7	CAS No.: 96-23-1	Substance: 1, 3-dichloro-2-propanol

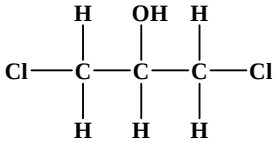
Chemical Substances Control Law Reference No.: 2-2002 1 (as mono [or di- / tri-] bromo [or chloro] alkanol [C = 2 - 5])

PRTR Law Cabinet Order No.: 1-134

Molecular Formula: $C_3H_6Cl_2O$

Molecular Weight: 128.99

Structural Formula:



1. General information

The aqueous solubility of this substance is 9.9 x 10^4 mg/L (19°C), and the partition coefficient (1-octonal / water) (log Kow) is 0.78 (calculated value). The vapor pressure is 0.750 mmHg (= 100 Pa) (20°C). The biodegradability of the substance is judged to be good, and its half-life by means of hydrolysis in water is 9.1 days (at 25°C, pH = 7).

This substance is a Class 1 Designated Chemical Substance under the Law concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR Law). Its primary uses and release sources are as a cross-linking agent (cellulose materials), as a solvent (for plastics and synthetic resins), and as a synthetic raw material. In 1993, production and import quantities amounted to 269 tons and 814 tons, respectively. Production and import quantities under the PRTR Law came to 1,000 tons.

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2. Exposure assessment

Total release to environment in FY2003 under the PRTR Law came to approximately 1,100 tons, of which only 50 tons was reported; most was estimated release outside notification to the atmosphere. Release to public water bodies accounted for a large part of the reported release. Pulp, paper and paper products and Chemical Industry accounted for large quantities of the reported release to the atmosphere. Pulp, paper and paper products and textile mill products accounted for large quantities of the reported release to public water bodies.

When estimated releases outside notification are included, release to water bodies accounted for the greatest quantity of release to the environment. The distribution into each environmental medium as determined by means of a multimedia model was 98.6% for water bodies.

The predicted maximum exposure concentration for inhalation exposure to human beings was estimated at less than 0.005 μg/m^3. The predicted maximum oral exposure was estimated at less than 0.08 μg/kg/day. Moreover, as the log Kow for the substance was low and bioconcentration is also predicted to be low, exposure from environmental media through the intake of food is thought to be low. Moreover, since the quantities of this substance released to water bodies and the distribution ratio are predicted to be high, exposure through water bodies is estimated to be high, so a study of exposure from drinking water is thought to be needed.

The predicted environmental concentration (PEC) that indicates exposure to aquatic organisms was estimated to be less than 2 μg/L for both freshwater and seawater public water bodies. However, since water bodies account for large quantities of release of the substance to the environment, and since the number of locations surveyed in freshwater bodies as part of this study (6 locations) was not adequate, the PEC value is likely to be greater.

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3. Initial assessment of health risk

The acute toxicity of this substance is similar to that of carbon tetrachloride. However, the irritation effect (for example, hemorrhagic gastritis, sore throat, etc.) may be greater.

There is insufficient information regarding the carcinogenicity of the substance, and it is not possible to make a judgment as to whether it causes cancer in humans. For this reason, an initial assessment of the substance was

conducted based on knowledge of non-carcinogenic effects.

As the 'Non-toxic level' was observed, used to estimate the margin of exposure (MOE), a no observed adverse effect level (NOAEL) of 1 mg/kg/day (increased liver weight, etc.), obtained from rat medium- and long-term toxicity testings, was obtained for oral exposure. This value was corrected to match the exposure circumstances, resulting in a value of 0.7 mg/kg/day. As the test period was short, this value was further divided by 10 to establish a value of 0.07 mg/kg/day. It was not possible to establish a 'Non-toxic level' for inhalation exposure.

With regard to oral exposure, the predicted maximum exposure when postulating intake of freshwater in public water bodies was estimated at less than 0.08 μg/kg/day. As the 'Non-toxic level' of 0.07 mg/kg/day and the predicted maximum exposure were derived by means of animal testing, the value was divided by 10 to derive an MOE that exceeded 88. Accordingly, assessment of the health risk from oral exposure to this substance was not possible to make. Moreover, exposure originating in the environment due to the intake of food was estimated to be minor. However, with regard to drinking water, etc., the lower limit for detection should be reconsidered and then a study should be conducted to determine the concentration.

