FOREWORD

INTRODUCTION

2,4-DICHLOROTOLUENE
CAS N°:95-73-8
SIDS Initial Assessment Report

For

SIAM 3

13-15 February 1995, Williamsburg, USA

1. Chemical Name: 2,4-Dichlorotoluene

2. CAS Number: 95-73-8

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, 2,4-dichlorotoluene was selected in the framework of HPV Programme.

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

     no testing ( )
     testing (X) Physical-Chemical Properties
               Environmental Fate/Biodegradation
               Ecotoxicity
               Toxicity

   The SIAR was discussed at SIAM 2 (September 1994) and was requested to be revised for SIAM 3. At SIAM-3, the conclusion was approved with comments. Comments at SIAM-3:
   Rearrangement of the documents.

7. Review Process Prior to the SIAM:
8. Quality check process:

9. Date of Submission: Date of Circulation: December 1994

10. Date of last Update:

11. Comments:
**SIDS INITIAL ASSESSMENT PROFILE**

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>95-73-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>2,4-Dichlorotoluene</td>
</tr>
<tr>
<td>Structural Formula</td>
<td><img src="" alt="Structural Formula" /></td>
</tr>
</tbody>
</table>

**CONCLUSIONS AND RECOMMENDATIONS**

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**

**Exposure**

2,4-Dichlorotoluene is volatile liquid and the production volume is ca. 900 tonnes/year in 1990 – 1992 in Japan and 10,000 - 20,000 tones/year in 1984 in the EEC. This chemical is used as an intermediate for pesticides, drugs and chlorinated-nitrated benzenes in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solution, and is considered to be “not readily biodegradable”.

PECs have been calculated based on several models considering its physico-chemical properties (e.g. molecular weight, water solubility, vapour pressure and partition coefficient). The worst estimated concentrations were $1.0 \times 10^{-8}$ mg/l (air), $2.5 \times 10^{-6}$ mg/l (water), $9.3 \times 10^{-4}$ mg/kg (soil), $1.2 \times 10^{-3}$ mg/kg (sediment). A PEC_{local} was also calculated as $6.0 \times 10^{-8}$ mg/l, based on a default scenario.

No monitoring data at the work place have been available. The chemical is manufactured in a closed system and is used as an intermediate for medicines etc. There are cases where the feeding to tanks and the filling are performed in open systems, but in these cases protective masks, gloves and goggles are used. So far no uses for consumers are known. Based on the physico-chemical properties, the level exposed indirectly through the environment was estimated as $3.4 \times 10^{-4}$ mg/man/day. The daily intake through drinking water is estimated as $8.3 \times 10^{-8}$ mg/kg/day and through fish is calculated as $2.1 \times 10^{-6}$ mg/kg/day.

**Environment**

For the environment, various NOEC and LC_{50} values were gained from test results; 96h LC_{50} = 2.7 mg/l (acute fish); 24h EC_{50} = 19 mg/l (acute daphnia); 72h EC_{50} = 9.7 mg/l (acute algae); 21d NOEC = 2.0 mg/l (long-term daphnia reproduction). Therefore, the chemical is considered to be moderately toxic to fish and algae and slightly toxic to daphnids. As the lowest chronic toxicity data, the 21d-NOEC (reproduction) of *Daphnia magna* (2.0 mg/l) was adopted. An 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, the PNEC of the chemical is 0.02 mg/l in the present report. The PEC is lower than the PNEC. The environmental risk is presumably low.

**Human Health**

The chemical showed no genotoxic effects in bacteria and in a chromosomal aberration test *in vitro*.

In a combined repeat dose and reproductive/developmental toxicity screening test, dose dependent salivation was
found in all treated groups. Toxicological significant changes in haematological and blood chemical examinations were found at the highest dose (e.g. decrease of platelet count). Increased liver and kidney weights were also found at the same level with pathological remarks (e.g. centrilobular swelling of hepatocytes). For reproductive/developmental end-points, a decrease of fertility was found in conjunction with normal copulation but with low pregnancy at the highest dose. However, no histopathological change related to infertility was seen in the paternal organs. Decreases of pup body weights were noted in the highest dose group during the lactation period. Therefore, the overall NOEL was less than 12.5 mg/kg/day for repeated dose toxicity and 79 mg/kg/day for reproductive toxicity.

As for indirect exposure via environment, the daily intake through drinking water is estimated to be 8.3 x 10^-8 mg/kg/day and through fish is calculated as 2.1 x 10^-6 mg/kg/day. 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

<table>
<thead>
<tr>
<th>CAS NO: 95-73-8</th>
<th>SPECIES</th>
<th>PROTOCOL</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYSICAL-CHEMICAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Melting Point</td>
<td></td>
<td></td>
<td>-13.5 °C</td>
</tr>
<tr>
<td>2.2 Boiling Point</td>
<td></td>
<td></td>
<td>200 °C (at 1013 hPa)</td>
</tr>
<tr>
<td>2.3 Density</td>
<td></td>
<td></td>
<td>1.25 g/cm³</td>
</tr>
<tr>
<td>2.4 Vapour Pressure</td>
<td>OECD TG 104</td>
<td></td>
<td>38 Pa at 25 °C</td>
</tr>
<tr>
<td>2.5 Partition Coefficient (Log Pow)</td>
<td>OECD TG 107</td>
<td></td>
<td>4.10 at 25 °C</td>
</tr>
<tr>
<td>2.6 A. Water Solubility</td>
<td>OECD TG 105</td>
<td></td>
<td>25 mg/L at 25 °C</td>
</tr>
<tr>
<td>B. PH</td>
<td></td>
<td></td>
<td>No data available.</td>
</tr>
<tr>
<td>PKa</td>
<td>OECD TG 112</td>
<td></td>
<td>Not observed.</td>
</tr>
<tr>
<td>2.12 Oxidation: Reduction Potential</td>
<td></td>
<td></td>
<td>No data available.</td>
</tr>
</tbody>
</table>

| **ENVIRONMENTAL FATE AND PATHWAY** |         |          |         |
| 3.1.1 Photodegradation estimation |         |          | T₁/₂ = 90.7 y (direct photodegradation in water) |
| 3.1.2 Stability in Water OECD TG 111 |         |          | Stable (pH 4.0, 7.0, 9.0) |
| 3.2 Monitoring Data | Calculated, fugacity model level III (MNSEM-147S) | In Air | 1.0E-8 mg/L |
| | | In Water | 2.5E-6 mg/L |
| | | In Soil | 9.3E-4 mg/g |
| | | In Sediment | 1.2E-3 mg/g |
| 3.3 Transport and Distribution | OECD TG 301C | In Air | 1.0E-8 mg/L |
| | | In Water | 2.5E-6 mg/L |
| | | In Soil | 9.3E-4 mg/g |
| | | In Sediment | 1.2E-3 mg/g |
| 3.5 Biodegradation | OCD TG 301C | Not readily biodegradable: 0 % (BOD) in 28 days, 0 % (GC) in 28 days |
| 3.6 Bioaccumulation |         |          | No data available |

