FOREWORD INTRODUCTION

2,2'-DIAMINO-4,4'-STILBENEDISULFONIC ACID

CAS N°: 81-11-8

SIDS Initial Assessment Report
For
SIAM 4
(Tokyo, 20-22 May 1996)

Chemical Name: 2,2'-Diamino-4,4'-stilbenedisulfonic acid

CAS No: 81-11-8

Sponsor Country: Japan

National SIDS Contact Point in Sponsor Country:
Mr. Yasuhisa Kawamura
Ministry of Foreign Affairs,
Japan

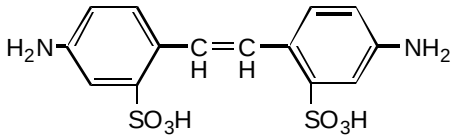
History:

As a high priority chemical for initial assessment, 2,2'-diamino-4,4'-stilbenedisulfonic acid (DSSA) was selected in the framework of the HPV Programme.
At SIAM-4, the conclusion was approved with comments.
Comments at SIAM-4: Rearrangement of the documents.

Deadline for circulation:

Date of Circulation:

SIDS INITIAL ASSESSMENT PROFILE

CAS No.	81-11-8
Chemical Name	Benzenesulfonic acid, 2,2-(1,2-ethenediyl)bis(5-amino-
Structural Formula	

CONCLUSIONS AND RECOMMENDATIONS

The chemical does not reveal any remarkable toxicity or ecotoxicity when exposure is low.

It is currently considered of low potential risk and low priority for further work.

SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS

Human Health

The chemical showed no genotoxic effects in bacteria and chromosomal aberration test *in vitro*. In a NTP chronic toxicity test using rats and mice, there were no biologically significant absolute or relative organ weight, clinical pathological, or histopathological findings in rat or mice. Mean body weights were marginally decreased for high-dose male and female rats and female mice. Food consumption in dosed rats and mice was similar to food consumption in the controls throughout the studies. Survival was similar among control and treated groups of rats and mice. Ulcers of the forestomach or glandular stomach occurred in dosed rats (males: 1/50, 5/50, 4/50, females: 0/50, 1/50, 4/50). The NOEL is estimated to be less than 558 mg/kg/day in rats for repeated dose toxicity. In a combined repeat dose and reproductive/developmental toxicity screening test, parental animals exhibited no effects on reproductive parameters and there were no significant differences in number of offspring, sex ratio, etc. and no abnormal findings in the offspring. Therefore, the NOEL was estimated to be 1000 mg/kg/day for reproductive toxicity.

As for indirect exposure via the environment, PEC was estimated to be 3.7×10^{-2} mg/l from a local exposure scenario. Therefore, the health risk through the environment, in general, is considered to be low due to its use pattern and exposure situation.

Environment

For the environment, various NOEC and LC_{50} values were gained from test results; LC_{50} = > 1000 mg/l (acute fish); EC_{50} = 210 mg/l (acute daphnia); EC_{50} = 76 mg/l (acute algae); NOEC = 32 mg/l (algae); NOEC = 37 mg/l (long-term daphnia reproduction). The lowest toxicity result (72h-NOEC, biomass, for *Selenastrum capricornutum*, 32 mg/l) was used to derive a PNEC. An assessment factor of 100 was used according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, PNEC of the chemical is 0.32 mg/l in the present report. The PEC is lower than the PNEC. The environmental risk is presumed to be low.

Exposure

Production and import volumes of 4,4'-diamino-2,2'-stilbenedisulfonic acid (DSSA) in Japan is ca. 1,000 and 35-77 tonnes/year, respectively, in 1988-92. Production volume is 10,000 tonnes/year in Germany. This chemical is used as an intermediate for pigments and fluorescent brighteners in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solutions, and is considered to be "not readily biodegradable". Direct photodegradation is expected as this chemical absorbs UV light with half-life of about one week.

PEC_{local} have been calculated based on an emission and effluent scenario and a dilution factor. PEC_{local} for the aquatic compartment was 3.7×10^{-2} mg/l.

As DSSA is produced in a closed system, exposure during synthesis may be excluded. Workplace exposure through the inhalation route is possible when the raw materials are cast into vessels. However workers wear personal protective equipment (e.g. safety glasses, dust respirator, rubber gloves) during the filling process. Therefore, the exposure at the workplace is considered to be negligible. In addition, DSSA is not contained in consumer products, because it is an intermediate for industrial use.

NATURE OF FURTHER WORK RECOMMENDED

No further testing is needed at present considering its toxicity and exposure levels.

FULL SIDS SUMMARY

CAS NO: 81-11-8		SPECIES	PROTOCOL	RESULTS
PHYSICAL-CHEMICAL				
2.1	Melting Point			> 300 °C
2.2	Boiling Point			No data available
2.3	Density			2.45 (relative density) at 20 °C
2.4	Vapour Pressure		OECD TG 104	< 130 Pa at 25 °C
2.5	Partition Coefficient (Log Pow)		OECD TG 107	Unmeasurable
2.6 A.	Water Solubility		OECD TG 105	32 mg/L at 25 °C
B.	PH			
	PKa		OECD TG 112	No data available
2.12	Oxidation: Reduction Potential			No data available
ENVIRONMENTAL FATE AND PATHWAY				
3.1.1	Photodegradation		Calculated	water: $T_{1/2} = 1.78 \times 10^{-2}$ years
3.1.2	Stability in Water		OECD TG 111	Stable (pH 4.0, 7.0, 9.0)
3.2	Monitoring Data			No data available.
3.3	Transport and Distribution			No data available
3.5	Biodegradation		OECD TG 301C	Not readily biodegradable: 0 % (BOD) in 28 days, 1 - 4 % (HPLC) in 28 days.
3.6	Bioaccumulation			No data available
ECOTOXICOLOGY				
4.1	Acute/Prolonged Toxicity to Fish	*Oryzias latipes*	OECD TG 203	LC_{50} (72hr): > 1,000 mg/L LC_{50} (96hr): > 1,000 mg/L
4.2	Acute Toxicity to Aquatic Invertebrates (*Daphnia*)	*Daphnia magna*	OECD TG 202	EC_{50} (24hr): 210 mg/l
4.3	Toxicity to Aquatic Plants e.g. Algae	*Selenastrum capricornutum*	OECD TG 201	EC_{50} (72hr): 76 mg/l NOEC: 32 mg/l
4.5.2	Chronic Toxicity to Aquatic Invertebrates (*Daphnia*)	*Daphnia magna*	OECD T G 202	EC_{50} (21d, Immobility): 74 mg/l EC_{50} (21d, Reproduction): 92 mg/l NOEC (21d, Repro): 37 mg/l
4.6.1	Toxicity to Soil Dwelling Organisms			No data available.
4.6.2	Toxicity to Terrestrial Plants			No data available.
(4.6.3)	Toxicity to Other Non-Mammalian Terrestrial Species (Including Birds)			No data available
TOXICOLOGY				
5.1.1	Acute Oral Toxicity	Rat	Unknown	$LD_{50:}$ > 5,000 mg/kg
5.1.2	Acute Inhalation Toxicity			No data available.
5.1.3	Acute Dermal Toxicity			No data available.

