

[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**

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

**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  $3.7 \times 10^{-2}$  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<sub>50</sub> values were gained from test results; LC<sub>50</sub> = > 1000 mg/l (acute fish); EC<sub>50</sub> = 210 mg/l (acute daphnia); EC<sub>50</sub> = 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<sub>local</sub> have been calculated based on an emission and effluent scenario and a dilution factor. PEC<sub>local</sub> for the aquatic compartment was  $3.7 \times 10^{-2}$  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.

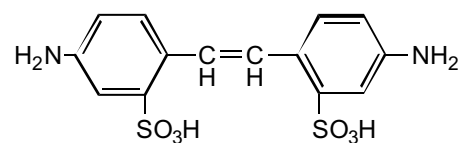
#### **NATURE OF FURTHER WORK RECOMMENDED**

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

## FULL SIDS SUMMARY

CAS NO: 81-11-8	SPECIES	PROTOCOL	RESULTS
<b>PHYSICAL-CHEMICAL</b>			
2.1			> 300 °C
2.2			No data available
2.3			2.45 (relative density) at 20 °C
2.4		OECD TG 104	< 130 Paat 25 °C
2.5		OECD TG 107	Unmeasurable
2.6 A.		OECD TG 105	32 mg/L at 25 °C
B.			
		OECD TG 112	No data available
2.12			No data available
<b>ENVIRONMENTAL FATE AND PATHWAY</b>			
3.1.1		Calculated	water: $T_{1/2} = 1.78 \times 10^2$ years
3.1.2		OECD TG 111	Stable (pH 4.0, 7.0, 9.0)
3.2			No data available.
3.3			No data available
3.5		OECD TG 301C	Not readily biodegradable: 0 % (BOD) in 28 days, 1 - 4 % (HPLC) in 28 days.
3.6			No data available
<b>ECOTOXICOLOGY</b>			
4.1	<i>Oryzias latipes</i>	OECD TG 203	LC <sub>50</sub> (72hr): > 1,000 mg/L LC <sub>50</sub> (96hr): > 1,000 mg/L
4.2	<i>Daphnia magna</i>	OECD TG 202	EC <sub>50</sub> (24hr): 210 mg/l
4.3	<i>Selenastrum capricornutum</i>	OECD TG 201	EC <sub>50</sub> (72hr): 76 mg/l NOEC: 32 mg/l
4.5.2	<i>Daphnia magna</i>	OECD T G 202	EC <sub>50</sub> (21d, Immobility): 74 mg/l EC <sub>50</sub> (21d, Reproduction): 92 mg/l NOEC (21d, Repro): 37 mg/l
4.6.1			No data available.
4.6.2			No data available.
(4.6.3)			No data available
<b>TOXICOLOGY</b>			
5.1.1	Rat	Unknown	LD <sub>50</sub> : > 5,000 mg/kg
5.1.2			No data available.
5.1.3			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 <i>In Vitro</i>			
A.	Bacterial Test (Gene mutation)	<i>S. typhimurium</i>	NTP Test and others	Negative (With metabolic activation) Negative (Without metabolic activation)
B.	Non-Bacterial <i>In Vitro</i> Test (Chromosomal aberrations)	CHO cells	NTP Test	Negative (With metabolic activation) Negative (Without metabolic activation)
5.6	Genetic Toxicity <i>In Vivo</i>			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<sub>14</sub>H<sub>14</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>**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  $1.78 \times 10^{-2}$  years.

