FOREWORD INTRODUCTION

1-Aminoanthraquinone

CAS N°: 82-45-1

SIDS Initial Assessment Report

For

SIAM 4

Tokyo, Japan, 20-22 May 1996

1. Chemical Name: 1-Aminoanthraquinone

2. CAS Number: 82-45-1

3. Sponsor Country: Japan

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

4. Shared Partnership with:

5. Roles/Responsibilities of the Partners:

- Name of industry sponsor /consortium
- Process used

6. Sponsorship History

- How was the chemical or category brought into the OECD HPV Chemicals Programme ?

As a high priority chemical for initial assessment, 1-aminoanthraquinone was selected in the framework of the HPV Programme.

SIDS Dossier and Testing Plan were reviewed at a SIDS Review Meeting in 1993, where the following SIDS Testing Plan was agreed.

No testing ( )

Testing(X) Physical-Chemical Properties
Vapour pressure
Partition coefficient
Water solubility
Environmental fate/Biodegradation
Biodegradation
Bioaccumulation
Photodegradation
Stability in water
Ecotoxicity
Acute toxicity to fish
Acute toxicity to daphnids

Toxicity to algae
Chronic toxicity to daphnids
Toxicity
Acute dermal toxixity
Repeated dose toxicity
Reproductive toxicity
Gene mutation
Chromosomal aberration
Genetic toxicity in vivo

Original report already circulated in August 1995, and the report was revised according to the comments from member countries.

7. Review Process Prior to the SIAM:

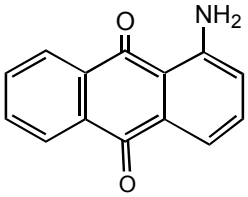
8. Quality check process:

9. Date of Submission: April 30, 1996

10. Date of last Update:

11. Comments:

SIDS INITIAL ASSESSMENT PROFILE

CAS No.	82-45-1
Chemical Name	9,10-Anthracenedione, 1-amino-
Structural Formula	

CONCLUSIONS AND RECOMMENDATIONS

A potential hazard to the environment due to toxicity to algae is identified, but exposure is low in the sponsor country.

Unless further information on exposure in other Member countries presents evidence to the contrary, 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

Production volume of 1-aminoanthraquinone in Japan is ca. 1,000 - 2,000 tonnes/year in 1990-1993. This chemical is used as intermediates for dyes and pharmaceuticals in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solutions, and is considered as "not readily biodegradable". Direct photodegradation is expected as this chemical absorbs UV light with half-life of about one week.

The potential environmental distribution of the chemical obtained from a generic fugacity model (Mackey level III) showed that the chemical would be distributed mainly into water and soil. Predicted environmental concentration (PEC_{local}) of this chemical was estimated as 1.7×10^{-4} mg/l from Japanese local exposure scenario.

For the environment, various NOEC and LC_{50} values were gained from test results; LC_{50} = > 1000 mg/l (acute fish); EC_{50} = > 1000 mg/l (acute daphnia); EC_{50} = 0.25 mg/l (acute algae); NOEC = 0.10 mg/l (acute algae); NOEC = 0.32 mg/l (long-term daphnia reproduction). From the lowest toxicity data to algae, acute-NOEC of *Algae* (0.1 mg/l) was adopted for the calculation of PNEC. The assessment factor of 100 was used to both acute and chronic toxicity data to determine PNEC according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, PNEC of the chemical is 0.001 mg/l in the present report. The PEC is lower than the PNEC, therefore environmental risk is presumably low.

As 1-aminoanthraquinone is produced in a closed system, exposure during synthesis may be excluded. The product is filled into barrels under the local exhaust ventilation. Inhalation at work place is considered to be main exposure route while skin contact plays a minor role. However workers wear personal protective equipment (e.g. safety glasses, dust respirator, rubber gloves) during the filling process. Therefore, the exposure at work place is considered to be negligible at present situation. In addition, this chemical is not contained in consumer products, because it is an intermediate in industrial use.

Although the chemical showed positive results only in *S. typhimurium* TA 1537 with metabolic activation, negative results were obtained by other bacterial strains and chromosomal aberration tests *in vitro* and *in vivo*. In a combined repeat dose and reproductive/developmental toxicity screening test, several toxicological findings in kidney and spleen were observed at the lowest dose (eosinophilic droplet/body [kidney], nephropathy [spleen]). The parental animals exhibited no effects on reproductive parameters such as fertility index. However, nursing behaviour disappeared in all of the treatment female groups. Viability of pups on day 4 after birth was decreased in all treatment groups. Therefore, NOEL was less than 40 mg/kg/day both for repeated dose toxicity and reproductive

toxicity.

As for indirect exposure via environment, PEC was estimated as $1.7 \times 10^{-4.}$ mg/l from local exposure scenario. For human health, although NOEL is estimated as less than 40 mg/kg/day for both repeated dose and reproductive toxicity, the margin of safety is large. Therefore, health risk through the environment, in general, is considered to be presumably low due to its use pattern and exposure situation.

