possibly attributed to treatment.

Test substance : Benax 2A1, was submitted as a light-colored powder. Thus dietary doses can readily be assumed to be percent by weight, w/w.

Reliability Flag : (2) valid with restrictions
26.04.2002 : Critical study for SIDS endpoint

(27)

5.5 GENETIC TOXICITY 'IN VITRO'**5.6 GENETIC TOXICITY 'IN VITRO'****5.7 CARCINOGENITY**

Species : rat
Sex : male/female
Strain : no data
Route of admin. : oral feed
Exposure period : 2 years
Frequency of treatment : Continuous
Post. obs. period : None
Doses : 0.03, 0.1, 0.3 and 1.0 % in diet (15, 50, 150, 500 mg/kg/day based on feed consumption)
Result : negative
Control group : yes, concurrent vehicle
Method : other: Historic
Year : 1963
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Weanling rats from the stock colony of the Biochemical Research Laboratory were placed on a diet of ground Famo Chow and observed for a period of about 4 weeks before being divided into well-matched groups according to body weight of 30 of each sex per group. As many as ten males and ten females in each group were designated to be sacrificed for examination after 12 and 18 months on test. When approximately 50 days of age, the groups of rats were started on diets containing 0.0 (control), 500, 150, 50 or 15 mg/kg/day of Benax 2A1. These levels are equivalent to the administration of 1.0, 0.3, 0.1 and 0.03 % Benax 2A1, respectively, in the diet of adult rats. For the first 5 months of the experiment, the percent of chemical in feed was adjusted according to body weight and food intake in order to administer the specified levels on a mg/kg/day basis.

Experimental diets were prepared by thoroughly mixing the test material with the basic diet of ground Famo Chow. After 5 months of the experiment, the stock diet was changed to ground Purina Laboratory Chow. The rats were caged individually and allowed food and water ad libitum.

During the course of the experiment, the rats were observed frequently for any changes in appearance or behavior. Each rat was weighed twice a week for the first month, weekly for the next 5 months, and every 2 weeks to the end. Whenever possible, failing animals were autopsied when moribund in an effort to ascertain the cause of impending death. In addition, records were kept of mortality, and food consumption was recorded during the second month of the test.

Hematological studies, including hematocrit, hemoglobin content, WBC, differentials were made on 5 male and 5 female rats from the control, 1.0 and 0.3 % groups after 4 months on test. At the end of 6, 9, 12, 18, and 24 months, hematological values were obtained from 5 rats of each sex from each of the groups.

At the end of the 2-year period, all surviving rats were fasted overnight, sacrificed by decapitation and examined grossly at autopsy. The lungs, heart, liver, kidneys, spleen, testes, and brain were removed and weighed. Portions of each organ, as well as adrenal, pancreas, urinary bladder, prostate gland, spinal cord, aorta, thymus, peripheral nerve, large intestine, small intestine, stomach, esophagus, pharynx, and skeletal muscle were preserved in formalin, and hematoxylin-eosin stained sections were prepared from the femurs of male and female rats on each level and stained with Wright's stain. Samples of blood serum were obtained for the determination of urea nitrogen content and alkaline phosphatase activity using the Technicon Auto-Analyzer.

This same procedure was followed for the interim sacrifices after 12 and 18 months.

When appropriate, the Fisher 't' test was used in comparing the mean values obtained on the experimental groups with those of the controls; in general, probability values (P) of less than 0.05 were interpreted as indicating a significant difference.

Result

- : In general, all the groups of rats appeared normal in appearance and behavior throughout the experimental period. There was no significant difference in food consumption, mortality, hematology, urea nitrogen, alkaline phosphatase, nor tumor incidence in rats fed diets containing Benax 2A1 when compared to controls.

Growth was normal for the groups of rats which received 0.3% of the test material in feed; however the females on the 1.0% level began to show growth retardation after 6 months of the experiment. Slight growth depression was observed in the males on this dose.

Twelve Months: Final average body and organ weight ratios showed no significant differences between groups of male control rats and those receiving the diets containing Benax 2A1. The organ/body weight ratios of the kidney and spleen of the females on the 0.1% level and of the liver of the 0.1 and 0.03% females were decreased when compared with controls. However, these lacked dose response and so were not considered related to treatment. There were no gross or microscopic findings related to treatment in the rats at any dose.

Eighteen Months: A decrease in the final average body weight of the group of female rats on the 1.0% diet which were autopsied after 18 months was the only evidence of any adverse effect at this time interval. There were no gross or microscopic findings related to treatment in the rats at any dose.

Twenty-four Months: There were no gross or microscopic examination findings related to treatment in the rats at any dose. The final body weight of the females on the 1.0% level was significantly decreased, resulting in an increase in the brain/body weight ratio. The increased testes weight of the male rats which received 1.0 or 0.3% Benax 2A1 in their diets was not considered to be of 'practical significance'.

Test substance : The test material, Benax 2A1, was submitted as a light-colored powder. Thus, it can be assumed that the % in the diet was on a w/w basis (no need to calculate from an aqueous solution).

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

26.04.2002

(28)

5.8 TOXICITY TO REPRODUCTION

5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.10 OTHER RELEVANT INFORMATION

5.11 EXPERIENCE WITH HUMAN EXPOSURE

- (1) The Dow Chemical Company, 2001.
- (2) Gonsior, S.J., Evaluation of the Inherent Biodegradability of Dowfax 2A1 Surfactant Using a Modification of the Zahn-Wellens/EMPA Test (OECD Method 302B), unpublished Dow report, August 5, 1998, 980015.
- (3) Lepaillieur, H., IRCHA report, B.7614 - Biodegradabilite, 30 October, 1979.
- (4) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactants XDS 8174.00, XDS 8292.00, and Dowfax 2A1, ES-932, January 8, 1987, unpublished Dow report.
- (5) Rhinehart, W.L., Maier, W.J., Biodegradability of Dowfax* 3B2 and 3B2/2A1 Surfactant by the Soap and Detergent Association (SDA) Confirming Test (Semi-Continuous Activated Sludge), ES-507, April 28, 1982, unpublished Dow report.
- (6) Gonsior, S.J., Generation of Activated Sludge Effluent Containing Dowfax* 2A1 Surfactant Biodegradation Products, unpublished Dow report, May 8, 1998, 980014.
- (7) Kirk, H.D., Gilles, M.M., Acute Toxicity of the Biodegradation Effluent of Dowfax 2A1 Surfactant in Rainbow Trout, *Oncorhynchus mykiss* Walbaum, unpublished Dow report, 24 March 1998, 980005.
- (8) Batchelder, T.L., Acute Static and Flow-Through Fish Toxicity Of Dowfax* 2A-1, Lot # 05033, ES=11, February 28, 1975, unpublished Dow report.
- (9) Rhinehart, W.L., Bailey, R.E., Toxicity of Dowfax* 2A1 Surfactant and Dowfax* 3B2 Surfactant Metabolites to Aquatic Organisms, July 25, 1978, ES-243, unpublished Dow report.
- (10) Batchelder, T.L., Acute Static and Flow-Through Fish Toxicity of Dowfax* 2A-1, Lot # 05033, ES-11, February 28, 1975, unpublished Dow report.
- (11) Kirk, H.D., Gilles, M.M., Acute Toxicity of the Biodegradation Effluent of Dowfax 2A1 Surfactant in Daphnia, *Daphnia magna* Straus, unpublished Dow report, 24 March, 1998, 980006.
- (12) Cowgill, U.M., Milazzo, D.P., The Static Acute Toxicity of Dowfax 2EP to *Daphnia Magna*, unpublished Dow report, ES-1070, June 14, 1988.
- (13) Cowgill, U.M., Milazzo, D.P., The Response of the Three Brood *Ceriodaphnia* Test to Tertiary Dodecyl Mercaptan, Dowfax* 2EP, NH₄OH, and Hardness Calculated as mg CaCO₃/L, ES-1078F, January 26, 1990, unpublished Dow report.
- (14) Rhinehart, W.L., Dowfax* 2A1 Surfactant Toxicity to *Daphnia Magna*, Letter Report ES-63L, February 6, 1978, unpublished Dow report.
- (15) Gilbert, K.S., Berdasco, N.M., Dowfax 2A1: Acute Toxicological Properties, unpublished Dow report, May 13, 1993.
- (16) Henck, J.W., Acute Toxicological Properties and Industrial Handling Hazards of Dowfax* 2A1 Surfactant, unpublished Dow report, February 19, 1980.
- (17) Wolf, M.A., Results of Range Finding Toxicological Tests on Sulfonated Dodecyl Diphenyl Oxide, Sodium Salt, T61.14-14-1, August 9, 1955, unpublished Dow report.
- (18) Olson, K.J., Results of Range Finding Toxicological Tests on Dowfax 2A1 (45% solution in water), T61.14-14-6, August 18, 1959, unpublished Dow report.

- (19) Wolf, M.A., I Results of Range Finding Toxicological Tests on Sulfonated Dodecyl Diphenyl Oxide, Sodium Salt, T61.14-14-1, August 9, 1955, unpublished Dow report.
- (20) Rowe, V.K., Results of Skin Irritation and Skin Sensitization Studies on Humans with Sulfonated Dodecyldiphenyl Oxide Sodium Salt (Dowfax 2A1), File T61.14-14.3, April 17, 1957, unpublished Dow report.
- (21) Brooks, K.J., Dowfax* 2A1 Surfactant (5% Aqueous Solution): Acute Primary Eye Irritation Study in New Zealand White Rabbits, unpublished Dow report, 02 February, 1998, 971197.
- (22) Carreon, R.M., Henck, J.W., Dowfax 2A1: Eye Irritation Potential of Samples of Differing pH, unpublished Dow report, August 21, 1980.
- (23) Olson, K.J. Results of Range Finding Toxicological Tests on Dowfax 2A1 (45% Solution in Water), T61.14-14-6, August 18, 1959, unpublished Dow report.
- (24) Rowe, V.K., Results of Skin Irritation and Skin Sensitization Studies on Humans with Sulfonated Dodecyldiphenyl Oxide Sodium Salt (Dowfax 2A1), File T61.14-14.3, April 17, 1957.
- (25) Lockwood, D.L., Results of Repeated Oral Feeding of Sulfonated Dodecyl Biphenyl Oxide Sodium Salt (Dowfax 2A1) to Rats, T61.14-14-2, September 3, 1957, unpublished Dow report.
- (26) Beatty, S.C., Results of 95-Day Dietary Feeding Studies of Benax 2A1 in Dogs, File T61.14-14-7, February 11, 1963, unpublished Dow report.
- (27) Beatty, S.C., Results of Two Year Dietary Feeding Studies of Benax 2A1 Surfactant in Dogs, File T61.14-14-12, unpublished Dow report, December 31, 1963.
- (28) Beatty, S.C., Results of Two Year Dietary Feeding Studies of Benax 2A1 Surfactant in Rats, T61.14-14-10, unpublished Dow report, December 27, 1963.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical : ID: 147732-60-3
CAS No. : 147732-60-3

Producer Related Part
Company : The Dow Chemical Company
Creation date : 13.08.2001

Substance Related Part
Company : The Dow Chemical Company
Creation date : 13.08.2001

Memo :

Printing date :

Revision date :

Date of last Update : 14.08.2003

Number of Pages :

Chapter (profile) :

Reliability (profile) :

Flags (profile) :