### 2.2 Environmental exposure

#### a) Biodegradability:

If released into water, this substance is not readily biodegraded. In a MITI 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  $1.78 \times 10^{-2}$  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.

$$\text{Amount of release } (2.70 \times 10^8 \text{ mg/y})$$

---

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



### **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<sub>50</sub> values were gained from the above-mentioned tests; LC<sub>50</sub>(96h) > 1,000 mg/l (acute fish); EC<sub>50</sub>(24h) = 210 mg/l (acute daphnia); EC<sub>50</sub>(72h) = 76 mg/l (algae); NOEC = 32 mg/l (algae); EC<sub>50</sub>(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 <sup>*1</sup>	Conc. (mg/L)	Reference
<i>Selenastrum capricornutum</i> (algae)	Biomass: EC <sub>50</sub> (72h)	76 mg/L 32 mg/L	MOE, Japan. (1994)
	Biomass:NOEC		
<i>Daphnia magna</i> (water flea)	Imm: LC <sub>50</sub> (24h)	210 mg/L	
	Rep: EC <sub>50</sub> (21d)	92 mg/L	
	Rep: LOEC(21d)	67 mg/L	
	Rep: NOEC (21d)	37 mg/L	
<i>Oryzias latipes</i> (fish, Medaka)	Mor: LC <sub>50</sub> (48h)	>1,000 mg/L	
	Mor: LC <sub>0</sub> (72h)	>1,000 mg/L	
	Mor:LC <sub>50</sub> (96h)	>1,000 mg/L	

Notes: <sup>\*1</sup> Mor; mortality, Rep; reproduction, Imm; immobilisation

#### 3.2 Human Toxicity

##### a) Acute toxicity

The acute oral LD<sub>50</sub> 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<sub>1</sub> 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 *uvrA* 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 exogenous 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  $3.7 \times 10^2$  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.

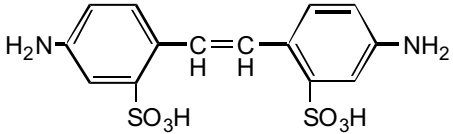
# **SIDS DOSSIER**

***Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis(5-amino)***  
***CAS No. 81-11-8***

***Sponsor country: Japan***

***DATE: March 2002***

## SIDS PROFILE

1.01 A.	<b>CAS No.</b>	81-11-8
1.01 C.	<b>CHEMICAL NAME (OECD Name)</b>	Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis(5-amino-(4,4'-Diamino-2,2'-stilbenedisulfonic acid)
1.01 D. 1.01 G.	<b>CAS DESCRIPTOR  STRUCTURAL FORMULA</b>	Not applicable  
	<b>OTHER CHEMICAL IDENTITY INFORMATION</b>	
1.5	<b>QUANTITY</b>	In Japan, approx 1,000 tonnes/year in 1988 - 1992. Import volume: 35-77 tonnes/year in 1988 - 1992.
1.7	<b>USE PATTERN</b>	In Japan, Intermediate for pigments and fluorescent brighteners  Closed system
1.9	<b>SOURCES AND LEVELS OF EXPOSURE</b>	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.
	<b>ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)</b>	



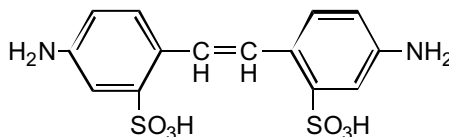
## SIDS SUMMARY

## 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
<b>PHYSICAL-CHEMICAL DATA</b>								
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								
<b>ENVIRONMENTAL FATE and PATHWAY</b>								
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								
<b>ECOTOXICITY</b>								
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								
<b>TOXICITY</b>								
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 <i>in vitro</i>							
	. Gene mutation	Y	N	N	Y	N	Y	N
	. Chromosomal aberration	Y	N	N	Y	N	Y	N
5.6	Genetic Toxicity <i>in vivo</i>	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<sub>14</sub>H<sub>14</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>
- 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  Ambiguous   
Sublimation: Yes  No  Ambiguous   
Method: Unknown  
GLP: Yes  No  ?   
Remarks: None  
Reference: MITI, Japan (1994b)