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

NATURE OF FURTHER WORK RECOMMENDED

FULL SIDS SUMMARY

CAS NO: 82-45-1		SPECIES	PROTOCOL	RESULTS
PHYSICAL-CHEMICAL				
2.1	Melting Point			256 – 258 °C
2.2	Boiling Point			> 300 °C
2.3	Density			No data available
2.4	Vapour Pressure		OECD TG 104	1.2×10^{-4} Pa at 100 °C
2.5	Partition Coefficient (Log Pow)		OECD TG 107	3.74 at 25 °C
2.6 A.	Water Solubility		OECD TG 105	32 mg/L at 25 °C
B.	pH			No data available.
	pKa			Na data available.
2.12	Oxidation: Reduction Potential			No data available.
ENVIRONMENTAL FATE AND PATHWAY				
3.1.1	Photodegradation		Estimation	$T_{1/2} = 1.4 \times 10^{-2}$ y (direct photolysis in water)
3.1.2	Stability in Water		OECD TG 111	Stable at pH 4.0, 7.0 and 9.0.
3.2	Monitoring Data			Not detected from surface water and sediment in Japan
3.3	Transport and Distribution		Calculated (Fugacity Level III)	100% released to water, In Air 0.04% In Water 62.57% In Soil 21.34% In Sediment 16.06%
3.5	Biodegradation		OECD TG 301C	Not readily biodegradable: 0 - 1 % (BOD) in 28 days, 1 - 3% (HPLC) in 28 days
3.6	Bioaccumulation	Carp	OECD TG 305C	BCF: 50 – 150
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} (48hr): > 1,000 mg/l
4.3	Toxicity to Aquatic Plants e.g. Algae	*Selenastrum capricornutum*	OECD TG 201	(biomass method) EC_{50} (72hr): 0.25 mg/l NOEC: 0.1 mg/l
4.5.2	Chronic Toxicity to Aquatic Invertebrates (*Daphnia*)	*Daphnia magna*	OECD TG 202	EC_{50} (21d, Mortality): 0.62 mg/l EC_{50} (21d, Reproduction): 0.56 mg/l NOEC (21d, Repro): 0.32 mg/l
4.6.1	Toxicity to Soil Dwelling Organisms			No data available.
4.6.2	Toxicity to Terrestrial Plants			No data available.

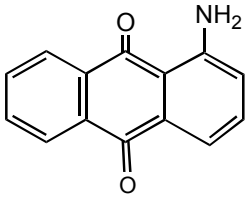
CAS NO: 82-45-1		SPECIES	PROTOCOL	RESULTS
(4.6.3)	Toxicity to Other Non- Mammalian Terrestrial Species (Including Birds)			No data available
TOXICOLOGY				
5.1.1	Acute Oral Toxicity	Rat	OECD TG 401	LD_{50} > 5,000 mg/kg
5.1.2	Acute Inhalation Toxicity			No data available.
5.1.3	Acute Dermal Toxicity	Mouse		LD_{50} > 2,000 mg/kg
5.4	Repeated Dose Toxicity	Rat	OECD Combined Test	NOAEL < 40 mg/kg/day
5.5	Genetic Toxicity In Vitro			
A.	Bacterial Test (Gene mutation)	*S. .typhimurium* *E. coli*	OECD Guidelines No.471 and 472 and Japanese Guideline	TA1537: Positive in TA1537 with metabolic activation Other bacterial strain: Negative (With And without metabolic activation)
B.	Non-Bacterial In Vitro Test (Chromosomal aberrations)	CHL cells	OECD Guideline No.473 and Japanese Guideline	Negative (With metabolic activation) Negative (Without metabolic activation)
5.6	Genetic Toxicity In Vivo	Mouse	Micronucleus test	Negative
5.8	Toxicity to Reproduction	Rat	OECD Combined Test	NOAEL Parental = < 40 mg/kg/day NOAEL F1 offspring = < 40 mg/kg/day
5.9	Developmental Toxicity/ Teratogenicity			
5.11	Experience with Human Exposure			

SIDS Initial Assessment Report

1 IDENTITY

1.1 Identification of the Substance

CAS Number: 82-45-1
IUPAC Name: 9,10-Anthracenedione, 1-amino-
Molecular Formula: $C_{14}H_9NO_2$
Structural Formula:



Synonyms: 1-Aminoanthraquinone

1.2 Purity/Impurities/Additives

Degree of Purity: > 97 %

Major Impurities: Anthraquinone

Essential Additives: None

1.3 Physico-Chemical properties

Table 1 Summary of physico-chemical properties

Property	Value
Melting point	256-258 °C
Boiling point	> 300 °C
Vapour pressure	1.2 x 10^{-4} Pa at 100 °C
Water solubility	32 mg/l
Partition coefficient n-octanol/water (log value)	3.74

2 GENERAL INFORMATION ON EXPOSURE

The production level of 1-aminoanthraquinone in Japan was about 1,000 - 2,000 tonnes/year. Most of this amount was sold and handled in Japan. This chemical is used as an intermediate for dyestuff and pharmaceuticals in closed systems. Release into the environment may occur at the production site or specific industrial sites. All disposal wastes are treated by wastewater treatment or incineration. 1-Aminoanthraquinone seems to be released into water and air from its production sites after biological treatment. In a Japanese company, about 1.9 tonnes/year are released into water from the production site. In a Japanese monitoring program by the Environment Agency, this chemical was not detected in the general environment in 1987. No specific local monitoring data of the chemical is available. 1-Aminoanthraquinone is not readily biodegradable (OECD 301C: 0% after 28d). 1-Aminoanthraquinone is not hydrolyzed at pH 4, 7 and 9. Direct photodegradation is

expected because 1-aminoanthraquinone absorbs UV light. The half-life in water is estimated to be about a week.

2.1 Environmental Exposure and Fate

2.1.1 Estimates of environmental fate, pathway and concentration

Global exposure

The potential environmental distribution of 1-aminoanthraquinone obtained from a generic level III fugacity model is shown in Table 2. The results show that if 1-aminoanthraquinone is released mainly into soil or air, it is likely to distribute into the soil compartment. But if 1-aminoanthraquinone is released mainly into water, it is likely to be transported to both soil and sediment. Due to the low vapour pressure of 1-aminoanthraquinone, it is unlikely to distribute into air.