1.0.1 OECD AND COMPANY INFORMATION**1.0.2 LOCATION OF PRODUCTION SITE**

Name of Plant : Pilot Chemical
Street : 606 Shepherd Drive
Town : 45215 Lockland, Ohio
Country : United States
Phone :
Telefax :
Telex :
Cedex :
21.01.2002

1.0.3 IDENTITY OF RECIPIENTS**1.1 GENERAL SUBSTANCE INFORMATION**

Substance type : organic
Physical status : liquid
Purity : % w/w
Test substance : This product is normally sold as an aqueous solution. The solid is also a mixture of isomers conforming to the generic description.
13.08.2001

1.1.0 DETAILS ON TEMPLATE**1.1.1 SPECTRA****1.2 SYNONYMS**

Benzene, 1,1'-oxybis-, sec-hexyl derivatives, sulfonated, sodium salts
14.08.2001

C6 Dowfax
13.08.2001

Dowfax C-6 Surfactant
13.08.2001

Dowfax C6 Surfactant
13.08.2001

Dowfax C6L Surfactant
13.08.2001

Dowfax Dry Hydrotrope Powder
13.08.2001

Dowfax XD 8292
13.08.2001

Dowfax* Dry Hydrotrope Powder (dry form of XD-8292)
08.01.2002

Sodium mono- and dihexyl diphenyl oxide disulfonate
14.08.2001

1.3 IMPURITIES

CAS-No : 7757-82-6
EINECS-No : 231-820-9
EINECS-Name : sodium sulphate
Contents : < 3 % w/w
14.08.2001

CAS-No : 7647-14-5
EINECS-No : 231-598-3
EINECS-Name : sodium chloride
Contents : < 3 % w/w
14.08.2001

1.4 ADDITIVES

Remark : The commercial product is normally an aqueous solution containing about 50% water.
14.08.2001

1.5 QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.7 USE PATTERN

1.7.1 TECHNOLOGY PRODUCTION/USE

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.9 SOURCE OF EXPOSURE

1.10.1 RECOMMENDATIONS/PRECAUTIONARY MEASURES

1.10.2 EMERGENCY MEASURES

1.11 PACKAGING

1.12 POSSIB. OF RENDERING SUBST. HARMLESS

1.13 STATEMENTS CONCERNING WASTE

1.14.1 WATER POLLUTION

1.14.2 MAJOR ACCIDENT HAZARDS

1.14.3 AIR POLLUTION

1.15 ADDITIONAL REMARKS

1.16 LAST LITERATURE SEARCH

1.17 REVIEWS

1.18 LISTINGS E.G. CHEMICAL INVENTORIES

2.1 MELTING POINT

Sublimation	:	
Method	:	other: EEC 92/69 EEC, Part A, L383, Dec. 1992
Year	:	1998
GLP	:	yes
Method	:	After a preliminary test to determine the melting range, the main study was performed with 2.05 mg of the substance in a sample container that was covered with a lid. This sample was heated with a rate of 10C/min in 3 runs: first from 35 to 200C, then from 150 to 250C and finally from 200 to 300C. Both the preliminary and main studies were performed under a flow of air (about 100 ml/min). After each experiment, the mass of the sample was measured and the sample was inspected visually.
Result	:	Up to about 150C part of Dowfax* dry hydrotrope powder (about 10%) evaporated. Between 215 and 232C a transition of the test substance (or part of it) from the glassy state to the undercooled liquid is observed. Between 265 and 280C a small exothermic effect is observed which may be caused by reaction or decomposition of the test substance or by crystallisation of (part of) the test substance. Reaction or decomposition of the test substance was certainly observed above 330C.
Test substance	:	The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
06.12.2001		(1)
Value	:	= 270 °C
Sublimation	:	
Method	:	other:
Year	:	2001
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : Melting Point, Boiling Point and Vapor Pressure estimated using Estimation Programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Reliability Flag : (2) valid with restrictions
Material Safety Dataset

11.03.2002 (2)

2.2 BOILING POINT

Value : = 610 ° C at

Decomposition :

Method : other:

Year : 2001

GLP : no

Test substance : as prescribed by 1.1 - 1.4

Method : Melting Point, Boiling Point and Vapor Pressure estimated using Estimation Programs Interface (EPIWIN, Version 2, February 1997) available from Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Reliability Flag : (2) valid with restrictions
Material Safety Dataset

29.10.2001 (3)

2.3 DENSITY

Type : density

Value : = 1.36 g/cm³ at 20° C

Method : Directive 84/449/EEC, A.3 "Relative Density"

Year : 1998

GLP : yes

Method : The test substance was dried for 4 days at room temperature in the dark in a desiccator, using silicagel as the agent.

The test cell was pressurized to a pressure of slightly less than 20 psi (1.406 kg/cm³) and the pressure was read. Subsequently, an extra volume (V sub a) was added to the pressure system, resulting in a lower pressure, which was read after equilibration of the system. During the performance of the test, the temperature was measured.

The volume of the calibration cell was determined, based on upper and lower pressure readings. The volume calibrations were based on a chrome plated calibration cylinder with known volume. The sample cell volume was determined from pressure differential, as well.

The sample cell was weighed, filled with the test substance and placed in the stereopycnometer. Then, the test was performed as outlined above, resulting in pressure readings p sub 7 and p sub 8 (upper and lower, resp.). Then the sample cell containing the test substance was reweighed to determine the mass of the tested material.

Result : Density was = amount of test substance (g) / V sub p.
The density of Dowfax* Dry Hydrotrope Powder was determined using the gas comparison method. It was found to be 1.36 g/cm³ using this gas comparison pycnometer.

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax

Reliability : XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.
Flag : (1) valid without restriction
 11.03.2002 : Critical study for SIDS endpoint (4)

2.3.1 GRANULOMETRY

Type of Distribution : other: visual, sieved and by laser diffraction
Precentile :
Method : other
Year : 1998
GLP : yes
Method : Visual: This looked at the dry substance and in suspension in cyclohexane. (it dissolved in water and ethanol but not in cyclohexane after 2 hrs) The instrument was a microscope with 200 and 300x power.

Sieve: 25.0 grams of the test substance was sieved through a 250 microm analytical sieve and then a 63 microm analytical sieve, using a Retsch mechanical sieving apparatus. The sieving was continued until < 0.1 g/min. passed the sieves.

Laser Diffraction: An amount of the test substance was added to the cyclohexane in the measuring cell until an obscuration ('turbidity') of 0.1 - 0.3 was reached. The particle size distribution was measured (using a 100 mm lense) with 20 seconds of sonication.

Result : The determination was based on the OECD 110 Guideline.
 : Sieve: < 63 microns: 21.5% (m/m)
 63-250 microns: 74.9%
 >250 microns: 3.6%

Laser Diffraction:
 <2 microns: 0.4% (m/m)
 2-5 microns: 2.4%
 5-10 microns: 3.6%
 10-20 microns: 12.1
 20-50 microns: 49.3%
 50-63 microns: 16.8%
 >63 microns: 15.4%

 Total 100%

Combined Results:

MALVERN	Total	
<2 microns: 0.4% (m/m)	(x21.5/100)	: 0.1%
2-5 microns: 2.4%	"	: 0.5%
5-10 microns: 3.6%	"	: 0.8%
10-20 microns: 12.1%	"	: 2.6%
20-50 microns: 49.3%	"	: 10.6%
50-63 microns: 16.8%	"	: 3.6%
>63 microns: 15.4%	"	= 3.3%
Sieve 63-250 microns:	=74.9%	78.2%
>250 microns:	3.6%	

 100%

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i. In this case, the report called the substance, "Dowfax* C6L"; it was a light tan powder.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

11.03.2002

(5)

2.4 VAPOUR PRESSURE

Value : = .02 hPa at 20° C
Decomposition :
Method : OECD Guide-line 104 "Vapour Pressure Curve"
Year : 1999
GLP : yes
Method : The 'Static Technique' was used. Static vapour pressure measurements were made with a capacitance manometer fitted with a 133 Pa capacitive sensor. The reference pressure at the right-hand side of the diaphragm of the pressure sensor was kept below 10⁻⁴ Pa. The temperature of the sample was measured with a platinum resistance thermometer.

The sample vessel was cleaned, dried and filled with approx. 0.4 g of the test sample. After attaching the vessel to the measuring set-up, it was evacuated during about 15 minutes. The measurements were started at 38.66C. After measurement 23, the temperature of the thermostatic bath in which the sample vessel is immersed was lowered to 29.80C and finally after measurement 44 to 23.66C. A total of 56 measurements was performed.

Because the measured vapor pressures were > 0.1 Pa, no correction according to Bennett and Tompkins (Trans Faraday Soc., 1957, 53, 185) for thermal transpiration was made. The test substance was considered to show ideal behavior. Thus the vapor pressure curve was derived according to Clarke and Glew (Trans Faraday Soc., 1966, 62, 539). The vapor pressure at 20C was calculated from the vapor pressure curve.

Remark : The vapor pressure determined in this test is higher than that predicted by QSAR and higher than experience has indicated.

Result : The static technique was used for the determination of the vapor pressure at 20C. At the beginning of the test, the vapor pressure of the test substance increased slightly every next measurement. After measurement 5, this decrease became negligible and the vapor pressure was stable. Only data from the stationary phase were used for the final result.

Measurement	Temp (C) in (p)	Mean V.P. (+/- 2 sigma n-1) Pa
6-23	38.66	1.87 +/-0.01 6.48 +/- 0.07
24-44	29.80	1.37 +/-0.01 3.95 +/-0.03
45-56	23.66	1.014 +/-0.001 2.76 +/- 0.01

Fitting these data according to Clark & Glew gives a value of 2.209 Pa with 0.007 Pa for 2 sigma n-1.

The value in mmHg is 1.66 x10⁻².

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.

Reliability Flag : (1) valid without restriction
 : Critical study for SIDS endpoint

17.06.2002

(6)

Value : = 0 hPa at 25° C
Decomposition :
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Melting Point, Boiling Point and Vapor Pressure estimated using Estimation Programs Interface (EPIWIN, Version 2, February 1997) available from

Syracuse Research Corporation (Syracuse, NY). Estimations of properties for representative isomers are based on quantitative structure-activity relationships.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 17.06.2002 (3)

2.5 PARTITION COEFFICIENT

Log pow : ≤ -3.5 at ° C
Method : other (calculated): Rekker
Year : 1998
GLP : yes
Method : Dowfax* Dry Hydrotrope Powder is a mixture of four, sulfonate groups containing salts. Because it is not possible to bring the salt molecules in a non-ionised form by pH adjustment, both the flask-shaking method and the HPLC method are not applicable for the determination of the partition coefficient (n-octanol/water). Since the structures of the sulfonate groups containing salts 'are not precisely known', the Rekker calculation method could not be used either. Thus, the partition coefficient (n-octanol/water) was calculated from the water solubility and the n-octanol solubility of Dowfax* Dry Hydrotrope Powder. The solutions and the test material were protected from light as much as possible.

Result : The partition coefficient (Pow) of Dowfax* Dry Hydrotrope Powder was determined to be $\leq 10^{-4}$ ($\log \text{Pow} \leq -3.5$) as a quotient of the n-octanol solubility and water solubility.

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 11.03.2002 (7)

Log pow : = .6 at 25° C
Method : other (calculated)
Year : 2001
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Partition coefficient in environmental pH range of 5 to 9 estimated using ACD/Log D program (Version 4.56, April 2000) available from ACD Labs (Toronto Canada). Estimations of Log P for representative isomers based on quantitative structure-activity relationships which account for dissociation as a function of pH.

Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 29.10.2001 (3)

2.6.1 WATER SOLUBILITY

Method : OECD Guide-line 105 "Water Solubility"
Year : 1999
GLP : yes
Test substance : other TS
Method : In a preliminary test, 1000 microl double distilled water was added to 1.10 g of the test substance. The tube was vortexed for 1 minute and thereafter placed on a magnetic stirring device. The content of the tube was stirred overnight in a climate room of which the temperature was measured continuously using a thermohygraphic device. The resultant phase was observed visually.

Result	:	After 17 hours in the preliminary test, no undissolved test substance was observed. Thus, no main study was performed. Dowfax* Dry Hydrotrope Powder was determined to be miscible with water in at least a 1:1 (w/v) ratio at 19.5 C.	
Test substance	:	The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.	
Reliability Flag	:	(1) valid without restriction	
11.03.2002	:	Critical study for SIDS endpoint	(8)
Value	:	> 100000 mg/l at 25 ° C	
Qualitative	:	of very high solubility	
Pka	:	at 25 ° C	
PH	:	ca. 5 - 9 at and ° C	
Method	:	other:	
Year	:	2001	
GLP	:	no	
Test substance	:	as prescribed by 1.1 - 1.4	
Method	:	Water solubility in environmental pH range of 5 to 9 estimated based on product formulation information. Formulations contain 10 to 50% of surfactant in water. Therefore solubility >100,000 mg/L.	
Reliability Flag	:	(2) valid with restrictions	
29.10.2001	:	Material Safety Dataset	(3)

2.6.2 SURFACE TENSION

Test type	:	Ring method
Value	:	= 34.2 mN/m at 20 ° C
Concentration	:	1019 mg/l
Method	:	Directive 84/449/EEC, A.5
Year	:	1998
GLP	:	yes
Test substance	:	other TS
Method	:	Glassware was washed with chromo-sulfuric acid. The measurement vessel was washed with hot chromo-sulfuric acid and then with syrupy phosphoric acid. Then glassware was rinsed in tap-water and in double-distilled water. The measuring ring was similarly washed and then heated above a flame. The tensiometer was calibrated.

The cleaned and rinsed measurement vessel was filled with the test solution. The measurement vessel was placed in a thermostated waterbath (20C) on the mobile sample table. The table was raised until the ring was immersed below the surface of th solution. Subsequently, the table was lowered until the ring was attached to the liquid surface. After some additional lowering of the table, the ring exerts a torque on the force measuring system. This torque was compensated for manually (via machine knob). Lowering of the table and subsequent compensation of the resulting torque were continued in small increments until the lamina broke, i.e., the upward force on the ring completely overcame the surface tension force and the ring was torn away from the surface. The surface tension was then recorded. After completing the measurement the ring was immersed below the surface again and the measurements were repeated until aconstant surface tension value was reached. The time passed since the solution was transferred to the measurement vessel was recorded for each determination.

Result	:	The surface tension of a solution of Dowfax* Dry Hydrotrope Powder in water at a concentration of 1.019 g/l is 34.2 mN/m. Based on the criteria as outlined in the guideline, it is concluded that Dowfax* Dry Hydrotrope
---------------	---	---

Powder should be regarded as a surface active material.

The measured value from the apparatus required a correction (Harkins-Jordan Correction) determined from a published table. According to the criteria as outlined in the EEC Directive, substances showing a surface tension lower than 60 mN/m under the conditions of this method, should be regarded as being surface active materials.

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i. An aqueous solution of this powder was prepared by dissolving 101.9 mg test substance in 10 ml milli-Q water.

Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint

24.04.2002

(9)

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

Value : > 400 °C at

Method : Directive 84/449/EEC, A.16 "Auto-flammability of solids"

Year : 1998

GLP : yes

Test substance : other TS

Method : The test oven and recorder were calibrated periodically using a calibrated digital thermometer. During the calibration procedure, the temp. rise, temp reading of the recorder and the temp. of the oven were evaluated.

The 'cube' was completely filled with the test substance. The sample was suspended in the center of the oven at room temperature. One thermocouple was placed at the center of the cube and the other between the cube and the oven wall to record the oven temp.

The temperatures of the oven and sample were continuously recorded while the temperature of the oven was increased to 400 C at a rate of 0.5 C/min.

At the end of the test, the consistency of the test substance was determined.

If an exothermic reaction occurs, the sample thermocouple shows a sharp temperature rise above the oven temp. The temperature of the oven at which the sample reaches 400C by self-heating is appointed as the self-ignition temperature of the test substance.

Result : No self-ignition occurred. The test substance changed into a grey/brown residue. Thus, according to the directive criteria, Dowfax* Dry Hydrotrope Powder is not self-ignitable.

Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

11.03.2002

(10)

2.9 FLAMMABILITY

Result : other: not 'highly flammable'

Method : Directive 84/449/EEC, A.10 "Flammability (solids)"

Year : 1998
GLP : yes
Test substance : other TS
Method : Dowfax* Dry Hydrotrope Powder was formed into a wedge-shaped pile with a length of 25 cm, a width of 2 cm and 1 cm in height. An attempt was made to ignite the test substance with a flame of a gas-burner. This was a preliminary test and after noting the results, no main study was necessary.
Result : Dowfax* Dry Hydrotrope Powder could be ignited with a flame, but no propagation throughout the test substance pile was observed. The test substance burned with an orange flame, colored black and emitted black smoke in contact with the ignition source. After removal of the ignition source, the test substance burned for another 20 seconds. Thus this dry form of the product is not 'highly flammable' according to this test.
Test substance : The test substance was the dry hydrotrope powder of the C6 alkyl Dowfax XD-8292, CAS 147732-60-3, Lot 941205-134, min. 92% a.i.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
24.04.2002 (11)

2.10 EXPLOSIVE PROPERTIES**2.11 OXIDIZING PROPERTIES****2.12 ADDITIONAL REMARKS**

3.1.1 PHOTODEGRADATION

Value : Not determined
Method
Year :
GLP :
Test substance :
Method :
Reliability :
Remark : Due to the very low vapor pressure of this compound, there is little likelihood that this compound would be found in air. Thus data is not needed for this endpoint.
Flag :

3.1.2 STABILITY IN WATER

Type : abiotic
t1/2 pH4 : at degree C
t1/2 pH7 : at degree C
t1/2 pH9 : at degree C
Degradation : < 6 % after 5 day at pH and degree C
Deg. Product :
Method : OECD Guide-line 111 "Hydrolysis as a Function of pH"
Year : 1998
GLP : yes
Test substance : other TS
Method : An accurately weighed amount of the test material (range 101.9-105.5 mg) was added to 50.0 ml buffer solution (pH 4.0, 7.0 and 9.0). The filter-sterilized solutions were treated for 5 minutes with nitrogen gas to exclude oxygen. The incubation took place at 50 C in the dark. The concentration of the test substance was determined by HPLC after 0, 2.4 hours and 5 days (quantification was based on the major component of Dowfax). pH values were checked at the same time points.
Result : Dowfax* Dry Hydrotrope Powder showed no significant decrease in concentration after incubation at 50 C at pH 4.0, 7.0 or 9.0 for up to 5 days. At pH 4.0 still 94% of the original concentration could be found after 5 days, whereas for pH 7.0 and 9.0 the 5-day figures were 98% and 101%, respectively. Correspondingly, the material can be termed to be hydrolytically stable.
Test substance : The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 24.04.2002 (12)

3.1.3 STABILITY IN SOIL**3.2 MONITORING DATA****3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS**

Type : other: adsorption/desorption
Media :
Air (level I) :

Water (level I)	:	
Soil (level I)	:	
Biota (level II / III)	:	
Soil (level II / III)	:	
Method	:	other: OECD 106
Year	:	1998
Method	:	For the investigation of the adsorption behavior, three different soils were used: 1) Cranfield 164 soil (3.4% organic matter; pH 7.2; 13.2% clay, 73.8% silt and 13.0% sand). 2) Midwest 2 soil (1.0% organic matter; pH 5.9; 6% clay, 8% silt and 86% sand). 3) Cranfield 115 soil (2.8 % organic matter; pH 8.1, 32.2% clay, 23.1% silt and 44.9% sand). The soils were first equilibrated with water. To approx. 5 g of each equilibrated soil approx. 10 ml of an aqueous solution of the test material (4.5 mg/l in 0.01 M CaCl ₂) was added (3 parallel samples per soil). Incubation took place at 20C on a shaker over a period of 16 hours. Subsequently, the vials were centrifuged (5 min, 170 x g). The supernatants were removed, weighed and an aliquot centrifuged for 5 minutes at 3500 xg. The amount of residual test material still present in the supernatant after incubation (adsorption) was analyzed with HPLC. To follow the desorption of the test material 10 ml of 0.01 M CaCl ₂ solution was added to the treated soil samples containing the Cranfield 164 soil. For the other soils the desorption step was omitted due to limited sorption in the first place. The vials were again shaken for 16 hours at 20C followed by centrifugation (5 min., 170 x g) and HPLC analysis for the 3500 x g supernatants.
Result	:	The Koc values were:
		Cranfield 164 12.3 ccm/g
		Midwest 2 5.3 ccm/g
		Cranfield 115 0 ccm/g
		Because of the low amount of the test material adsorbed to Cranfield 164 soil (0-8%) desorption could not be determined. These results indicate that Dowfax Dry Hydrotrope Powder can be considered to be highly mobile in soil.
Test substance	:	The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
24.04.2002		(13)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Type	:	aerobic
Inoculum	:	activated sludge, domestic
Concentration	:	20.7mg/l related to Test substance 12mg/l related to COD (Chemical Oxygen Demand)
Contact time	:	28 day
Degradation	:	ca. 0 % after 28 day
Result	:	under test conditions no biodegradation observed
Control substance	:	Acetic acid, sodium salt
Kinetic	:	% %
Deg. Product	:	

