

## Summary of Initial Risk Assessment Report

**1,3,5,7-Tetraazatricyclo[3.3.1.1<sup>3,7</sup>]decane** CAS No : 100-97-0

PRTR No of Japan: 198

This substance is assessed based on Guideline for Initial Risk Assessment Version 2.0

### 1. General Information

#### 1.1 Physico-chemical properties

Appearance	Colorless solid
Melting point	Approx. 263 degC (sublimation point)
Boiling point	None
Water solubility	895 g/L (20 degC)
Henry's constant	$1.66 \times 10^{-4}$ Pa*m <sup>3</sup> /mol ( $1.64 \times 10^{-9}$ atm*m <sup>3</sup> /mol) (25degC, measured)
Octanol/water partition coefficient ( log Kow)	-4.15 (estimated)
Soil adsorption coefficient	Koc = 55 (estimated)

#### 1.2 Environmental fate

Bioaccumulation	Low bioaccumulative Bioconcentration factor (BCF) : 3.2 (calculated using logKow of -4.15)
Biodegradation	Readily biodegradable
Stability in the environment	(In air) Reaction with OH radical: Reaction rate constant is $5.09 \times 10^{-10}$ cm <sup>3</sup> /molecule-sec. (25 degC, estimated) The half-life is 0.4-0.8 hours, given OH radical concentration of $5 \times 10^5$ - $1 \times 10^6$ molecule/cm <sup>3</sup> . Reaction with ozone: No data Reaction with nitrate radical: No data  (In water) The half-life by hydrolysis at 37.5 degC is reported to be 1.6 hours (pH 2) and 13.8 hours (pH 5.8). Based on this data, half-life by hydrolysis at 30 degC is estimated to be 160 days (pH 7). It is reported that ammonia and formaldehyde are produced by hydrolysis of 1,3,5,7-tetraazatricyclo[3.3.1.1 <sup>3,7</sup> ]decane.
Environmental fate	When released to water, 1,3,5,7-tetraazatricyclo[3.3.1.1 <sup>3,7</sup> ]decane is expected to be removed by biodegradation and hydrolysis.

## 2. Sources of release to the environment

### 2.1 Annual production, import, export and domestic supply in 2002 (ton/year)

Production	Import	Export	Domestic supply	Remarks
--	--	--	6,000	

### 2.2 Uses

Coated sands (casting sands) (40%), phenol resin accelerators (30%), rubber vulcanization accelerators (5%), others (synthetic resin blowing agents, phosgene absorbents, raw material for medical products, explosives, agricultural chemicals) (25%)

### 2.3 Release from the industries within the scope of PRTR system (in 2002)

Release sources		Air (ton)	Waters (ton)	Soil (ton)	Remarks
Listed industries	Reported release	42	1	< 0.5	Release to rivers: 1 ton
	Release outside notification	--	--	--	
Release outside notification from non listed industry		0	0	68	
Households		0	0	< 0.5	
Mobile sources		--	--	--	
Total		42	1	68	

### 2.4 Releases from other sources

The joint FAO/WHO Expert Committee on Food Additives (JECFA) evaluated this substance and included this substance in the list of food additives in 1973. However, in the Japanese Food Sanitation Act, the use of the substance as a food additive is not permitted.

### 2.5 Main release route

According to 2002 PRTR data and known use that 1,3,5,7-tetraazatricyclo[3.3.1.1<sup>3,7</sup>]decane is contained in coated sands (casting sands), 1,3,5,7-tetraazatricyclo[3.3.1.1<sup>3,7</sup>]decane is considered to be released to air during heat treatment of casting sands. It may be released to soil during use of agricultural chemicals.

### 3. Exposure Assessment

#### 3.1 Measured environmental concentration

No data

#### 3.2 Estimated environmental concentration

Media	Estimated concentration	Description
Air (microg/m <sup>3</sup> )	0.22	Calculated by mathematical model / Atmospheric Dispersion Model for Exposure and Risk Assessment ver.1.01 (AIST-ADMER)
River water (microg/L)	3.0	Calculated by mathematical model / Initial Assessment System for the PRTR chemicals (IAS)

#### 3.3 Estimated environmental concentration in water (EEC)

EEC(microg/L)	3.0
	Estimated concentration of 3.0 microg/L was used, since measured concentrations were unavailable <sup>1)</sup> .

