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CAS No.: 81103-11-9

Substance: Clarithromycin

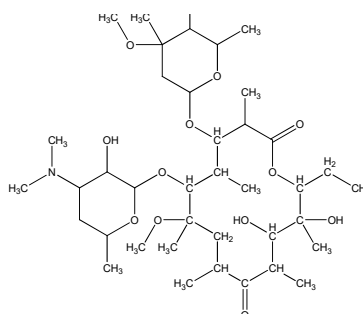
Chemical Substances Control Law Reference No.:

PRTR Law Cabinet Order No.:

Molecular Formula: C<sub>38</sub>H<sub>69</sub>NO<sub>13</sub>

Molecular Weight: 747.95

Structural Formula:



### 1. General information

The aqueous solubility of this substance is 99.48 mg/L (20°C), the partition coefficient (1-octanol/water) ( $\log K_{ow}$ ) is 0.69 (pH=4.0), and the vapor pressure is  $2.32 \times 10^{-25}$  mmHg ( $=3.09 \times 10^{-23}$  Pa) (25°C, calculated value). The biodegradability (aerobic degradation) is characterized by a BOD degradation rate of 0%, and the bioconcentration factor is 56 (calculated value).

The main use of this substance is pharmaceuticals (macrolide antibiotics). The production and import quantity in fiscal 2015 was 107 t.

### 2. Exposure assessment

Because this substance is not classified as a Class 1 Designated Chemical Substance under the PRTR Law, release and transfer quantities 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 would be largest.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was around 0.49 µg/L for public freshwater bodies and generally 0.059 µg/L for seawater.

### 3. Initial assessment of ecological risk

With regard to acute toxicity, the following reliable data were obtained: a 72-h EC<sub>50</sub> of 6.9 µg/L for growth inhibition in the green alga *Pseudokirchneriella subcapitata*, a 48-h EC<sub>50</sub> of more than 2,000 µg/L for immobilization in the crustacean *Daphnia magna*, a 96-h LC<sub>50</sub> of more than 100,000 µg/L for the fish species *Oryzias latipes* (medaka), and a 96-h LC<sub>50</sub> of more than 10,000 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 0.069 µg/L was obtained.

With regard to chronic toxicity, the following reliable data were obtained: a 72-h NOEC of 2.45 µg/L for growth inhibition in the green alga *P. subcapitata*, a 21-d NOEC of 3.1 µg/L for reproductive inhibition in the crustacean *D. magna*, and a 7-d NOEC of 800 µg/L for growth inhibition in the common duckweed *Lemna minor*. Based on acute toxicity, the green alga was inferred to be the most sensitive. It was estimated that the chronic toxicity value for fish would not be lower than that for the green alga. Accordingly, based on the chronic toxicity values and an assessment factor of 10 for the three trophic levels, a PNEC of 0.24 µg/L was obtained.

The value of 0.069 µg/L obtained from the acute toxicity to the alga was used as the PNEC for this substance.

The PEC/PNEC ratio is less than 7 for freshwater bodies and 0.9 for seawater. Accordingly, these substances are considered to be candidates for detailed assessment. Further, although PNEC is calculated based on the reliable minimum toxicity value obtained from each trophic levels from the perspective of erring on the side of caution in this initial

assessment, reliable data for the no observed effect concentration (NOEC) for reproductive inhibition in the crustacean *D. magna* that was more than 100 times larger than the minimum toxicity adopted was also obtained. Thus, toxicity differs greatly for the same organism and end point. Accordingly, toxicity data should be augmented when carrying out detailed assessment, and there is a need to consider the factors causing differences in toxicity values.

Hazard assessment (basis for PNEC)			Assessment coefficient	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)			
Green algae	Acute	EC <sub>50</sub> Growth inhibition	100	0.069	Freshwater	0.49	7	■	■
					Seawater	0.059	0.9		

#### 4. Conclusions

	Conclusions	Judgment
Ecological risk	Candidates for further work.	■

[Risk judgments] ○: No need for further work      ▲: Requiring information collection  
 ■: Candidates for further work      ×: Impossibility of risk characterization  
 (○) : Although risk to human health could not be confirmed, collection of further information would not be required.  
 (▲) : Further information collection would be required for risk characterization.