OHIO EPA AQUATIC LIFE WATER QUALITY CRITERION FACT SHEET

Chemical Name: Barium Developed by: Chris J. Skalski
CAS # 7440-39-3 Data Retrieval Date: 2-12-98
Internal Code # __ Fact Sheet Preparation Date: 3-01-06

ACUTE DATA

SPECIES	EC_{50}/LC_{50} (µg/l)	TEST TYPE[a]	DURATION (HOURS)	SMAV[b] (µg/l)	GMAV[b] (µg/l)	REFERENCE NUMBER
Cladoceran	410,000[e]	S,U	48	32,000	32,000	1
Daphnia magna	32,000	S,U	48			2
	14,500[d]	S,U	48			3
Tubificid Worm *Tubifex tubifex*	33,650[d]	R,U	96			4
Crayfish *Austropotamobius pallipes*	46,000[c]	S,M	96	46,000	46,000	5
Crayfish *Orconectes limosus*	78,000	S,M	96	78,000	78,000	5
Amphipod *Echinogammarus berilloni*	122,000	S,U	96	122,000	122,000	6
Amphipod *Gammarus pulex*[c]	238,000	S,U	96	238,000	238,000	6
Mosquitofish	6,950,000	S,U	96	2,740,000	2,740,000	7
Gambusia affinis	1,080,000	S,U	96			7

[a] S = static; R= renewal; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.
[c] This species is not resident to North America and is therefore not used in Tier II value calculations.
[d] This data not used to calculate the SMAV because the presence of a precipitate in the test vessels was indicated.
[e] This data not used to calculate the SMAV because it varies by over a factor of 10 from the other data available for this species.

CHRONIC DATA

SPECIES	CHRONIC VALUE (µg/l)	METHOD	SMCV[a] (µg/l)	GMCV[a] (µg/l)	REFERENCE NUMBER

No Chronic Data

[a] SMCV = Species Mean Chronic Value; GMCV = Genus Mean Chronic Value.

REFERENCES

1. LeBlanc, G.A. 1980. Acute Toxicity of Priority Pollutants to Water Flea (*Daphnia magna*). Bull. Environ. Contam. Toxicol. 24(5):684-691.

2. Biesinger, K.E. and G.M. Christensen. 1972. Effects of Various Metals on Survival, Growth, Reproduction, and Metabolism of *Daphnia magna*. J. Fish. Res. Board Can. 29(12):1691-1700.

3. Khangarot, B.S. and P.K. Ray. 1989. Investigation of Correlation Between Physicochemical Properties of Metals and Their Toxicity to the Water Flea *Daphnia magna* Straus. Ecotoxicol. Environ. Saf. 18(2):109-120.

4. Khangarot, B.S. 1991. Toxicity of Metals to a Freshwater Tubificid Worm, *Tubifex tubifex* (Muller). Bull. Environ. Contam. Toxicol. 46:906-912.

5. Boutet, C. and C. Chaisemartin. 1973. Specific Toxic Properties of Metallic Salts in *Austropotamobius pallipes pallipes* and *Orconectes limosus*. C.R. Soc. Biol. 167(12):1933-1938.

6. Vincent, M., J. Debord and B. Penicaut. 1986. Comparative Studies on the Toxicity of Metal Chlorides and of a Synthetic Organic Molluscicide, N-Trityl-Morpholine, Upon Two Aquatic Amphipod..... Ann. Rech. Vet. 17(4):441-446.

7. Wallen, I.E., W.C. Greer and R. Lasater. 1957. Toxicity to *Gambusia affinis* of Certain Pure Chemicals in Turbid Waters. Sewage Ind. Wastes 29(6):695-711.

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CALCULATION OF ACUTE AQUATIC VALUE (AAV)[a]

Data Requirement OAC 3745-1-36(A)(1)	SPECIES	GMAV (μg/l)
(c)	Mosquitofish	2,740,000
(d)	*Daphnia magna*	32,000
(e)	Crayfish	78,000

Secondary Acute Factor (SAF) = 8.0

Secondary Acute Value (SAV) = Lowest GMAV ÷ SAF
= 32,000 ÷ 8.0
= 4,000 μg/l

Tier II Acute Aquatic Value (AAV) = SAV ÷ 2
= 4,000 ÷ 2
= 2,000 μg/l

CALCULATION OF CHRONIC AQUATIC VALUE (CAV)[a]

Experimentally determined Acute-Chronic Ratios (ACRs):

SPECIES	ACUTE VALUE (μg/l)	CHRONIC VALUE (μg/l)	ACUTE-CHRONIC RATIO	SPECIES MEAN ACR

None Available

Secondary Acute-Chronic Ratio (SACR) = $\sqrt[3]{(18)(18)(18)} = 18$

Chronic Aquatic Value (CAV) = SAV ÷ SACR
= 4,000 ÷ 18
= 222 = 220 μg/l

[a]See Ohio Administrative Code 3745-1-36 effective February 22, 2002.