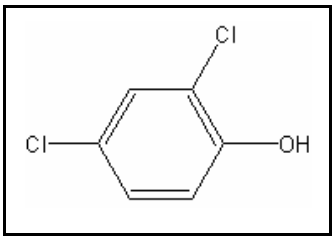
Indiana Department of Environmental Management
Office of Water - Wetlands, Water Quality and Sediments Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

2,4-DICHLOROPHENOL

CAS RN:	120-83-2
Water Solubility:	0.45 g/100 mL
Log K_{ow}:	1.85[P]
Vapor Pressure:	4.3 x 10^{-4} mm of Hg[P]
Environmental Partitioning @25 ^{0}C:	98.5% into Water[P]
Hydrolysis Half-life:	hydrolysis unlikely



Standard

The procedures described in the Tier II methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of 2,4-dichlorophenol does not exceed 17 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 120 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 1,910 µg/L
SAF = 8.0

SAV = 1,910/8.0 = 238.7 µg/L

SMC = SAV/2 = 238.7/2 = **120 µg/L**

Chronic Aquatic Life:

SCC= SAV/SACR

SACR = 14.11 (Geometric mean of 18, 18, and 8.679)

SCC = 238.7/14.11 = **17 μg/L**

Calculation of ACR

Fathead Minnow (from reference #5)

MATC = 795 μg/L

ACR = 6,900/795 = 8.679

Data

Table 1. Toxicity data used in the derivation of the acute and chronic aquatic life values.

Species	LC_{50}/EC_{50} (μg/L)	Duration (hr)	Test Type	Chemical Form	SMAV (μg/L)	GMAV (μg/L)	Reference Number	EVISTRA Score N, U, M
Bluegill Lepomis macrochirus	**2,000**	**96**	**S,U**	**2,4-dichloro-phenol**	**2,000**	**2,000**	**1**	
Fathead Minnow Pimephales promelas	**7,750**	**96**	**FT,M**	**2,4-dichloro-phenol**	**8,844**	**8,844**	**2**	
Fathead Minnow Pimephales promelas	**8,200**	**96**	**FT,M**	**2,4-dichloro-phenol**			**6**	
Fathead Minnow Pimephales promelas	**8,300**	**96**	**FT,M**	**2,4-dichloro-phenol**			**6**	
Fathead Minnow Pimephales promelas	**11,600**	**96**	**FT,M**	**2,4-dichloro-phenol**			**7**	
Cladoceran Daphnia magna	**1,400**	**48**	**S,U**	**2,4-dichloro-phenol**	**1,910**	**1,910**	**3**	
Cladoceran Daphnia	**2,600**	**48**	**S,U**	**2,4-dichloro-**			**4**	

magna				**phenol**				

References

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2. Geiger,D.L., C.E.Northcott, D.J.Call, and L.T.Brooke 1985. Acute Toxicities of Organic Chemicals to Fathead Minnows (Pimephales promelas), Vol. 2. Center for Lake Superior Environmental Studies, University of Wisconsin, Superior, WI:326 p. (AQUIRE Ref. Number 12447)

3. 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. (AQUIRE Ref. Number 846)

4. LeBlanc, G.A. 1980. Acute toxicity of priority pollutants to Daphnia magna. Bull. Environ. Contam. Toxicol. 24(5): 684-691. (AQUIRE Ref. Number 5184)

5. Mayes, M.A., D.C. Dill, C.C. Mendoza 1982. The acute and chronic toxicity of 2,4-dichlorophenol to the Fathead Minnow (Pimephales promelas Rafinesque). Health and Environmental Sciences. Dow Chemical, Midland, MI.

6. Phipps,G.L., G.W.Holcombe, and J.T.Fiandt 1981. Acute Toxicity of Phenol and Substituted Phenols to the Fathead Minnow. Bull. Environ. Contam. Toxicol. 26(5):585-593. (AQUIRE Ref. Number 2189).

7. Broderius, S.J., M.D. Kahl, and M.D. Hoglund 1995. Use of joint toxic response to define the primary mode of toxic action for diverse industrial organic chemicals. Environ. Toxicol. Chem. 9: 1591-1605.

Acronyms/Abbreviations

CAS RN	Chemical Abstract Service Registry Number
K_{ow}	Octanol-Water Partition Coefficient
P (superscript)	Predicted value

SAV	Secondary Acute Value
GMAV	Genus Mean Acute Value
SAF	Secondary Acute Factor
SMC	Secondary Maximum Concentration
SCC	Secondary Continuous Concentration
SACR	Secondary Acute-Chronic Ratio
FT	Flow-thru
S	Static
U	Unmeasured
M	Measured
EVISTRA	Evaluation and Interpretation of Suitable Test Results in AQUIRE (EPA quality checking method/database)

Revision History

4/14/99 Values first developed
11/17/99 Fact sheet updated to new design
4/6/01 New search for data. Fathead minnow data added. No criteria change.

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