Method	:	Directive 84/449/EEC, C.4 "Biotic degradation - modified AFNOR test NF T90/302"
Year	:	1998
GLP	:	yes
Test substance	:	other TS
Method	:	The study was conducted with glass culture vessels that contained 2 liters of mineral medium. The vessels were maintained in the dark at 21C for 28 days and aerated with CO2-free air. An aliquot of the supernatant of washed, settled municipal sludge was added as inoculum. The test substance was incubated in the nutrient medium at a concentration of 20.7 mg/L (corresponding to 12 mg/l Total Organic Carbon (TOC); two parallel samples). Concurrent controls consisted of nutrient medium plus inoculum alone (blank), nutrient medium with 40.15 mg/L sodium acetate (12 mg/l TOC; positive control) as well as a toxicity control with test and reference substance together (same concentration as in the individual samples described above). Degradation was measured by total inorganic carbon analysis of evolved CO2 absorbed with 0.0125 M Ba(OH)2 in gas scrubbing bottles in multiple samples from day 0 through day 28. The percentage degradation was calculated from the theoretical CO2 content (ThCO2) of the test material (2.14 mg/l).
Result	:	Dowfax* Dry Hydrotrope Powder showed no significant biodegradation after 28 days. The sodium acetate control attained 60% degradation after 14 days which confirmed the suitability of the inoculum and test conditions. The toxicity control showed more than 25% biodegradation within 14 days (absence of significant inhibitory effects by the test material). Based on these results Dowfax* Dry Hydrotrope Powder cannot be considered as readily biodegradable under the strict terms and conditions of the CO2 Evolution Test.
Test condition	:	The temperature of a vessel in the same room with the test vessel varied between 20 and 22C. The pH of all vessels were 7.6 and on day 28, they were 7.7 for the blank controls and the Dowfax vessels and 8.0 for the toxicity and positive controls. The positive control was degraded by 60% of day 14; the total CO2 released in the blank reached a total of 20 mg CO2/2 liters; and the difference of duplicate values for %-degradation of Dowfax was always <20. Thus the criteria for acceptability of the test were met.
Test substance	:	The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
15.08.2002		(14)
Type	:	aerobic
Inoculum	:	activated sludge, domestic
Concentration	:	20mg/l related to Test substance related to
Contact time	:	
Degradation	:	ca. 73 % after 21 day
Result	:	other: did not meet the pass level of 80% in the CAS test
Control substance	:	other: potassium hydrogen phthalate
Kinetic	:	% %
Deg. Product	:	
Method	:	OECD Guide-line 303 A "Simulation Test - Aerobic Sewage Treatment: Coupled Unit Test"
Year	:	1999
GLP	:	yes
Test substance	:	other TS
Method	:	Two small OECD Confirmatory Test units containing 360 ml medium in the aeration vessel were run in parallel without being coupled (no sludge exchange). The test material was dissolved in settled domestic sewage which was collected from a municipal waste water treatment plant at

	weekly intervals. Settled sewage and test material at a concentration of 20.0 mg/l were continuously fed to the aeration vessel of the first unit. A second unit where only settled sewage was continuously added served as a control. Both units contained activated sludge at a concentration of approx. 1.5 g/l (dry weight) during the relevant test period. Incubation took place at 21-23 deg.C in diffuse light. The hydraulic residence time (HRT) was kept at 6 hr whereas the sludge retention time (SRT) was 10 days. Effluents of both units were collected and aliquots used for determination of Methylene Blue Active Substance (MBAS). Primary biodegradation was calculated based on the percentage MBAS removal by comparing influent and effluent MBAS concentrations corrected by the effluent MBAS concentration of the control unit.	
Result	: Upon addition of Dowfax* Dry Hydrotrope Powder a significant MBAS removal between 70 and 80% was observed. The percentage removal did not further increase during the following test period. A time window of three weeks was chosen to calculate the mean percentage of removal. The primary biodegradation based on MBAS removal measured during the specified 21 days reached a mean value of 73% (95% c.l.: +/- 4%). The test material did therefore, not pass the 80% level for primary biodegradation as required by the EU Detergent Directive (Council Directive 82/243/EEC).	
Test condition	: The test was performed in diffuse light. The incubation temperature of both CAS units ranged from 19.0 to 21.7C. The pH of the effluent of the CAS units varied from 7.2 to 7.6. The oxygen concentrations measured were >4.7 mg/l. The test met the performance criteria for validity.	
Test substance	: The test substance was Dowfax* Dry Hydrotrope Powder.	
Reliability	: (1) valid without restriction	
Flag	: Critical study for SIDS endpoint	(15)
15.08.2002		
Type	: aerobic	
Inoculum	:	
Contact time	:	
Degradation	: = 63.3 % after 19 day	
Result	:	
Control substance	: other: Marlon A	
Kinetic	: % %	
Deg. Product	:	
Method	: other: 82/243/44C	
Year	: 1986	
GLP	: no	
Test substance	: as prescribed by 1.1 - 1.4	
Reliability	: (2) valid with restrictions	
Flag	: Material Safety Dataset	(16)
20.08.2001		
Type	: aerobic	
Inoculum	:	
Concentration	: 2500mg/l related to related to	
Contact time	: 7 day	
Degradation	: = 79.2 % after 7 day	
Result	: other	
Control substance	: other	
Kinetic	: % %	
Deg. Product	:	
Method	:	
Year	: 1987	
GLP	: yes	

Test substance : as prescribed by 1.1 - 1.4
Method : Activated sludge from the E. Lansing, MI, municipal wastewater treatment plant was used. A positive control linear alkylbenzene sulfonate (LAS) was used. Aliquots of mixed liquor (1.5L) were dispensed into each of 10 SCAS cylinders (2/test substance) at a nominal TSS concentration of 2500 mg/L. An airflow rate of 500 cc/min was maintained in each cylinder.

Beginning the following morning and continuing throughout the study, the SCAS cylinders were operated on a 24-hour fill and drain cycle. Following 23 hours of aeration, the air flow to the SCAS cylinders was stopped and the activated sludge solids allowed to settle at least 30 min. One liter of clarified supernatant liquid was drained from each cylinder, replaced with one liter of synthetic sewage feed, and the aeration resumed. The synthetic sewage feed was prepared by diluting 10 ml of a synthetic sewage stock solution to one liter with tap water.

Aqueous solutions of the surfactants were prepared at nominal concentrations of 1.0 mg/ml and added to the appropriate synthetic sewage feed solutions as described.

Test Duration:
 5 day surfactant build-up in feed
 3 day equilibrium at 20 mg/l
 7 days of operation with 20 mg/l surfactant in feed

Remark : Did not meet the criteria for biodegradability (90% reduction in methylene blue active substance following 23 hours of aeration).
Result : The 7 days % biodegradation was 79.0 for one cylinder and 79.4 for the other--which averages to 79.2 for both together.
Test substance : XDS 8292.00 -- A linear 6 carbon alkylated sulfonated diphenyl oxide; 45% active ingredient in water
Flag : Critical study for SIDS endpoint
 24.04.2002 (17)

3.6 BOD5, COD OR BOD5/COD RATIO

COD
Method : other
Year : 1987
GLP : yes
COD : mg/g substance
Method : COD was determined using an acidic dichromate digestion procedure (Hach method). This procedure uses a high temperature acidic dichromate digestion of an aqueous solution of the test material followed by a spectrophotometric determination of unreacted dichromate. The latter value allows calculation of the COD of the test material. COD was determined by comparison to a standard LAS (linear alkylbenzene sulfonate) calibration curve.
Result : COD was reported as 1.91 parts of oxygen/part of product (on a 100% active basis)
 24.04.2002 (17)

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	static
Species	:	Cyprinus carpio (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
Analytical monitoring	:	yes
LC50	:	c = 6.8
Method	:	other: C.1 and OECD 203
Year	:	1998
GLP	:	yes
Test substance	:	other TS
Method	:	Subsequent to a range-finding study, groups of 7 fish were exposed to aqueous solutions of the test material at nominal concentrations of 0.22, 0.46, 1.0, 2.2, 4.6 and 10.0 mg/l; an additional group of 7 fish was included as untreated control. The fish were exposed for 96 hours in 4 L glass aquaria that contained 3 L of test media; the exposure method was static. The fish were observed for mortality and other effects at 2, 24, 48, 72 and 96 hours of exposure. The temperature, pH and oxygen concentration of the test solutions were monitored throughout the study. Samples were taken for analysis at 0 and 96 hours from the vessels containing 0, 0.22, 1.0 and 10.0 mg/l of the test material.
Result	:	Exposure to 10.0 mg/l of the test material resulted in 100% mortality at 48 hours. No deaths were observed in the control group and in the groups exposed to other concentrations of the test material. All fish exposed to the test material as well as the untreated controls were normal throughout the study period, except those exposed to 4.6 mg/l which were hyperactive at the 24 hr reading.
		The 96-hr median lethal concentration (LC50) of Dowfax* Dry Hydrotrope Powder was 6.8 mg/l. Analysis confirmed that the measured test concentration found at 0 and 96 hours were in agreement with the nominal concentrations. The LC50 calculation was therefore based on the nominal concentrations.
Test condition	:	After aeration the hardness of the test medium was 250 mg CaCO ₃ /l and the pH was 8.1.
Test substance	:	The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
15.08.2002		(18)

Type	:	static
Species	:	Pimephales promelas (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
Analytical monitoring	:	yes
LC50	:	c = 13
Method	:	
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	The method was based on the Dow Environmental Sciences Research Laboratory Standard Operating Procedures for daphnid and fish toxicity tests which were based on procedures recommended by the ASTM Subcommittee on Safety to Aquatic Organisms (1980).

This test consisted of exposing groups of 10 fathead minnows to seven concentrations of the test material (32, 24, 18, 13, 10, 7.5, 5.6 mg/L) and a dilution water control. Exposure was initiated by adding appropriate

- amounts of an aqueous stock solution of Dowfax C6 to exposure vessels containing 8 L of dilution water and 10 fish. Additional dilution water was simultaneously added to each vessel to aid in mixing of the test solution, bringing the final test volume to 10L. The D.O., pH and temperature were measured daily in representative tanks as long as fish survived. Fish were not fed during the test. Dead fish were removed daily. The LC50 was calculated by probit analysis.
- Remark Result** : The LC50 was 13 mg/l with 95% C. I. of 12-14 mg/l.
 : Water Quality Measurements:
 Temperature Range 16.6-16.9 C
 pH Range 7.4-8.0
 Dissolved Oxygen
 (0-48 hour) >60% of saturation
 (48-96 hour) >54% of saturation
- Raw Data:
 32 mg/l 100 % dead 24 hr
 24 100 % dead 48 hr
 18 100 % dead 48 hr
 13 50 % dead 96 hr
 10 0 % dead 96 hr
 7.5 0 % dead 96 hr
 5.6 0 % dead 96 hr
- Test substance** : The test material was Dowfax C6 surfactant, containing 47.5% active ingredient in water.
- Reliability Flag** : (2) valid with restrictions
 : Critical study for SIDS endpoint
- 15.08.2002 (19)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

- Type** : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : yes
NOEC : c = 5.6
EC50 : c = 11.8
EC100 : m = 32
Method : other: OECD 202 and EEC C.2
Year : 1998
GLP : yes
Test substance : other TS
Method : Subsequent to a range-finding study, 2 replicate groups of 10 daphnia were exposed to aqueous solutions of the test material at nominal concentrations of 5.6, 10, 18, 32, 56 and 100 mg/l. Additional duplicate groups of 10 daphnia were included as untreated controls. The daphnia were exposed under static conditions in 100 ml glass beakers that contained 80 ml of the test medium. The daphnia were observed for immobilization at 24 and 48 hours of exposure. Oxygen concentration and pH of the test solutions were monitored at 0 and 48 hours. Samples were taken at 0 and 72 hours from test vessels containing 0, 5.6, 18 and 100 mg/l test material to verify the nominal test concentrations.
- Result** : Exposure over 48 hours to the test material resulted in 100% immobilization of the daphnia at the three highest test concentrations (32, 56 and 100 mg/l). 85 and 35% immobilization was observed in the 18 and 10 mg/l vessels, respectively. Exposure to the untreated control solutions and to 5.6 mg/l of the test material did not show any adverse effects.

The nominal 48-hour median effective concentration (EC50) of Dowfax*

Dry Hydrotrope Powder in Daphnia magna was 11.8 mg/l (95% c.l. 10.5 and 13.9 mg/l). The experimentally determined No-Observed-Effect Concentration (NOEC) was 5.6 mg/l. 100% immobilization was reached at 32 mg/l. The analytical results confirmed that measured test concentrations were within 80% of the nominal ones. Therefore, the calculation of the EC50 was based on the latter.

Test condition : Hardness of the M7 Medium was 250 mg/l (as CaCO₃) and the pH was 8.0 after aeration.
The temperature of the test medium measured in the blank control varied from 20.5 to 20.7C.
The pH at 0 hr ranged from 8.0-8.2 and at 48 hr from 7.8-8.0.
Dissolved oxygen was 9.2-9.3 at 0 hrs and 8.8-9.0 at 48 hrs.

