

Summary of Initial Risk Assessment Report

1,2-Dichloropropane CAS No : 78-87-5

PRTR No of Japan: 135

This substance is assessed based on Guideline for Initial Risk Assessment Version 1.0

1. General Information

1.1 Physico-chemical properties

Appearance	Colorless liquid
Melting point	-100 degC
Boiling point	96 degC
Water solubility	2.8 g/L (25 degC)
Henry's constant	286 Pa*m ³ /mol (2.82*10 ⁻³ atm*m ³ /mol) (25degC, measured)
Octanol/water partition coefficient (log Kow)	1.98 (measured), 2.25 (estimated)
Soil adsorption coefficient	Koc = 47 (measured)

1.2 Environmental fate

Bioaccumulation	Not bioaccumulative or low bioaccumulative Bioconcentration factor (BCF) : 1.2-3.2 (0.4 mg/L), 0.5-6.9 (0.04 mg/L) (carp)(measured)
Biodegradation	Non-biodegradable
Stability in the environment	(In air) Reaction with OH radical: Reaction rate constant is 4.4*10 ⁻¹³ cm ³ /molecule-sec. (25 degC, estimated) The half-life is 20-40 days, given OH radical concentration of 5*10 ⁵ -1*10 ⁶ molecule/cm ³ . Reaction with ozone: No data. Reaction with nitrate radical: No data. 1,2-Dichloropropane is not expected to be directly photolyzed. (In water) 1,2-Dichloropropane is not hydrolyzed in water.
Environmental fate	If released into water, 1,2-dichloropropane is expected to be removed from water mainly by volatilization to air. This substance may be removed by biodegradation under specific conditions involving acclimatized microorganisms.

2. Sources of release to the environment

2.1 Annual production, import, export and domestic supply in 2001 (ton/year)

Production	Import	Export	Domestic supply	Remarks
5,140		--	--	

2.2 Uses

Metal degreaser, solvent for greases, resins, rubber, wax, and asphalt, solvent for dry cleaning, chemical intermediate for carbon tetrachloride and tetrachloroethylene.

2.3 Release from the industries within the scope of PRTR system (in 2001)

Release sources		Air (ton)	Waters (ton)	Soil (ton)	Remarks
Listed industries	Reported release	218	< 0.5	0	Release to rivers: 0.764 ton
	Release outside notification	1,870	1	0	
Release outside notification from non listed industry		--	--	--	
Households		--	--	--	
Mobile sources		--	--	--	
Total		2,088	1	0	

2.4 Releases from other sources

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2.5 Main release route

1,2-Dichloropropane is expected to be released into air mainly during use of 1,2-dichloropropane or products containing it.

3. Exposure Assessment

3.1 Measured environmental concentration

Media	No. of points detected / No. of points measured	No. of samples detected / No. of samples measured	Detection range	95th percentile	Detection limit	Year of investigation, Institution
Air (microg/m ³) (indoor)	18/18	51/52	nd-0.3	0.18	0.004	2001 Ministry of the Environment
River water (microg/L)	0/607	0/1,006	nd	--	0.2-6	2001 Ministry of the Environment
Drinking water (microg/L)	--	-/107	nd	--	0.1	2001 Tokyo Metropolitan Government
Food (microg/g)	0/24	0/72	nd	--	0.001	1999 Ministry of the Environment

nd: Not detected

For calculation of the 95th percentile, data less than the detection limit are replaced with a value equal to 1/2 of the detection limit.

3.2 Estimated environmental concentration

Media	Estimated concentration	Description
Air (microg/m ³)	2.1	Calculated by mathematical model / Atmospheric Dispersion Model for Exposure and Risk Assessment ver.1.0 (AIST-ADMER)
River water (microg/L)	0.0035	Calculated by mathematical model / Integrated River Model to predict the distribution of chemical concentration (IRM1)

3.3 Estimated environmental concentration in water (EEC)

EEC(microg/L)	3
	-1,2-dichloropropane was not detected in any samples surveyed by the Ministry of the Environment in 2001 ¹⁾ -The value (3 microg/L) equal to 1/2 of the maximum detection (6 microg/L) limit in the survey was used.

