OHIO EPA SURFACE WATER QUALITY CRITERION FACT SHEET

Chemical Name: 1,2-Dichloroethane Developed by: Chris J. Skalski
CAS # 107-06-2 Data Retrieval Date: 9-05-97
Internal Code # 55 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	160,000	S,M	48	183,769	183,769	1
Daphnia magna	155,000[c]	S,M	48			2
	180,000[e]	S,M	48			1
	183,000[e]	S,M	48			2
	320,000[e]	S,M	48			1
	315,000[e]	S,M	48			2
	270,000[g]	S,M	48			1
	268,000[g]	S,M	48			2
	220,000	S,U	48			3
	324,000	S,U	48			4
	>100,000	S,U	48			5
	1,430,000[f]	S,U	49			6
Amphipod	>100,000	S,U	96	>100,000	>100,000	5
Gammarus fasciatus						
Stonefly	>100,000	S,U	96	>100,000	>100,000	5
Pteronarcys californica						
Fathead Minnow	116,000	F,M	96	123,015	123,015	7
Pimephales promelas	118,000	F,M	96			8
	136,000	F,M	96			9
Rainbow Trout	225,000	S,U	96	225,000	225,000	5
Oncorhynchus mykiss						
Bluegill	430,000[d]	S,U	96	550,000	550,000	10
Lepomis macrochirus	550,000	S,U	96			11

[a] S = static; F= flow through; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.
[c] Duplicate data not used to calculate the SMAV.
[d] Not used in the calculation of an SMAV because the presence of a precipitate was indicated.
[e] Data not used to calculate the SMAV because the test organisms were fed during the test period.
[f] Data not used to calculate the SMAV since it varied by more than a factor of 10 from the remaining data for this species.
[g] This data not used to calculate the SMAV since corresponding EC_{50} data were available.

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CHRONIC DATA

SPECIES	CHRONIC VALUE (µg/l)	METHOD	SMCV[a] (µg/l)	GMCV[a] (µg/l)	REFERENCE NUMBER
Fathead Minnow *Pimephales promelas*	14,000-29,000 20,149	Embryo-Larval	28,870	28,870	12
Fathead Minnow *Pimephales promelas*	29,000-59,000 41,364	Embryo-Larval			13
Cladoceran *Daphnia magna*	11,000-21,000 15,199	Life Cycle	15,199	15,199	1
Cladoceran *Daphnia magna*	10,600-20,700[b] 14,813	Life Cycle			2

[a] SMCV = Species Mean Chronic Value; GMCV = Genus Mean Chronic Value.
[b] Duplicate data not used to calculate the SMAV.

REFERENCES

1. Richter, J.E., S.F. Peterson and C.F. Kleiner. 1983. Acute and Chronic Toxicity of Some Chlorinated Benzenes, Chlorinated Ethanes, and Tetrachloroethylene to *Daphnia magna*. Arch. Environ. Contam. Toxicol. 12(6):679-684.

2. Call, D.J., L.T. Brooke, N. Ahmad and J.E. Richter. 1983. Toxicity and Metabolism Studies with EPA Priority Pollutants and Related Chemicals in Freshwater Organisms. EPA 600/3-83-095, U.S. EPA, Duluth, MN:120 p.

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

4. Kuhn, R., M. Pattard, K. Pernak and A. Winter. 1989. Results of the Harmful Effects of Selected Water Pollutants (Anilines, Phenols, Aliphatic Compounds) to *Daphnia magna*. Water Res. 23(4):495-499.

5. Mayer, F.L. and M.R. Ellersieck. 1986. Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals. U.S. Fish and Wildlife Service, Resource Publication 160, U.S.D.I., Washington, D.C.:506 p.

6. Qureshi, A.A., K.W. Flood, S.R. Thompson, S.M. Janhurst, C.S. Inniss and D.A. Rokosh. 1982. Comparison of a Luminescent Bacterial Test with Other Bioassays for Determining Toxicity of Pure Compounds and Complex Effluents. In: J.G. Pearson, R.B. Foster and W.E. Bishop (Eds.), Aquatic Toxicology and Hazard Assessment, 5th Conference, ASTM STP 766, Philadelphia, PA:179-195.

7. Walbridge, C.T., J.T. Fiandt, G.L. Phipps and G.W. Holcombe. 1983. Acute Toxicity of Ten Chlorinated Aliphatic Hydrocarbons to the Fathead Minnow (*Pimephales promelas*). Arch. Environ. Contam. Toxicol. 12(6):661-666.

8. Veith, G.D., D.J. Call and L.T. Brooke. 1983. Estimating the Acute Toxicity of Narcotic Industrial Chemicals to Fathead Minnows. In: W.E. Bishop, R.D. Cardwell and B.B. Heidolph (Eds.), Aquatic Toxicology and Hazard Assessment, 6th Symposium, ASTM STP 802, Philadelphia, PA:90-97).

9. Geiger, D.L., C.E. Northcott, D.J. Call and L.T. Brooke. 1985. Acute Toxicities of Organic Chemicals to Fathead Minnows *(Pimephales promelas*), Volume 2. Center for Lake Superior Environmental Studies, Univ. of Wisconsin, Superior, WI:326 p.

10. Buccafusco, R.J., S.J. Ells and G.A. LeBlanc. 1981. Acute Toxicity of Priority Pollutants to Bluegill (*Lepomis macrochirus*). Bull. Environ. Contam. Toxicol. 26(4):446-452.

11. Dawson, G.W., A.L. Jennings, D. Drozdowski and E. Rider. 1977. The Acute Toxicity of 47 Industrial Chemicals to Fresh and Saltwater Fishes. J. Hazard. Mat. 1(4):303-318.

12. U.S. EPA. 1980. Ambient Water Quality Criteria for Chlorinated Ethanes. EPA 440/5-80-029.

13. Benoit, D.A., F.A. Puglisi and D.L. Olson. 1982. A Fathead Minnow Pimephales promelas Early Life Stage Toxicity Test Method Evaluation and Exposure to Four Organic Chemicals. Environ. Pollut. (Ser. A) 28(3):189-197.

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CALCULATION OF ACUTE AQUATIC VALUE (AAV)[a]

Data Requirement OAC 3745-1-36(A)(1)	SPECIES	GMAV (μg/l)
(a)	Rainbow Trout	225,000
(b)	Bluegill	550,000
(c)	Fathead Minnow	123,015
(d)	*Daphnia magna*	183,769
(e)	Amphipod	>100,000
(f)	Stonefly	>100,000

Secondary Acute Factor (SAF) = 5.2

Secondary Acute Value (SAV) = Lowest GMAV ÷ SAF
= 100,000 ÷ 5.2
= 19,231 = 19,000 μg/l

Tier II Acute Aquatic Value (AAV) = SAV ÷ 2
= 19,231 ÷ 2
= 9,615 = 9,600 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
Fathead Minnow *Pimephales promelas*	123,015	28,870	4.26	4.26	
Cladoceran *Daphnia magna*	160,000	15,199	10.53	10.53	

Secondary Acute-Chronic Ratio (SACR) = $\sqrt[3]{(4.26)(10.53)(18)} = 9.31$

Chronic Aquatic Value (CAV) = SAV ÷ SACR
= 19,231 ÷ 9.31
= 2,065 = 2,000 μg/l

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

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