Test substance : The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
15.08.2002 (20)

Type : static
Species : Daphnia magna (Crustacea)
Exposure period : 48 hour(s)
Unit : mg/l
Analytical monitoring : yes
LC50 : c = 47
Method :
Year : 1984
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : This test consisted of exposing groups of 10 first instar daphnids to five concentrations of the test material (100, 56, 32, 18, 10 mg/L) and a dilution water control. The 5 test concentrations and the control were set in triplicate. In addition, a fourth beaker was set at the high, middle, low and control concentrations for the purpose of taking daily D.O., pH and temperature measurements. Test concentrations were prepared by adding appropriate amounts of an aqueous stock solution of Dowfax C6 to the test vessels and bringing the final volume up to 200 ml with additional daphnid dilution water. The daphnids were then added to the test vessels. The test organisms were not fed during the test. The LC50 was calculated using probit analysis.

Remark : The LC50 was 47 mg/l with 95% C.I. of 36-64 mg/l at 48 hr.
Result : Water Quality Measurements
Temperature Range 20.0-20.6 C
pH Range 7.9-8.2
Dissolved Oxygen >111% of saturation

Raw Data:

100 mg/l	77% dead in 48 hr
56	50% dead in 48 hr
32	37% dead in 48 hr
18	30% dead in 48 hr
10	3% dead in 48 hr

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
15.08.2002 (19)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species : Selenastrum capricornutum (Algae)
Endpoint : growth rate
Exposure period : 72 hour(s)
Unit : mg/l

Analytical monitoring	:	yes
NOEC--growth inhibition	:	c = 10
NOEC--growth rate reduction	:	c = 22
Method	:	OECD Guide-line 201 "Algae, Growth Inhibition Test"
Year	:	1998
GLP	:	yes
Test substance	:	other TS
Method	:	Subsequent to a range-finding study the cells of <i>S. capricornutum</i> were exposed to 3 parallel samples of an aqueous nutrient solution (100 ml) containing 10, 22, 46, 100 and 220 mg/l of the test material over a period of 72 hours. Additional six parallel samples were included as blank controls without addition of test substance. The incubation took place on a laboratory shaker at 22.5-23.0C under continuous illumination (7500-8000 lux). Samples of the algae suspensions were taken at 0, 24, 48 and 72 hours and the cell number was determined with the use of a spectrophotometer at 720 nm. As growth parameters the area under the growth curve was determined (used as a base for the calculation of the concentration leading to 50% growth inhibition (EbC50) as well as the growth rate between 0 and 72 hours to calculate the ErC50 (0-72h) value. pH was determined at 0 and 72 hours whereas the temperature was recorded daily. Samples were taken at 0 and 72 hours from test vessels containing 0, 10 and 46 mg/l test material to verify the nominal test concentrations.
Result	:	The nominal effective 72-hour EbC50/ErC50 (0-72h) values of Dowfax* Dry Hydrotrope Powder when tested with <i>S. capricornutum</i> were determined to be 55 mg/l (95% c.l. 31.6-95.5) and >220 mg/l, respectively. The 72-hour No-Observed-Effect Concentration (NOEC) corresponded to values of 10.0 mg/l (growth inhibition) and 22 mg/l (growth rate reduction). The analytical results confirmed that measured test concentrations were within 80% of the nominal ones. Therefore the calculation of the EC50 values was based on the latter.
Test condition	:	The ISO medium contained 0.24 mmol/l (Ca + Mg) =24 mg CaCO3/l. The temperature for the test medium ranged from 22.5 to 23.0C. The pH at 0 hr was either 8.3 or 8.2 (top 2 doses) in the vessels and ranged from 7.8 to 8.2 in the various vessels at 72 hr.
Test substance	:	The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint
15.08.2002		(21)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

Type	:	aquatic
Species	:	activated sludge of a predominantly domestic sewage
Exposure period	:	30 minute(s)
Unit	:	mg/l
Analytical monitoring	:	no
EC0	:	m > 100
Method	:	OECD Guide-line 209 "Activated Sludge, Respiration Inhibition Test"
Year	:	1998
GLP	:	yes
Test substance	:	other TS
Method	:	The effect of the test material on the respiration rate of activated sludge from a municipal waste water treatment plant was determined by comparing the oxygen consumption of two parallel samples treated with 100 mg/l of the test material with two untreated control samples (oxygen determination at the start and end of the experiment). The oxygen consumption was measured with an oxygen electrode after an incubation

Result	: period of 30 minutes at 20C. The susceptibility of the activated sludge was evaluated by the addition of 3,5-dichlorophenol (3.2, 10.0 and 32.0 mg/l). : The test substance at a concentration of 100 mg/l showed no significant inhibitory effect on aerobic waste water bacteria. The control with 3,5-dichlorophenol showed an EC50 of 9 mg/l indicating suitability of the test conditions.
Test condition	: Test solutions were prepared in 'Milli-Q water'. The pH of the stock solution was 7.5. The pH of the synthetic sewage was 7.0. The temperature of the test medium varied between 19 and 20C. The mean respiration rates of the controls and the EC50 of the reference met the criteria for acceptability of the test.
Test substance	: The test was conducted on Dowfax* Dry Hydrotrope Powder.
Reliability	: (1) valid without restriction
Flag	: Critical study for SIDS endpoint
15.08.2002	(22)

4.5.1 CHRONIC TOXICITY TO FISH

Reliability	: (2) valid with restrictions
14.08.2001	

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO OTHER NON-MAMM. TERRESTRIAL SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Species : rat
Strain : Fischer 344
Sex : male
Number of animals : 3
Vehicle :
Value : > 2000 mg/kg bw
Method :
Year : 1995
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : This study was for industrial product handling and MSDS purposes. The test material was administered undiluted--as sold.
Result : All 3 rats survived the 14 day observation period. There was no obvious effect noted.
Test substance : The test substance was Dowfax C6L
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset
 24.04.2002 (23)

Type : LD50
Species : rat
Strain : Fischer 344
Sex : male
Number of animals : 3
Vehicle :
Value : > 5000 mg/kg bw
Method : other
Year : 1985
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : Three rats per dose. The test material was C6 Dowfax. Doses were 1300, 2500 and 5000 mg/kg. The test material was administered undiluted.
Result : Transient diarrhea, lethargy and palpebral closure were observed in all rats following dosing. All rats survived the 2-week observation period and steadily gained weight during that period.
Reliability : (2) valid with restrictions
 24.04.2002 (24)

Type : LD50
Species : rat
Strain : Wistar
Sex : male/female
Number of animals : 3
Vehicle : water
Value : > 2000 mg/kg bw
Method : Directive 84/449/EEC, B.1 "Acute toxicity (oral)"
Year : 1998
GLP : yes
Test substance : other TS
Method : Three male and three female fasted Wistar rats were given a single oral dose of the test material in water at a dose of 2000 mg/kg (10 ml/kg). Animals were observed at 0, 2 and 4 hours after dosing and then once daily for 15 days. Individual body weights were recorded on the day of treatment and on days 8 and 15. Animals were examined for gross pathological changes at the termination of the study.
Result : There were no deaths. Diarrhea was noted in all males on day 1.

Salivatiion and rales were observed in one female on day 1 and 2, respectively. No other treatment related adverse effects were noted. All animals showed the expected body weight gain during the study. No abnormalities were noted at necropsy. Thus, the acute oral median lethal dose (LD50) of Dowfax* Dry Hydrotrope Powder was >2000 mg/kg body weight in the Wistar rat.

Test substance : The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 24.04.2002

(25)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

Type : LD50
Species : rat
Strain : Wistar
Sex : male/female
Number of animals : 5
Vehicle : water
Value : > 2000 mg/kg bw
Method : OECD Guide-line 402 "Acute dermal Toxicity"
Year : 1998
GLP : yes
Test substance : other TS
Method :

Result : Five male and five female Wistar rats were treated with a single, occluded, dermal application of the test material mixed with water at a concentration of 20% (W/w). The dose volume was 10 ml/kg. The material was applied at a dose of 2000 mg/kg body weight to an area of shorn skin which approximated 10% of the total body surface area. Twenty-four hours after application, the dressing and residual test material were removed. The rats were observed for signs of toxicity and death at 0, 2 and 4 hours after dosing and subsequently once daily for 15 days. Body weights were recorded on the day of treatment and on days 8 and 15. The rats also were examined for gross pathologic changes at the termination of the study.

Result : Dermal application of the test material did not result in any deaths. No clinical signs of systemic toxicity were noted during the study. Adverse skin reactions at the treatment sites included necrosis developing into scabs in all females and one male. The effects had resolved between days 7 and 9. No significant effects on body weight were noted during the study and there were no treatment related post-mortem observations at the termination of the study.

The acute, dermal, median lethal dose (LD50) of Dowfax* Dry Hydrotrope Powder in Wistar rats was >2000 mg/kg body weight.

Test substance : The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 24.04.2002

(26)

Type : LD50
Species : rabbit
Strain : New Zealand white
Sex : female
Number of animals : 2
Vehicle :

Value	:	> 2000 mg/kg bw
Method	:	other
Year	:	1985
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Two rabbits were treated with 2000 mg/kg of the undiluted test material. The material was placed under a plastic cuff which was secured by rubber bands and then wrapped with a cotton cloth. After 24 hours, the wrappings were removed and the site washed with water and signs of irritation recorded. The rabbit was observed for behavioral changes as indicators of toxicity up to removal of the test material and for the subsequent 2 weeks. The rabbits were weighed on days 0, 1, 7 and 14.
Result	:	Slight redness and swelling was observed on the application sites of rabbits 24 hours following exposure. Transient lethargy was observed following treatment. Both rabbits steadily gained weight during the 2-week test period.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint
24.04.2002		(24)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species	:	rabbit
Concentration	:	undiluted
Exposure	:	
Exposure time	:	
Number of animals	:	1
PDII	:	
Result	:	slightly irritating
EC classification	:	not irritating
Method	:	other
Year	:	1995
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	The 'neat' Dowfax C6L was applied to the inner surfact of the left ear and to intact and abraded skin on the abdomen of one male NZ white rabbit. Five consecutive applications were made to the ear and the intact abdominal site. Three consecutive applications were made to the abraded abdominal site. The abdominal sites were covered with cotton wool and wrapped in cotton cloth secured with tape to the marginal fur. This is a 'range-finding' type test conducted for handling and MSDS purposes.
Result	:	No clinical signs indicative of systemic toxicity were observed. Very slight erythema was observed at the ear application site. Very slight to slight erythema was observed at the abdominal test sites. Erythema at all application sites may have been due to mechanical damage which occurred during test material removal. Very slight edema was observed at the intact abdominal application site, after five applications. Dermal application of Dowfax C6L had no effect on body weight.
Reliability	:	(2) valid with restrictions
24.04.2002		(23)

Species	:	rabbit
Concentration	:	undiluted
Exposure	:	
Exposure time	:	
Number of animals	:	1

PDII :
Result : not irritating
EC classification : not irritating
Method : other
Year : 1985
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The undiluted C6 Dowfax was applied to the ear of one New Zealand white rabbit for 10 consecutive weekdays; to an intact site on the abdomen for 10 consecutive weekdays; and to an abraded site on the abdomen for 3 consecutive days. The ear site was left uncovered; the abdominal sites were covered with cotton wool and then cotton cloth which was taped to the marginal skin. The rabbits were observed for the first 11 days on test and then at day 14. Body weights were taken at days 0, 7 and 14.
Result : There was no irritation observed at any site at any observation time. There was no indication of systemic toxicity observed by behavior nor body weight parameters.
Reliability : (2) valid with restrictions
 24.04.2002 (24)

