11	CAS No.: 108-69-0	Substance: 3,5-Dimethyl aniline

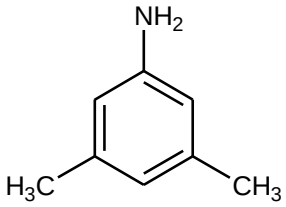
Chemical Substances Control Law Reference No.: 3-129 (dialkyl (C =1–5) aniline)

PRTR Law Cabinet Order No.:

Structural Formula:

Molecular Formula: $C_8H_{11}N$

Molecular Weight: 121.18



1. General information

The aqueous solubility of this substance is 2.7×10^3 mg/L (25°C, calculated value), the partition coefficient (1-octanol/water) (log K_{ow}) is 1.83, and the vapor pressure is 0.128 mmHg (=18.4 Pa) (25°C, calculated value). The biodegradability (aerobic degradation) is characterized by a BOD degradation rate of 3%, and bioaccumulation is thought to be nonexistent or low. The substance does not have any hydrolyzable groups.

This substance designated as a Type II and III Monitoring Chemical Substance under the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances. Its main application is as an intermediate in the synthesis of Pigment Red 149.

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2. Exposure assessment

Because this substance 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), 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 higher.

Data for setting the predicted maximum exposure to humans via inhalation could not be obtained, but there is a report of less than 0.0015 μg/m^3 when data from a limited area (Kawasaki City) was used. The predicted maximum oral exposure was estimated to be less than around 0.00028 μg/kg/day based on calculations from data for groundwater. The risk of exposure to this substance by intake from an environmental medium via food is considered slight.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was less than around 0.007 μg/L for both public freshwater bodies and seawater.

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3. Initial assessment of health risk

Diminished consciousness is caused as a result of exposure to high levels of this substance and MetHb may possibly be generated. Inhalation exposure causes dizziness, lethargy, headache and nausea while oral exposure causes cyanosis on the lips, nail beds and skin, dizziness, lethargy, headache, nausea and loss of consciousness.

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, its no-observed-adverse-effect-level (NOAEL) of 10 mg/kg/day for increased splenic weight, splenic extramedullary hematopoiesis, hepatic hemosiderosis, and hepatocyte hypertrophy obtained from its mid-term and long-term toxicity tests for rats was divided by 10, due to their short test periods, to produce 1 mg/kg/day as its ‘non-toxic level*’. As for inhalation exposure, its ‘non-toxic level*’ could not be identified.

As for its oral exposure, the predicted maximum exposure was estimated to be less than around 0.00028 μg/kg/day,

when intakes of groundwater were assumed. Its margin of exposure (MOE) would be more than 360,000 when calculated from its 'non-toxic level*' of 1 mg/kg/day and the predicted maximum exposure, and then divided by 10 due to the fact that 'non-toxic level*' was obtained from animal experiments. Since risk associated with exposure to this substance through food intakes from the environment is presumed to be minimal, this exposure will not increase MOE significantly, and no further action will be required at the moment to assess health risk from oral exposure to this substance.

As for inhalation exposure to this substance, its 'non-toxic level' could not be identified, and its exposure concentrations were yet to be obtained. Its health risk could not be assessed. The 'non-toxic level' for its oral exposure, if 100% absorption is assumed for it, turns to be the 'non-toxic level' of 3.3 mg/m^3 for its inhalation exposure. When combined with the predicted maximum concentration of less than 0.0015 $\mu g/m^3$ in the ambient air estimated from the report for some location, MOE will be more than 220,000.

Its half-life in the atmosphere is 0.32 to 3.2 hrs. When released to the atmosphere, most of it is expected to go to media other than the ambient air, and collection of information on its inhalation exposure to assess health risk associated with its inhalation exposure in the ambient air would not be required.

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*' 1 mg/kg/day	Rats	Increase in splenic weight, splenic extramedullary hematopoiesis, splenic hemosiderosis, hepatocyte hypertrophy, etc.	Drinking water	− μg/kg/day	MOE	−	×	○
				Groundwater	< 0.00028 μg/kg/day	MOE	> 360,000	○	
Inhalation	'Non-toxic level*' − mg/m^3	−	−	Ambient air	− $\mu g/m^3$	MOE	−	×	(○)
				Indoor air	− $\mu g/m^3$	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 is available for the short-term exposure, 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, the following reliable data were obtained: a 72-h median effective concentration (EC_{50}) of 29,100 µg/L for growth inhibition in the green algae *Pseudokirchneriella subcapitata;* a 48-h EC_{50} of 2,200 µg/L for swimming inhibition in the crustacean *Daphnia magna*; and a 48-h median tolerance limit (TLm) of 17,000 µg/L for mortality of the fish species *Oryzias latipes* (medaka). Accordingly, based on these acute toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 22 µg/L was obtained. With regard to chronic toxicity, the following reliable data were obtained: a 72-h no observed effect concentration (NOEC) of 5,800 µg/L for growth inhibition in the green algae *P. subcapitata*, and a 21-d NOEC of 30 µg/L for reproductive inhibition in the crustacean *D. magna*. Accordingly, based on these chronic toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 0.3 µg/L was obtained. The value of 0.3 µg/L obtained from the chronic toxicity to the crustacean was used as the PNEC for this substance.

The PEC/PNEC ratio was less than 0.02 for both freshwater bodies and seawater. 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)		
Crustacean (water flea)	Chronic	NOEC Reproductive inhibition	100	0.3	Freshwater	<0.007	<0.02	○
					Seawater	<0.007	<0.02	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	No need for further work.	○
	Inhalation exposure	Though a risk characterization cannot be determined, there would be little necessity of collecting 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.