CAS NO: 81-11-8		SPECIES	PROTOCOL	RESULTS
5.4	Repeated Dose Toxicity	Rat	NTP Test	NOAEL = less than 558 mg/kg/day
5.5	Genetic Toxicity *In Vitro*			
A.	Bacterial Test (Gene mutation)	*S. .typhimurium*	NTP Test and others	Negative (With metabolic activation) Negative (Without metabolic activation)
B.	Non-Bacterial *In Vitro* Test (Chromosomal aberrations)	CHO cells	NTP Test	Negative (With metabolic activation) Negative (Without metabolic activation)
5.6	Genetic Toxicity *In Vivo*			No data available.
5.8	Toxicity to Reproduction	Rat	OECD Preliminary reproductive toxicity Test	NOAEL Parental = 1,000 mg/kg/day NOAEL F1 offspring = 1,000 mg/kg/day
5.9	Developmental Toxicity/ Teratogenicity			
5.11	Experience with Human Exposure			

SIDS Initial Assessment Report

1. Identity

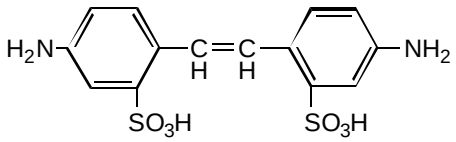
OECD Name: Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis(5-amino-

Synonym: 4,4'-Diamino-2,2'-stilbenedisulfonic acid
DSSA

CAS Number: 81-11-8

Empirical Formula: $C_{14}H_{14}N_2O_6S_2$

Structural Formula:



Degree of Purity: > 94 %

Major Impurities: Unknown

Essential Additives: None

2. Exposure

2.1 General discussion

Production and import volumes of 4,4'-diamino-2,2'-stilbenedisulfonic acid (DSSA) in Japan was ca. 1,000 and 35 - 77 tonnes/year in 1988 - 1992, respectively. The production volume is 10,000 tonnes/year in Germany. This chemical is used as an intermediate for pigments and fluorescent brighteners in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solutions, and is considered to be "not readily biodegradable". Direct photodegradation is expected as this chemical absorbs UV light with half-life of $1.78 * 10^{-2}$ years.

2.2 Environmental exposure

a) Biodegradability:

If released into water, this substance is not readily biodegraded. In a MITI I test (corresponding to OECD TG 301C), 0 % degradation during 28 days based on BOD and 1 - 4 % based on HPLC analysis were measured.

b) Hydrolysis as a function to pH:

The chemical is stable in water at pH 4, 7 and 9 (OECD TG 111).

c) Photodegradability (estimation)

The half-life time of $1.78 * 10^{-2}$ years is estimated for the direct photodegradation of the substance in water due to the absorption of UV light (MITI, Japan).

d) Bioaccumulation:

No data are available.

e) Global exposure

Global exposure model cannot be applied, because the Octanol/water partition coefficient of DSSA cannot be measured.

f) Local exposure

According to Japanese manufacturer, 270 kg/year of DSSA are released with 240,000 t/y of effluent into a river (flow rate 6,920,000 tonnes/year). The local predicted environmental concentration (PEC_{local}) is 3.7E-2 mg/l, employing the following calculation model.

$$\frac{\text{Amount of release } (2.70 \times 10^{8} \text{ mg/y})}{\text{Volume of effluent } (2.40 \times 10^{8} \text{ l/y}) \times \text{Dilution factor } (6.92 \times 10^{6} / 2.40 \times 10^{5})}$$

2.3 Consumer Exposure

DSSA is not contained in consumer products, because DSSA is an intermediate for the production of pigments and fluorescent brighteners.

2.4 Occupational Exposure

As DSSA is produced in a closed system, exposure during synthesis may be excluded. This chemical is used as the intermediates for pigments and fluorescent brighteners. Workplace exposure is possible when the raw materials are cast into vessels, with inhalation uptake considered to be the main route of exposure. Skin contact plays a minor role. Workers wear safety glasses, dust respirator, and rubber gloves during the filling process. Therefore, the exposure to worker is estimated to be negligible.

3. Toxicity

3.1 Ecotoxicity

DSSA has been tested in a limited number of aquatic species (*Selenastrum capricornutum*, *Daphnia magna* and *Oryzias latipes*), according to OECD test guidelines [OECD TG 201, 202, 203, 204 and 211]. Acute and chronic toxicity data to test organisms for DSSA are summarized in Table 1. No other ecotoxicological data are available.

Various NOEC and LC_{50} values were gained from the above-mentioned tests; LC_{50}(96h) > 1,000 mg/l (acute fish); EC_{50}(24h) = 210 mg/l (acute daphnia); EC_{50}(72h) = 76 mg/l (algae); NOEC= 32 mg/l (algae); EC50(21d) = 92 mg/l (long-term daphnia reproduction); NOEC(21d) = 37 mg/l (long-term daphnia reproduction). Therefore, the chemical is considered to be slightly toxic to, daphnids and algae and non-toxic to fish. As the lowest toxicity data, the 72h-NOEC (biomass) for *Selenastrum capricornutum* (32 mg/l) was adopted. An assessment factor of 100 was used to determine a PNEC according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, the PNEC of the chemical is 0.32 mg/l. The PEC is lower than the PNEC. The environmental risk is presumed to be low.

Table 1. Acute and chronic toxicity data of DSSA to aquatic organisms.

Species	Endpoint[*1]	Conc. (mg/L)	Reference
Selenastrum capricornutum (algae)	Biomass: EC_{50} (72h) Biomass:NOEC	76 mg/L 32 mg/L	MOE, Japan. (1994)
Daphnia magna (water flea)	Imm: LC_{50}(24h) Rep: EC_{50}(21d) Rep: LOEC(21d) Rep: NOEC (21d)	210 mg/L 92 mg/L 67 mg/L 37 mg/L	
Oryzias latipes (fish, Medaka)	Mor: LC_{50}(48h) Mor: LC_0(72h) Mor:LC50(96h)	>1,000 mg/L >1,000 mg/L >1,000 mg/L	

Notes: [*1] Mor; mortality, Rep; reproduction, Imm; immobilisation

3.2 Human Toxicity

a) Acute toxicity

The acute oral LD_{50} value of DSSA for male Wistar rat was reported to be over 5,000 mg/kg. No data are available on acute inhalation and acute dermal toxicity.