Species : rabbit
Concentration : other: moistened with water
Exposure : Semioclusive
Exposure time : 4 hour(s)
Number of animals : 3
PDII :
Result : slightly irritating
EC classification : not irritating
Method : Directive 84/449/EEC, B.4 "Acute toxicity (skin irritation)"
Year : 1998
GLP : yes
Test substance : other TS
Method : Three rabbits were exposed to 0.5 g of Dowfax* Dry Hydrotrope Powder, applied onto clipped skin (moistened with water) for 4 hours using a semi-occlusive dressing. Observations were made 1, 24, 48 and 72 hours after exposure.
Result : Exposure to Dowfax* Dry Hydrotrope Powder resulted in very slight to well-defined erythema with or without very slight edema in the treated skin areas of the three rabbits. The skin irritation had resolved within 48 hours after exposure in all animals.
Test substance : The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
 24.04.2002 (27)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : undiluted
Dose :
Exposure Time :
Comment :
Number of animals : 1
Result : moderately irritating
EC classification : irritating
Method : other
Year : 1995
GLP : no
Test substance : as prescribed by 1.1 - 1.4
Method : The 'neat' Dowfax C6L was instilled (0.1ml) into each conjunctival sac of a

	male New Zealand White rabbit. One eye was washed with water after a 30-second exposure, while the other eye was washed with water after one hour. Moderate discomfort was exhibited by the animal immediately after instillation of the test material, in the first eye dosed. Ophthaine ocular anesthetic was then instilled into this eye and into the other eye prior to test material instillation. Observations were made at 24, 48 72 hrs and at one week.	
Result	: Moderate to severe conjunctival redness and swelling was observed in both eyes from immediately after dosing through the 72 hour read. The 30-second exposure eye had very slight irritation of the iris immediately after dosing, and both eyes had very slight to moderate irritation of the iris from one hour after dosing through the 48 hour read. The one hour wash exposure eye had slight corneal opacity after staining with fluorescein, at the one hour read. Both eyes had very slight corneal opacity before staining and very slight to moderate corneal opacity after staining with fluorescein from the 24 hour read through the 72 hour read. Ocular irritation was resolved by seven days after dosing and the test was terminated.	
Reliability	: (2) valid with restrictions	
Flag	: Critical study for SIDS endpoint	
24.04.2002		(23)
Species	: rabbit	
Concentration	: undiluted	
Dose	:	
Exposure Time	:	
Comment	:	
Number of animals	: 1	
Result	: moderately irritating	
EC classification	: irritating	
Method	: other	
Year	: 1985	
GLP	: no	
Test substance	: as prescribed by 1.1 - 1.4	
Method	: Undiluted C6 Dowfax was instilled into each conjunctival sac of a female New Zealand White rabbit. One eye was washed after 30 seconds and the other after one hour. Observations were made after 24, 48, 72 hrs and after 7, 14 and 21 days.	
Result	: Instillation of C6 Dowfax resulted in moderate discomfort, marked conjunctival redness and swelling, moderate reddening of the iris and moderate corneal haziness. All signs of irritation were essentially resolved in the unwashed eye 7 days post-exposure. In the eye which was treated and subsequently washed, signs of irritation were still exhibited 21 days post-exposure.	
Reliability	: (2) valid with restrictions	
Flag	: Material Safety Dataset	
24.04.2002		(24)
Species	: rabbit	
Concentration	: 5 %	
Dose	: .1 ml	
Exposure Time	: 24 hour(s)	
Comment	:	
Number of animals	: 6	
Result	: slightly irritating	
EC classification	: not irritating	
Method	: OECD Guide-line 405 "Acute Eye Irritation/Corrosion"	
Year	: 1998	
GLP	: yes	
Test substance	: other TS	
Method	: An ocular anesthetic was used for all rabbits after discomfort was observed in the first rabbit dosed.	

Result	: Slight conjunctival redness was present in the treated eyes of all rabbits one hour after dosing. Two of the rabbits had slight chemosis, three rabbits had slight ocular discharge, and two rabbits had reddening of the iris one hour after dosing, as well. Twenty-four hours after dosing, all rabbits had slight conjunctival redness, five rabbits had slight chemosis, one rabbit had slight ocular discharge, three rabbits had opacity of the cornea, and one rabbit had reddening of the iris. Forty-eight hours after dosing, three rabbits had slight conjunctival redness, three rabbits had slight chemosis, and three rabbits had opacity of the cornea. The ocular lesions were resolved in all animals 72 hours after instillation of the test material, and the test was terminated.
	Instillation of 5% aqueous Dowfax C6L into the eye had no effect on body weight of rabbits.
	The average combined scores for 24, 48 and 72 hours were: Redness: 0.5 Chemosis: 0.444 Corneal Opacity: 0.333 Reddening of the Iris: 0.06
Test substance	: The test material was a 5% aqueous solution of Dowfax C6L. This is the use dilution.
Reliability Flag 24.04.2002	: (1) valid without restriction : Material Safety Dataset
	(28)
Species	: rabbit
Concentration	: undiluted
Dose	: 33 other: mg
Exposure Time	:
Comment	: not rinsed
Number of animals	: 3
Result	: highly irritating
EC classification	: irritating
Method	: Directive 84/449/EEC, B.5 "Acute toxicity (eye irritation)"
Year	: 1998
GLP	: yes
Test substance	: other TS
Method	: Single samples of 33 mg of Dowfax* Dry Hydrotrope Powder were instilled into one eye of each of three rabbits. Observations were made 1, 24, 48, and 72 hours and 6, 7, 14 and 21 days after instillation.
Result	: Instillation of Dowfax* Dry Hydrotrope Powder resulted in adverse effects on the cornea, iris and conjunctivae. Corneal injury consisted of opacity (maximum grades 1 and 2) and epithelial damage (maximum 35 to 100% of the corneal area). Neovascularization was apparent in one animal 7 and 14 days after instillation. The corneal injury had completely resolved within 7 to 21 days. Iridic irritation (grade 1) was observed in all animals and had resolved within 48 hours. The irritation of the conjunctivae consisted of redness, chemosis and discharge and had completely resolved within 14 days in all animals.
Test substance	: The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability Flag 24.04.2002	: (1) valid without restriction : Critical study for SIDS endpoint
	(29)

5.3 SENSITIZATION

Type	: Guinea pig maximization test
Species	: guinea pig
Concentration	: Induction 1 % intracutaneous

	Induction 50 % occlusive epicutaneous Challenge 50 % occlusive epicutaneous
Number of animals	: 10
Vehicle	: water
Result	: not sensitizing
Classification	: not sensitizing
Method	: other: OECD 406 and EC B.6
Year	: 1998
GLP	: yes
Test substance	: other TS
Method	: The concentration of the test material used in the main study was based on the results of a pretest. Ten test and five control female Dunkin-Hartley guinea pigs were used for the main study. Intradermal induction consisted of two injections (0.1 ml per site) of the test material (1.0% w/v in water), with and without Freund's Complete Adjuvant, and a control with Adjuvant alone. After one week, the scapular area between the two intradermal injection sites (one day before the topical treatment the skin was rubbed with 10% (w/v) sodium dodecyl sulfate to increase sensitivity) was treated topically for 48 hours with 0.5 ml of a 50% (w/v) dilution of the test material in water. Induction readings were made at day 3 (after intradermal injection) and day 10 (after epidermal exposure). Challenge on day 21 consisted of a single, 24-hour, topical application (0.5 ml) for the test material at a concentration of 50% w/v in water on one flank of each test and control animal under an occlusive dressing. Observations for any dermal reaction were made approximately 24 and 48 hours after removal of the dressing.
Result	: The induction readings were: on day 3 (after intradermal injection)--well-defined to moderate erythema (controls) and severe erythema with cases of necrosis (experimental animals); on day 10 (after epidermal exposure)--no adverse effects to slight erythema with small scabs (control and experimental animals). Generally, no edema was observed. No signs of skin reactions were evident after the challenge exposure in the experimental and control animals.
Test substance	: The test substance was Dowfax* Dry Hydrotrope Powder.
Reliability	: (1) valid without restriction
Flag	: Critical study for SIDS endpoint
24.04.2002	(30)

5.4 REPEATED DOSE TOXICITY

Species	: rat
Sex	: male/female
Strain	: other
Route of admin.	: gavage
Exposure period	: 28 consecutive days
Frequency of treatment	: daily
Post obs. period	: None
Doses	: targeted 0, 50, 250 or 1000 mg/kg/day
Control group	: yes, concurrent vehicle
NOAEL	: = 50 mg/kg
LOAEL	: = 250 mg/kg
Method	: OECD Guide-line 407 "Repeated Dose Oral Toxicity - Rodent: 28-day or 14-d Study"
Year	: 1987
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Groups of 5 male and female CD rats were given Dowfax XD 8292 by oral gavage at doses of 0, 50, 250 or 1000 mg/kg/day for 28 consecutive days.

Parameters examined were daily clinical observations, weekly food consumption, water consumption by inspection, twice weekly body weights, calculated food conversion ratios, hematology (PCV, Hb, RBC, WBC, platelets, differentials, MCHC, MCV and MCH) and blood chemistry (AP, ALT, AST, urea, creatinine, glucose, bilirubin, total protein conc., electrophoretic protein fractions, Na, K) at 3 weeks, urinalysis at 3 weeks (appearance, volume, pH, sp.gr., protein, total reducing substances, glucose, ketones, bilirubin, urobilin, nitrite, blood, sed.), macroscopic examination, organ weights (adrenals, heart, kidneys, liver, spleen, testes), microscopic exams of adrenals, heart, kidneys, liver, spleen, stomach and macroscopically abnormal tissues.

Remark	: Data were examined by various appropriate statistical methods. : The rats were CD rats (remote Sprague-Dawley origin). : The stomach irritation seen in females at 250 mg/kg/day was judged to be of questionable toxicologic significance by these authors.
Result	: There were no adverse effects on body weights, food consumption or food utilization during the course of the study. However, post-dosing salivation was observed throughout the study in the group given 1000 mg/kg/day. There were also several minor changes in clinical chemistry parameters and urinalyses for animals in the high dose group; changes in some of these parameters also occurred in animals in the 250 mg/kg/day group. At necropsy, there were no differences in organ weights nor any macro pathological changes clearly attributable to treatment with the test material. Histopathological examinations revealed acute inflammation of the glandular gastric mucosa of all animals treated at 1000 mg/kg/day, as well as in females given 250 mg/kg/day. There were no treatment-related effects in either male or female rats given 50 mg/kg/day.
Source	: Life Sciences Research, Suffolk, England for Dow Chemical Europe.
Test substance	: The test material was Dowfax* XD 8292 (primarily C-6 alkylated sodium sulfonated diphenyl oxide), 45.8% active ingredient. Doses cited in the report are expressed gravimetrically in terms of the active component (45%, assumed w/v).
Reliability	: (2) valid with restrictions
Flag	: Critical study for SIDS endpoint
24.04.2002	(31)
Species	: rat
Sex	: female
Strain	: Fischer 344
Route of admin.	: gavage
Exposure period	: 10 consecutive days
Frequency of treatment	: daily
Post obs. period	: None
Doses	: 10
Control group	: yes, concurrent vehicle
NOAEL	: = 367 mg/kg bw
LOAEL	: = 1223 mg/kg bw
Method	: other
Year	: 1985
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: This study was conducted for the purpose of dose-setting for the Chernoff test which was required for the PMN.