<p>| <strong>ECOTOXICOLOGY</strong> |         |          |         |
| 4.1 Acute/Prolonged Toxicity to Fish Oryzias latipes OECD TG 203 | LC₅₀ (72hr): 2.9 mg/L | |
| | | | LC₅₀ (96hr): 2.7 mg/L |
| 4.2 Acute Toxicity to Aquatic Invertebrates (Daphnia) Daphnia magna OECD TG 202 | EC₅₀ (24hr): 19 mg/l | |
| 4.3 Toxicity to Aquatic Plants e.g. Algae Selenastrum capricornutum OECD TG 201 | EC₅₀ (72hr): 9.7 mg/l | |
| 4.5.1 Chronic Toxicity To Fish Peocelia reticulata OECD TG 202 | LC₅₀ (14dr):4.64mg/l | |
| 4.5.2 Chronic Toxicity to Aquatic Invertebrates (Daphnia) Daphnia magna | LC₅₀ (21d, Mortality): &gt; 2.0 mg/l | |
| | EC₅₀ (21d, Repro): &gt; 2.0 mg/l | |
| | NOEC: 2.0 mg/l | |
| 4.6.1 Toxicity to Soil Dwelling Organisms | | No data available. |
| 4.6.2 Toxicity to Terrestrial Plants | | No data available. |</p>
<table>
<thead>
<tr>
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<th>PROTOCOL</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4.6.3) Toxicity to Other Non-Mammalian Terrestrial Species (Including Birds)</td>
<td></td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td><strong>TOXICOLOGY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1.1 Acute Oral Toxicity</td>
<td>Rat</td>
<td>OECD TG 401</td>
<td>LD₅₀: 2,790 mg/kg</td>
</tr>
<tr>
<td>5.1.2 Acute Inhalation Toxicity</td>
<td></td>
<td></td>
<td>LD₅₀: &gt; 2,669 mg/kg</td>
</tr>
<tr>
<td>5.1.3 Acute Dermal Toxicity</td>
<td></td>
<td></td>
<td>No data available</td>
</tr>
<tr>
<td>5.4 Repeated Dose Toxicity</td>
<td>Rat</td>
<td>OECD Combined Test</td>
<td>NOEL = &lt; 12.5 mg/kg/day</td>
</tr>
<tr>
<td>5.5 Genetic Toxicity In Vitro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Bacterial Test (Gene mutation)</td>
<td>S. typhimurium</td>
<td>OECD Guidelines No.471 and 472 and Guidelines for Screening Mutagenicity Testing of Chemicals (Japan)</td>
<td>Negative (With metabolic activation)</td>
</tr>
<tr>
<td></td>
<td>E. coli</td>
<td></td>
<td>Negative (Without metabolic activation)</td>
</tr>
<tr>
<td>B. Non-Bacterial In Vitro Test (Chromosomal aberrations)</td>
<td>CHL cells</td>
<td>OECD Guideline No.473 and Guidelines for Screening Mutagenicity Testing of Chemicals (Japan)</td>
<td>Negative (With metabolic activation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Negative (Without metabolic activation)</td>
</tr>
<tr>
<td>5.6 Genetic Toxicity In Vivo</td>
<td></td>
<td></td>
<td>No data available</td>
</tr>
<tr>
<td>5.8 Toxicity to Reproduction</td>
<td>Rat</td>
<td>OECD Combined Test</td>
<td>NOEL Parental = 79 mg/kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NOEL F1 offspring = 79 mg/kg/day</td>
</tr>
<tr>
<td>5.9 Developmental Toxicity/Teratogenicity</td>
<td>Rat</td>
<td>OECD Combined Test</td>
<td>NOEL Maternal toxicity = 79 mg/kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NOEL Teratogenicity = 500 mg/kg/day</td>
</tr>
<tr>
<td>5.11 Experience with Human Exposure</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
SIDS Initial Assessment Report

1  IDENTITY

1.1 Identification of the Substance

CAS Number:  95-73-8
IUPAC Name:  2,4-Dichlorotoluene
Molecular Formula:  C_7H_6Cl_2
Structural Formula:

1.2 Purity/Impurities/Additives

Degree of Purity:  > 98.5 %
Major Impurities:  2,5-Dichlorotoluene: < 1.5 %
Essential Additives:  No additives

1.3 Physico-Chemical properties

Table 1  Summary of physico-chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point</td>
<td>-13.5 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>200 °C at 1013 hPa</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.25 g/cm³</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>38 Pa at 25 °C</td>
</tr>
<tr>
<td>Water solubility</td>
<td>25 mg/L at 25 °C</td>
</tr>
<tr>
<td>Partition coefficient n-octanol/water (log value)</td>
<td>4.10 at 25 °C</td>
</tr>
</tbody>
</table>
2 GENERAL INFORMATION ON EXPOSURE

2.1 Production Volumes and Use Pattern

2,4-Dichlorotoluene is volatile stable liquid, and the production volume is ca. 900 tonnes/year in 1990-1992 in Japan, and 10,000 – 20,000 tonnes/year in EEC in 1984.

This chemical is used as an intermediate for pesticides and medicinal drugs in closed systems in Japan. Release to the environment may occur at the production site and at specific industrial sites. All disposal wastes are treated by incineration. 2,4-Dichlorotoluene seems to be released into water and air from its production sites after biological treatment. In a Japanese monitoring program of the Environment Agency, this chemical was not detected in the general environment in 1987. No specific monitoring data of the chemical is available. This chemical is stable in neutral, acidic or alkaline solutions, and is classified as “not readily biodegradable”.

2.2 Environmental Exposure and Fate

2.2.1 Photodegradation

The half-life time of 90.7 years is estimated for the degradation of 2,4-dichlorotoluene in water by direct photodegradation (MITI, Japan).

2.2.2 Stability in Water

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

2.2.3 Biodegradation

If released into water, this substance is not readily biodegraded (MITI (I), corresponding to the OECD 301C: 0 % biodegradation during 28 days based on BOD and 0 % based on GC analysis).

2.2.4 Bioaccumulation

No data are available.

2.2.5 Estimates of environmental fate, pathway and concentration

The potential environmental distribution of 2,4-dichlorotoluene obtained from a generic fugacity model, Mackay level III, under emission scenarios is shown in Table I. The results show that when the chemical is released into water, the majority of the chemical is likely to be distributed into soil and sediment.

PECs have been calculated based on several models (MNSEM, CHEMCAN, CHEMFRANCE) considering its physico-chemical properties (e.g. molecular weight, water solubility, vapour pressure and partition coefficient). The estimated concentrations of MNSEM model were $1.0 \times 10^{-8}$ mg/l (air), $2.5 \times 10^{-6}$ mg/l (water), $9.3 \times 10^{-4}$ mg/kg (soil), $1.2 \times 10^{-3}$ mg/kg (sediment). A PEC local in surface water was also calculated as $6.0 \times 10^{-8}$ mg/l, based on a default scenario. In Japanese monitoring program by Environment Agency, this chemical was not detected from general environment in 1987. The chemical is used in closed system, and no data for consumer use are available. Based on the physico-chemical properties, the total exposed dose indirectly through the
environment was estimated as $3.4 \times 10^{-4}$ mg/man/day. Also, the daily intake through drinking water is estimated as $5.0 \times 10^{-6}$ mg/man/day (i.e. approx $8.3 \times 10^{-8}$ mg/kg/day) and through fish is calculated as $1.3 \times 10^{-4}$ mg/man/day (i.e. approx $2.1 \times 10^{-6}$ mg/kg/day).

Global situation:

**Method:** MNSEM 147S

**Results:** Steady state mass and concentration calculated using MNSEM 147S

<table>
<thead>
<tr>
<th></th>
<th>Air</th>
<th>Water</th>
<th>Soil</th>
<th>Sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1.0E-08$</td>
<td>$2.5E-06$</td>
<td>$9.3E-04$</td>
<td>$1.2E-03$</td>
</tr>
</tbody>
</table>

**Exposure dose**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation of air</td>
<td>$2.0E-04$ [mg/day]</td>
</tr>
<tr>
<td>Drinking water</td>
<td>$5.0E-06$ [mg/day]</td>
</tr>
<tr>
<td>Ingestion of fish</td>
<td>$1.3E-04$ [mg/day]</td>
</tr>
<tr>
<td></td>
<td>$2.9E-08$ [mg/day]</td>
</tr>
<tr>
<td></td>
<td>$3.1E-08$ [mg/day]</td>
</tr>
<tr>
<td></td>
<td>$1.2E-05$ [mg/day]</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total exposure dose</td>
<td>$3.4E-04$ [mg/day]</td>
</tr>
</tbody>
</table>

**Remarks:**

- **Input data:**
  - Molecular weight: 161.03
  - Water solubility: $25.00$ [mg/l]
  - Vapor pressure: 38 Pa
  - Log Pow: 4.10

MNSEM 147S is a slightly revised version of MNSEM 145I.