Two reports on irritation tests are available. The results indicate that DSSA is not irritating to skin and eyes in rabbit.

b) Repeated toxicity

This chemical was studied for oral toxicity (feeding) in rats and mice for 2 years by the National Toxicology Program (NTP). The study was well controlled and conducted under GLP. That is why it was considered to be a key study.

There were no biologically significant absolute or relative organ weight, clinical pathology, or histopathology findings in rats or mice administered disodium 4,4'-diamino-2,2'-stilbene disulfonate in feed for 15 months. Body weight, food consumption, survival, and clinical findings: Mean body weights were marginally decreased for high-dose male and female rats and female mice. Food consumption by dosed rats and mice was similar to food consumption by the controls throughout the studies. Survival was similar among control and treated groups of rats and mice. Ulcers of the forestomach or glandular stomach occurred in dosed rats (males: 1/50, 5/50, 4/50, females: 0/50, 1/50, 4/50). No clinical findings related to chemical administration were observed in rats or mice. The NOEL is estimated to be less than 558 mg/kg/day in rats for repeated dose toxicity.

c) Reproductive toxicity

DSSA was studied for oral toxicity in rats according to the OECD Preliminary reproductive toxicity test at doses of 0, 40, 200 and 1,000 mg/kg/day.
<Repeat dose toxicity> The test substance had no effects on clinical signs, body weight changes, food consumption or necropsy findings in either sex. Testicular and epididymal weights were similar among all four groups. No histopathological changes ascribed to the test substance in these reproductive organs were observed in any of the male rats.
<Reproductive and developmental toxicity> Parental animals exhibited no effects on reproductive parameters including the copulation index, the fertility index, the gestation index, the delivery index, parturition or maternal behavior. There were no significant differences in number of offspring or live offspring, sex ratio, the live birth index, the viability index, or body weight. No abnormal findings attributable to the test substance were noted in external examination, clinical signs or necropsy of the offspring. (MHW, 1993). The NOEL values for both parental and F_1 offspring regarding reproductive toxicity are considered to be 1,000 mg/kg/day.

d) Genetic toxicity

Bacterial test
Several data including results from the NTP programme on reverse gene mutation assays were reported. These studies were well controlled and regarded as a key studies. DSSA showed negative results in *Salmonella typhimurium* TA100, TA1535, TA98, TA1537 and *Escherichia coli* WP2 *uvr* A with or without metabolic activation (MHW, 1993).

Non-bacterial test *in vitro*
A chromosomal aberration test was conducted using cultured Chinese Hamster ovary (CHO) cells by NTP. This study was well controlled and regarded as a key study. The maximum concentration of the chemical was 5.0 mg/ml. Chromosomal aberrations was not recognized up to a maximum concentration of 5.0 mg/ml with or without an exogeneous metabolic activation system (NTP, 1992).

in vivo test
No data are available on *in vivo* genotoxic effects.

e) Other human health related information

None

4. Initial assessment

4.1 Exposure

Production and import volumes of 4,4'-diamino-2,2'-stilbenedisulfonic acid (DSSA) in Japan is ca. 1,000 and 35-77 tonnes/year, respectively, in 1988-92. The production volume is 10,000 tonnes/year in Germany. This chemical is used as an intermediate for the production of pigments and fluorescent brighteners in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solutions, and is considered to be "not readily biodegradable".

A PEC_{local} have been calculated based on an emission and effluent scenario and a dilution factor. PEC_{local} for aquatic compartment was 3.7×10^{-2} mg/l.

As DSSA is produced in a closed system, exposure during synthesis may be excluded. Workplace exposure through inhalation route is possible when the raw materials are cast into vessels. However workers wear personal protective equipment (e.g. safety glasses, dust respirator, rubber gloves) during the filling process. Therefore, the exposure at the work place is considered to be negligible. In addition, DSSA is not contained in consumer products, because it is an intermediate for industrial use.

4.2 Ecotoxicity

Various NOEC and LC_{50} values were gained from test results; 96h LC_{50} > 1000 mg/l (acute fish); 48h EC_{50} = 210 mg/l (acute daphnia); 72h EC_{50} = 76 mg/l (algae); NOEC = 32 mg/l (algae); 21d NOEC = 37 mg/l (long-term daphnia reproduction). As the lowest toxicity data the 72h-NOEC (biomass) of *Selenastrum capricornutum* (32 mg/l) was adopted. An assessment factor of 100 was used to determine a PNEC according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, the PNEC of the chemical is 0.32 mg/l in the present report. The PEC is lower than the PNEC. The environmental risk is presumed to be low.

4.3 Toxicity

The chemical showed no genotoxic effects in bacteria and chromosomal aberration test *in vitro*. In an NTP chronic toxicity test using rats and mice, there were no biologically significant absolute or relative organ weight, clinical pathological, or histopathological findings in rat or mice. Mean body weights were marginally decreased for high-dose male and female rats and female mice. Food consumption by dosed rats and mice was similar to food consumption by the controls throughout the studies. Survival was similar among control and treated groups of rats and mice. Ulcers of the forestomach or glandular stomach occurred in dosed rats (males: 1/50, 5/50, 4/50, females: 0/50, 1/50, 4/50). The NOEL is estimated as less than 558 mg/kg/day in rats for repeated dose toxicity. In an OECD preliminary reproductive toxicity test, parental animals exhibited no effects on reproductive parameters and there were no significant differences in number of offspring, sex ratio, etc. and no abnormal findings in the offspring. Therefore, the NOEL was estimated to be 1000 mg/kg/day for reproductive toxicity.

As for indirect exposure via the environment, a PEC was estimated to be $3.7 \times 10^{-2.}$ mg/l from a local exposure scenario. The margin of safety is large. Therefore, health risk through the environment, in general, are considered to be low due to its use pattern and exposure situation.

5. Overall recommendation and initial assessment

5.1 Conclusion

In conclusion, no further testing is needed at present considering its toxicity and exposure situation.