Groups of 10 adult female F-344 rats were given Dowfax C-6 alkylate sodium sulfonate in water by gavage for 10 consecutive days with dose levels targeted at 0, 100, 300 and 1000 mg/kg bw/day. The top dose was selected on the basis of the regulatory guidelines for the Chernoff test which require a dose level sufficiently high to produce overt maternal toxicity, to a maximum dose of 1000 mg/kg/day. The low and middle dose

levels were selected as approximate half-log decrements of the high dose level. Analysis of dosing solutions revealed actual dose levels to be 122, 367 and 1223 mg/kg/day. Rats were dosed at a volume of 4 ml/kg/day, with dose volumes adjusted daily according to body weights.

Feed and water consumption were recorded at 3-day intervals during the dosing period. Animals were observed at least once daily throughout the dosing period for signs of toxicity. Animals found moribund were submitted for gross pathologic examination.

At termination, a complete necropsy examination, external and internal, was performed by a veterinary pathologist. Terminal body weights and weights of the liver, kidneys, brain, heart and thymus were recorded at the time of necropsy. The eyes were examined in situ by gently pressing a glass slide against the cornea and observing the eyes under fluorescent light illumination. Tissues routinely collected (44) were saved from all animals in neutral phosphate buffered 10% formalin; however, histologic examination was not deemed necessary.

Result	: Results were examined by a variety of appropriate statistical methods. : At 1223 mg/kg/day, rats exhibited clinical signs of loose/watery stools with perineal staining. Necropsy examination of these animals revealed gas and watery ingesta in the gastrointestinal tract. Increased absolute and relative liver weights and decreased absolute and relative thymic weights were observed in rats given 1223 mg/kg/day when compared to controls. Relative liver weight increases at 122 and 367 mg/kg/day were considered secondary to the apparent incidental decreases in weight gain in these two groups (control weight gains at high end of historical range).
Conclusion	: Based on the results of this study, doses of 1000 and 300 mg/kg/day would be used for the proposed Chernoff study.
Reliability Flag	: (2) valid with restrictions : Material Safety Dataset
24.04.2002	(32)

5.5 GENETIC TOXICITY 'IN VITRO'

Type	: Ames test
System of testing	: Dowfax C6L Surfactant was evaluated in the Salmonella-Escherichia coli/mammalian-microsome bacterial mutagenicity assay using a pre-incubation modification of the standard assay.
Concentration	: Dowfax C6L Surfactant was evaluated at doses of 100, 250, 500, 1000, 2500 up to a concentration of 5000 micrograms/plate.
Cycotoxic conc.	: Above 5000 micrograms/plate
Metabolic activation	: with and without
Result	: negative
Method	: OECD Guide-line 471 "Genetic Toxicology: Salmonella thyphimurium Reverse Mutation Assay"
Year	: 1996
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: A range-finding study was used to determine the concentrations for the main study. There was no cytotoxicity in the range-finding study.

Tester strains were TA98, TA100, TA1535, TA1537 and Escherichia coli WP2uvrA.

The vehicle was DMSO. Positive controls were as prescribed by the guidelines.

Source	: Corning Hazleton, Vienna, VA, USA for The Dow Chemical Company, Midland, Michigan, USA
---------------	--

Conclusion	:	The test material did not induce a positive increase in the number of revertant colonies in any of the tester strains either in the presence or absence of the external metabolic activation system. The results were confirmed in an independent repeat assay. All criteria for a valid study were met.	
Reliability Flag 24.04.2002	:	(1) valid without restriction Critical study for SIDS endpoint	(33)
Type	:	Ames test	
System of testing	:	S. typhimurium and E. coli	
Concentration	:	6-10,000 micrograms/plate	
Cytotoxic conc.	:	6800-10,000 micrograms/plate without and 10,000 micrograms/plate with activation	
Metabolic activation	:	with and without	
Result	:	negative	
Method	:	other: OECD 471 and EEC B.14	
Year	:	1999	
GLP	:	yes	
Test substance	:	other TS	
Method	:	The plate incorporation standard procedure with and without the addition of rat liver homogenate as activation system was used in two independent assays. The doses per plate covered a range of 6 to 10,000 micrograms. Besides the number of revertants the possible bactericidal effects were assayed by observing the density of the bacterial background lawn on the plates. Standard positive and solvent controls were included to verify the acceptability of the test conditions, the specific spontaneous mutation frequency of the individual test strains as well as the ability of the rat liver homogenate to metabolically activate the standard promutagens. Tester strains were (TA 1535, TA 1537, TA 100 and TA 98) and WP2uvrA in the case of E. coli. Physiological saline and DMSO were used as solvents for reference substances. A variety of chemicals were used as positive controls, choices taken from recommendations in the published methods.	
Result	:	No significant increase in the mutation frequency was seen in any of the bacterial strains at any of the dose levels including the highest concentration tested (10,000 micrograms/plate) with and without activation. All of the positive controls produced a marked increase in mutation frequency in the expected range. No inhibition of the bacterial lawn was observed even at the highest concentrations. However, at concentrations of 6800 - 10,000 micrograms/plate without activation and 10,000 micrograms/plate with activation the number of spontaneous revertants significantly decreased indicating bactericidal effects. Based on these findings Dowfax* Dry Hydrotrope Powder can be considered to be non-mutagenic to the tester strains of Salmonella typhimurium and Escherichia coli used in this study.	
Test substance	:	The test substance was Dowfax* Dry Hydrotrope Powder.	
Reliability Flag 24.04.2002	:	(1) valid without restriction Critical study for SIDS endpoint	(34)
Type	:	Chromosomal aberration test	
System of testing	:	Cultured peripheral human lymphocytes	
Concentration	:	Based on mitotic indices Absence of S-9: 1000, 3330 and 5000 micrograms/ml Presence of S-9: 1000, 3330, and 5000 micrograms/ml	

Cytotoxic conc.	: Absence of S-9: the mitotic index was reduced by 50-60% at doses of 3330 and 5000 micrograms/ml Presence of S-9: the mitotic index was reduced slightly at 1000 and 3330 micrograms/ml but not at 5000 micrograms/m
Metabolic activation	: with and without
Result	: positive
Method	: other
Year	: 1987
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Dowfax XD 8292 was tested up to cytotoxic concentrations (5000 micrograms/ml), both in the presence and absence of a metabolic activation system (Aroclor-1254 induced rat liver S9-mix).
Result	: The test substance induced a statistically significant, dose-related increase in the numbers of cells with chromosome aberrations in the absence of a metabolic system. The types of aberrations induced mainly consisted of simple aberrations (breaks, gaps, fragments). In the presence of S9-mix, statistically significant increases were observed at two doses; however, there was no dose-response relationship. Positive control chemicals, mitomycin C and cyclophosphamide, both produced a statistically significant increase in the incidence of chromosome aberrations. It was concluded that the test substance was clastogenic in human lymphocytes under the conditions of the assay. The authors stated, "The high peroxide content of the test substance (210 ppm)[sic] might have contributed to the observed effect."
Source	: Notox Toxicological Research & Consultancy C.V., for Dow Europe.
Test substance	: The test material was a brown liquid containing 205 +/- 20 ppm peroxide. The trade name was Dowfax XD 8292.
Reliability	: (2) valid with restrictions
Flag	: Directive 67/548/EEC
24.04.2002	(35)
Type	: Chromosomal aberration test
System of testing	: Rat Lymphocytes
Concentration	: Absence of S-9: 0, 50, 167, and 500 micrograms Dowfax C6L Surfactant per ml of culture medium. Presence of S-9: 0, 167, 500 and 1667 micrograms/ml.
Cytotoxic conc.	: Mitotic indices were reduced at 1667 micrograms/ml in the absence of S-9 and between 500 and 1667 micrograms/ml with S-9.
Metabolic activation	: with and without
Result	: negative
Method	: EPA OTS 798.5375
Year	: 2001
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Approximately 48 h after the initiation of whole blood cultures, cells in the absence of S-9 activation were treated for 24 hours with targeted doses of 0, 16.7, 50, 167, 500, 1667 and 5000 micrograms Dowfax C6L Surfactant per ml of culture medium and harvested at the end of treatment. In the presence of S-9 activation, cultures were treated for 4 h and harvested 20 h after treatment termination. Cultures treated with 0.05 and 0.075 micrograms/ml mitomycin C or 4 and 6 micrograms/ml cyclophosphamide were used as positive controls for the non-activation and activation assays, respectively; only one dose level was evaluated for aberrations. Based on the mitotic indices, cultures treated with targeted doses of 0, 50, 167 and 500 micrograms/ml in the absence of S-9 activation and cultures treated with targeted doses of 0, 167, 500 and 1667 micrograms/ml in the presence of S-9 activation were selected for determining the incidence of chromosomal aberrations.
Result	: No significant increase in the incidence of aberrant cells was noticed at any of the treatment levels when compared to the negative controls. The positive control cultures had significantly higher incidences of abnormal

cells. Hence, Dowfax C6L surfactant was considered to be negative in the in vitro chromosomal aberration assay using rat lymphocytes.

Reliability Flag : (1) valid without restriction
 : Critical study for SIDS endpoint
 24.04.2002 (36)

Type : Chromosomal aberration test
System of testing : Rat Lymphocytes
Concentration : Absence of S-9: 0, 145.2, 290.4 and 387.2 micrograms/ml
 Presence of S-9: 0, 72.6, 290.4 and 774.4 micrograms/ml
Cycotoxic conc. : Absence of S-9: mitotic indices slightly reduced at 387.2 to 484 micrograms/ml
 Presence of S-9: No change in mitotic indices at top level of 774.4 micrograms/ml
Metabolic activation : with and without
Result : negative
Method : EPA OPPTS 870.5375
Year : 1998
GLP : yes
Test substance : as prescribed by 1.1 - 1.4
Method : approximately 48 h after the initiation of whole blood cultures, cells in the absence of S-9 activation were treated for 24 hours with targeted doses of 0, 12.1, 36.3, 72.6, 145.2, 217.8, 290.4, 387.2 and 484 micrograms Dowfax Dry Hydrotrope Powder per ml of culture medium and harvested at the end of treatment. In the presence of S-9 activation, cultures were treated for 4 h with dose levels of 0, 36.3, 72.6, 145.2, 290.4, 435.6, 580.8, 677.6 and 774.4 micrograms/ml Dowfax Dry Hydrotrope Powder per ml of culture medium and harvested 20 h after treatment termination. Based upon the mitotic indices, cultures treated with targeted doses of 0, 145.2, 290.4 and 387.2 micrograms/ml in the absence of S-9 activation and cultures treated with targeted doses of 0, 72.6, 290.4 and 774.4 micrograms/ml in the presence of S-9 activation were selected for determining the incidence of chromosomal aberrations.

Result : No significant increase in the incidence of aberrant cells was noticed at any of the treatment levels when compared to the negative controls. Cultures treated with the positive control chemicals (i.e., mitomycin C without S-9 and cyclophosphamide with S-9) had significantly higher incidences of abnormal cells. Hence, Dowfax Dry Hydrotrope Powder was considered to be negative in the in vitro chromosomal aberration assay using rat lymphocytes.

Test substance : Benzene, 1,1'-oxybis-, sec-hexyl derivatives, sulfonated sodium salts, a powder having 92% active ingredient.

