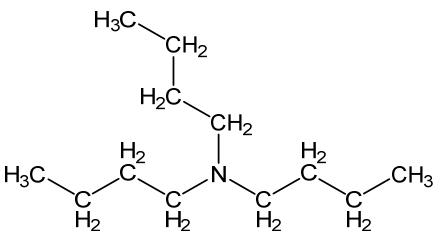| 4	CAS No.: 102-82-9	Substance: Tributylamine

Chemical Substances Control Law Reference No.: 2-142

PRTR Law Cabinet Order No.: 292

Molecular Formula: $C_{12}H_{27}N$

Molecular Weight: 185.35

Structural Formula:

1. General information

The aqueous solubility of this substance is 142 mg/1,000 g(25°C), the partition coefficient (1-octanol/water) (log K_{ow}) is 3.34 (pH unknown), and the vapor pressure is 10 Pa (25°C). The biodegradability (aerobic degradation) is characterized by a BOD degradation rate of 2%, and the substance is considered to be persistent but not highly bioaccumulative. Further, this substance is believed to not hydrolyze under ambient environmental conditions because it does not possess any hydrolyzable groups.

This substance is classified as a Class 1 Designated Chemical Substance under the PRTR Law. The main uses of this substance are as a synthesis raw material (surfactants, rubber chemicals, dyestuffs, pharmaceuticals, agricultural chemicals), catalyst, and polymer modifier. The production and import quantity in fiscal 2021 was less than 1,000 t.

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2. Exposure assessment

Total release to the environment in fiscal 2021 under the PRTR Law was approximately 0.01 t, and all releases were notified. The major destination of notified releases was the atmosphere. In addition, 0.017 t was transferred to sewage and approximately 98 t was transferred to waste materials. The major source of notified releases to the atmosphere and public water bodies was the chemical industry. A multi-media model used to predict the proportions distributed to individual media in the environment indicated that in regions where the largest quantities were estimated to have been released to the environment overall or to the atmosphere in particular, the predicted proportion distributed to water bodies would be 94.3%. Where the largest quantities were estimated to have been released to public water bodies, the predicted proportion distributed to water bodies would be 96.7%.

Public freshwater body and seawater data for setting the predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, could not be obtained. Further, albeit data that was more than 10 years old, concentrations of less than around 3 µg/L for public freshwater bodies and less than around 3 µg/L for seawater were reported. However, while no releases to public freshwater bodies were notified in fiscal 2021 under the PRTR Law, transfer to sewage was reported. Accordingly, when releases to public freshwater bodies estimated from the reported transfer to sewage were divided by the ordinary water discharge of the national river channel structure database, estimating the concentration in rivers by taking into consideration only dilution gave a maximum value of 0.00083 µg/L. Releases under the PRTR Law and transfers to sewage vary from year to year and as such, erring on the side of caution, data from fiscal 2019, where for recent years the transfer to sewage was particularly high, was used to estimate the river concentration. This gave a maximum value of 7.3 µg/L. Further, using the transfer to sewage for fiscal 2018 also gave the same maximum value of 7.3 µg/L for estimated river concentration.

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3. Initial assessment of ecological risk

With regard to acute toxicity, the following reliable data were obtained: a 72-h EC_{50} exceeding 10,100 µg/L for growth

inhibition in the green alga *Raphidocelis subcapitata*, a 48-h EC$_{50}$ of 8,000 µg/L for swimming inhibition in the crustacean *Daphnia magna*, and a 96-h LC$_{50}$ of 16,300 µg/L for the fish *Oryzias latipes* (medaka). Accordingly, based on these acute toxicity values and an assessment factor of 100, a predicted no effect concentration (PNEC) of 80 µg/L was obtained.

With regard to chronic toxicity, the following reliable datum was obtained: a 72-h NOEC of 1,650 µg/L for growth inhibition in the green alga *R. subcapitata*. Accordingly, based on this chronic toxicity value and an assessment factor of 100, a PNEC of 16 µg/L was obtained.

The value of 16 µg/L obtained from the chronic toxicity to the green alga was used as the PNEC for this substance.

Data for setting the predicted environmental concentration (PEC) could not be obtained for this substance. Accordingly, an assessment of ecological risk could not be made.

While the data is more than 10 years prior, reports of less than around 3 µg/L for public freshwater bodies and less than around 3 µg/L for seawater. The ratios of these concentrations to the predicted no effect concentration (PNEC) are less than 0.2. Releases under the PRTR Law and transfers to sewage vary from year to year and as such, erring on the side of caution, data from fiscal 2019 was divided by ordinary water discharge of the national river channel structure database to estimate the concentration in rivers by taking into account only dilution. This gave a maximum value of 7.3 µg/L. The ratio of this value to PNEC was 0.5.

Furthermore, based on expert opinion that this type of amine may have a particularly strong effect on chronic toxicity rather than acute toxicity in crustaceans, a QSAR study of chronic toxicity in crustaceans was conducted, resulting in a QSAR prediction value of 47 µg/L. This PNEC reference value based on this value is 0.47 µg/L. The ratio of this PNEC reference value to past (more than ten years ago) public waterbody concentrations (less than around 3 µg/L for freshwater bodies and less than around 3 µg/L for seawater) was less than 6. Based on a comprehensive review of the above findings efforts to collect further data are considered necessary.

For this substance, further efforts are considered necessary to collect data regarding environmental concentrations and chronic toxicities towards crustaceans.

Hazard assessment (basis for PNEC)			Assessment coefficient	Predicted no effect concentration PNEC (µg/L)	Exposure assessment		PEC/ PNEC ratio	Comprehensive judgment
Species	Acute/ chronic	Endpoint			Water body	Predicted environmental concentration PEC (µg/L)		
Green algae	Chronic	NOEC Growth inhibition	100	16	Freshwater	—	—	▲
					Seawater	—	—	

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4. Conclusions

	Conclusions	Judgment
Ecological risk	Requiring information collection.	▲

〔Risk judgments〕 ○: No need for further work   ▲: Requiring information collection

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