5.2 Recommendation

None

6. Reference

Bayer AG (1990) Sicherheitsdatenblatt Bayer AG vom 06.07.1990

Bayer AG (1991) Berechnung UWS-Produktsicherheit, Bayer AG 1991

EA, Japan (1994) "Investigation of the Ecotoxicological Effects of OECD High Production Volume Chemicals", Office of Health Studies, Environmental Health

Department, Environment Agency, Japan (HPV/SIDS Test conducted by EA, Japan)

EA & MITI, Japan (1994) Unpublished Report on Exposure Estimation (HPV/SIDS Test conducted by EA and MITI, Japan)

ECDIN database (1994)

Huang-Minlon, J. Am. Chem. Soc., 70, 2802-2804 (1948)

Leo, A. J. (1982) LogP Values Calculated Using the CLOGP Program for Compounds In ISHOW Files. Pomona College Medicinal Chemistry Project; 1982

Loeser, E. (1979): Bayer AG data, short report, 3. 5. 1979

Lyman W.J. et al (1961) W. J. Lyman, W. F. Reehl and D. H. Rosenblatt, "Handbook of Chemical Property Estimation Method", McGraw Hill Book Co., 1981.

MHW, Japan (1994) Unpublished Report on Preliminary Reproductive Toxicity Test of 4,4'-diamino-2,2'-stilbenedisulfonic acid. (HPV/SIDS Test conducted by MHW, Japan)

Merck Index (1982) Windholz, M. The Merck Index, 9th Edition Merck and Company, Inc., Rahway, NJ; 1982

MITI, Japan (1994a): Unpublished data

MITI, Japan (1994b) Unpublished Report (HPV/SIDS Test conducted by MITI, Japan., Test was performed in Chemicals Inspection and Testing Institute, Japan)

Norpoth, K. (1977): Data of Bayer AG, University of Murnster, 22. 7. 1977

NTP (1992): Technical Report No. 412

Thyssen, J. (1979): Bayer AG data, short report, 6. 8. 1979

Zaitseva, N. V.; Kulikov, A. L. (1980): Gig. Sanit. 45, 73-76

Zeiger, E. et al. (1987): Environ. Mutagen. 9, Suppl. 9, 1-110. Salmonella Mutagenicity test 3.Results from the testing of 255 chemicals.

SIDS DOSSIER

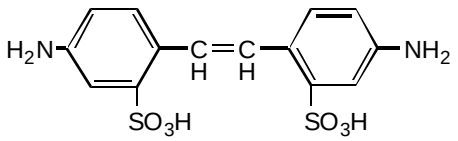
Benzenesulfonic acid, 2,2'-(1,2- ethenediyl)bis(5-amino)

CAS No. 81-11-8

Sponsor country: Japan

DATE: March 2002

S I D S P R O F I L E

1.01 A.	**CAS No.**	81-11-8
1.01 C.	**CHEMICAL NAME (OECD Name)**	Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis(5-amino-(4,4'-Diamino-2,2'-stilbenedisulfonic acid)
1.01 D. 1.01 G.	**CAS DESCRIPTOR** **STRUCTURAL FORMULA**	Not applicable 
	OTHER CHEMICAL IDENTITY INFORMATION	
1.5	**QUANTITY**	In Japan, approx 1,000 tonnes/year in 1988 - 1992. Import volume: 35-77 tonnes/year in 1988 - 1992.
1.7	**USE PATTERN**	In Japan, Intermediate for pigments and fluorescent brighteners Closed system
1.9	**SOURCES AND LEVELS OF EXPOSURE**	In Japan, 1. Amount released from production site to water is 270 kg/year. 2. Amount released to air from production site is negligible. 3. Information on consumer exposure is not available.
ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)		

S I D S S U M M A R Y

4,4'-Diamino-2,2'-stilbenedisulfonic acid

CAS NO: 81-11-8		Information	OECD Study	GLP	Other Study	Estimation Method	Acceptable	SIDS Testing Required
STUDY		**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**
PHYSICAL-CHEMICAL DATA								
2.1	Melting Point	Y	N	N	Y	N	Y	N
2.2	Boiling Point	Y	N	N	Y	N	Y	N
2.3	Density	Y	N	N	Y	N	Y	N
2.4	Vapour Pressure	N						Y
2.5	Partition Coefficient	N						Y
2.6	Water Solubility	N						Y
	pH and pKa values	N						N
OTHER P/C STUDIES RECEIVED								
ENVIRONMENTAL FATE and PATHWAY								
3.1.1	Photodegradation	N						Y
3.1.2	Stability in water	N						Y
3.2	Monitoring data	N						N
3.3	Transport and Distribution	N						N
3.5	Biodegradation	N						Y
3.6	Bioaccumulation	N						N
OTHER ENV FATE STUDIES RECEIVED								
ECOTOXICITY								
4.1	Acute toxicity to Fish	N						Y
4.2	Acute toxicity to Daphnia	N						Y
4.3	Toxicity to Algae	N						Y
4.5.2	Chronic toxicity to Daphnia	N						Y
4.6.1	Toxicity to Soil dwelling organisms	N						N
4.6.2	Toxicity to Terrestrial plants	N						N
4.6.3	Toxicity to Birds	N						N
OTHER ECOTOXICITY STUDIES RECEIVED								
TOXICITY								
5.1.1	Acute Oral	Y	Y	Y	N	N	Y	N
5.1.2	Acute Inhalation	N						N
5.1.3	Acute Dermal	N						N
5.4	Repeated Dose	Y	Y	Y	N	N	Y	N
5.5	Genetic Toxicity *in vitro*							
	. Gene mutation	Y	N	N	Y	N	Y	N
	. Chromosomal aberration	Y	N	N	Y	N	Y	N
5.6	Genetic Toxicity *in vivo*	N						N
5.8	Reproduction Toxicity	N						Y
5.9	Development / Teratogenicity	N						Y
5.11	Human experience	N						N
OTHER TOXICITY STUDIES RECEIVED								

1. GENERAL INFORMATION

1.01 SUBSTANCE INFORMATION

A. CAS-Number 81-11-8

B. Name (IUPAC name) 4,4'-Diamino-2,2'-stilbenedisulfonic acid

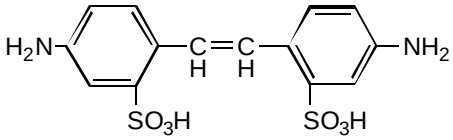
C. Name (OECD name) Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis (5-amino-

D. CAS Descriptor Not applicable

E. EINECS-Number 201-325-2

F. Molecular Formula $C_{14}H_{14}N_2O_6S_2$

G. Structural Formula



H. Substance Group

I. Substance Remark None

J. Molecular Weight 370.42

1.02 OECD INFORMATION

A. Sponsor Country: Japan

B. Lead Organization:

Name of Lead Organization:
Ministry of Health and Welfare (MHW)
Ministry of International Trade and Industry (MITI)
Environment Agency (EA)
Ministry of Labor (MOL)

Contact person: Mr. Yasuhisa Kawamura
Director Second International Organization Bureau
Ministry of Foreign Affairs

Address: 2-2-1 Kasumigaseki, Chiyoda-ku
Tokyo 100, Japan
TEL 81-3-3581-0018
FAX 81-3-3503-3136