With regard to inhalation exposure, it was not possible to determine health risk. However, release of the substance to the atmosphere and the distribution ratio are thought to be low. Moreover, as a reference, if the rate of absorption is postulated to be 100% and the 'Non-toxic level' for inhalation exposure is converted to the 'Non-toxic level' for oral exposure, a value of 0.23 mg/m^3 is obtained. The MOE assessed from this value and the predicted maximum exposure concentration is more than 4,600. Accordingly, there is thought to be comparatively little need to gather information, etc. on inhalation exposure in order to evaluate the health risk with regard to inhalation exposure to the substance in the ambient air.

Knowledge of toxicity				Exposure assessment			Result of risk assessment			Judgment
Exposure path	Guidelines for risk assessment	Animal	Impact assessment guideline (endpoint)	Exposure medium	Predicted maximum exposure quantity and concentration					
Oral	No observed adverse effect level 0.07 mg/kg/day	Rat	Increased liver weight, etc.	Drinking water	–	μg/kg/day	MOE	–	×	×
				Fresh water	< 0.08	μg/kg/day	MOE	> 88	▲～○	
Inhalation	No observed adverse effect level – mg/m^3	–	–	Ambient air	< 0.005	μg/m^3	MOE	–	×	×
				Indoor air	–	μg/m^3	MOE	–	×	×

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4. Initial assessment of ecological risk

With regard to acute toxicity, reliable information of a 48-hour EC_{50} growth inhibition value of 300,000 μg/L was found for the algae *Scenedesmus subspicatus*, a 48-hour EC_{50} immobilization value of 725,000 μg/L was found for the crustacea *Daphnia magna* (water flea), a 96-hour LC_{50} value of 100,000 μg/L was found for the fish *Oryzias latipes* (medaka), and a 48-hour LC_{50} value of 450,000 μg/L was found for the *Xenopus laevis* (African clawed frog). Accordingly, an assessment factor of 100 was used, and a predicted no effect concentration (PNEC) exceeding 1,000 μg/L was obtained based on the acute toxicity values. With regard to chronic toxicity, reliable information of a 72-hour no observed effect concentration (NOEC) growth inhibition value of 34,800 μg/L was found for the algae *Pseudokirchneriella subcapitata*, and a 21-day NOEC reproduction value of 6,250 μg/L was found for the crustacea *D. magna*. Accordingly, an assessment factor of 100 was used, and a PNEC value of 63 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value of 63 μg/L obtained from the chronic toxicity for the crustacean was used.

The PEC/PNEC ratio was less than 0.03 for both freshwater bodies and seawater bodies. However, considering the fact that the PEC value was established based on measurement data from a limited number of measurement locations, ecological risk cannot be determined at this time. It is necessary to determine trends in production and

release quantities and conduct a study to make a more complete determination of environmental concentration.

Hazard assessment (basis for PNEC)			Assessment factor	Predicted no effect concentration PNEC (μg/L)	Exposure assessment		PEC/PNEC ratio	Result of assessment
Species	Acute / chronic	Endpoint			Water body	Predicted environmental concentration PEC (μg/L)		
Crustacea	Chronic	NOEC reproduction	100	63	Freshwater	< 2	< 0.03	×
					Seawater	< 2	< 0.03	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	Risk cannot be determined. The lower limit for detection should be reconsidered and then a study should be conducted to determine the concentration in drinking water, etc.	×
	Inhalation exposure	Risk cannot be determined. However, there is thought to be comparatively little need to collect information, etc.	×
Ecological risk	Impossible of risk characterization. It is necessary to determine trends in production and release quantities and conduct a study to make a more complete determination of environmental concentration.		×

［Risk judgments］ ○: No need of further work ▲: Requiring information collection
■: Candidates for further work ×: Impossible of risk characterization