

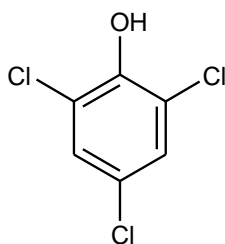
Chemical Substances Control Law Reference No.: 3-931 trichlorophenol (and its sodium salts)

PRTR Law Cabinet Order No.\*: 1-287

Molecular Formula: C<sub>6</sub>H<sub>3</sub>Cl<sub>3</sub>O

Structural formula:

Molecular Weight: 197.45



\*Note: No. in Revised Cabinet Order enacted on October 1, 2009

### 1. General information

The aqueous solubility of this substance is 500 mg/1000 g (25°C), the partition coefficient (1-octanol/water) (log K<sub>ow</sub>) is 3.69, and the vapor pressure is 0.024 mmHg (=3.2 Pa) (25°C). Biodegradability (aerobic degradation) is considered to be good. Furthermore, its half-life for hydrolysis is more than 8×10<sup>6</sup> years (neutral).

This substance is designated as 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). The main uses are as dyestuff intermediates, fungicides and preservatives (wood preservative agents), while the substance also finds usage in slime-controlling agents in the papermaking industry and preservatives for timber. The production quantity in 1997 and 1998 was 200 t/y, while the import quantity was 100 t/y.

### 2. Exposure assessment

Because this substance was not a Class 1 Designated Chemical Substance prior to revision of substances regulated by the PRTR Law, release and transfer quantities could not be obtained. Predictions of distribution by medium using a Mackay-type level III fugacity model indicated that if equal quantities were released to the atmosphere, water bodies, and soil, the proportion distributed to soil would be greater.

Data for setting the predicted maximum exposure to humans via inhalation could not be obtained. The predicted maximum oral exposure was estimated to be around 0.0035 µg/kg/day based on data calculated from public freshwater bodies. Furthermore, there was a report of around 0.008 µg/kg/day using groundwater data from a limited area. In addition, while the data applied is from the past, estimating oral exposure through ingestion of fish for a limited water body area using seawater data is likely to be higher than the case where public freshwater body data is used.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was around 0.088 µg/L for public freshwater bodies and generally less than 0.005 µg/L for seawater. Furthermore, while no data has been reported within the past 10 years, there is a report (1997) of around 5.4 µg/L for a limited area of seawater.

### 3. Initial assessment of health risk

This substance is irritating to eyes, skin and respiratory tracts. When inhaled, it will cause coughing, and pharyngodynia. When orally taken, it will cause twitch, diarrhea, dizziness, headache, short breath, vomiting, torpor and ataxia. When taken into eyes, they will turn red and suffer from pain. When attached to skin, skin will be red.

Sufficient information could not be obtained on its carcinogenicity, and its initial assessment was conducted on the basis of data on its non-carcinogenic effects.

As for its oral exposure, NOAEL of 0.3 mg/kg/day (for increase of liver weight in F<sub>1</sub>) was obtained from its

reproductive and developmental toxicity tests for rats, and this was identified as its ‘non-toxic level\*’. For its inhalation exposure, its ‘non-toxic level\*’ could not be established.

As for its oral exposure, its average exposure was calculated to be around less than 0.0002 µg/kg/day, and its maximum exposure was estimated to be around 0.0035 µg/kg/day, when intakes of freshwater from public water supply were assumed. Its margin of exposure (MOE) would be 1,700 when calculated from its ‘non-toxic level\*’ of 0.3 mg/kg/day and its estimated maximum exposure, then divided by 10 due to the fact that ‘non-toxic level\*’ was obtained from animal experiments, and divided again by 5 when its carcinogenicity was considered. Its intakes through drinking of groundwater up to 0.008 µg/kg/day have been reported for some location, and MOE for these will be 750. MOE can be less than 100, if it is calculated from the estimated oral exposure by its intakes through fish, on the basis of data on public seawater for some locality. Collection of information would be required to assess health risk from oral exposure to this substance.