C. Name of responder Same as above contact person

1.1 GENERAL SUBSTANCE INFORMATION

A. Type of Substance

element **[ ]**; inorganic **[ ]**; natural substance **[ ]**;
organic **[X]**; organometallic **[ ]**; petroleum product **[ ]**

B. Physical State gaseous **[ ]**; liquid **[ ]**; solid **[X]**

C. Purity > 94 %

1.2 SYNONYMS

4,4'-Diamino-2,2'-stilbenedisulfonic acid
DSSA

1.3 IMPURITIES

Unknown

1.4 ADDITIVES

None

1.5 QUANTITY

Location	Production(tonnes)	Date
Japan	1,000/year	1988-1992
Japan	35-77/year (Import)	1988-1992

Reference: MITI Japan (1994a)

1.6 LABELLING AND CLASSIFICATION

None

1.7 USE PATTERN

A. General

Type of Use:	Category:
Industry use	Intermediate for pigments and fluorescent brighteners

Reference: MITI, Japan (1994a)

B. Uses in Consumer Products

None

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUE

None

1.9 SOURCES OF EXPOSURE

Source: Media of release: Water from a production site
Quantities per media: 270 kg/year

Reference: MITI, Japan (1994a)

1.10 ADDITIONAL REMARKS

A. Options for disposal

No information provided

B. Other remarks

Processes
sulfonation
p-Nitrobenzene p-Nitrotoluene-o-sulfonic acid
oxidation reduction
4,4'-Dinitrostilbene-2,2'-disulfonic acid

Reference: MITI, Japan (1994a)

2. PHYSICAL-CHEMICAL DATA

2.1 MELTING POINT

(a)

Value:	> 300 °C
Decomposition:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Sublimation:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:	Unknown
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Remarks:	None
Reference:	MITI, Japan (1994b)

(b)

Value:	300 °C
Decomposition:	Yes **[ ]** No **[ ]** Ambiguous **[ ]**
Sublimation:	Yes **[ ]** No **[ ]** Ambiguous **[ ]**
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Remarks:	None
Reference:	Huang-Minlon (1948)

2.2 BOILING POINT

No data available

2.3 DENSITY (Relative density)

Type:	Bulk density **[ ]**; Density **[ ]**; Relative Density **[X]**
Value:	2.45
Temperature:	20°C
Method:	Unknown
GLP:	Yes [ ] No **[ ]** ? **[X]**
Remarks:	None
Reference:	ECDIN database (1994)

2.4 VAPOUR PRESSURE

Value:	< 130 Pa
Temperature:	25°C
Method:	calculated **[ ]**; measured **[X]** OECD Test Guideline 104 Static method
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Reference:	MITI, Japan (1994b)

2.5 PARTITION COEFFICIENT $log_{10}P_{ow}$

(a)

Log Pow:	Unmeasurable
Temperature:	25 °C
Method:	calculated **[ ]**; measured **[X]**
	OECD Test Guideline 107
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Comment:	The chemical was poor soluble into both water and octanol.
Reference:	MITI, Japan (1994b)

(b)

Log Pow:	(1) -1.7 (2) -2.5
Temperature:	
Method:	calculated **[X]**; measured **[ ]**
	CLOGP-3.54 Medchem Software 1989
GLP:	Yes **[ ]** No **[ ]** ? **[ ]**
Reference:	(1) Bayer AG (1991) (2) Leo, A. J. (1982)

2.6 WATER SOLUBILITY

A. Solubility

(a) Preferred result

Value:	32 mg/l
Temperature:	25 °C
Description:	Miscible **[ ]**; Of very high solubility **[ ]**;
	Of high solubility **[ ]**; Soluble **[ ]**; Slightly soluble **[ ]**;
	Of low solubility **[ ]**; Of very low solubility **[X]**;
	Not soluble **[ ]**
Method:	OECD Test Guideline 105
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Reference:	MITI, Japan (1994b)

(b)

Value:	0.65 mg/l
Temperature:	20 °C
Description:	Miscible **[ ]**; Of very high solubility **[ ]**;
	Of high solubility **[ ]**; Soluble **[ ]**; Slightly soluble **[ ]**;
	Of low solubility **[ ]**; Of very low solubility **[X]**;
	Not soluble **[ ]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Remarks:	No details are provided.
Reference:	Bayer AG (1990)
	Merck Index (1982)

B. pH Value, pKa Value

No data available

2.7 FLASH POINT

No data available

2.8 AUTO FLAMMABILITY

No data available

2.9 FLAMMABILITY

No data available

2.10 EXPLOSIVE PROPERTIES

No data available

2.11 OXIDIZING PROPERTIES

No data available

2.12 OXIDATION: REDUCTION POTENTIAL

No data available

2.13 ADDITIONAL DATA

A. Partition co-efficient between soil/sediment and water (Kd)

No data available

B. Other data

None

3. ENVIRONMENTAL FATE AND PATHWAYS

3.1 STABILITY

3.1.1 PHOTODEGRADATION

Type:	Air **[ ]**; Water **[X]**; Soil; Other **[ ]**	
Light source:	Sunlight **[X];** Xenon lamp **[ ];** Other **[ ]**	
Spectrum of substance:	epsilon = 1.61 x 10^4 at 300 nm epsilon = 3.32 x 10^4 at 340 nm	
Estimated parameter for calculation:		
	Quantum yield	0.001
	Concentration	5 x 10^{-5} M
	Depth of water body	500 cm
	Conversion constant	6.023 x 10^{20}
Result:	Degradation rate	6.19 x 10^{-11} mol/l/s
	Half life	1.78 x 10^{-2} years
Reference:	Lyman, W.J. et al. (1981)	

3.1.2 STABILITY IN WATER

Type:	Abiotic (hydrolysis) **[X]**; biotic (sediment)**[ ]**
Result:	Stable at pH 4 ,7 and 9 at 25°C
Method:	OECD Test guideline 111
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Reference:	MITI, Japan (1994b)

3.1.3 STABILITY IN SOIL

No data available

3.2 MONITORING DATA (ENVIRONMENT)

No studies located

3.3 TRANSPORT AND DISTRIBUTION BETWEEN ENVIRONMENTAL COMPARTMENTS INCLUDING ESTIMATED ENVIRONMENTAL CONCENTRATIONS AND DISTRIBUTION PATHWAYS

3.3.1 TRANSPORT

No data available

3.3.2 THEORETICAL DISTRIBUTION (FUGACITY CALCULATION)

Global exposure model cannot be applied, because the Octanol/water partition coefficient of DSSA is not available.

3.4 IDENTIFICATION OF MAIN MODE OF DEGRADABILITY IN ACTUAL USE

No studies located.