1. addition of air particle compartment to air phase
2. execution of calculation on a spreadsheet program

Table 2. Comparison of calculated environmental concentration using several methods (Japanese environmental conditions are applied to the calculations.)

<table>
<thead>
<tr>
<th>Model</th>
<th>Air[mg/l]</th>
<th>Water[mg/l]</th>
<th>Soil[mg/kg]</th>
<th>Sediment[mg/kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNSEM</td>
<td>$1.0E-08$</td>
<td>$2.5E-06$</td>
<td>$9.3E-04$</td>
<td>$1.2E-03$</td>
</tr>
<tr>
<td>CHEMCAN2</td>
<td>$1.8E-07$</td>
<td>$2.9E-06$</td>
<td>$5.5E-04$</td>
<td>$8.7E-04$</td>
</tr>
<tr>
<td>CHEMFRAN</td>
<td>$1.8E-07$</td>
<td>$3.2E-06$</td>
<td>$5.9E-04$</td>
<td>$9.7E-04$</td>
</tr>
</tbody>
</table>
Local exposure assessment (1)

1. Production volume: 438 tonnes/year

2. Emission volume: to water 662 kg/year
to air 20 kg/year

3. Calculation of PEC\textsubscript{local}

\[
PEC\textsubscript{local} = \frac{W \times 1/Q \times (100-P)/100 \times 1/D}{W: 662 \text{ kg/year}}
\]
\[Q: 1100000 \text{ m}^3/\text{year} \]
\[P: 90\% \]
\[D: 1000 \text{ assuming the dilution with sea water. The actual dilution rate must be higher because the treated waste water is directly released to the Tokyo Bay.} \]

Local exposure assessment (2)

1. Production volume: 150 tonnes/year

2. Emission volume: to water none
to air 0.7 kg/year
waste material none

2.3 Human Exposure

2.3.1 Occupational Exposure

No data on work place monitoring have been reported.

2.3.2 Consumer Exposure

No data on consumer exposure are available.
3 HUMAN HEALTH HAZARDS

3.1 Effects on Human Health

3.1.1 Acute Toxicity

LD$_{50}$ in acute oral toxicity studies in rats were reported as $> 2,000$ mg/kg or $2,790$ mg/kg. Also, the LC$_{50}$ in an acute inhalation toxicity study in rats was $> 2,669$ mg/kg/4h.

3.1.2 Repeated Dose Toxicity

Studies in Animals

Oral

There is only one key study on repeated dose toxicity of 2,4-dichlorotoluene. 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 appropriate to be regarded as a key study. Male and female SD rats were orally administered (gavage) at doses of 0, 12.5, 79 and 500 mg/kg/day. In male rats, the administration period was two weeks prior to mating, 2 weeks of mating and 2 weeks after the completion of the mating period. In females, in addition to a maximum four weeks pre-mating and mating period, they were exposed through pregnancy until day 3 of post delivery.

Dose dependent salivation was noted immediately after administration in all treated groups. Decreases in body weight gain were noted in the females of the 500 mg/kg group at the gestation and lactation periods. In food consumption, decreases were noted in both sexes of the 500 mg/kg groups. In hematological and blood chemical examinations, decreases in platelet count, alfa-globulin fraction, triglyceride and blood urea nitrogen, and increase in cholinesterase were noted in the 500 mg/kg male group. In organ weights of the 500 mg/kg group, increased relative liver weights in both sexes, and of the relative kidney weights in the males were noted. In autopsy, dark brown discoloration of the liver was noted in 500 mg/kg male group. In histopathological examination of the liver, centrilobular swelling of hepatocytes was noted in all males of the 500 mg/kg group and 2 males of the 79 mg/kg group. In kidneys, atrophy and regeneration of tubular epithelium, and dilation of tubules were noted in the 79 mg/kg groups and above. In addition, the number of the males with hyalin droplets and eosinophilic depositions in tubular epithelium increased progressively in the 79 and 500 mg/kg groups. On the basis of above-described effects, the NOEL for this compound was indicated to be less than 12.5 mg/kg/day.

3.1.3 Mutagenicity

In vitro Studies

Bacterial test

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.

2,4-Dichlorotoluene showed negative results in *Salmonella typhimurium* TA100, TA1535, TA98, TA1537 and *Escherichia coli* WP2 uvrA at concentrations up to 1 mg/plate with or without metabolic activation system (MHW, 1993).
Non-bacterial test

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 within no apparent cytotoxic effect in continuous treatment. In short term treatment, it was set to 90 ug/ml.

No structural chromosomal aberrations or polyploidy were observed up to a maximum concentration in both continuous treatment and short-term treatment with or without an exogeneous metabolic activation system (MHW, 1998).

In vivo Studies

No data are available on in vivo genotoxic effects.

3.1.4 Toxicity for Reproduction

2,4-Dichlorotoluene 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, 12.5, 79, 500 mg/kg/day. Although this combined study was designed to investigate reproductive capability in parental generation as well as development in F1 offspring, parameters to evaluate developmental toxicity were limited to only body weights at day 0 and day 4 after birth, and autopsy findings at day 4.

Regarding reproductive ability, all pairs in the 12.5 and 79 mg/kg groups achieved pregnancy. In the 500 mg/kg group, 12 pairs showed evidence of copulation with a sperm positive vaginal smear, however, only 5 pairs out of them achieved pregnancy. In six non-pregnant pairs in the 500 mg/kg group, vaginal plugs were not noted or a few sperm were found in the vaginal smears. This result suggests that the male reproductive organs and secondary reproductive organs had functional disorders. Regarding body weight changes of pups, decreases in liver and body weights were noted in the 500 mg/kg group on day 1 of lactation. For delivery or lactating behavior of dams, viability, general appearance or autopsy of pups, no effects related to the administration of this chemical was noted. On the basis of above-described effects, the NOEL for reproductive/developmental toxicity for both sexes was considered to be 79 mg/kg/day.

3.2 Initial Assessment for Human Health

No monitoring data at the work place have been available. The chemical is manufactured in a closed system and is used as an intermediate for medicines etc. There are cases where the feeding to tanks and the filling are performed in open systems, but in these cases protective masks, gloves and goggles are used. So far no uses for consumers are known. Based on the physico-chemical properties, the level exposed indirectly through the environment was estimated as $3.4 \times 10^{-4}$ mg/man/day. The daily intake through drinking water is estimated as $8.3 \times 10^{-8}$ mg/kg/day and through fish is calculated as $2.1 \times 10^{-6}$ mg/kg/day.

The chemical showed no genotoxic effects in bacteria and in a chromosomal aberration test in vitro.

In a combined repeat dose and reproductive/developmental toxicity screening test, dose dependent salivation was found in all treated groups. Toxicological significant changes in haematological and blood chemical examinations were found at the highest dose (e.g. decrease of platelet count). Increased liver and kidney weights were also found at the same level with pathological remarks (e.g. centrilobular swelling of hepatocytes). For reproductive/developmental end-points, a decrease of fertility was found in conjunction with normal copulation but with low pregnancy at the highest
dose. However, no histopathological change related to infertility was seen in the paternal organs. Decreases of pup body weights were noted in the highest dose group during the lactation period. Therefore, the overall NOEL was less than 12.5 mg/kg/day for repeated dose toxicity and 79 mg/kg/day for reproductive toxicity.

