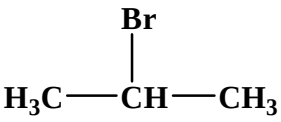
15	CAS No.: 75-26-3	Substance: 2-bromopropane

Chemical Substances Control Law Reference No.: 2-76

PRTR Law Cabinet Order No.: 1-287

Molecular Formula: C_3H_7Br Structural Formula:

Molecular Weight: 122.99



1. General information

The aqueous solubility of this substance is 3.18 x 10^3 mg/L (20°C), and the partition coefficient (1-octanol / water) (log Kow) is 2.14. The vapor pressure is 216 mmHg (= 2.88 x 10^4 Pa) (25°C, extrapolated value). Degradability is judged to be good. In terms of hydrolyzability, the half-life is 2.1 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 synthetic raw material (pharmaceuticals, agricultural chemicals and photosensitizing agents). Domestic production in 2003 was 100 tons (estimated).

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2. Exposure assessment

Total release to the environment in FY2003 under the PRTR Law came to approximately 1.5 tons. Of this quantity, the amount reported was 1.5 tons. Release to the atmosphere accounted for a large part of the reported release. Chemical Industry and manufacturers of electronic components accounted for high levels of release to the atmosphere. Chemical Industry accounted for high levels of release to public water bodies.

When estimated releases outside notification are included, release to the atmosphere accounted for the greatest quantity of release to the environment. The distribution into the different media in the environment predicted by means of a multimedia model was 98.8% for atmosphere.

The predicted maximum exposure concentration for inhalation exposure to human beings was estimated at less than 0.17 μg/m^3. The predicted maximum oral exposure was estimated to be less than 0.0004 μg/kg/day. As the substance is released primarily to the atmosphere and its distribution to water bodies and bottom sediment is predicted to be low, and as bioconcentration is expected to be low, exposure to this substance from environmental media via the food chain is assumed to be low.

The predicted environmental concentration (PEC) that indicates exposure to aquatic organisms was estimated to be less than 0.01 μg/L for both freshwater and seawater public water bodies.

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3. Initial assessment of health risk

Information regarding acute toxicity with respect to humans could not be obtained. However, in tests with mouse that had been given LC_{50} 31,171 ppm, no abnormalities were observed during the exposure time, and no clear pathological changes were observed in respiratory orgens, reproductive organs or liver.

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 human beings. For this reason, an initial assessment of the substance was conducted based on information of non-carcinogenic effects.

As the ‘Non-toxic level’ was observed, used to estimate the margin of exposure (MOE), a lowest observed adverse effect level (LOAEL) of 500 mg/m^3 (reduction in number of follicle at each developmental stage), obtained from rat reprodctive and developmental toxicity testings, was obtained for inhalation exposure. This value was corrected to match the exposure circumstances to obtain a value of 170 mg/m^3, and as it was a LOAEL value, it was further divided by 10 to establish a value of 17 mg/m^3. A ‘Non-toxic level’ could not be established for oral exposure.

With regard to oral exposure, the health risk could not be determined. However, as more than 99% of the quantity released to the environment is released to the atmosphere, and subsequently as well almost all of the substance is predicted to be distributed in the atmosphere, exposure originating in the environment via the food chain is predicted 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 5.1 mg/kg/day is obtained. The MOE assessed from this value and the predicted maximum exposure concentration exceeds 1,300,000. Accordingly, there is thought to be little need to gather information, etc. in order to evaluate the health risk due to oral exposure to the substance.

With regard to inhalation exposure, the predicted maximum exposure concentration in ambient air was estimated to be less than 0.17 μg/m^3. As the NOAEL of 17 mg/m^3, etc. and the predicted maximum exposure concentration were established by animal testing, the value was divided by 10 to derive an MOE exceeding 10,000. Accordingly, there is thought to be no need at this time for assessment of 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	– mg/kg/day	–	–	Drinking water	–	μg/kg/day	MOE	–	×	×
					Fresh water	< 0.0004	μg/kg/day	MOE	–	×	
Inhalation	No observed adverse effect level	17 mg/m^3	Rat	Reduction in number of follicle at each developmental stage	Ambient air	< 0.17	μg/m^3	MOE	> 10,000	○	○
					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} immobilization value of 23,100 μg/L was found for the crustacea *Daphnia magna* (water flea), and a 96-hour LC_{50} value of 66,600 μg/L was found for the fish *Oryzias latipes* (medaka). As toxicity values for two groups of organisms (crustacea and fish) were obtained, an assessment factor of 1,000 was used, and a predicted no effect concentration (PNEC) of 23 μg/L was obtained based on the acute toxicity values. With regard to chronic toxicity, reliable information of a 21-day no observed effect concentration (NOEC) reproduction value of 4,940 μg/L was found for the crustacea *D. magna*. Accordingly, an assessment factor of 100 was used, and a PNEC value of 49 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value of 23 μg/L obtained from the acute toxicity for the crustacea was used.

The PEC/PNEC ratio was less than 0.0004 for both freshwater bodies and seawater bodies. Accordingly, further work is thought to be unnecessary at this time.

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	Acute	EC_{50} immobilization	1000	23	Freshwater	< 0.01	< 0.0004	○
					Seawater	< 0.01	< 0.0004	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	Risk could not be determined. However, there is thought to be little need to gather information, etc.	×
	Inhalation exposure	Assessment with regard to the ambient air is thought to be unnecessary at this time.	○
Ecological risk	No need of further work.		○

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