Table 2. Environmental distribution 1-aminoanthraquinone using a generic level III fugacity model.

Compartment	Release: 100% to air	Release: 100% to water	Release: 100% to soil
Air	0.18%	0.04%	0.00%
Water	0.60%	62.57%	0.47%
Soil	99.06%	21.34%	99.41%
Sediment	0.15%	16.06%	0.12%

Local exposure

According to a Japanese manufacturer, 1,900 kg/year (measured) of 1-aminoanthraquinone are released with 1.10 x 10^7 t/y of effluent into a bay. The local predicted environmental concentration (PEC_{local}) is 1.7 x 10^{-4} mg/l, employing the following calculation model:

$$\frac{\text{Amount of release } (1.90 \times 10^9 \text{ mg/y})}{\text{Volume of effluent } (1.10 \times 10^{10} \text{ l/y}) \times \text{Dilution factor } (1{,}000)}$$

2.1.2 Photodegradation

A half-life time of 1.44 x 10^{-2} years is estimated for the direct photodegradation of 1-aminoanthraquinone in water. (MITI, Japan).

2.1.3 Stability in Water

The chemical is stable in water at pH 4, 7 and 9 at 25°C (OECD TG 111).

2.1.4 Biodegradation

If released into water, this substance does not readily biodegrade (MITI (I), corresponding to the OECD 301C: 0 - 1 % after 28 days based on BOD and 1 - 3 % based on HPLC analysis).

2.1.5 Bioaccumulation

BCF= 50 – 150 in carp (8 weeks at 25 °C) suggests that the potential for bioconcentration in aquatic organisms is low.

2.2 Human Exposure

2.2.1 Occupational Exposure

As 1-aminoanthraquinone is produced in a closed system, exposure during synthesis may be excluded. This chemical is used as intermediate for dyestuffs. The product is poured into barrels under local exhaust ventilation. Inhalation uptake is considered to be the main exposure route. Skin contact plays a minor role. Workers wear safety glasses, dust respirators, and protective gloves during the filling process. Therefore, the exposure to workers is estimated to be negligible at the present situation.

2.2.2 Consumer Exposure

1-Aminoanthraquinone is not contained in consumer products, because the substance is an intermediate for dyestuffs. No other information on uses is available.

2.2.3 Exposure via the Environment

The highest exposure to the general population via the environment would be expected through drinking water processed from surface water. Based on physical chemical properties of 1-aminoanthraquinone, a significant removal during processing is not to be expected. Although reliable PEC_{global} cannot be estimated, the concentration in drinking water is assumed to be 1.7×10^{-4} mg/l as a worst case.

3 HUMAN HEALTH HAZARDS

3.1 Effects on Human Health

3.1.1 Acute Toxicity

LD_{50}s from acute oral toxicity studies in rats were reported as > 5,000 mg/kg or >1,600 mg/kg. Also, the LD_{50} in an acute dermal toxicity study in mice was reported to be > 2,000 mg/kg.

3.1.2 Repeated Dose Toxicity

There is only one key study on repeated dose toxicity of 1-aminoanthraquinone. This chemical was studied for oral toxicity in rats according to the OECD combined repeated dose and reproductive/developmental toxicity test [OECD TG 422]. As the study was well controlled and conducted under GLP, this was considered to be a key study. Male and female SD rats were orally administered (gavage) at doses of 0, 40, 200 and 1,000 mg/kg/day.

Increased spleen weights were observed in males in the 200 mg/kg group and above, as well as females in the 1000 mg/kg group. Also, relative liver weight was increased in males in the 200 mg/kg group and above. Regarding hemato-morphological examination, erythrocyte count, hemoglobin and mean corpuscular hemoglobin was decreased in males in the 200 mg/kg group and above. In clinical chemistry, the potassium concentration in males in the 1000 mg/kg group, and the

chlorine concentration in males in the 200 mg/kg group decreased. In histopathological examination, formation of the eosinophilic droplet and eosinophilic body in kidneys was increased in males in the 40 mg/kg group and above. Nephropathy and dark coloration of the spleen were observed in both males and females in the 40 mg/kg groups.

The NOEL is estimated to be less than 40 mg/kg/day for repeated dose toxicity.

3.1.3 Mutagenicity

In vitro Studies

A reverse gene mutation assay was conducted in line with Guidelines for Screening Mutagenicity Testing of Chemicals (Japan) and OECD Test Guidelines 471 and 472, using the pre-incubation method. This study was well controlled and regarded as a key study.

Although 1-aminoanthraquinone showed positive results in *S. typhimurium* TA1537 with metabolic activation, negative results were obtained with other bacterial strains at concentrations up to 5 mg/plate with or without a Metabolic activation system (MHW, 1993).

A chromosomal aberration test in line with Guidelines for Screening Mutagenicity Testing of Chemicals (Japan) and OECD Test Guideline 473 was conducted using cultured Chinese Hamster lung (CHL/IU) cells. This study was well controlled and regarded as a key study. The maximum concentration of the chemical was used with no apparent cytotoxic effect in continuous treatment. Neither structural chromosomal aberrations nor polyproidy were recognized up to a maximum concentration of 2.2 mg/ml under conditions of both continuous treatment and short-term treatment with or without an exogeneous metabolic activation system (MHW, 1998).