As for indirect exposure via environment, the daily intake through drinking water is estimated to be $8.3 \times 10^{-8}$ mg/kg/day and through fish is calculated as $2.1 \times 10^{-6}$ mg/kg/day. 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 Effects

2,4-Dichlorotoluene 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]. The daphnid reproduction test (OECD TG 202, Part 2, EA Japan 1992) showed 100% mortality of the parental daphnids at concentrations above 6.2 mg/l of the chemical. In the lower concentrations the mortalities of parental daphnids were as high as in the vehicle control at which five daphnids died among 40 individuals at the start of the test. Therefore the 21d LC50 was > 2.0 mg/l (less than 6.2 mg/l). The mean number of offspring produced per adults for 21 days was reported to be 29.6, 27.6 and 23.2 individuals at the concentrations of 0.2, 0.62 and 2.0 mg/l, respectively. These result showed that the dose-response relationship was obscure and thus the 21d EC50 on reproduction was regarded to be > 2.0 mg/l, however all daphnids at the concentration above (6.2 mg/l) died. Acute and chronic toxicity data to test organisms for the chemical are summarized in Table 3. No other ecotoxicological data are available.

Various NOEC and LC50 values were gained from the above tests; 96h LC50 = 2.7 mg/l (acute fish); 24h LC50 = 19 mg/l (acute daphnia); 72h EC50 = 9.7 mg/l (acute algae); 21d-NOEC = 2.0 mg/l (long-term daphnia reproduction). Therefore, the chemical is considered to be moderately toxic to fish and daphnids and slightly toxic to algae. The lowest chronic toxicity result is the 21 d-NOEC (reproduction) of *Daphnia magna* (2.0 mg/l). An assessment factor of 100 is applied. Thus PNEC of 2,4-dichlorotoluene is 0.02 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.

<table>
<thead>
<tr>
<th>Species</th>
<th>Endpoint*1</th>
<th>Conc. (mg/L)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Selenastrum capricornutum</em></td>
<td>Biomass: EC50 (72h)</td>
<td>9.7 mg/L</td>
<td></td>
</tr>
<tr>
<td><em>Daphnia magna</em> (water flea)</td>
<td>Mor: LC50(24h)</td>
<td>19 mg/L</td>
<td>EA, Japan. (1992)</td>
</tr>
<tr>
<td></td>
<td>Mor: LC50(21d)</td>
<td>&gt;2.0 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rep: EC50(21d)</td>
<td>&gt;2.0 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC(21d)</td>
<td>2.0 mg/L</td>
<td></td>
</tr>
<tr>
<td><em>Oryzias latipes</em> (fish, Medaka)</td>
<td>Mor: LC50(24h)</td>
<td>5.4 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mor: LC50(72h)</td>
<td>2.9 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mor: LC50(96h)</td>
<td>2.7 mg/L</td>
<td></td>
</tr>
<tr>
<td><em>Poecilia reticulata</em> (fish, Guppy)</td>
<td>Mor:LC50(14d)</td>
<td>4.64 mg/l</td>
<td>Koenemann (1981)</td>
</tr>
</tbody>
</table>

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

4.2 Initial Assessment for the Environment

2,4-Dichlorotoluene is volatile liquid and the production volume is ca. 900 tonnes/year in 1990 – 1992 in Japan and 10,000 - 20,000 tones/year in 1984 in the EEC. This chemical is used as an
intermediate for pesticides, drugs and chlorinated-nitrated benzenes in closed systems in Japan. This chemical is stable in neutral, acidic or alkaline solution, and is considered to be “not readily biodegradable”.

PECs have been calculated based on several models considering its physico-chemical properties (e.g. molecular weight, water solubility, vapour pressure and partition coefficient). The worst estimated concentrations were $1.0 \times 10^{-8}$ mg/l (air), $2.5 \times 10^{-6}$ mg/l (water), $9.3 \times 10^{-8}$ mg/kg (soil), $1.2 \times 10^{-3}$ mg/kg (sediment). A PEC\textsubscript{local} was also calculated as $6.0 \times 10^{-8}$ mg/l, based on a default scenario.

For the environment, various NOEC and LC\textsubscript{50} values were gained from test results; 96h LC\textsubscript{50} = 2.7 mg/l (acute fish); 24h EC\textsubscript{50} = 19 mg/l (acute daphnia); 72h EC\textsubscript{50} = 9.7 mg/l (acute algae); 21d NOEC = 2.0 mg/l (long-term daphnia reproduction). Therefore, the chemical is considered to be moderately toxic to fish and algae and slightly toxic to daphnids. As the lowest chronic toxicity data, the 21d-NOEC (reproduction) of Daphnia magna (2.0 mg/l) was adopted. An assessment factor of 100 were used to both acute and chronic toxicity data to determine PNEC according to the OECD Provisional Guidance for Initial Assessment of Aquatic Effects. Thus, the PNEC of the chemical is 0.02 mg/l in the present report. The PEC is lower than the PNEC. The environmental risk is presumably low.
5 RECOMMENDATIONS

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

Aldrich: Catalog Handbook of Fine Chemicals

Bayer AG Unpublished report


Bayer AG (1990) Unpublished report


EA, Japan (1990) "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 and MITI, Japan (1993) Unpublished Report on Exposure Estimation (HPV/SIDS Test conducted by EA and MITI, Japan)

Encyclopedia Chimica, 4, 227


MHW, Japan (1993a) Unpublished Report on Acute Toxicity Test of 2,4-Dichlorotoluene. (HPV/SIDS Test conducted by MHW, Japan)

MHW, Japan (1993b) Unpublished Report on Combined Repeat Dose and Reproductive/Developmental Toxicity Screening Test of 2,4-Dichlorotoluene. (HPV/SIDS Test conducted by MHW, Japan)

MHW, Japan (1993c) Unpublished Report on Mutagenicity Test of 2,4-Dichlorotoluene. (HPV/SIDS Test conducted by MHW, Japan)

MITI, Japan: Unpublished data

MITI, Japan (1993): Unpublished Report (1993) (HPV/SIDS Test conducted by MITI, Japan. Test was performed in Chemicals Inspection and Testing Institute, Japan)

Zoeteman B.C.J. et al. (1980) Chemosphere 9, 231
SIDS DOSSIER

2,4-DICHLOROTOLUENE

CAS NO. 95-73-8

SPONSOR COUNTRY: JAPAN
<table>
<thead>
<tr>
<th><strong>1.01 A.</strong></th>
<th><strong>CAS No.</strong></th>
<th><strong>95-73-8</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.01 C.</strong></td>
<td><strong>CHEMICAL NAME (OECD Name)</strong></td>
<td>2,4-Dichlorotoluene</td>
</tr>
<tr>
<td><strong>1.01 D.</strong></td>
<td><strong>CAS DESCRIPTOR</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>1.01 G.</strong></td>
<td><strong>STRUCTURAL FORMULA</strong></td>
<td>C₇H₅Cl₂</td>
</tr>
<tr>
<td><strong>1.5</strong></td>
<td><strong>QUANTITY</strong></td>
<td>In Japan, approx 900 tonnes in 1990 - 1992.</td>
</tr>
<tr>
<td><strong>1.7</strong></td>
<td><strong>USE PATTERN</strong></td>
<td>In Japan, intermediates for pesticides and medicinal drugs in closed system</td>
</tr>
</tbody>
</table>
| **1.9** | **SOURCES AND LEVELS OF EXPOSURE** | 1. Amount released from production site to water is negligible.  
2. Amount released to air from production site is less than 20 kg/year (estimation)  
3. Information on consumer exposure is not available. |
<p>| <strong>ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)</strong> | | |</p>
<table>
<thead>
<tr>
<th>STUDY</th>
<th>Y/N</th>
<th>Y/N</th>
<th>Y/N</th>
<th>Y/N</th>
<th>Y/N</th>
<th>Y/N</th>
<th>Y/N</th>
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<td>PHYSICAL-CHEMICAL DATA</td>
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<td></td>
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<td></td>
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<tr>
<td>2.1 Melting Point</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.2 Boiling Point</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.3 Density</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.4 Vapour Pressure</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>2.5 Partition Coefficient</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.6 Water Solubility</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>pH and pKa values</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>OTHER P/C STUDIES RECEIVED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| ENVIRONMENTAL FATE and PATHWAY |     |     |     |     |     |     |     |
| 3.1.1 Photodegradation       | N   | N   | Y   | Y   | N   | Y   | N   |
| 3.1.2 Stability in water     | N   | N   | Y   | Y   | N   | Y   | N   |
| 3.2 Monitoring data          | Y   | N   | N   | Y   | N   | Y   | N   |
| 3.3 Transport and Distribution| Y   | N   | N   | Y   | N   | Y   | N   |
| 3.5 Biodegradation           | N   | N   | Y   | Y   | N   | Y   | N   |
| 3.6 Bioaccumulation          | N   | N   | Y   | Y   | N   | Y   | N   |
| OTHER ENV FATE STUDIES RECEIVED |     |     |     |     |     |     |     |