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

### 2.2 BOILING POINT

No data available

### 2.3 DENSITY (Relative density)

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

### 2.4 VAPOUR PRESSURE

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

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

(a)  
 Log Pow: Unmeasurable  
 Temperature: 25 °C  
 Method: calculated ; measured   
 OECD Test Guideline 107  
 GLP: Yes  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 ; 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 ;  
 Not soluble   
 Method: OECD Test Guideline 105  
 GLP: Yes  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 ;  
 Not soluble   
 Method:  
 GLP: Yes  No  ?   
 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 <input type="checkbox"/> ; Water <input checked="" type="checkbox"/> ; Soil; Other <input type="checkbox"/>
Light source:	Sunlight <input checked="" type="checkbox"/> ; Xenon lamp <input type="checkbox"/> ; Other <input type="checkbox"/>
Spectrum of substance:	epsilon = $1.61 \times 10^4$ at 300 nm epsilon = $3.32 \times 10^4$ at 340 nm
Estimated parameter for calculation:	Quantum yield 0.001 Concentration $5 \times 10^{-5}$ M Depth of water body 500 cm Conversion constant $6.023 \times 10^{20}$
Result:	Degradation rate $6.19 \times 10^{-11}$ mol/l/s Half life $1.78 \times 10^2$ years
Reference:	Lyman, W.J. et al. (1981)

##### 3.1.2 STABILITY IN WATER

Type:	Abiotic (hydrolysis) <input checked="" type="checkbox"/> ; biotic (sediment) <input type="checkbox"/>
Result:	Stable at pH 4, 7 and 9 at 25°C
Method:	OECD Test guideline 111
GLP:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> ? <input type="checkbox"/>
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 <input checked="" type="checkbox"/> ; anaerobic <input type="checkbox"/>
Inoculum:	adapted <input type="checkbox"/> ; non-adapted <input checked="" type="checkbox"/>
Concentration of the chemical:	100 mg/l related to Test Substance <input checked="" type="checkbox"/>
Medium:	water <input type="checkbox"/> ; water-sediment <input type="checkbox"/> ; soil <input type="checkbox"/> ; sewage treatment <input type="checkbox"/> other <input checked="" type="checkbox"/> (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. <input type="checkbox"/> ; Inherently biodeg. <input type="checkbox"/> ; under test condition no biodegradation observed <input checked="" type="checkbox"/>
Method:	OECD Test Guideline 301 C
GLP:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> ? <input type="checkbox"/>
Test substance:	4,4'-Diamino-2,2'-stilbenedisulfonic acid
Reference:	MITI, Japan (1994b)

**3.6 BOD<sub>5</sub>, COD OR RATIO BOD<sub>5</sub>/COD**

Not applicable

**3.7 BIOACCUMULATION**

No data available

**3.8 ADDITIONAL REMARKS**

- |           |                          |      |
|-----------|--------------------------|------|
| <b>A.</b> | <b>Sewage treatment</b>  | None |
| <b>B.</b> | <b>Other information</b> | None |

