17	CAS No.: 67-63-0	Substance: 2-propanol

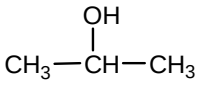
Chemical Substances Control Law Reference No.: 2-207 (Propyl alcohol)

PRTR Law Cabinet Order No.:

Structural Formula:

Molecular Formula: C_3H_8O

Molecular Weight: 60.10



1. General information

This substance is such that the substance is freely miscible and the partition coefficient (1-octanol / water) (log Kow) is 0.05. The vapor pressure is 45.4 mmHg (=6.05 x 10^3 Pa) (25°C). This substance is determinated to be ready biodegradable. But the substance is thought to be one that does not have hydrolyzable groups.

The substance is mainly used for intermediate materials for synthetic acetone, solvents, solvents for nitrocellulose lacquer, extraction solvents for printing ink, dehydration agents and compounding agents for hair tonic and lotion, and in manufacturing pharmaceuticals, disinfection, anti-freezing for aircraft, anti-icing of radiator coolant, preparation of brake oil, synthesis of other raw materials, and purification. It is also used for food addictives. The production in FY 2005 was 185,179 tons and the exports and imports of the total of 2-propanol and 1-propanol were 38,621 and 17,451 tons, respectively.

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2. Exposure assessment

As 2-propanol is not 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), no information on release and transfer quantities could be obtained. When predictions of distribution ratios by medium were made using the Mackay-Type Level III Fugacity Model, in the event of equal release to the atmosphere, water and soil, the distribution ratio was highest for soil and water.

Based on previous data for the ambient air, the predicted maximum exposure concentration for inhalation exposure to human beings was approximately 8.3 μg/m^3. The expected maximum concentration in the indoor air was 890 μg/m^3. The highest oral predicted exposure was calculated to be approximately less than 0.12 μg/kg/day based on groundwater data. The risk of exposure to this substance through food in environmental media is considered to be low.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was estimated to be less than 3 μg/L for both freshwater and seawater public water bodies.

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3. Initial assessment of health risk

The substance irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system, resulting in depression. Contact with the skin and the eyes may cause dry skin and redness of the eyes. By inhalation or ingestion, it may cause cough, sore throat, dizziness, drowsiness and headache. Additionally, by ingestion, it may cause vomiting, abdominal pain, laboured breathing, nausea and unconsciousness. For humans, lethal doses lowest (LDL_0) for oral exposure of 5,272 mg/kg, 3,570 mg/kg and 571 mL/kg, toxic dose lowest(TDL_0) for oral exposure of 14,432 mg/kg, 13,000 mg/kg(infants) ,286 mg/kg and 223 mg/kg, toxic concentration lowest(TCL_0) for inhalation exposure of 35 ppm（4hr）were reported.

There was insufficient information regarding the carcinogenicity of the substance. For this reason, an initial assessment of the substance was conducted based on information of non-carcinogenic effects.

A no observed adverse effect level (NOAEL) of 100 mg/kg/day (increase in the relative weight of liver of female, decrease in survival rate of pups) was obtained for oral exposure from the reproductive or developmental toxicity testing for rats. A no observed adverse effect level (NOAEL) for the inhalation of 1,230 mg/m^3（renal disease of male and

female） was obtained from the medium- and long-term toxicity testing for rats. The NOAEL was adjusted to 220 mg/m^3 taking into account the exposure situations, and a value of 220 mg/m^3 was derived as the 'Non-toxic level*'.

With regard to oral exposure, in case of intakes of groundwater, the predicted maximum exposure was approximately less than 0.12 μg/kg/day. The margin of exposure (MOE) of exceeding 83,000 was derived from the 'Non-toxic level*' of 100 mg/kg/day divided by the predicted maximum dose, and divided by 10, because the 'Non-toxic level*' was established by means of animal testing. As the exposure to this substance through food intakes was estimated minor, even when the exposure through groundwater and food are combined, it would not greatly affect the MOE values. Accordingly, further action for assessment of its health risk from oral exposure to this substance would not be required at present.

For inhalation exposure to this substance in the ambient air, the predicted maximum exposure concentration was approximately 8.3 μg/m^3. The MOE of 2,700 was derived from the 'Non-toxic level*' of 220 mg/m^3 divided by the predicted maximum exposure concentration, and divided by 10 because the 'Non-toxic level*' was established by means of animal testing. For inhalation exposure to this substance in the indoor air, the predicted maximum exposure concentration was 890 μg/m^3. From the 'Non-toxic level*' of 220 mg/m^3 and the predicted maximum exposure concentration, the MOE of 25 was determined. Therefore, further action would not be required at present for assessment of its health risk from inhalation exposure to this substance in the ambient air. On the other hand, it would be required to collect information on inhalation exposure to this substance in the indoor air for its health risk assessment.

Information of toxicity				Exposure assessment			Result of risk assessment			Judgment
Exposure Path	Criteria for risk assessment	Animal	Criteria for diagnoses (endpoint)	Exposure medium	Predicted maximum exposure quantity and concentration					
Oral	'Non-toxic level*' 100 mg/kg/day	Rats	increase in the relative weight of liver of female, decrease in survival rate of pups	Drinking water	— μg/kg/day		MOE	—	×	○
				Groundwater	< 0.12 μg/kg/day		MOE	> 83,000	○	
Inhalation	'Non-toxic level*' 220 mg/m^3	Rats	renal disease of male and female	Ambient air	8.3 μg/m^3		MOE	2,700	○	○
				Indoor air	890 μg/m^3		MOE	25	▲	▲

Non-toxic level *

- When a LOAEL is available, it is divided by 10 to obtain a level equivalent to NOAEL.
- When an adverse effect level for the short-term exposure is available, it is divided by 10 to obtain a level equivalent to an adverse effect level for the long-term exposure.

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4. Initial assessment of ecological risk

With regard to acute toxicity, reliable information of a 72-hour median effective concentration (EC_{50}) growth inhibition value exceeding 1,000,000 μg/L was found for the algae *Pseudokirchneriella subcapitata*, a 48-hour EC_{50} immobilization value exceeding 1,000,000 μg/L was found for the crustacea *Daphnia magna* (water flea), a 96-hour median lethal concentration (LC_{50}) value exceeding 100,000 μg/L was found for the fish *Oryzias latipes* (medaka), and a 24-hour LC_{50} value of 28,600,000 μg/L was found for the other organism, *Brachionus calyciflorus* (rotifer). 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 1,000,000 μg/L was found for the algae *P. subcapitata*, and a 21-day NOEC reproduction value of more than 100,000 μg/L was found for the crustacea *D. magna*. Accordingly, an assessment factor of 100 was used, and a PNEC value of more than 1,000 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value of more than 1,000 μg/L obtained from the chronic toxicity for the crustacea, was used.

The PEC/PNEC ratio was less than 0.003 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 (water flea)	Chronic	NOEC reproduction	100	≧1,000	Freshwater	<3	≦0.003	○
					Seawater	<3	≦0.003	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	No need for further work.	○
	Inhalation exposure	For the ambient air, further action would not be required at the moment. For the indoor air, it would be required to collect information.	▲
Ecological risk	No need for further work.		○

［Risk judgments］ ○: No need for further work ▲: Requiring information collection

■: Candidates for further work ×: Impossibility of risk characterization

（○）: Though a risk characterization cannot be determined, there would be little necessity of collecting information.

（▲）: Further information collection would be required for risk characterization.