In vivo Studies

One test result is available on *in vivo* genotoxic effects. A micronucleus test in mice was reported as having negative results. No further information is provided (Bayer AG).

3.1.4 Carcinogenicity

There is some carcinogenicity data, but the data is inadequate.

3.1.5 Toxicity for Reproduction

1-Aminonaphthoquinone was studied for oral toxicity in rats according to the OECD combined repeated dose and reproductive/developmental toxicity test [OECD TG 422] at doses of 0, 40, 200 and 1,000 mg/kg/day. The parental animals exhibited no effects on reproductive parameters including copulation index, fertility index, gestation length, number of corpora lutea or implantation, implantation index, gestation index, delivery index, parturition or maternal behavior. However, nursing behavior disappeared in all of the treatment female groups. Viability of pups on day 4 after birth was decreased in all treatment groups. No external or skeletal anomalies related to the test substance administration were detected in any of the offspring. Furthermore, there are no significant differences in the number of offspring or live offspring, sex ratio, live birth index or body weights.

NOEL is estimated to be less than 40 mg/kg/day for reproductive toxicity.

3.2 Initial Assessment for Human Health

As 1-aminoanthraquinone is produced in a closed system, exposure during synthesis may be excluded. The product is poured into barrels under local exhaust ventilation. Inhalation in the workplace is considered to be the main exposure route while skin contact plays a minor role. However, workers wear personal protective equipment (e.g. safety glasses, dust respirators, rubber gloves) during the filling process. Therefore, the exposure in the workplace is considered to be negligible at present. In addition, this chemical is not contained in consumer products.

Although the chemical showed positive results only in *S. typhimurium* TA 1537 with metabolic activation, negative results were obtained by other bacterial strains and chromosomal aberration tests *in vitro* and *in vivo*. In a combined repeat dose and reproductive/developmental toxicity test, several toxicological findings in the kidney and spleen were observed at the lowest dose (eosinophilic droplet [kidney], nephropathy [spleen]). The parental animals exhibited no effects on reproductive parameters such as fertility index. However, nursing behaviour disappeared in all of the treatment female groups. Viability of pups on day 4 after birth was decreased in all treatment groups. Therefore, the NOEL was less than 40 mg/kg/day for both repeated dose toxicity and reproductive toxicity.

For human health, the NOEL is estimated to be 40 mg/kg/day for repeated dose and 40 mg/kg/day for reproductive toxicity. As for indirect exposure via the environment, the PEC was estimated to be $1.7 \times 10^{-4.}$ mg/l from a local exposure scenario. The margin of safety is large. Therefore, health risk through the environment, in general, is considered to be presumably low due to its use pattern and exposure situation.

4 HAZARDS TO THE ENVIRONMENT

4.1 Aquatic Toxicity

1-Aminoanthraquinone has been tested in a limited number of aquatic species (*Selenastrum capricornutum*, *Daphnia magna* and *Oryzias latipes*), under OECD test guidelines [OECD TG 201, 202, 203, 204 and 211]. Acute and chronic toxicity data to test organisms for 1-aminoanthraquinonw are summarized in Table 3. No other ecotoxicological data are available.

Various NOEC and LC_{50} values were gained from the above-mentioned tests; 96h LC_{50} = >1,000 mg/l (acute fish); 24h EC_{50} = > 1,000 mg/l (acute daphnia); 72h EC_{50} = 0.25 mg/l (acute algae); NOEC = 0.1 mg/l (algae); 21d NOEC = 0.32 mg/l (long-term daphnia reproduction). Therefore, the chemical is considered to be strongly toxic to algae and daphnids (long-term) and non-toxic to fish. As the lowest toxicity result, the NOEC for algae (0.1 mg/l) was adopted. An assessment factor of 100 is applied. Thus the PNEC of 1-aminoanthraquinone is 0.001 mg/l. Since the PEC is lower than the PNEC, environmental risk is presumably low.

Table 3. Acute and chronic toxicity data of 1,4-diethylbenzene to aquatic organisms.

Species	Endpoint[*1]	Conc. (mg/L)	Reference
Selenastrum capricornutum (algae)	Biomass: EC_{50} (72h) Biomass: NOEC	0.25 mg/L 0.10 mg/L	EA Japan. (1992)
Daphnia magna (water flea)	Imm: EC_{50}(48h) Imm: EC_{50}(21d) Rep: EC_{50}(21d) Rep: NOEC	> 1,000 mg/L 0.62 mg/L 0.56 mg/L 0.32 mg/L	
Oryzias latipes (fish, Medaka)	Mor: LC_{50}(24h) Mor: LC_{50}(72h) Mor:LC_{50}(96h)	> 1,000 mg/L > 1,000 mg/L > 1,000 mg/L	

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

4.2 Initial Assessment for the Environment

The production volume of 1-aminoanthraquinone in Japan is ca. 1,000 - 2,000 tonnes/year in 1990 - 1993. This chemical is used as an intermediate for dyes and pharmaceuticals 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 a half-life in water of about one week.

The potential environmental distribution of the chemical obtained from a generic fugacity model (Mackey level III) showed the chemical will be distributed mainly to water and soil. The predicted environmental concentration (PEC_{local}) for this chemical was estimated to be 1.7×10^{-4} mg/l from a Japanese local exposure scenario.

For the environment, various NOEC and LC_{50} values were gained from test results; 96h LC_{50} = > 1000 mg/l (acute fish); 24h EC_{50} = > 1000 mg/l (acute daphnia); 72h EC_{50} = 0.25 mg/l (acute algae); NOEC = 0.10 mg/l (algae); 21d NOEC = 0.32 mg/l (long-term daphnia reproduction). As the lowest toxicity result, the NOEC for algae (0.1 mg/l) was adopted.. An assessment factor of 100 is used to determine a PNEC according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, the PNEC of the chemical is 0.001 mg/l in the present report. Because the PEC is lower than the PNEC, environmental risk is presumably low.

