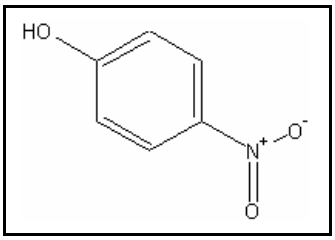
Indiana Department of Environmental Management
Office of Water - Wetlands, Water Quality and Sediments Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

4-NITROPHENOL

CAS RN:	100-02-7
Water Solubility:	1.6 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 4-nitrophenol does not exceed 58 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 530 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 8,400 µg/L
SAF = 8.0

SAV = 8,400/8.0 = 1,050 µg/L

SMC = SAV/2 = 1,050/2 = **530 µg/L**

Chronic Aquatic Life:

SCC= SAV/SACR

SACR = 18

SCC = 1,050/18 = **58 µg/L**

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	**8,400**	**96**	**S,U**	**4-Nitrophenol**	**8,400**	**8,400**	**1**	
Fathead Minnow Pimephales promelas	**58,000**	**96**	**FT,M**	**4-Nitrophenol**	**58,600**	**58,600**	**2**	
Channel Catfish Ictalurus punctatus	**15,000**	**96**	**FT,M**	**4-Nitrophenol**	**15,000**	**15,000**	**3**	
Cladoceran Daphnia magna	**7,680**	**48**	**S,M**	**4-Nitrophenol**	**11,226**	**11,226**	**4**	
Cladoceran Daphnia magna	**4,700**	**48**	**S,U**	**4-Nitrophenol**			**5**	
Cladoceran Daphnia magna	**22,000**	**48**	**S,U**	**4-Nitrophenol**			**6**	
Cladoceran Daphnia magna	**20,000**	**48**	**S,U**	**4-Nitrophenol**			**7**	

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.) (AQUIRE Ref. Number 12447)

3. Holcombe, G.W., G.L. Phipps, M.L. Knuth, 1984. The acute toxicity of selected substituted phenols, benzenes and benzoic acid esters to fathead minnows (*Pimepahles promelas)*. Environ. Pollut. (Series A). 35: 367-381. (AQUIRE Ref. Number 10954)

4. Keen, R. and C.R. Baillod 1985. Toxicity to Daphnia of the end products of wet oxidation of phenol and substituted phenols. Water Res. 19: 767-772. (AQUIRE Ref. Number 10915)

5. Kuhn, R., M. Pattard, K. Pernak, and A. Winter 1989. Results of the harmful effects of water pollutants to Daphnia magna in the 21 day reproduction test. Wat. Res. 23: 501-510. (AQUIRE Ref. Number 846)

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

7. Randall, T.L. and P.V. Knopp 1980. Detoxification of specific organic substances by wet oxidation. J. Water Pollut. Control. Fed. 52(8): 2117-2130. (AQUIRE Ref. Number 2193)

Acronyms

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

April 14, 1999 - Values first developed
November 9, 1999 - Fact sheet updated to new design

Contact Information

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