3.4 Estimated human intake

Intake route		Concentration used for estimation of intake	Estimated intake (microg/ person/ day)	Estimated intake (microg/ kg-Bodyweight (BW)/ day)
Inhalation	Air	0.18 (microg/m ³)	3.6	0.072
		The ninety-fifth percentile (0.18microg/m ³) of measured concentrations in indoor air surveyed by the Ministry of the Environment in 2001.		
Oral	Drinking water	0.05 (microg/L)	0.10	0.002
		The value (0.05 microg/L) equal to 1/2 of the detection limit of the survey by the Bureau of Waterworks, Tokyo Metropolitan Government.		
	Food	0.0005 (microg/g)	1.0	0.02
		The value (0.0005 microg/g) equal to 1/2 of the detection limit of the survey by the Ministry of the Environment in 1999.		
	Subtotal	--	1.1	0.022
Total route		--	4.7	0.094

1) This substance is assessed based on the Guideline for Initial Risk Assessment Version1.0. If adequate measured concentrations are available, they are given priority and used as values for risk assessment. If they are not available, an estimated value calculated using a mathematical model is used.

4. Hazard assessment

4.1 Effects on organisms in the environment

	Acute or Chronic	Species	Endpoint	Concentration
Algae	Chronic	<i>Selenastrum capricornutum</i>	72 hours NOEC Growth inhibition (biomass)	10.6 (mg/L)
Crustacea	Chronic	<i>Daphnia magna</i>	21 days NOEC Reproduction	0.960 (mg/L)
Fish	Chronic	<i>Pimephales promelas</i>	28 days NOEC Growth	6 (mg/L)
Key study		The data of crustacea (<i>daphnia magna</i>) was chosen for the key study because effects were observed at the lowest concentration in the hazard assessment.		

4.2 Human health toxicity

Toxicity	Exposure route	Species	Duration / Dose method	Toxic effects (Key study is underlined)	NOAEL or LOAEL
Repeated dose toxicity	Inhalation	Rat	13 weeks	<u>Hyperplasia of respiratory epithelium of nasal cavity, degeneration of olfactory epithelium,</u> reduced body weight gains	NOAEL: 70.5 mg/m ³ (equivalent to 9.4 mg/kg/day)
	Oral	Rat	13 weeks Gavage administration	<u>Reduced body weight gains, hemolytic anemia,</u> decreased Hct and Hgb, increased Bil concentration, increased glutathione in liver/spleen, increased relative weight of liver and spleen, testicular degeneration, reduction in sperm in epididymis	LOAEL: 100 mg/kg/day (equivalent to 71 mg/kg/day)
	Dermal	--	--	--	--
Reproductive and developmental toxicity	Oral	Rat	two generations Drinking water	Decreased body weight and increased mortality in neonates during lactation period	NOAEL: 0.1% (equivalent to 121 mg/kg/day)
Carcinogenicity	Evaluation by IARC : Group 3 (not classifiable as to its carcinogenicity to humans)				
Genotoxicity	Considered to be genotoxic.				

5. Risk Assessment

5.1 Environmental organisms

Risk characterization	EEC (microg/L)	NOEC * (mg/L)	MOE (NOEC * /EEC)	Product of uncertainty factors	Conclusion
	3	NOEC: 0.96	320	10	No immediate concern
Product of uncertainty factors (UF): Extrapolation from laboratory test (10) = 10					
Recommendation : The substance is considered to be of no immediate concern for the moment, and low priority of further work.					

* NOEC means NOEC, LOEC, EC₅₀, etc.

5.2 Human health

5.2.1 Repeated dose toxicity

Exposure route	Intake (microg/kgBW/ day)	NOAEL (mg/kgBW/day)	Risk characterization		
			MOE	Product of uncertainty factors	Conclusion
Inhalation	0.072	9.4	130,000	500	No immediate concern
Oral	0.022	LOAEL: 71	3,200,000	5,000	No immediate concern
Total	--	--	--	--	--
Product of uncertainty factors (UF): Inhalation: Interspecies (10) * Intraspecies (10) * Duration of test (5) = 500 Oral: Interspecies (10) * Intraspecies (10) * Using of LOAEL (10) * Duration of test (5) = 5,000					

5.2.2 Reproductive and developmental toxicity

Since NOAEL of reproductive and developmental toxicity is larger than NOAEL of repeated toxicity, risk characterization was not carried out.

5.2.3 Carcinogenicity

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5.2.4. Recommendation for Human Health

The substance is considered to be of no immediate concern for the moment, and a low priority for further work.

6. Supplement

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