| ECOTOXICITY |     |     |     |     |     |     |     |
| 4.1 Acute toxicity to Fish  | N   | N   | Y   | Y   | N   | Y   | N   |
| 4.2 Acute toxicity to Daphnia| Y   | N   | N   | Y   | N   | Y   | N   |
| 4.3 Toxicity to Algae       | Y   | N   | N   | Y   | N   | Y   | N   |
| 4.5.2 Chronic toxicity to Daphnia | Y   | N   | N   | Y   | N   | Y   | N   |
| 4.5.1 Toxicity to Soil dwelling organisms | Y   | N   | N   | Y   | N   | Y   | N   |
| 4.6.2 Toxicity to Terrestrial plants | Y   | N   | N   | Y   | N   | Y   | N   |
| 4.6.3 Toxicity to Birds     | N   | N   | Y   | Y   | N   | Y   | N   |
| OTHER ECOTOXICITY STUDIES RECEIVED |     |     |     |     |     |     |     |

| TOXICITY |     |     |     |     |     |     |     |
| 5.1.1 Acute Oral | Y   | N   | N   | Y   | N   | Y   | N   |
| 5.1.2 Acute Inhalation | Y   | N   | N   | Y   | N   | Y   | N   |
| 5.1.3 Acute Dermal     | N   | N   | Y   | Y   | N   | Y   | N   |
| 5.4 Repeated Dose      | N   | N   | Y   | Y   | N   | Y   | N   |
| 5.5 Genetic Toxicity in vitro | Y   | N   | N   | Y   | N   | Y   | N   |
| . Chromosomal aberration | Y   | N   | N   | Y   | N   | Y   | N   |
| 5.6 Genetic Toxicity in vivo | Y   | N   | N   | Y   | N   | Y   | N   |
| 5.8 Reproduction Toxicity| N   | N   | Y   | Y   | N   | Y   | N   |
| 5.9 Development / Teratogenicity | N   | N   | Y   | Y   | N   | Y   | N   |
| 5.11 Human experience   | N   | N   | Y   | Y   | N   | Y   | N   |
| OTHER TOXICITY STUDIES RECEIVED |     |     |     |     |     |     |     |
1.01 SUBSTANCE INFORMATION
A. CAS-No 95-73-8
B. Name (IUPAC name) 1-Methyl-2, 4-dichlorobenzene
C. Name (OECD name) 2,4-Dichlorotoluene
D. CAS Descriptor Not applicable
E. EINECS-Number 201-163-2
F. Molecular Formula C7 H6 Cl2
G. Structural Formula
H. Substance Group Not applicable
I. Substance Remark
J. Molecular Weight 161.03

1.02 OECD INFORMATION
A. Sponsor Country: Japan
B. Lead Organisation:
   Name of Lead Organisation: Ministry of Health and Welfare (MHW)
   Ministry of International Trade and Industry (MITI)
   Environment Agency (EA)
   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 [X]; solid [ ]
C. Purity > 98.5 % (weight/weight)

1.2 SYNONYMS 2,4-Dichlortoluol

1.3 IMPURITIES Name: 2,5-Dichlorotoluene Value: < 1.5 %

1.4 ADDITIVES None

1.5 QUANTITY Location Production (tonnes) Date
Japan 900 t/year 1990-1992
EEC 10,000 - 20,000 t/y 1984
Location Export (tonnes, India) Date
Japan 50 1990
10 1991
30 1992
50 1993
Reference: MITI, Japan
ECDIN Database (1993)

1.6 LABELLING AND CLASSIFICATION

None

1.7 USE PATTERN
A. General

Type of Use: Category:

(a) main industry use Intermediate for pesticides and medicinal drugs (closed system)

(b) main industry use Intermediate for chlorinated-nitrated benzenes, pesticides and other applications

Reference: (a) MITI, Japan
(b) ECDIN Database (1993)

B. Uses in Consumer Products

None

1.8 OCCUPATIONAL EXPOSURE

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of workers exposed</th>
<th>Frequency &amp; duration of exposure</th>
<th>Emission data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>1</td>
<td>20 min/month</td>
<td></td>
</tr>
<tr>
<td>Sampling</td>
<td>3</td>
<td>12 min/day</td>
<td>&lt; 1 ppm</td>
</tr>
</tbody>
</table>
1.9 SOURCES OF EXPOSURE

(a) Source: Media of release: Water from a production site
Quantities per media: Negligible small
Reference: MITI, Japan

(b) Source: Media of release: Air from a production site
Quantities per media: < 20 kg/year (estimation)
References: MITI, Japan

1.10 ADDITIONAL REMARKS

A. Options for disposal Incineration
Reference: MITI, Japan

B. Other remarks None
2.1 MELTING POINT

Value: -13.5 degrees C
Decomposition: Yes [ ] No [X] Ambiguous [ ]
Sublimation: Yes [ ] No [X] Ambiguous [ ]
Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Remarks: None
Reference: (a) Encyclopedia Chimica
(b) Bayer AG (1990)

2.2 BOILING POINT

Value: 200 degrees C
Pressure: at 1013 hPa
Decomposition: Yes [ ] No [X] Ambiguous [ ]
Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Remarks: None
Reference: (a) Aldrich Chem. Co.
(b) Bayer AG (1990)

2.3 DENSITY (Relative density)

Type: Bulk density [ ]; Density [X]; Relative Density [ ]
Value: 1.25 g/cm³
Temperature: 20 degrees C
GLP: Yes [ ]; No [ ]; ? [ ]
Reference: Bayer AG (1990)

2.4 VAPOUR PRESSURE

(a)
Value: 38 Pa
Temperature: 25 degrees C
Method: calculated [ ]; measured [X]
OECD Test Guideline 104 Dynamic Method
GLP: Yes [X] No [ ] ? [ ]
Remarks: Purified substance (98%) used
Reference: MITI, Japan (1993)

(b)
Value: 4 hPa
Temperature: 50 degrees C
Method: calculated [ ]; measured [X]
GLP: Yes [ ] No [ ] ? [X]
Remarks: Bayer AG (1990)
2.5 PARTITION COEFFICIENT  log10Pow

(a)
Log Pow: 4.10
Temperature: 25 degrees C
Method: calculated [ ]; measured [X]
OECD Test Guideline 107
GLP: Yes [X] No [ ] ? [ ]
Remarks: None
Reference: MITI, Japan (1993)

(b)
Log Pow: 4.24
Temperature: 25 degrees C
Method: calculated [X]; measured [ ]
GLP: Yes [ ] No [ ] ? [X]
Remarks: None