5 RECOMMENDATIONS

A potential hazard to the environment due to toxicity to algae is identified, but exposure is low in the sponsor country.

Unless further information on exposure in other Member countries presents evidence to the contrary, it is currently considered of low potential risk and low priority for further work.

6 REFERENCES

EA, Japan (1987) Environment Monitoring of Chemicals - Environmental Survey Report of F.Y. 1986 and 1987 (Office of Health Studies, Environmental Health Department, EA, Japan)

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)

Laham S. et al., Toxicol. Appl. Pharmacol. 8, 346 (1966)

Loeser E., Bayer AG data, short report, 11. 8. 1978

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

MHW, Japan (1994a) Unpublished Report on Combined Repeat Dose and Reproductive/ Developmental Toxicity Screening Test of 1-aminoanthraquinone. (HPV/SIDS Test conducted by MHW, Japan)

MHW, Japan (1994b) Unpublished Report on Mutagenicity Test of 1-aminoanthraquinone. (HPV/SIDS Test conducted by MHW, Japan)

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)

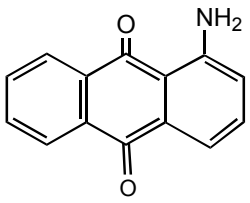
SIDS DOSSIER

9,10-Anthracenedione, 1-amino-

CAS No. 82-45-1

Sponsor Country: Japan

S I D S P R O F I L E

1.01 A.	**CAS No.**	82-45-1
1.01 C.	**CHEMICAL NAME (OECD Name)**	9,10-Anthracenedione, 1-amino-
1.01 D.	**CAS DESCRIPTOR**	Not applicable
1.01 G.	**STRUCTURAL FORMULA**	
	OTHER CHEMICAL IDENTITY INFORMATION	
1.5	**QUANTITY**	In Japan, 1,000 - 2,000 tonnes/year in 1990 - 1993.
1.7	**USE PATTERN**	In Japan, Intermediate for dyestuffs and pharmaceuticals Closed system
1.9	**SOURCES AND LEVELS OF EXPOSURE**	In Japan, 1. Amount released from production site to water is 1.9 tonnes/year All of the waste water is incinerated
ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)		

S I D S S U M M A R Y

1-Aminoanthraquinone

CAS NO: 82-45-1		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	Y	Y	Y	N	N	Y	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	N						Y
5.1.2	Acute Inhalation	N						N
5.1.3	Acute Dermal	N						N
5.4	Repeated Dose	N						Y
5.5	Genetic Toxicity *in vitro*							
	. Gene mutation	N						Y
	. Chromosomal aberration	N						Y
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								

1.01 SUBSTANCE INFORMATION

A. CAS-Number 82-45-1

B. Name (IUPAC name) 1-Aminoanthraquinone

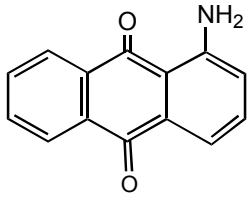
C. Name *(OECD name)* 9,10-Anthracenedione, 1-amino-

D. CAS Descriptor Not applicable

E. EINECS-Number 201-423-5

F. Molecular Formula $C_{14}H_9NO_2$

G. Structural Formula



H. Substance Group Not applicable

I. Substance Remark None

J. Molecular Weight 223.20

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

Name: Same as above contact person
Address:

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 > 97 %

1.2 SYNONYMS 1-Aminoanthraquinone

1.3 IMPURITIES Anthraquinone

1.4 ADDITIVES None

1.5 QUANTITY

Location	Production (tonnes)	Date
Japan	1,000-2,000/year	1990-1993

Reference: MITI, Japan (1994a)

1.6 LABELLING AND CLASSIFICATION

None

1.7 USE PATTERN

A. General

Type of Use:	**Category:**
(1) Industry use	Intermediate for dyestuffs
(2) Industry use	Intermediate for dyes and pharmaceuticals

Reference: (1) MITI, Japan (1994a)
(2) ECDIN Database

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: 1.9 tonnes/year
Reference: MITI, Japan (1994a)

1.10 ADDITIONAL REMARKS

A. Options for disposal Incineration

Reference: MITI, Japan (1994a)

B. Other remarks None

2.1 MELTING POINT

(a)

Value:	256 - 258 °C
Decomposition:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Sublimation:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Reference:	MITI (1992)

(b)

Value:	260 °C
Decomposition:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Sublimation:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Reference:	Bayer AG

(c)

Value:	251 - 252 °C
Decomposition:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Sublimation:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:	
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Reference:	Shibusawa et al. (1977)

2.2 BOILING POINT

(a)

Value:	> 300 °C
Pressure:	
Decomposition:	Yes **[ ]** No **[ ]** Ambiguous **[ ]**
Method:	
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Reference:	MITI, Japan (1994b)

(b)

Value:	>300 °C
Pressure:	
Decomposition:	Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Remarks:	None
Reference:	Bayer AG

2.3 DENSITY (Relative density)

No data available

2.4 VAPOUR PRESSURE

Value:	1.2×10^{-4} Pa
Temperature:	100°C
Method:	calculated **[ ]**; measured **[X]**

	OECD Test Guideline 104 Dynamic method
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Reference:	MITI, Japan (1994b)