#### 4. ECOTOXICOLOGICAL DATA

##### 4.1 ACUTE/PROLONGED TOXICITY TO FISH

(a)	
Type of test:	static <input type="checkbox"/> ; semi-static <input checked="" type="checkbox"/> ; flow-through <input type="checkbox"/> ; other <input type="checkbox"/> open-system <input checked="" type="checkbox"/> ; closed-system <input type="checkbox"/>
Species:	<i>Oryzias latipes</i>
Exposure period:	96 hr
Results:	LC <sub>50</sub> (24h) = > 1,000 mg/l LC <sub>50</sub> (48h) = > 1,000 mg/l LC <sub>50</sub> (72h) = > 1,000 mg/l LC <sub>50</sub> (96h) = > 1,000 mg/l NOEC = LOEC =
Analytical monitoring:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> ? <input type="checkbox"/>
Method:	OECD Test Guideline 203 (1981)
GLP:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> ? <input type="checkbox"/>
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 <input type="checkbox"/> ; semi-static <input type="checkbox"/> ; flow-through <input type="checkbox"/> ; other <input type="checkbox"/> open-system <input type="checkbox"/> ; closed-system <input type="checkbox"/>
Species:	<i>Leuciscus idus</i> (Goldorfe)
Exposure period:	48 hr
Results:	LC <sub>0</sub> (48h) = 200 mg/l
Analytical monitoring:	Yes <input type="checkbox"/> No <input type="checkbox"/> ? <input checked="" type="checkbox"/>
Method:	Other method
GLP:	Yes <input type="checkbox"/> No <input type="checkbox"/> ? <input checked="" type="checkbox"/>
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 <input checked="" type="checkbox"/> ; semi-static <input type="checkbox"/> ; flow-through <input type="checkbox"/> ; other <input type="checkbox"/> open-system <input checked="" type="checkbox"/> ; closed-system <input type="checkbox"/>
Species:	<i>Daphnia magna</i>
Exposure period:	24 hr
Results:	EC <sub>50</sub> (24h) = 210 mg/l (95% confidence limits: 130-250 mg/l) EC <sub>50</sub> (48h) = NOEC = LOEC =
Analytical monitoring:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> ? <input type="checkbox"/>

Method: OECD Test Guideline 202 (1984)  
 GLP: Yes  No  ?   
 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 ; Growth rate ; Other   
 Exposure period: 72 hours  
 Results: Biomass: EC<sub>50</sub> (24h) =  
 EC<sub>50</sub> (72h) = 76 mg/l  
 NOEC = 32 mg/l (p < 0.05)  
 LOEC =  
 Analytical monitoring: Yes  No  ?   
 Method: open-system ; closed-system   
 OECD Test Guideline 201 (1984)  
 GLP: Yes  No  ?   
 Test substance: 4,4'-Diamino-2,2'-stilbenedisulfonic acid, purity = 96.4 %  
 Remarks: The EC<sub>50</sub> 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<sub>0</sub> (24h) = 1,000 mg/l  
 Method: Other method  
 Bestimmung der biologischen Schadwirkung toxischer Abwaesser gegen Bakterien. DEV, L8 (1968) Modifiziert.  
 GLP: Yes  No  ?   
 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 ; flow-through ; other ;  
open-system ; closed-system

Species: *Daphnia magna*

End-point: Mortality ; Reproduction rate ; Other

Exposure period: 21 days

Results:

Immobility: EC<sub>50</sub> (48 h) = 130 mg/l (95% confidence limits: 110-140 mg/l)  
EC<sub>50</sub> (21 d) = 74 mg/l (95% confidence limits: 63-86 mg/l)  
NOEC =  
LOEC =

Reproduction: EC<sub>50</sub> (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  ?

Method: OECD Test Guideline 202 (1984)

GLP: Yes  No  ?

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<sub>0</sub> [ ]; LD<sub>100</sub> [ ]; LD<sub>50</sub> [X]; LD<sub>L0</sub> [ ]; 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<sub>0</sub> [ ]; LD<sub>100</sub> [ ]; LD<sub>50</sub> [X]; LD<sub>L0</sub> [ ]; 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[ ]

Method: Not irritating[X]  
 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  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 ;  
No data

Results:

Genotoxic effects: + ? -

With metabolic activation:

Without metabolic activation:

Method:

GLP: Yes  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 ;  
No data

Results:

Genotoxic effects: + ? -

With metabolic activation:

Without metabolic activation:

Method: Aroclor 1254-induced male SD rat liver S9 at  
concentrations up to 1,020 ug/ml or 5,000 ug/ml

GLP: Yes  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 ; 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)

Control group: Mice: 0, 6,250 (776 mg/kg), 12,500 ppm (1656 mg/kg) )  
 Yes ; No ; No data ;  
 Concurrent no treatment ; Concurrent vehicle ;  
 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  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

Species/strain: Rat Crj:CD(SD)

Sex: Female ; Male ; Male/Female ; 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 ; No ; No data ;  
 Concurrent no treatment ; Concurrent vehicle ;  
 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  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 Munster, 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.