2.6 WATER SOLUBILITY

A. Solubility

Value: 25 mg/l
Temperature: 25 degrees C
Description: Miscible [ ]; Of very high solubility [ ]; Of high solubility [ ]; Soluble [ ]; Slightly soluble [ ]; Of low solubility [X]; Of very low solubility [ ]; Not soluble [ ]
Method: calculated [ ]; measured [X]
GLP: Yes [X] No [ ] ? [ ]
Remarks: None
Reference: MITI, Japan (1993)

B. pH Value, pKa Value Not applicable

2.7 FLASH POINT

Value: (1) 87 degrees C
(2) 101 degrees C
Type of test: Closed cup [X]; Open cup [ ]; Other [ ]
Closed cup [ ]; Open cup [X]; Other [ ]
Method: (1) tag closed cup
(2) open cup
GLP: Yes [ ] No [ ] ? [X]
Remarks: Unpublished company data
Reference: OECD SIDS 2,4-DICHLOROTOLUENE ID: 95-73-8

2.8 AUTO FLAMMABILITY
Not applicable
2.9 FLAMMABILITY

Value: Flame point 89 degrees C
Results: Extremely flammable[ ]; Extremely flammable-liquified gas[ ];
Highly Flammable [ ]; Flammable [X]; Non flammable [ ];
Spontaneously flammable in air [ ]; Contact with water liberates
highly flammable gases [ ]; Other [ ]

Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Remarks: Bayer AG (1990)

2.10 EXPLOSIVE PROPERTIES

No studies located

2.11 OXIDIZING PROPERTIES

No studies located

2.12 OXIDATION: REDUCTION POTENTIAL

No studies located

2.13 ADDITIONAL DATA

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

No studies located

B. Other data

No studies located
3.1 STABILITY

3.1.1 PHOTODEGRADATION

Type: Air [ ]; Water [ X ]; Soil [ ]; Other [ ]
Light source: Sun light [ X ]; Xenon lamp [ ]; Other [ ]
Light spectrum: 
Relative intensity: 
Spectrum of substance: \( \epsilon = 2.58 \) at 300 nm
Concentration of Substance:
Estimated parameter for calculation:
\[
\begin{align*}
\text{Quantum yield} & \quad 0.01 \\
\text{Concentration} & \quad 5 \times 10^{-5} \text{ M} \\
\text{Depth of water body} & \quad 500 \text{ cm} \\
\text{Conversion rate} & \quad 6.023 \times 10^{20}
\end{align*}
\]
Results: Degradation rate \( 1.21 \times 10^{-14} \text{ mol/l/s} \)
Half life \( 90.7 \text{ years} \)

3.1.2 STABILITY IN WATER

Type: Abiotic (hydrolysis) [ X ]; biotic (sediment) [ ]
Half life: Not hydrolysed at pH 4, 7 and 9
Method: OECD Test Guideline 111
GLP: Yes [X]  No [ ]  ? [ ]
Test substance: 2,4-Dichlorotoluene, purity: > 98.5 %
Remarks: None
Reference: MITI, Japan (1993)

3.1.3 STABILITY IN SOIL

No studies located

3.2 MONITORING DATA (ENVIRONMENT)

(a)
Type of Measurement: Background [ ]; At contaminated Site [ ]; Other [X]
Media: Surface water
Results: ND (Detection limits: 6 60 µg/l) in 7 areas in Japan as of 1981
Remarks:
Reference: EA, Japan (1983)

(b)
Type of Measurement: Background [ ]; At contaminated Site [ ]; Other [ ]
Media: Surface water in River
Results: 0.3 µg/l in 1977 79
Remarks:
Reference: Zoeteman et.al. (1980)
3. ENVIRONMENTAL FATE AND PATHWAYS

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

3.3.1 TRANSPORT

No studies located

3.3.2 THEORETICAL DISTRIBUTION (FUGACITY CALCULATION)

Media: Air-biota [ ]; Air-biota-sediment-soil-water [ ]; Soil-biota [ ]; Water-air [ ]; Water-biota [ ]; Water-soil [ ]; Other [X]

Method: Fugacity level III [X]; Other(calculation) [ ]; Other(measurement)[ ]

Results: Steady state mass and concentration calculated using MNSEM 147S

Air: 1.0E 08 [mg/l]
Water: 2.5E 06 [mg/l]
Soil: 9.3E 04 [mg/kg dry solid]
Sediment: 1.2E 03 [mg/kg dry solid]

Exposure dose

Inhalation of air: 2.0E 04 [mg/day]
Drinking water: 5.0E 06 [mg/day]
Ingestion of fish: 1.3E 04 [mg/day]
meat: 2.9E 08 [mg/day]
milk: 3.1E 08 [mg/day]
vegetation: 1.2E 05 [mg/day]

Total exposure dose: 3.4E 04 [mg/day]

Remarks: Input data:

Molecular weight: 161.03
Water solubility: 25.00[mg/l]
Vapor pressure: 38Pa[mmHg]
OECD SIDS  2,4-DICHLOROTOLUENE

3. ENVIRONMENTAL FATE AND PATHWAYS  ID: 95-73-8

Log Pow: 4.10

MNSEM 147S is a slightly revised version of MNSEM 145I.
1. addition of air particle compartment to air phase
2. execution of calculation on a spreadsheet program

Comparison of calculated environmental concentration using several methods (Japanese environmental conditions are applied to the calculations.)

<table>
<thead>
<tr>
<th>Model</th>
<th>Air[mg/l]</th>
<th>Water[mg/l]</th>
<th>Soil[mg/kg]</th>
<th>Sediment[mg/kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNSEM 1.0E 08</td>
<td>2.5E 06</td>
<td>9.3E 04</td>
<td>1.2E 03</td>
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<tr>
<td>CHEMCAN2 1.8E 07</td>
<td>2.9E 06</td>
<td>5.5E 04</td>
<td>8.7E 04</td>
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<tr>
<td>CHEMFRAN 1.8E 07</td>
<td>3.2E 06</td>
<td>5.9E 04</td>
<td>9.7E 04</td>
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</tr>
</tbody>
</table>

Reference: EA and MITI, Japan (1993)

3.4 IDENTIFICATION OF MAIN MODE OF DEGRADABILITY IN ACTUAL USE

No studies located

3.5 BIODEGRADATION

Type: aerobic [X]; anaerobic [ ]
Inoculum: adapted [ ]; non-adapted [X];
Concentration of the chemical: 100 mg/l Test substance [X]
Medium: water [X]; water sediment [ ]; soil [ ]; sewage treatment others [X]
(Japanese standard activated sludge)
Degradation: Degree of degradation after 28 days
0, 0 and 0 % from BOD
0, 0 and 0 % from GC analysis
Results: Readily biodeg. [ ]; Inherently biodeg. [ ]; under test condition
No biodegradation observed [X], Other [ ]
Method: OECD Test Guideline 301C
GLP: Yes [X] No [ ] ? [ ]
Test substance: 2,4-Dichlorotoluene, purity: > 98.5 %
Remarks: None
Reference: MITI, Japan (1993)

3.6 BOD5,COD OR RATIO BOD5/COD

No studies located

3.7 BIOACCUMULATION
3. ENVIRONMENTAL FATE AND PATHWAYS

No studies located

3.8 ADDITIONAL REMARKS

None

A. Sewage treatment

B. Other information
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 hrs
Results:  
LC50(24h) = 5.4 mg/l (95% confidence level: 2.3-13 mg/l)
LC50(48h) = 3.2 mg/l (95% confidence level: 1.9-5.5 mg/l)
LC50(72h) = 2.9 mg/l (95% confidence level: 2.0-4.7 mg/l)
LC50(96h) = 2.7 mg/l (95% confidence level: 1.0-1.9 mg/l)
NOEC =
LOEC =
Analytical monitoring: Yes [ ]; No [X]; ? [ ]
GLP: Yes [ ]; No [X]; ? [ ]
Test substance: 2,4 Dichlorotoluene, purity = 99.8 %
Remarks: A group of 10 fishes were exposed to 5 nominal concentrations
(1.0-10 mg/l). Stock solution was prepared with Tween 80 (10 mg/l).
Controls with and without this vehicle were taken for test.
Reference: EA, Japan (1992)