3.5 BIODEGRADATION

Type:	aerobic **[X]**; anaerobic **[ ]**
Inoculum:	adapted **[ ]**; non-adapted **[X]**;
Concentration of the chemical:	100 mg/l related to Test Substance **[X]**
Medium:	water**[ ];** water-sediment**[ ];** soil **[ ];** sewage treatment**[ ]** other **[**X**]** (Japanese standard activated sludge)
Degradation:	Degree of degradation after 28 days 0, 0 and 0 % from BOD 4, 1 and 3 % from HPLC analysis
Results:	Readily biodeg. **[ ];** Inherently biodeg. **[ ]**; under test condition no biodegradation observed **[X]**
Method:	OECD Test Guideline 301 C
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Reference:	MITI, Japan (1994b)

3.6 BOD_5,COD OR RATIO BOD_5/COD

Not applicable

3.7 BIOACCUMULATION

No data available

3.8 ADDITIONAL REMARKS

A. Sewage treatment None

B. Other information None

4. ECOTOXICOLOGICAL DATA

4.1 ACUTE/PROLONGED TOXICITY TO FISH

(a)

Type of test:	static **[ ]**; semi-static **[X]**; flow-through **[ ]**; other **[ ]** open-system **[X]**; closed-system **[ ]**
Species:	*Oryzias latipes*
Exposure period:	96 hr
Results:	LC_{50} (24h) = > 1,000 mg/l LC_{50} (48h) = > 1,000 mg/l LC_{50} (72h) = > 1,000 mg/l LC_{50} (96h) = > 1,000 mg/l NOEC = LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 203 (1981)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %
Remarks:	A group of 10 fish were exposed to each of 5 nominal concentrations (95-1,000 mg/l) and laboratory water control.
Reference:	EA, Japan (1994)

(b)

Type of test:	static [ ]; semi-static **[ ]**; flow-through **[ ]**; other **[ ]** open-system **[ ]**; closed-system **[ ]**
Species:	*Leuciscus idus* (Goldorfe)
Exposure period:	48 hr
Results:	LC_0 (48h) = 200 mg/l
Analytical monitoring:	Yes **[ ]** No **[ ]** ? **[X]**
Method:	Other method
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Remarks:	No detailed data are provided
Reference:	Company data (Bayer AG)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

A. Daphnia

Type of test:	static **[X]**; semi-static **[ ]**; flow-through **[ ]**; other **[ ]**; open-system **[**X**]**; closed-system **[ ]**
Species:	*Daphnia magna*
Exposure period:	24 hr
Results:	EC_{50} (24h) = 210 mg/l (95% confidence limits: 130-250 mg/l) EC_{50} (48h) = NOEC = LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**

Method:	OECD Test Guideline 202 (1984)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %
Remarks:	20 daphnids (4 replicates; 5 organisms per replicate) were exposed to each of 5 nominal concentrations(100-1000 mg/l). Stock solution was prepared with DMSO:HCO=9:1(100-1000 mg/l). Controls with and without this vehicle were taken for test.
Reference:	EA, Japan (1994)

B. Other aquatic organisms

No studies located

4.3 TOXICITY TO AQUATIC PLANTS e.g. Algae

Species:	*Selenastrum capricornutum* ATCC 22662	
End-point:	Biomass **[X]**; Growth rate **[ ]**; Other **[ ]**	
Exposure period:	72 hours	
Results:	Biomass:	EC_{50} (24h) =
		EC_{50} (72h) = 76 mg/l
		NOEC = 32 mg/l ($p < 0.05$)
		LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**	
Method:	open-system **[**X**]**; closed-system **[ ]**	
	OECD Test Guideline 201 (1984)	
GLP:	Yes **[ ]** No **[X]** ? **[ ]**	
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %	
Remarks:	The EC_{50} values for biomass were calculated based on 7 nominal concentrations (10-320 mg/l). Stock solution was prepared with DMSO (100 mg/l). Controls with and without this vehicle were taken for test.	
Reference:	EA, Japan (1994)	

4.4 TOXICITY TO BACTERIA

Species:	*Pseudomonas fluorescens*
Results:	EC_0 (24h) = 1,000 mg/l
Method:	Other method
	Bestimmung der biologischen Schadwirkung toxischer Abwaesser gegen Bakterien. DEV, L8 (1968) Modifiziert.
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %
Remarks:	No details are provided.
Reference:	Company data (Bayer AG)

4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

4.5.1. CHRONIC TOXICITY TO FISH

No data provided

4.5.2. CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

(a)

Type of test:	static **[ ]**; semi-static **[**X**]**; flow-through **[ ]**; other **[ ]**; open-system **[X]**; closed-system **[ ]**
Species:	*Daphnia magna*
End-point:	Mortality **[ ]**; Reproduction rate **[X]**; Other **[X]**
Exposure period:	21 days
Results:	
Immobility:	EC_{50} (48 h) = 130 mg/l (95% confidence limits:110-140 mg/l)
	EC_{50} (21 d) = 74 mg/l (95% confidence limits: 63-86 mg/l)
	NOEC =
	LOEC =
Reproduction:	EC_{50} (21 d) = 92 mg/l (95% confidence limits:85-98 mg/l)
	NOEC = 37 mg/l ($p < 0.05$)
	LOEC = 67 mg/l ($p < 0.05$)
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 202 (1984)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %
Remarks:	40 daphnids (4 replicates; 10 organisms per replicate) were exposed to each of 5 nominal concentrations (21-210 mg/l).
Reference:	EA, Japan (1995)

4.6 TOXICITY TO TERRESTRIAL ORGANISMS

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

No data available

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

No data available

4.6.3 TOXICITY TO OTHER NON MAMMALIAN TERRESTRIAL SPECIES (INCLUDING AVIAN)

No data available

4.7 BIOLOGICAL EFFECTS MONITORING (INCLUDING BIOMAGNIFICATION)

No data available

4.8 BIOTRANSFORMATION AND KINETICS IN ENVIRONMENTAL SPECIES

No data available

4.9 ADDITIONAL REMARKS

None

5. TOXICITY

5.1 ACUTE TOXICITY

5.1.1 ACUTE ORAL TOXICITY

(a)

Type :	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Rat (Wistar, Male)
Value :	> 5,000 (mg/kg) for male
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Disodium 4,4'-Diamino-2,2'-stilbenedisulfonate
Remarks:	No symptoms
Reference:	Loeser, E. (1979)

(b)

Type :	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Guinea pig
Value :	47,000 (mg/kg)
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Remarks:	Function of liver and kidney were impaired. Ureter and bladder were also affected.
Reference:	Zaitseva, N. V.; Kulikov, A. L. (1980)