#### 3.4 Estimated human intake

Intake route		Concentration used for estimation of intake	Estimated intake (microg/ person/ day)	Estimated intake (microg/ kg-Bodyweight (BW)/ day)
Inhalation	Air	0.22 (microg/m <sup>3</sup> )	4.4	0.088
		Estimated concentration (0.22 microg/m <sup>3</sup> ) was used as the concentration in air, since measured concentrations were unavailable.		
Oral	Drinking water	3.0 (microg/L)	6.0	0.12
		Estimated concentration in river water (3.0 microg/L) was used here, since measured concentrations in drinking water were unavailable.		
	Food	0.00096 (microg/g)	0.12	0.0023
		-Data of intake via food were unavailable. -The concentration in fish was estimated as a product of a concentration in seawater and a BCF. Since neither measured concentrations in seawater nor river water were available, the concentration in seawater was assumed to be 1/10 of the estimated concentration in river water (3.0microg/L). $3.0 \text{ (microg/L)} * 1/10 * 3.2 \text{ (L/kg)} = 0.00096 \text{ (microg/g)}$		
Subtotal		--	6.1	0.12
Total route		--	10.5	0.21

1) This substance is assessed based on the Guideline for Initial Risk Assessment Version2.0. Under Version 2.0, a measured concentration and a estimated concentration (calculated by mathematical model) are compared and the larger of two concentrations is used for risk assessment.

## 4. Hazard assessment

### 4.1 Effects on organisms in the environment

	Acute or Chronic	Species	Endpoint	Concentration
Algae	Chronic	<i>Selenastrum capricornutum</i>	72 hours NOEC Growth inhibition	100 or higher (mg/L)
Crustacea	Chronic	<i>Daphnia magna</i>	21 days NOEC Reproduction	99.1 or higher (mg/L)
Fish	Acute	<i>Pimephales promelas</i>	96 hours LC <sub>50</sub>	49,800 (mg/L)
Key study		The data of crustacea ( <i>daphnia magna</i> ) was chosen for the key study because effects were observed at the lowest concentration in the hazard assessment.		

### 4.2 Human health toxicity

Toxicity	Exposure route	Species	Duration / Dose method	Toxic effects (Key study is underlined)	NOAEL or LOAEL
Repeated dose toxicity	Inhalation	No data	--	--	--
	Oral	No data	--	--	--
	Dermal	No data	--	--	--
Reproductive and developmental toxicity	--	No data	--	--	--
Carcinogenicity	Evaluation by IARC : This substance has not been evaluated by IARC.				
Genotoxicity	Unable to determine genotoxicity				

## 5. Risk Assessment

### 5.1 Environmental organisms

Risk characterization	EEC (microg/L)	NOEC * (mg/L)	MOE (NOEC * /EEC)	Product of uncertainty factors	Conclusion
	3.0	99.1 or higher	33,000 or higher	50	No immediate concern
Product of uncertainty factors (UF): Extrapolation from laboratory test (10) * Toxicity data on two nutritional stages (5) = 50					
Recommendation : The substance is considered to be of no immediate concern for the moment, and a low priority for further work.					

NOEC\* means NOEC, LOEC, EC<sub>50</sub>, etc.

**5.2 Human health**

**5.2.1 Repeated dose toxicity**

Exposure route	Intake (microg/kgBW/day)	NOAEL (mg/kgBW/day)	Risk characterization		
			MOE	Product of uncertainty factors	Conclusion
Inhalation	0.088	No adequate data	Not calculated	--	--
Oral	0.12		Not calculated	--	--
Total	--	--	--	--	--
Product of uncertainty factors (UF): --					

**5.2.2 Reproductive and developmental toxicity**

--
----

**5.2.3 Carcinogenicity**

--
----

**5.2.4. Recommendation for Human Health**

The risk assessment could not be conducted because adequate toxicity data was not available. A risk assessment should be conducted when toxicity data becomes available.

**6. Supplement**

--
----