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

(a)

Log Pow:	3.74
Temperature:	25 °C
Method:	calculated **[ ]**; measured **[X]** OECD Test Guideline 107
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Reference:	MITI (1992)

(b)

Log Pow:	2.1
Temperature:	25 °C
Method:	calculated **[X]**; measured **[ ]** Leo and Hansch method
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Reference:	Bayer AG (1991)

2.6 WATER SOLUBILITY

A. Solubility

(a)

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 (1992)

(b)

Value:	20 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:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Reference:	Bayer AG

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

3.1 STABILITY

3.1.1 PHOTODEGRADATION

Type:	Air **[ ]**; Water **[X]**; Soil; Other **[ ]**
Light source:	Sunlight **[X];** Xenon lamp **[ ];** Other **[ ]**
Spectrum of substance:	epsilon = 5.46 x 10^3 at 300 nm epsilon = 6.89 x 10^3 at 470 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 7.62 x 10^{-11} mol/l/s
	Half life 1.44 x 10^{-2} years
Reference:	W. J. Lyman, W. F. Reehl and D. H. Rosenblatt (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:	1-Aminoanthraquinone
Reference:	MITI, Japan (1994b)

3.1.3 STABILITY IN SOIL

No data available

3.2 MONITORING DATA (ENVIRONMENT)

(a)

Type of Measurement:	Background **[ ]**, At contaminated Site **[ ]**; Other **[X]**
Media:	Surface water
Results:	ND (Detection limits: 0.0002 ug/ml) in 9 areas in Japan
Remarks:	None
Reference:	EA, Japan (1987)

(b)

Type of Measurement:	Background **[ ]**, At contaminated Site **[ ]**, Other **[X]**
Media:	Sediment
Results:	0.022 ug/g dry (Number of detections/Number of samples: 1/21 in 7 areas, Detection limits: 0.02 ug/g dry) in Japan
Remarks:	None
Reference:	EA, Japan (1987)

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)

The potential environmental distribution of 1-Aminoanthraquinone obtained from a generic level III fugacity model is shown in Table. The results show that if 1-aminoanthraquinone is released mainly to soil or air, it is likely to distribute into soil compartment. But, if 1-Aminoanthraquinone is released mainly to water, it is likely to be transported both to soil and sediment. Due to the low vapour pressure of 1-aminoanthraquinone, it is unlikely to distribute into air.

Environmental distribution 1-Aminoanthraquinone using a generic level III fugacity model.

Compartment	**Release: 100% to air**	**Release: 100% to water**	**Release: 100% to soil**
Air	0.18%	0.04%	0.00%
Water	0.60%	62.57%	0.47%
Soil	99.06%	21.34%	99.41%
Sediment	0.15%	16.06%	0.12%

Reference: EA and MITI, Japan (1994)

3.4 IDENTIFICATION OF MAIN MODE OF DEGRADABILITY IN ACTUAL USE

No data available

3.5 BIODEGRADATION

(a)
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 **[**Japanese standard activated sludge**]**
Degradation: Degree of degradation after 28 days
0, 0 and 1 % from BOD
3, 1 and 2 % 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: 1-Aminoanthraquinone
Reference: MITI, Japan (1992)

(b)
Type: aerobic **[ ]**; anaerobic **[X]**
Inoculum: adapted **[ ]**; non-adapted **[ ]**;

Concentration of the chemical: related to Test Substance **[ ]**

Medium:	water**[ ];**water-sediment**[ ];**soil **[ ];**sewage treatment **[ ]** other **[ ]**
Degradation:	Degree of degradation after 20 days 0 %
Results:	Readily biodeg. **[ ];** Inherently biodeg. **[ ]**; under test condition no biodegradation observed **[X]**
Method:	OECD Test Guideline 301 D (Closed bottle Test)
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	1-Aminoanthraquinone
Reference:	Bayer AG

3.6 BOD_5,COD OR RATIO BOD_5/COD

Not applicable

3.7 BIOACCUMULATION

Species:	Carp
Exposure period:	8 weeks
Temperature:	25 °C
Concentration:	(1) 30 mg/l (2) 3 mg/l
BCF:	(1) 50 - 150 (2) 55 - 137
Method:	OECD Test Guideline 305 C
Type of test:	calculated **[ ]**; measured **[X]** static **[ ]**; semi-static **[ ]**; flow-through **[ ]**; other **[ ]**
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	1-Aminoanthraquinone
Reference:	MITI, Japan (1992)

3.8 ADDITIONAL REMARKS

A. Sewage treatment None

B. Other information None

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) = > 1000 mg/l LC_{50} (48h) = > 1000 mg/l LC_{50} (72h) = > 1000 mg/l LC_{50} (96h) = > 1000 mg/l NOEC = LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 203 (1981)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	1-Aminoanthraquinone, purity = 98.8 %
Remarks:	A group of 10 fish were exposed to each of 5 nominal concentrations (95-1000 mg/l). Stock solution was prepared with DMSO(1000 mg/l). Controls with and without this vehicle were taken for test.
Reference:	EA, Japan (1994)

(b)

Type of test:	static **[ ]**; semi-static **[ ]**; flow-through **[ ]**; other **[ ]** open-system **[ ]**; closed-system **[ ]**
Species:	*Leuciscus idus* (Goldorfe)
Exposure period:	96 hr
Results:	LC_0 (48h) = > 1000 mg/l
Analytical monitoring:	Yes **[ ]** No **[ ]** ? [X]
Method:	Other method Bestimmung der akuten Wirkung von Stoffen auf Fische Arbeitskreis "Fischtest" im Hauptausschuss "Detergenten" (15.10.1973)
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	1-Aminoanthraquinone
Remarks:	None
Reference:	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) = > 1000 mg/l EC_{50} (48h) = > 1000 mg/l NOEC =

	LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 202 (1984)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	1-Aminoanthraquinone, purity: = 98.8 %
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:	$EC_{50\ (24h)}$ =
		$EC_{50\ (72h)}$ = 0.25 mg/l
		NOEC = 0.10 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:	1-Aminoanthraquinone, purity = 98.8 %	
Remarks:	The EC_{50} values for biomass were calculated based on 8 nominal concentrations (0.058-3.2 mg/l). Stock solution was prepared with DMSO (100 mg/l). Controls with and without this vehicle were taken for the test.	
Reference:	EA, Japan (1994)	

4.4 TOXICITY TO BACTERIA

No studies located

4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

4.5.1. CHRONIC TOXICITY TO FISH

No studies located

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 day
Results:	
Immobility:	$EC_{50\ (48\ h)}$ = > 1000 mg/l
	$EC_{50\ (21\ d)}$ = 0.62mg/l (95% confidence limits: 0.49-0.74 mg/l)
	NOEC =
	LOEC =
Reproduction:	$EC_{50\ (21\ d)}$ = 0.56mg/l (95% confidence limits: 0.51-0.62 mg/l)
	NOEC = 0.32mg/l ($p < 0.05$)
	LOEC = 0.56mg/l ($p < 0.05$)
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 202 (1984)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	1-Aminoanthraquinone, purity = 98.8%
Remarks:	40 daphnids (4 replicates; 10 organisms per replicate) were exposed to each of 5 nominal concentrations (100-1000 mg/l) or (5.6-56 mg/l) or (0.32-3.2 mg/l). Stock solution was prepared with DMSO:HCO-40=9:1(100-1000 mg/l) or (5.6-56 mg/l) or (0.32-3.2 mg/l). Controls with and without this vehicle were taken for test.
Reference:	EA, Japan (1994)

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 studies located

4.8 BIOTRANSFORMATION AND KINETICS IN ENVIRONMENTAL SPECIES

No data available

4.9 ADDITIONAL REMARKS

None

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
Value :	> 5000 (mg/kg)
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	1-Aminoanthraquinone, purity: Unknown
Remarks:	None
Reference:	Loeser E. (1978)

(b)

Type :	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Rat
Value :	> 1600 (mg/kg)
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	1-Aminoanthraquinone, purity: unknown
Remarks:	None
Reference:	Marhold J. (1972)

5.1.2 ACUTE INHALATION TOXICITY

No data available

5.1.3 ACUTE DERMAL TOXICITY

Type :	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Mice (ddN strain)
Value:	> 2000 (mg/kg b.w.)
Method:	Fixed dose test 10 animals/dose, 14 days observation period,
GLP:	Yes **[ ]** No **[**X**]** ? **[ ]**
Test substance:	1-Aminoanthraquinone, purity: unknown
Remarks:	No compound related clinical signs were observed
Reference:	Unpublished company data

5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION

No data available

5.2 CORROSIVENESS/IRRITATION

5.2.1 SKIN IRRITATION/CORROSION

No data available

5.2.2 EYE IRRITATION/CORROSION

Test species/strain:	*Rabbit*
Test method:	Standard Draize test
GLP:	YES **[ ]** NO **[ ]** ? **[X]**
Test result:	500 mg/24h, "Mild" effect
Test substance:	1-Aminoanthraquinone
Remarks:	
Reference:	Marhold J. (1986)

5.3 SKIN SENSITIZATION

No data available

5.4 REPEATED DOSE TOXICITY

Species/strain:	Rat (Crj:CD(SD))
Sex:	Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of Administration:	Oral gavage
Exposure period:	Males: 42 days including 14 days before mating Females: from 14 days before mating to day 3 of lactation
Frequency of treatment:	7 days/week
Post exposure observation period:	
Dose:	0, 40, 200 or 1000 mg/kg (13 animals /group)
Control group:	Yes **[X]**; No **[ ]**; No data **[ ]**; Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
NOEL:	< 40 mg/kg/day
LOEL:	40 mg/kg/day
Results:	Increased spleen weights were observed in males in the 200 mg/kg group and above as well as in females in the 1000 mg/kg group. Also, relative liver weight was increased in more than 200 mg/kg male groups. In hemato-morphological examination, erythrocyte count, hemoglobin and mean corpuscular hemoglobin were decreased in more than 200 mg/kg male groups. In clinical chemistry, the potassium concentration in 1000 mg/kg male group, and the chlorine concentration in 200 mg/kg male group were decreased. In histopathological examination, formation of the eosinophilic droplet and eosinophilic body in kidney were increased in more than 40 mg/kg male groups. Nephropathy and dark coloration of the spleen were observed in 40 mg/kg both male and female groups. Extramedullary hematopoiesis in spleen were observed in males in the 40 mg/kg group and above.
Method:	OECD Combined Repeat dose and reproductive/ Developmental Screening Toxicity Test (1992)
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Commercial, purity: 98.7 %
Reference:	MHW, Japan (1994a)

5.5 GENETIC TOXICITY IN VITRO

A. BACTERIAL TEST

(a)