Reliability Flag : (1) valid without restriction
 : Critical study for SIDS endpoint
 24.04.2002 (37)

5.6 GENETIC TOXICITY 'IN VITRO'

5.7 CARCINOGENITY

5.8 TOXICITY TO REPRODUCTION

5.9 DEVELOPMENTAL TOXICITY/TERATOGENICITY

Type : other
Species : rat
Sex : female
Strain : Fischer 344

Route of admin.	: gavage
Exposure period	: days 6 through 15 of gestation
Frequency of treatment	: daily
Premating exposure period	
Male	: None
Female	: None
Duration of test	: Day 6 of gestation through day 3 post-partum
Doses	: 0, 300 or 1000 mg/kg/day
Control group	: yes, concurrent vehicle
NOAEL Parental	: < 300 mg/kg bw
NOAEL F1 Offspr.	: > 1000 mg/kg bw
Method	:
Year	: 1985
GLP	: yes
Test substance	: as prescribed by 1.1 - 1.4
Method	: Chernoff Test: Pregnant female Fischer 344 rats were administered doses of 0, 300 or 1000 mg/kg/day of Dowfax* C-6 surfactant in deionized water by gavage on days 6 through 15 of gestation. These animals were then allowed to deliver their litters and the litters were evaluated for size, neonatal growth and survival.
Result	: Administration of oral doses of 300 or 1000 mg/kg/day of Dowfax C-6 surfactant during gestation produced significant depression in maternal weight gain at both dose levels. Evaluation of the litters for mean litter size, neonatal growth and survival through the first 3 days post-partum did not reveal any significant adverse effects at either dose level. Thus, the test material did not appear to have a selective developmental toxicity even at doses producing significant maternal toxicity.
Flag	: Critical study for SIDS endpoint
24.04.2002	

(38)

5.10 OTHER RELEVANT INFORMATION

5.11 EXPERIENCE WITH HUMAN EXPOSURE

- (1) Krips, H.J., Determination of the Melting Temperature of Dowfax* Dry Hydrotrope Powder, NOTOX Project 233472, NOTOX Substance 81126, 30 September, 1998, for Dow Chemical Europe, Horgen, Switzerland.
- (2) The Dow Chemical Company, 2001, using EPIWIN, Version 2, February 1997 from Syracuse Research Corp.
- (3) The Dow Chemical Company, 2001.
- (4) Krips, H.J., Determination of the Density of Dowfax* Dry Hydrotrope Powder, HOTOX Project 233483, NOTOX Substance 81126, September 30, 1998, for Dow Europe, SA, Horgen, Switzerland.
- (5) Krips, H.J., Determination of the Particle Size Distribution of Dowfax* C6L, NOTOX Project 233538, NOTOX Substance 81126, October 10, 1998, for Dow Europe, SA, Horgen, Switzerland.
- (6) Krips, H.J., Determination of the Vapour Pressure of Dowfax* Dry Hydrotrope Powder, NOTOX Project 256567, NOTOX Substance 81126, April 27, 1999, for Dow Europe, SA, Horgen, Switzerland.
- (7) Brekelmans, M.J.C., Determination of the Partition Coefficient (n-Octanol/Water) of Dowfax* Dry Hydrotrope Powder, NOTOX Project 233505, NOTOX Substance 81126, September, 29, 1998, for Dow Chemical Europe, SA, Horgen, Switzerland.
- (8) Brekelmans, M.J.C., Determination of the Water Solubility of Dowfax* Dry Hydrotrope Powder, NOTOX Project 256556, NOTOX Substance 81126, March 24, 1999, for Dow Chemical Europe, SA, Horgen, Switzerland.
- (9) Krips, H.J., Determination of the Surface Tension of an Aqueous Solution of Dowfax* Dry Hydrotrope Powder, NOTOX Project 233494, NOTOX Substance 81126, September 30, 1998, for Dow Europe, SA, Horgen, Switzerland.
- (10) Krips, H. J., Determination of the Self-Ignition Temperature of Dowfax* Dry Hydrotrope Powder, NOTOX Project 233527, NOTOX Substance 81126, September 30, 1998, for Dow Europe, SA, Horgen, Switzerland.
- (11) Krips, H.J., Determination of the Flammability of Dowfax* Dry Hydrotrope Powder, NOTOX Project 233516, NOTOX Substance 81126, September 30, 1998, for Dow Europe, SA, Horgen, Switzerland.
- (12) Brekelelmans, NOTOX, 's-Hertogenbosch, NL, Dowfax* Dry Hydrotrope Powder: Determination of the Hydrolysis as a Function of pH, NOTOX Project 233549, NOTOX Substance 81126, Report DET 2648, 24 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (13) Willems, Ir.H., NOTOX BV, 's-Hertogenbosch, The Netherlands, Dowfax* Dry Hydrotrope Powder: Soil Adsorption/Desorption Screening Test (OECD106), NOTOX Project: 233551, NOTOX Substance: 81126, Report DET 2649, 25 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (14) Desmares-Koopmans, M.J.E., NOTOX, NL, Dowfax* Dry Hydrotrope Powder: Assessment of Ready Biodegradability (C)2 Evolution Test), NOTOX Project 233617, NOTOX Substance 81126, Report DET 2636, 19 August, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (15) van Ginkel, C.G., Stroo, C.A., Akzo Nobel Central Research, The Netherlands, Dowfax Dry Hydrotrope Powder: Assessment of Primary Biodegradability in the Continuous Activated Sludge Assay, Akzo Task No. 68994, Report DET-2712, 2 June, 1999, unpublished Dow report, for Dow Europe, S.A., Horgen, Switzerland.

- (16) Lepailleur, H., IRCHA report 1986: Etude B. 7953.
- (17) Gonsior, S.J., Semi-Continuous Activated Sludge Biodegradability Test for Experimental Surfactants XDS 8174.00, XDS 8292.00, and Dowfax 2A1, ES-932, January 8, 1987, unpublished Dow report.
- (18) Bogers, M., RCC-NOTOX, The Netherlands, Dowfax* Dry Hydrotrope Powder: 96-Hour Acute Toxicity in the Carp (*Cyprinus Carpio*), NOTOX Project 233628, NOTOX Substance 81126, Report DET-2650, January 22, 1999, unpublished Dow report, for Dow Europe S.A., Horgen, Switzerland.
- (19) Dill, D.C., Murphy, P.G., Richardson, C.H., Evaluation of the Acute Toxicity of C6 Alkylated DPO Disulfonate, Dowfax* C6 Surfactant, to Representative Aquatic Organisms, ES-694, July 16, 1984, unpublished Dow report.
- (20) Bogers, M., NOTOX B.V., The Netherlands, Dowfax* Dry Hydrotrope Powder: Acute Toxicity to *Daphnia magna*, NOTOX Project 233639, NOTOX Substance 81126, Report DET-2653, 4 November, 1998, unpublished Dow report, for Dow Europe S.A., Horgen, Switzerland.
- (21) Bogers, M., NOTOX B.V., The Netherlands, Dowfax* Dry Hydrotrope Powder: Algal Inhibition Test with *Selenastrum capricornutum*, NOTOX Project 233641, NOTOX Substance 81126, Report DET-2652, 2 November, 1998, unpublished Dow report, for Dow Europe, S.A., Horgen, Switzerland.
- (22) Desmares-Koopmans, NOTOX, The Netherlands, Dowfax* Dry Hydrotrope Powder: Activated Sludge Respiration Inhibition Test, NOTOX Project 233652, NOTOX Substance 81126, Report DET 2635, 12 August, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (23) Gilbert, K.S., Dowfax C6L: Acute Toxicological Properties, 14 March, 1995, unpublished Dow report.
- (24) Carreon, R.E., Sodium Mono and Di Hexyl Diphenyl Oxide Disulfonate: Acute Toxicologic Properties, January 15, 1985, unpublished Dow report.
- (25) Pels Rijcken, W.R., NOTOX, B.V., The Netherlands, Dowfax* Dry Hydrotrope Powder: Acute Oral Toxicity (Limit Test) in the Rat, NOTOX Project 233562, NOTOX Substance 81126, Report DET 2642, 10 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (26) Pels Rijcken, NOTOX B.V., The Netherlands, Dowfax* Dry Hydrotrope Powder: Acute Dermal Toxicity (Limit Test) in the Rat, NOTOX Project 233573, NOTOX Substance 81126, Report DET 2644, 17 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (27) Pels Rijcken, W.R., NOTOX, B.V., The Netherlands, Primary Skin Irritation/Corrosion Study with Dowfax* Dry Hydrotrope Powder in the Rabbit, NOTOX Project 233584, NOTOX Substance 81126, Report DET 2646 21 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (28) Brooks, K.J., Dowfax* C6L Surfactant (5% Aqueous Solution): Acute Primary Eye Irritation Study in New Zealand White Rabbits, 02 February, 1998, unpublished Dow report, 971198.
- (29) Pels Rijcken, W.R., NOTOX, B.V., The Netherlands, Acute Eye Irritation/Corrosion Study with Dowfax* Dry Hydrotrope Powder in the Rabbit, NOTOX Project 233595, NOTOX Substance 81126, Report DET 2645, 18 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.

- (30) Pels Rijcken, W.R., NOTOX, B.V., The Netherlands, Assessment of Contact Hypersensitivity to Dowfax* Dry Hydrotrope Powder in the Albino Guinea Pig, NOTOX Project 233606, NOTOX Substance 81126, Report DET 2647, 22 September, 1998, for Dow Europe S.A., Horgen, Switzerland, unpublished Dow report.
- (31) Cummins, H.A., Ashby, R., Fowler, J.S.L., Dowfax* XD 8292: Four Week Toxicity Study by Oral Administration to CD Rats, DET 975, November 25, 1987, unpublished Dow report.
- (32) Hanley, T.R., Jr., Yano, B.L., Dowfax* C-6 Surfactant: 10-Day Repeated oral Gavage Study in Female Fischer 344 Rats, Nov. 21, 1985, unpublished Dow report.
- (33) Lawlor, T.E., Mutagenicity Test on Dowfax* C6L Surfactant in the Salmonella-Escherichia coli/Mammalian-Microsome Reverse Mutation Assay, July 8, 1996, unpublished Dow report.
- (34) Verspeek-Rip, C.M., NOTOX B.V., The Netherlands, Dowfax* Dry Hydrotrope Powder: Reverse Mutation Assay in Salmonella typhimurium and Escherichia coli (with independent repeat), NOTOX Project 244698, NOTOX Substance 81126, Report DET-2674, 14 January, 1999, unpublished Dow report, for Dow Europe, S.A., Horgen, Switzerland.
- (35) Enninga, I.C., Dowfax* XD 8292: Chromosomal Aberration Assay with Cultured Peripheral Human Lymphocytes in vitro, November 25, 1987, DET 974, unpublished Dow report(s).
- (36) Linscombe, V.A., Shabrang, S.N., Evaluation of Dowfax* C6L Surfactant in an in vitro Chromosomal Aberration Assay Utilizing Rat Lymphocytes, August 7, 1996, unpublished Dow report.
- (37) Linscombe, V.A., Day, S.J., Evaluation of Dowfax* Dry Hydrotrope Powder in an in vitro Chromosomal Aberration Assay Utilizing Rat Lymphocytes, 15 December, 1998, unpublished Dow report.
- (38) Hanley, T.R. Jr., Berdasco, N.M., Yano, B.L., Dowfax* C-6 Surfactant: Chernoff Test in Female Fischer 344 Rats, 11 June, 1985, unpublished Dow report.

7.1 END POINT SUMMARY

7.2 HAZARD SUMMARY

7.3 RISK ASSESSMENT