(b)
Type of test: static [ ]; semi static [ ]; flow through [ ]; other [ ];
open system [ ] closed system [ ]
Species: Brachydanio rerio (Zebrabaerbling)
Exposure period: 96 hrs
Results:  
LC50 (96h) = > 100 mg/l
NOEC =
LOEC =
Analytical monitoring: Yes [ ]; No [ ]; ? [X]
GLP: Yes [ ]; No [ ]; ? [X]
Test substance: 2,4 Dichlorotoluene
Remarks: 
Reference: Bayer AG

4.2  ACUTE TOXICITY TO AQUATIC INVERTEBRATES

A. Daphnia

(a)
Type of test: static [X]; semi static [ ]; flow through [ ];
other [ ];
open system [X]; closed system [ ]
Species: Daphnia magna
Exposure period: 24 hrs
Results:  
EC50(24h) = 19 mg/l (95% confidence level: 15-23 mg/l)
EC50(48h) =
NOEC = 
LOEC = 

Analytical monitoring: Yes [ ] No [X] ? [ ]
GLP: Yes [ ] No [X] ? [ ]
Test substance: 2,4 Dichlorotoluene, purity = 99.8 %
Remarks: 20 Daphnids (4 replicates; 5 organisms per replicate) were exposed to 5 nominal concentrations (10-100 mg/l). Stock solution was prepared with DMSO:HCO-40 = 9:1 (100 mg/l). Controls with and without this vehicle were taken for test.
Reference: EA, Japan (1992)

(b) Type of test: static [X]; semi static [ ]; flow through [ ]; other [ ]; open system [ ]; closed system [ ]
Species: Daphnia magna
Exposure period: 48 hrs
Results: EC50(24h) =
EC50(48h) = 0.6 mg/l
NOEC =
LOEC =

Analytical monitoring: Yes [ ] No [ ] ? [X]
Method:
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4 Dichlorotoluene
Remarks:

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 hrs
Results: Biomass: EC50(72h) = 9.7 mg/l
NOEC =
LOEC =

Analytical monitoring: Yes [ ] No [X] ? [ ]
open system [X]; closed system [ ]
GLP: Yes [ ] No [X] ? [ ]
Test substance: 2,4 Dichlorotoluene, purity = 99.8 %
Remarks: The EC50 values were calculated based on 5 nominal concentrations (4.8-50 mg/l). Stock solution was prepared with ethanol (100 mg/l). Controls with and without this vehicle were taken for test.
4.4 TOXICITY TO BACTERIA

Type: Aquatic [ ]; Field [ ]; Soil [ ]; Other [ ]
Species: Pseudomonas putida
Exposure period: 30 min.
Results: EC0(30 min) = 125 mg/l
Analytical monitoring: Yes [ ] No [ ] ? [X]
Method: Flow through
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4 Dichlorotoluene
Remarks:
Reference: Bayer AG (1991)

4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

4.5.1. CHRONIC TOXICITY TO FISH

Type of test: static [ ]; semi static [ ]; flow through [ ]; other [ ]; open system [ ]; closed system [ ]
Species: Guppy (Poecilia reticulate)
End point: Length of young fish [ ]; Weight of young fish [ ]; Reproduction rate [ ]; Other [ ]
Exposure period: 14 days
Results: EC50( d) =
LC50(14d) = 4.64 mg/l
NOEC =
LOEC =
Analytical monitoring: Yes [ ] No [ ] ? [X]
Method: GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4 Dichlorotoluene
Remarks:

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 [X]; Reproduction rate [X]; Other [ ]
Exposure period: 21 days
Results:
Mortality: LC50(24h) = 11 mg/l (95% confidence level: 8.6-14 mg/l)
LC50(48h) = 6.5 mg/l (95% confidence level: 4.8-9.3 mg/l)
LC50(96h) = 5.0 mg/l (95% confidence level: 3.6-7.2 mg/l)
LC50(7d) > 2 mg/l
LC50(14d) > 2 mg/l
LC50(21d) > 2 mg/l

Reproduction:
EC50(14d) > 2 mg/l
EC50(21d) > 2
NOEC = 2.0 mg/l (p < 0.05)
LOEC = 6.2 mg/l (p < 0.05)

Analytical monitoring: Yes [ ] No [X] ? [ ]
GLP: Yes [ ] No [X] ? [ ]
Test substance: 2,4 Dichlorotoluene, purity = 99.8 %
Remarks: 40 daphnids (4 replicates; 10 organisms per replicate) were exposed
to 5 nominal concentrations (0.2-20 mg/l). Stock solution was
prepared with DMSO:HCO-40 = 9:1 (100 mg/l). Controls with and
without this vehicle were taken for test.
The mortality of the parent daphnids on the 21st day were 100 % at
the highest two concentrations of 20 and 6.5 mg/l. The mortality were
consistent among the exposure levels as 17.5, 27.5 and 17.5 % at
the concentrations of 2.0, 0.62 and 0.20 mg/l, respectively, then the toxic
value such as LC50s(21d) was not determined. Regarding effect on
reproduction the average number of offspring for a 21 days (% of the
control) were 23.2 (66.7%), 27.6 (79.2%), 29.6(85.0%) and 34.8
individuals/female at the concentrations of 2.0, 0.62, 0.20 mg/l, and
the control, respectively. The reduction rate (15.0-33.3 %) in those
concentrations was not significant, and then the NOEC on
reproduction was 2.0 mg/l, however the parent daphnids were died at
6.2 mg/l.

Reference: EA, Japan (1992)

(b)
Type of test: static [X]; semi static [ ]; flow through [ ];
other [ ];
open system [ ]; closed system [ ]
Species: Daphnia magna
End point: Mortality [ ]; Reproduction rate [ ]; Other [ ]
Exposure period: 16 days
Results: EC50( h) =
NOEC = 0.24 mg/l
LOEC =
Analytical monitoring: Yes [ ] No [ ] ? [X]
Method: GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4 Dichlorotoluene
### 4. ECOTOXICITY

#### 4.6 TOXICITY TO TERRESTRIAL ORGANISMS

#### 4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

No studies located

#### 4.6.2 TOXICITY TO TERRESTRIAL PLANTS

No studies located

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

No studies located

#### 4.7 BIOLOGICAL EFFECTS MONITORING (INCLUDING BIOMAGNIFICATION)

No studies located

#### 4.8 BIOTRANSFORMATION AND KINETICS IN ENVIRONMENTAL SPECIES

No studies located

#### 4.9 ADDITIONAL REMARKS

None
5.1 ACUTE TOXICITY

5.1.1 ACUTE ORAL TOXICITY

(a) Type: LD0 []; LD100 []; LD 50 [X]; LDL0 []; Other []
Species/strain: Rat
Value: > 2000 (mg/kg):
Method: OECD Test Guideline 410
GLP: Yes [X] No [ ] ? [ ]
Test substance: 2,4-Dichlorotoluene, purity: 98.96 %
Remarks: None
Reference: MHW, Japan (1993a)

(b) Type: LD0 []; LD100 []; LD 50 [X]; LDL0 []; Other []
Species/strain: Rat
Value: = 4600 (mg/kg):
Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4-Dichlorotoluene, purity: unknown
Remarks: None
Reference: Unpublished company data

(c) Type: LD0 []; LD100 []; LD 50 [X]; LDL0 []; Other []
Species/strain: Rat
Value: = 2790 (mg/kg):
Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4-Dichlorotoluene, purity: unknown
Remarks: None
Reference: Bayer AG (1981)