Type :	Bacterial reverse mutation assay
System of testing:	
Species/strain:	*S. typhimurium* TA 98, TA 100, TA 1535, TA1537 E. coli WP2 uvrA
Concentration:	0, 312.5, 625, 1250, 2500, 5000 µg/plate
Metabolic activation:	With **[ ]**; Without **[ ]**; With and Without **[X]**;No data**[ ]**
Results:	
Cytotoxicity conc:	With metabolic activation: 5000 µg/plate Without metabolic activation: 5000 µg/plate
Precipitation conc:	
Genotoxic effects:	

S. typhimurium TA 100, TA1535, TA98

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

S. typhimurium TA 1537

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

E. coli WP2 uvrA

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

Method:	Japanese Guideline for Screening Mutagenicity testing of chemicals
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Teat substance:	Commercial, purity: 98.7%
Remarks:	Procedure: Plate incorporation method Plates/test: 3 Activation system: Liver S-9 fraction from Phenobarbital and 5,6-Benzoflavone pretreated male SD rats with NADPH-generating system Media:Histidine selective No. replicates: 2
Reference:	MHW, Japan (1994b)

B. NON-BACTERIAL IN VITRO TEST

Type :	Cytogenetics Assay
System of testing:	
Species/strain:	Chinese hamster lung (CHL/IU) cells
Concentration:	-S9 (continuous treatment) 0, 0.3, 0.7, 1.3 mg/ml -S9 (short-term treatment) 0, 0.6, 1.1, 2.2 mg/ml

	+S9 (short-term treatment) 0, 0.6, 1.1, 2.2 mg/ml
Metabolic activation:	With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:	
	Cytotoxicity conc: With metabolic activation: 2.2 mg/ml Without metabolic activation: 2.2 mg/ml
Precipitation conc:	
Genotoxic effects:	+ ? - With metabolic activation: **[ ] [ ] [X]** Without metabolic activation: **[ ] [ ] [X]**
Method:	Japanese Guideline for Screening Mutagenicity testing of chemicals
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Commercial, purity 98.7 %
Remarks:	Plates/test:2 Activation system: S-9 fraction from the liver of Phenobarbital and 5,6-Benzoflavone induced male SD derived rats with NADPH-generating system Media: RPMI 1640 medium *plus* 10% foetal calf serum *plus* phytohaemagglutinin No. replicates: 1
Reference:	MHW, Japan (1994b)

5.6 GENETIC TOXICITY IN VIVO

Test type:	Micronucleus Test
Test species/strain:	Mice
Test method:	i.p. once, 5000 mg/kg b.w.
GLP:	Yes **[ ]**, No **[ ]**, ? **[X]**
Test Results:	No indications of a clastogenic effect
Genotoxic effects:	
	+ ? - Micronucleus test **[ ] [ ] [X]**
Remarks:	No further information are provided
Reference:	Bayer AG

5.7 CARCINOGENICITY

Species/strain:	Rats
Method:	once a week, orally, 10 mg/0.5 ml corn oil/rat, 14 months, 20 males and 20 females
GLP:	YES [ ] NO [X]
Result:	female: 6 adenomas of the mammary gland and other benign tumors (no further information) male: one cell sarcoma of the intestine and neurofibrosarcoma
Test substance:	1-Aminoanthraquinone
Remarks:	Only meeting abstracts (15 lines)
Reference:	Laham S. et al. (1966)

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: 42 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 (10 animals/sex/group)
Control group:	Yes **[X]**; No **[ ]**; No data **[ ]**; Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
NOEL Parental :	< 40 mg/kg/day
NOEL F1 Offspring:	< 40 mg/kg/day
NOEL F2 Offspring:	N/A
Results:	The parental animals exhibited no effects on reproductive parameters including copulation index, fertility index, gestation length, number of corpora lutea or implantation, implantation index, gestation index, delivery index, parturition or maternal behavior. However, nursing behavior disappeared in all of the treatment female groups. Viability of pups on day 4 after birth was decreased in all treatment groups. No external or skeletal anomalies related to the test substance administration were detected in any of the offspring. Furthermore, there are no significant differences in the number of offspring or live offspring, sex ratio, live birth index or body weights.
Method:	OECD Combined Repeat dose and reproductive/ developmental Screening Toxicity Test (1992)
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Purity 98.7 %
Remarks:	
Reference:	MHW, Japan (1994b)

5.9 DEVELOPMENTAL TOXICITY/ TERATOGENICITY

See 5.8

5.10 OTHER RELEVANT INFORMATION

A. Specific toxicities

No data available

B. Toxicodynamics, toxicokinetics

No data available

5.11 EXPERIENCE WITH HUMAN EXPOSURE

None

EA, Japan (1987) Environment Monitoring of Chemicals - Environmental Survey Report of F.Y. 1986 and 1987 (Office of Health Studies, Environmental Health Department, EA, Japan)

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)

Laham S. et al., Toxicol. Appl. Pharmacol. 8, 346 (1966)

Loeser E., Bayer AG data, short report, 11. 8. 1978

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

Marhold J. (1986) Prehled prumyslove Toxikol; Organick Latky, Parague Czechoslovakia, Avicenum. pp 731

MHW, Japan (1994a) Unpublished Report on Combined Repeat Dose and Reproductive/Developmental Toxicity Screening Test of 1-aminoanthraquinone. (HPV/SIDS Test conducted by MHW, Japan)

MHW, Japan (1994b) Unpublished Report on Mutagenicity Test of 1-aminoanthraquinone. (HPV/SIDS Test conducted by MHW, Japan)

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)

Shibusawa et al. (1977) Nippon Kagaku kaishi, 1536, 1538-2540

Thyssen J. (1979) Bayer AG data, Untersuchung zur Haut- ung Schleim-hautvertraeglichkeit, 3, 19, 1979.