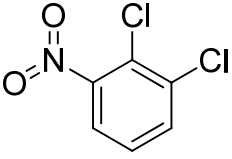


3	CAS No.: 3209-22-1	Substance: 1,2-Dichloro-3-nitrobenzene
<p>Chemical Substances Control Law Reference No.: 3-455 (Dichloronitrobenzene)</p> <p>PRTR Law Cabinet Order No.:</p> <p>Molecular Formula: C₆H₃Cl₂NO₂ Structural Formula: </p> <p>Molecular Weight: 192.00</p>		
<p>1. General information</p> <p>The aqueous solubility of this substance is 62.4 mg/L (20°C), the partition coefficient (1-octanol/water) (log K_{ow}) is 3.05, and the vapor pressure is 0.2 mmHg (=30 Pa). Biodegradability (aerobic degradation) is characterized by a BOD (NO₂) degradation rate of 4%, and bioaccumulation is judged to be non-existent or low. Its half-life for hydrolysis is more than 1 y (25°C, pH=4.0, 7.0, 9.0).</p> <p>This substance is used as an intermediate. The production and import quantity as dichloronitrobenzene in fiscal 2010 was less than 1,000 t. The production and import quantity in fiscal 2011 was not disclosed because the number of reporting businesses was not more than two.</p> <p>-----</p> <p>2. Exposure assessment</p> <p>This substance was classified as a Class 1 Designated Chemical Substance prior to revision of substances regulated by the PRTR Law. Total release to the environment in fiscal 2009 under the PRTR Law was 0 t. Releases and transfers to groundwater based on the PRTR Law could not be obtained. Predictions of proportions distributed to individual media by 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 was largest.</p> <p>The maximum expected concentration of exposure to humans via inhalation could not be obtained. The maximum expected oral exposure was estimated to be less than 0.00048 µg/kg/day on the basis of calculations from data for public freshwater bodies. The risk of exposure to this substance by intake from an environmental medium via food is considered slight, based on its low bioaccumulation.</p> <p>The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was less than 0.012 µg/L for public freshwater bodies, and generally less than 0.012 µg/L for seawater.</p> <p>-----</p> <p>3. Initial assessment of health risk</p> <p>Dose dependent symptoms observed in the acute toxicity tests include decreased activity, ptosis, staggering gate, systemic relaxed muscles and pale skin in male and female rats, and deep breathing in male rats, leading to their death one or two days after administration of the substance when these symptoms aggravate and weak breathing occur. Surviving rats recover six hours to three days after its administration.</p> <p>As sufficient information was not available to evaluate carcinogenicity of the substance, an initial assessment was conducted on the basis of information on its non-carcinogenic effects.</p> <p>With regard to oral exposure to the substance, a NOAEL of 5 mg/kg/day (for symptoms such as increased relative liver and kidney weight, enlarged hepatocytes) obtained from its mid-term and long-term toxicity tests on rats, was divided by a factor of 10 due to their short test periods. Outcome of 0.5 mg/kg/day was considered to be the reliable lowest dose of the substance and was identified as its 'non-toxic level*'. As for inhalation exposure to the substance, its 'non-toxic level*' could not be identified.</p> <p>With regard to its oral exposure, its mean and maximum exposure levels were both predicted to be below 0.00048 µg/kg/day, when intakes of freshwater from public water bodies were assumed. The MOE (Margin of Exposure) would be over 100,000 when calculated from its 'non-toxic level*' of 0.5 mg/kg/day and the</p>		

maximum exposure level predicted from animal experiments, and divided by a factor of 10 to convert animal data to human data. As exposure to the substance in the environment through food intakes would be limited, the MOE would not change significantly even when this exposure is included. Therefore, no further action would be required at this moment to assess health risk from oral exposure to the substance in the ambient air.

As for its inhalation exposure, its 'non-toxic level*' could not be identified nor its exposure concentrations were not known, and its health risk could not be assessed. In addition, this substance is used as its chemical intermediate, and its total emission into the ambient air in FY 2009 was 0 t. Therefore, collection of further information would not be required to assess health risk from its inhalation exposure in the ambient air.

Exposure Path	Toxicity			Exposure assessment		Result of risk assessment			Judgment
	Criteria for risk assessment	Animal	Criteria for diagnoses (endpoint)	Exposure medium	Predicted maximum exposure dose and concentration				
Oral	'Non-toxic level*' 0.5 mg/kg/day	Rat	Increased relative liver and kidney weights, enlarged hepatocytes.	Drinking water	- μg/kg/day	MOE	-	×	
				Freshwater	<0.00048 μg/kg/day	MOE	>100,000	○	
Inhalation	'Non-toxic level*' - mg/m ³	-	-	Ambient air	- μg/m ³	MOE	-	×	()
				Indoor air	- μg/m ³	MOE	-	×	

Non-toxic level *

- When a LOAEL is available, it is divided by 10 to obtain a NOAEL-equivalent level.
- 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 EC₅₀ of 2,900 μg/L for growth inhibition in the green alga *Chlorella pyrenoidosa*, a 48-h EC₅₀ of 1,600 μg/L for immobilization in the crustacean *Daphnia magna*, and a 96-h LC₅₀ of 3,800 μg/L for the fish species *Danio rerio* (zebrafish). Accordingly, based on these acute toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 16 μg/L was obtained.

The value of 16 μg/L obtained from the acute toxicity to the crustacean was used as the PNEC for this substance because reliable chronic toxicity data could not be obtained.

The PEC/PNEC ratio was less than 0.0008 for both freshwater bodies and seawater. Accordingly, further work is considered unnecessary at this time.

Hazard assessment (basis for PNEC)			Assessment factor	Predicted no effect concentration PNEC (μg/L)	Exposure assessment		PEC/PNEC ratio	Judgment based on PEC/PNEC ratio	Assessment result
Species	Acute/chronic	Endpoint			Water body	Predicted environmental concentration PEC (μg/L)			
Crustacean <i>Daphnia magna</i>	Acute	EC ₅₀ immobilization	100	16	Freshwater	<0.012	<0.0008		
					Seawater	<0.012	<0.0008		

5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	No need of further work at present.	
	Inhalation exposure	Although risk to human health could not be confirmed, collection of further information would not be required.	()
Ecological risk	No need of further work at present.		

[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.