5.1.2 ACUTE INHALATION TOXICITY

No data available

5.1.3 ACUTE DERMAL TOXICITY

No data available

5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION

No data available

5.2 CORROSIVENESS/IRRITATION

No data available

5.2.1 SKIN IRRITATION/CORROSION

Species/Strain:	Rabbit
Results:	Highly corrosive[ ]; Corrosive[ ]; Highly irritating[ ]; Irritating[ ]; Moderate irritating[ ]; Slightly irritating[ ]; Not irritating[X]
Classification:	Highly corrosive[ ]; Corrosive[ ]; Irritating[ ];

Not irritating[X]

Method:
GLP* Yes [ ] No [X] ? [ ]
Test substance: Disodium 4,4'-diamino-4,4'-stilbenedisulfonate
Remarks: Exposure time: 24 h, ear, 500 mg/animal, semi-occlusive, observation time: 7 days.
Reference: Thyssen, J. (1979)

5.2.2 EYE IRRITATION/CORROSION

Species/Strain: Rabbit
Results: Highly corrosive[ ]; Corrosive[ ]; Highly irritating[ ]; Irritating[ ]; Moderate irritating[ ]; Slightly irritating[ ]; Not irritating[X]
Classification: Highly corrosive[ ]; Corrosive[ ]; Irritating[ ]; Not irritating[X]
Method:
GLP* Yes [ ] No [X] ? [ ]
Test substance: Disodium 4,4'-diamino-2,2'-stilbenedisulfonate (CAS No. 7336-20-1)
Remarks: 50 mg/animal, observation time: 7 days.
Reference: Thyssen, J. (1979)

5.3 SKIN SENSITIZATION

No data available

5.4 REPEATED DOSE TOXICITY

Species/strain: Rats/F344/N and Mice/B6C3F1
Sex: Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of Administration: Feeding
Exposure period: (1) 14 days (2) 13 weeks (3) 2 years
Frequency of treatment: 7 days/week
Post exposure observation period:
Dose: (1) 0, 6,250, 12,500, 25,000, 50,000,100,000 ppm (Rats, Mice)
(2) 0, 6,250, 12,500, 25,000, 50,000,100,000 ppm (Rats, Mice)
(3) Rat: 0, 12,500 (558 mg/kg), 25,000 ppm (1151 mg/kg)
Mice: 0, 6,250 (776 mg/kg), 12,500 ppm (1656 mg/kg)
Control group: Yes **[X]**; No **[ ]**; No data **[ ]**;
Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**;
Historical **[ ]**
NOEL: (1) Rat: 25,000 ppm (2,315 mg/kg/day)
Mice: 25,000 ppm (2,618 mg/kg/day
(2) Rat: 25,000 ppm (1,207 mg/kg/day)
Mice: 12,500 ppm (1,681 mg/kg/day)
(3) Rat: 12,500 ppm (558 mg/kg/day)
Mice: 6,250 ppm (776 mg/kg/day)
Results: (1) All rats and mice survived to the end of the studies. The mean body weight gain of male rats receiving 50,000 or

100,000 ppm and of female rats and male and female mice receiving 100,000 ppm was significantly lower than those of the respective controls. Clinical findings included diarrhea in the rats and mice receiving 100,000 ppm. There were no chemical-related changes in absolute or relative organ weights in rats and mice. There were no gross or microscopic lesions related to chemical administration in rats or mice.

(2) One female rat, six male mice, and one female mouse receiving 100,000 ppm dose group died during the studies. Mean body weight gain was significantly decreased in male rats and female mice receiving 50,000 or 100,000 ppm, in male mice receiving 25,000, 50,000 or 100,000 ppm, and in female rats receiving 100,000 ppm. Clinical findings in rats receiving 50,000 or 100,000 ppm and in female rats receiving 100,000 ppm induced diarrhea, emaciation, and hyperemia of the perineum.

There were no biologically significant changes in absolute or relative organ weights or clinical pathology results in rats or mice. Histopathologic lesions present in rats receiving 100,000 ppm were bone marrow hypercellularity and chronic inflammation of the anus and rectum. Ulcerative inflammation of the anus and rectum was observed in mice receiving 25,000 ppm and above. Female mice in the 6,250, 12,500, and 25,000, and 50,000 ppm dose groups had increased incidence of cystic endometrial hyperplasia.

(3) There were no biologically significant absolute or relative organ weight, clinical pathology, or histopathology findings in rats or mice administered disodium 4,4'-diamino-2,2'-stilbene disulfonate in feed for 15 months. Body weight, Food consumption, Survival, and Clinical findings: Mean body weights were marginally decreased for high-dose male and female rats and female mice. Food consumption by dosed rats and mice was similar to food consumption by the controls throughout the studies. Survival was similar among control and treated groups of rats and mice. No clinical findings related to chemical administration were observed in rats or mice. Non-neoplastic and Neoplastic Effects: There were no chemical-related increased incidence of neoplasms at any site in rats. Ulcers of the forestomach or glandular stomach occurred in dosed rats (males: 1/50, 5/50, 4/50, females: 0/50, 1/50, 4/50). There were no chemical-related incidence of neoplasm, non-neoplastic lesions, or other toxic effects in mice. Although the animals might have been able to tolerate slightly higher doses, results of the 13-week studies indicate that a doubling of the highest doses could not have been tolerated.

GLP: Yes **[X]** No **[ ]** ? **[ ]**

Test substance: Disodium 4,4'-diamino-2,2'-stilbenedisulfonate

Reference: NTP (1992)

5.5 GENETIC TOXICITY IN VITRO

A. BACTERIAL TEST

(a)

Type :	Bacterial reverse mutation assay
System of testing:	
Species/strain:	*E. coli* WP2 uvrA, K12 (343/113)
Concentration:	
Metabolic activation:	With **[ ]**;Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:	
Genotoxic effects:	+ ? -
	With metabolic activation: **[ ] [ ] [X]**
	Without metabolic activation: **[ ] [ ] [X]**
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Reference:	Norpoth, K. (1977)

(b)

Type :	Bacterial reverse mutation assay
System of testing:	
Species/strain:	*S. typhimurium* TA98, TA100
Concentration:	
Metabolic activation:	With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:	
Genotoxic effects:	+ ? -
	With metabolic activation: **[ ] [ ] [X]**
	Without metabolic activation: **[ ] [ ] [X]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Remarks:	Mouse liver S-9 mix
Reference:	Norpoth, K. (1977)

(c)