(d) Type: LD0 []; LD100 []; LD 50 [X]; LDL0 []; Other []
Species/strain: Mouse
Value: = 2900 (mg/kg):
Method: Unknown
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4-Dichlorotoluene, purity: unknown
Remarks: None
Reference: Unpublished company data

5.1.2 ACUTE INHALATION TOXICITY

Type: LC0 []; LC100 []; LC50 [X]; LCL0 []; Other []
Species/strain: Rat
Exposure time: 4h
Value: > 2669 mg/4h
5. TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

No studies located

5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION

No studies located

5.2 CORROSIVENESS/IRRITATION

5.2.1 SKIN IRRITATION/CORROSION

Species/strain: Rabbit
Results: Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ];
Irritating [ ]; Moderate irritating [X]; Slightly
irritating [ ]; Not irritating [ ]
Classification: Highly corrosive (causes severe burns)[ ]; Corrosive caused burns)
[ ];
Irritating [X]; Not irritating [ ]
Method: Patch test according to "Code of Federal Regulations, Title 16,
Section 1500.41"
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4-Dichlorotoluene
Remarks:
Reference: Bayer AG

5.2.2 EYE IRRITATION/CORROSION

Species/strain: Rabbit
Results: Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ];
Irritating [ ]; Moderate irritating [X]; Slightly
irritating [ ]; Not irritating [ ]
Classification: Irritating [ ]; Not irritating [X]; Risk of serious damage to eyes [ ]
Method: Patch test according to "Code of Federal Regulations, Title 16,
Section 1500.41"
GLP: Yes [ ] No [ ] ? [X]
Test substance: 2,4-Dichlorotoluene
Remarks:
Reference: Bayer AG

5.3 SKIN SENSITISATION

No studies located
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: Male: 46 days including 14 days before mating
Female: from 14 days before mating to day 3 of lactation
Frequency of treatment: 7 days/week
Post exposure observation period:
Dose: 0, 12.5, 79 or 500 mg/kg (12 animals /group)
Control group: Yes [X]; No [ ]; No data [ ];
Concurrent no treatment [ ]; Concurrent vehicle [X]; Historical [ ]
NOEL: < 12.5 mg/kg/day
LOEL: 12.5 mg/kg/day
Results: Dose dependent salivation was noted immediately after
administration in all treated groups. Decrease in body weight gain
were noted in the females of the 500 mg/kg group at the gestation and
lactation periods. In food consumption, decreases were noted in both
sexes of the 500 mg/kg groups. In hematological and blood chemical
examinations, decreases in platelet count, alfa-globulin fraction,
triglyceride and blood urea nitrogen, and increase in cholinesterase
were noted in the 500 mg/kg male group. In organ weights of the 500
mg/kg group, increased relative liver weights in both sexes, and of the
relative kidney weights in the males were noted. In autopsy, dark
brown discoloration of the liver was noted in 500 mg/kg male group.
In histopathological examination of the liver, centrilobular swelling
of hepatocytes was noted in all males of the 500 mg/kg group and 2
males of the 79 mg/kg group. In kidney, atrophy and regeneration of
tubular epithelium, and dilation of tubules were noted in 79 mg/kg or
more groups. In addition, the number of the males with hyalin
droplets and eosinophilic depositions in tubular epithelium increased
progressively in the groups of 79 and 500 mg/kg. On the basis of
above-mentioned, NOEL of this compound was indicated less than
12.5 mg/kg/day.
Method: OECD Combined Repeat dose and Reproductive/Developmental
Screening Toxicity Test (1992)
GLP: Yes [X] No [ ] ? [ ]
Test substance: Commercial, purity: 98.96 %
Reference: MHW, Japan (1993b)

5.5 GENETIC TOXICITY IN VITRO

A. BACTERIAL TEST

Type : Bacterial reverse mutation assay
System of testing: Species/strain: S. typhimurium TA 98, TA 100, TA 1535, TA 1537,
TA 1538
E. Coli uvrA
Concentration: 0, 15.625 - 1000 µg/plate
Metabolic activation: With [ ]; Without [ ]; With and Without [X]; No data [ ]
Results:

Cytotoxicity conc:  
With metabolic activation: 1000 µg/plate
Without metabolic activation: 500 µg/plate

Precipitation conc:  µg/plate

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: 98.96 %

Remarks:  Procedure: Plate 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 (1993c)

B. NON BACTERIAL IN VITRO TEST

Type:  Cytogenetics Assay
System of testing:  Species/strain: Chinese hamster CHL cells
Concentration:  Incubated with 0, 17.5 - 70.0 µg/ml (-S9)
0, 22.5 - 90.0 µg/ml (+S9)

Metabolic activation:  With [ ]; Without [ ]; With and Without [X]; No data [ ]

Results:
Cytotoxicity conc:  With metabolic activation: 90 µg/plate
Without metabolic activation: 70 µg/plate

Precipitation conc:

Genotoxic effects:  +  ?  -
With metabolic activation: [ ] [ ] [X]
Without metabolic activation: [ ] [ ] [X]

Method:  Japanese Guideline for Screening Mutagenicity of chemicals

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

Test substance:  Commercial, purity %

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
No. replicates: 1

Reference:  MHW, Japan (1993c)

5.6 GENETIC TOXICITY IN VIVO

No studies located

5.7 CARCINOGENICITY

No studies located
5.8 TOXICITY TO REPRODUCTION

Type:  Fertility [ ]; One generation study [ ];
      Two generation study [ ]; Other [X]
Species/strain:  Rat slc:SD
Sex:  Female [ ]; Male [ ]; Male/Female [X]; No data [ ]
Route of Administration: oral gavage
Exposure period:  Males: 46 days including 14 days before mating
      Females: from 14 days before mating to day 3 of lactation.
Frequency of treatment: 7 day /week
Postexposure observation period:
Premating exposure period: male: 14 days; female: 14 days
Duration of the test;
Doses:  0, 12.5, 79, or 500 mg/kg ( 12 /animals/sex/group)
Control group:  Yes [X]; No [ ]; No data [ ];
      Concurrent no treatment [ ]; Concurrent vehicle [X]; Historical [ ]
NOEL Parental :  79 mg/kg/day
NOEL F1 Offspring:  79 mg/kg/day
NOEL F2 Offspring:  N/A
Results:  In reproductive ability test, all pairs in the 12.5 and 79 mg/kg groups
achieved pregnancy. In the 500 mg/kg group, 12 pairs showed
      evidence of copulation with a sperm positive vaginal smear, however,
      only 5 pairs out of them achieved pregnancy. In six non-pregnant
      pairs in the 500 mg/kg group, vaginal plugs were not noted or a few
      sperm were found in the vaginal smears. These results suggested that
      the male reproductive organs and secondary reproductive organs had
      functional disorder. In body weight changes of pups, decreases in
      liver and body weights were noted in the 500 mg/kg group on day 1
      of lactation. In delivery or lactating behavior of dams, viability,
      general appearance or autopsy of pups, no effects of this chemical
      administration was noted. On the basis of above-mentioned, NOEL of
      the reproductive/developmental toxicity for both sexes was
      considered to be 79 mg/kg/day.
Method:  Combined Repeated Dose and Reproductive/Developmental Toxicity
      Screening Test
GLP:  Yes [X] No [ ] ? [ ]
Test substance:  Commercial, purity 98.96 %
Remarks:
Reference:  MHW, Japan (1993b)

5.9 DEVELOPMENTAL TOXICITY/ TERATOGENICITY

No studies located

5.10 OTHER RELEVANT INFORMATION

A. Specific toxicities
   No studies located
B. Toxicodynamics, toxicokinetics

   No studies located

5.11 EXPERIENCE WITH HUMAN EXPOSURE

   None
Aldrich: Catalog Handbook of Fine Chemicals

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