As for inhalation exposure to this substance, its ‘non-toxic level\*’ was not identified and its exposure concentration was not understood, so its health risk could not be assessed.

Its half-life in the atmosphere is 8.8 to 88 days, and when released to the atmosphere, around 20% of it is expected to remain there. Its production and import and its emission to the environment have not been understood. Collection of information would be required to assess health risk associated with its inhalation exposure in the ambient 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	MOE			
Oral	‘Non-toxic level’ 0.3 mg/kg/day	Rats	increase of liver weight in F <sub>1</sub>	Drinking water	— µg/kg/day	MOE	—	×	(▲)
				Freshwater	0.0035 µg/kg/day	MOE	1,700	○	
Inhalation	‘Non-toxic level’ — mg/m <sup>3</sup>	—	—	Ambient air	— µg/m <sup>3</sup>	MOE	—	×	(▲)
				Indoor air	— µg/m <sup>3</sup>	MOE	—	×	×

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.

#### 4. Initial assessment of ecological risk

With regard to acute toxicity, the following reliable data were obtained: a 96-h median effective concentration (EC<sub>50</sub>) of 3,500 µg/L for growth inhibition in the green algae *Pseudokirchneriella subcapitata*; a 96-h median lethal concentration (LC<sub>50</sub>) of 1,210 µg/L for the crustacean *Palaemonetes pugio*; a 96-h LC<sub>50</sub> of 410 µg/L for the fish species *Lepomis macrochirus* (bluegill); and a 96-h LC<sub>50</sub> of 1,200 µg/L for the African clawed frog *Xenopus laevis*. Accordingly, based on these acute toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 4.1 µg/L was obtained.

With regard to chronic toxicity, the following reliable data were obtained: a 21-d no observed effect concentration (NOEC) of 500 µg/L for reproductive inhibition in the crustacean *Daphnia magna*; and a 30-d post-hatch NOEC of 970 µg/L for mortality/growth inhibition in the fish species *Pimephales promelas* (fathead minnow). Accordingly, based on these chronic toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 5.0 µg/L was obtained. Furthermore, a 2-d NOEC of 300 µg/L was obtained for reproductive inhibition in the marine rotifer *Brachionus calyciflorus*; when this organism was adopted, the PNEC reference value based on chronic toxicity value was 3.0 µg/L. The value of 4.1 µg/L obtained from the acute toxicity value to the fish species was used as the PNEC for this substance.

The ratio of predicted environmental concentration (PEC) and predicted no effect concentration (PNEC) is 0.02 for

freshwater bodies and less than 0.001 for seawater, and there is no need of further work at present.

Furthermore, while no data has been reported within the past 10 years, there is a report (1997) of around 5.4 µg/L for a limited area of seawater, and because the ratio of this concentration and PNEC is 1.3, no further collection of data regarding this area of seawater is considered necessary.

Hazard assessment (basis for PNEC)			Assessment factor	Predicted no effect concentration PNEC (µg/L)	Exposure assessment		PEC/PNEC ratio	Assessment result
Species	Acute/chronic	Endpoint			Water body	Predicted environmental concentration PEC (µg/L)		
Fish species Bluegill	Acute	LC <sub>50</sub>	100	4.1	Freshwater	0.088	0.02	○
		Mortality			Seawater	<0.005	<0.001	

### 5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	Risk can not be assessed. Collection of information required on health risk associated with oral exposure.	(▲)
	Inhalation exposure	Risk can not be assessed. Collection of information required on health risk associated with inhalation exposure in the ambient air.	(▲)
Ecological risk	No need of further work at present. Furthermore, while no data has been reported within the past 10 years, there is a report (1997) of around 5.4 µg/L for a limited area of seawater. Because the ratio of this concentration and PNEC is 1.3, no further collection of data regarding this area of seawater is considered necessary.		○

[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.