Type :	Bacterial reverse mutation assay
System of testing:	
Species/strain:	*S. typhimurium* TA98, TA100, TA1535, TA1537
Concentration:	
Metabolic activation:	With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:	
Genotoxic effects:	+ ? -
	With metabolic activation: **[ ] [ ] [X]**
	Without metabolic activation: **[ ] [ ] [X]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Remarks:	Male Sprague Dawley rat and Syrian hamster liver S-9 mix
Reference:	Zeiger, E. et al. (1987)

(d)

Type : Bacterial reverse mutation assay
System of testing:
Species/strain: *S. typhimurium* TA98, TA100, TA1535, TA1537
Concentration:
Metabolic activation: With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:
Genotoxic effects:

	+	?	-
With metabolic activation:	**[ ]**	**[ ]**	**[X]**
Without metabolic activation:	**[ ]**	**[ ]**	**[X]**

Method:
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Disodium 4,4'-diamino-2,2'-stilbenedisulfonate
Remarks: Aroclor 1254-induced male SD rat or Syrian hamster liver S9 mix, 100-5,000 ug/plate
Reference: NTP (1992)

B. NON-BACTERIAL IN VITRO TEST

Type : Cytogenetics Assay
System of testing:
Species/strain: Chinese Hamster CHO cells
Concentration:
Metabolic activation: With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:
Genotoxic effects:

	+	?	-
With metabolic activation:	**[ ]**	**[ ]**	**[X]**
Without metabolic activation:	**[ ]**	**[ ]**	**[X]**

Method: Aroclor 1254-induced male SD rat liver S9 at concentrations up to 1,020 ug/ml or 5,000 ug/ml
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Disodium 4,4'-Diamino-2,2'-stilbenedisulfonate
Remarks:
Reference: NTP (1992)

5.6 GENETIC TOXICITY IN VIVO

No data available

5.7 CARCINOGENICITY

Species/strain: Rats/F344/N and Mice/B6C3F1
Sex: Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of Administration: Feeding
Exposure period: 2 years
Frequency of treatment: 7 days/week
Post exposure observation period:
Dose: Rat: 0, 125,000 (558 mg/kg), 25,000 ppm (1151 mg/kg)

	Mice:0, 6,250 (776 mg/kg), 12,500 ppm (1656 mg/kg))
Control group:	Yes **[X]**; No **[ ]**; No data **[ ]**; Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
Results:	Neoplastic Effects: There were no chemical-related increased incidence of neoplasms at any site in rats. There were no chemical-related incidence of neoplasm in mice.
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Disodium 4,4'-diamino-2,2'-stilbenedisulfonate
Reference:	NTP (1992)

5.8 TOXICITY TO REPRODUCTION

Type:	Fertility **[ ]**; One generation study **[ ]**; Two generation study **[ ]**; Other **[X]**
Species/strain:	Rat Crj:CD(SD)
Sex:	Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of Administration:	Oral, gavage
Exposure period:	Males: 41 days including 14 days before mating Females: from 14 days before mating to day 3 of lactation.
Frequency of treatment:	7 days/week
Postexposure observation period:	
Premating exposure period:	male: 14 days, female: 14 days
Duration of the test;	
Doses:	0, 40, 200, or 1000 mg/kg/day (10 animals/sex/group)
Control group:	Yes **[X]**; No **[ ]**; No data **[ ]**; Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
NOEL Parental :	1000 mg/kg/day
NOEL F1 Offspring:	1000 mg/kg/day
NOEL F2 Offspring:	N/A
Results:	<Repeat dose toxicity> The test substance had no effects on clinical signs, body weight changes, food consumption or necropsy findings in either sex. Testicular and epididymal weights were similar among all four groups. No histopathological changes ascribed to the test substance in these reproductive organs were observed in any of the male rats. <Reproductive and developmental toxicity> Parental animals exhibited no effects on reproductive parameters including the copulation index, the fertility index, the gestation index, the delivery index, parturition or maternal behavior. There were no significant differences in number of offspring or live offspring, sex ratio, the live birth index, the viability index, or body weight. No abnormal findings attributable to the test substance were noted in external examination, clinical signs or necropsy of the offspring.
Method:	OECD Preliminary Reproductive Toxicity Test
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Purity 92.02 %
Remarks:	0.5% Sodium CMC was used as a vehicle.

Reference: MHW, Japan (1995)

5.9 DEVELOPMENTAL TOXICITY/ TERATOGENICITY

See 5.8

5.10 OTHER RELEVANT INFORMATION

A. Specific toxicities

No studies located

B. Toxicodynamics, toxicokinetics

No data available

5.11 EXPERIENCE WITH HUMAN EXPOSURE

None

6. REFERENCES

Bayer AG (1990) Sicherheitsdatenblatt Bayer AG vom 06.07.1990

Bayer AG (1991) Berechnung UWS-Produktsicherheit, Bayer AG 1991

EA, Japan (1994) "Investigation of the Ecotoxicological Effects of OECD High Production Volume Chemicals", Office of Health Studies, Environmental Health Department, Environment Agency, Japan (HPV/SIDS Test conducted by EA, Japan)

EA & MITI, Japan (1994) Unpublished Report on Exposure Estimation (HPV/SIDS Test conducted by EA and MITI, Japan)

ECDIN database (1994)

Huang-Minlon, J. Am. Chem. Soc., 70, 2802-2804 (1948)

Leo, A. J. (1982) LogP Values Calculated Using the CLOGP Program for Compounds. In ISHOW Files. Pomona College Medicinal Chemistry Project; 1982

Loeser, E. (1979): Bayer AG data, short report, 3. 5. 1979

Lyman W.J. et al (1961) W. J. Lyman, W. F. Reehl and D. H. Rosenblatt, "Handbook of Chemical Property Estimation Method", McGraw Hill Book Co., 1981.

MHW, Japan (1994) Unpublished Report on Preliminary Reproductive Toxicity Test of 4,4'-diamino-2,2'-stilbenedisulfonic acid. (HPV/SIDS Test conducted by MHW, Japan)

Merck Index (1982) Windholz, M. The Merck Index, 9th Edition Merck and Company, Inc., Rahway, NJ; 1982

MITI, Japan (1994a): Unpublished data

MITI, Japan (1994b) Unpublished Report (HPV/SIDS Test conducted by MITI, Japan. Test was performed in Chemicals Inspection and Testing Institute, Japan)

Norpoth, K. (1977): Data of Bayer AG, University of Murnster, 22. 7. 1977

NTP (1992): Technical Report No. 412

Thyssen, J. (1979): Bayer AG data, short report, 6. 8. 1979

Zaitseva, N. V.; Kulikov, A. L. (1980): Gig. Sanit. 45, 73-76

Zeiger, E. et al. (1987): Environ. Mutagen. 9, Suppl. 9, 1-110. Salmonella Mutagenicity test 3.Results from the testing of 255 chemicals.