16	CAS No.: 71-23-8	Substance: 1-propanol

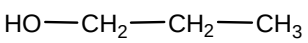
Chemical Substances Control Law Reference No.: 2-207 (Propyl alcohol)

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 0.25. The vapor pressure is 21.0 mmHg (= 2.80 x 10^3 Pa) (25°C). The biodegradability (aerobic degradation) at the BOD degradation rate was 64% for 5 days of study period, 76% for 10 days, 81% for 15 days and 75% for 20 days. The substance is thought to be one that does not have hydrolyzable groups.

It is mainly used for solvents and in food additives. The total of production (shipment) and imports in FY 2001 was 1,000 to less than 10,000 tons/yr, and in FY 2004, 100,000 to less than 1,000,000 tons/yr as propylalcohol. The total exports and imports of 1-propanol and 2-propanol in FY 2005 were 38,621 and 17,451 tons, respectively.

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2. Exposure assessment

As 1-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 less than 0.2 μg/m^3. The expected maximum concentration in the indoor air was 11 μg/m^3. The highest oral predicted exposure was calculated to be approximately less than 0.008 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 0.2 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. The substance may cause effects on the central nervous system, resulting in unconsciousness at high levels. Contact with the eyes may case redness, pain and blurred vision. Contact with the skin may cause dry skin. By inhalation or ingestion, it may cause ataxia, confusion, dizziness, drowsiness, headache, nausea and weakness. Additionally, by ingestion, it may cause abdominal pain, sore throat and vomiting. There is a report that determined the lethal dose lowest (LDL_0) for humans of 5,700 mg/kg.

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 3,000 mg/kg/day (no effect even at the highest dose) was obtained for oral exposure from the medium- and long-term toxicity testing for rats. The NOAEL was divided by 10, because of the experimental period being short, and a value of 300 mg/kg/day was derived as the 'Non-toxic level*'. A no observed adverse effect level (NOAEL) for the inhalation exposure of 1,230 mg/m^3 (swelling around eyes, crust around eyes or nose) was obtained from the medium- and long-term toxicity testing for rats. The NOAEL was adjusted to 200 mg/m^3 taking into account the exposure conditions, and a value was derived as the 'Non-toxic level*'. It was decided that there would be no necessity to take into the account the effect of the short experimental period,

considering the endpoint symptoms on rats.

With regard to oral exposure, in case of intakes of groundwater, the predicted maximum exposure was approximately less than 0.008 μg/kg/day. The margin of exposure (MOE) of exceeding 3,800,000 was derived from the 'Non-toxic level*' of 300 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 less than 0.2 μg/m^3. The MOE of exceeding 100,000 was derived from the 'Non-toxic level*' of 200 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 11 μg/m^3. From the 'Non-toxic level*' of 200 mg/m^3 and the predicted maximum exposure concentration, the MOE of 1,800 was determined. Accordingly, further action would not be required at present for its health risk with regard to inhalation exposure to this substance both in the ambient and the indoor air.

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*' 300 mg/kg/day	Rats	no effect even at the highest dose	Drinking water	— μg/kg/day	MOE	—	×	○
				Groundwater	< 0.008 μg/kg/day	MOE	> 3,800,000	○	
Inhalation	'Non-toxic level*' 200 mg/m^3	Rats	swelling around eyes, crust around eyes or nose	Ambient air	< 0.20 μg/m^3	MOE	> 100,000	○	○
				Indoor air	11 μg/m^3	MOE	1,800	○	○

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 48-hour median lethal concentration (LC_{50}) value of 3,025,000 μg/L was found for the crustacea *Daphnia pulex* (water flea), and a 48-hour LC_{50} value of 3,200,000 μg/L was found for the fish *Oncorhynchus mykiss* (rainbow trout). No applicable findings for algae were obtained, but acute toxicity was considered to exceed chronic toxicity based on the chronic toxicity for green algae *Chlorella pyrenoidosa*. Therefore, with an assessment factor of 100, a predicted no effect concentration (PNEC) based on acute toxicity was determined to be above 12,000 μg/L. With regard to chronic toxicity, reliable information of a 48-hour no observed effect concentration (NOEC) growth inhibition value of 1,150,000 μg/L was found for the algae *C. pyrenoidosa*. Accordingly, an assessment factor of 100 was used, and a PNEC value of 12,000 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value of 12,000 μg/L obtained from the chronic toxicity for the algae was used.

The PEC/PNEC ratio was less than 0.00002 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)		
Algae (green algae)	Chronic	NOEC growth inhibition	100	12,000	Freshwater	<0.2	<0.00002	○
					Seawater	<0.2	<0.00002	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	No need for further work.	○
	Inhalation exposure	Further work would not be required at the moment to assess its health risk for its inhalation exposure in the ambient and indoor air.	○
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.