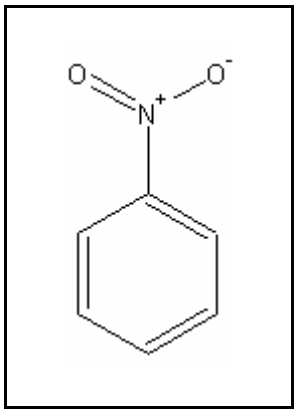
Indiana Department of Environmental Management
Office of Water Quality - Water Quality Standards Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

NITROBENZENE

CAS RN: 98-95-3
Water Solubility: 0.19 g/100 mL
Log K_{ow}: 1.828^{P}



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 nitrobenzene does not exceed 220 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 1,000 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 16,375 µg/L
SAF = 8.0

SAV = 16,375/8.0 = 2,047 µg/L

SMC = SAV/2 = 2,047/2 = **1,000 µg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 9.272 (Geometric mean of 18, 18, and 2.460)

SCV = 2,047/9.272 = **220 µg/L**

Calculation of ACR

Fathead Minnow

MATC = 48,375 µg/L

ACR = 119,000/48,375 = 2.460

Notes:

Juvenile data from Marchini et al. (1992) was not used for GMAV calculations since the larval stage was the most sensitive by more than a factor of 2.

Data

Table 1. GMAVs and SMAVs for nitrobenzene

Genus Mean Acute Value (µg/L)	Species	Species Mean Acute Value (µg/L)	Acute-Chronic Ratio	Reference Number
43,000	Bluegill *Lepomis macrochirus*	43,000		1
16,375	Fathead Minnow *Pimephales promelas*	6,080		2
	Fathead Minnow *Pimephales promelas*	44,100		3
	Fathead Minnow *Pimephales promelas*	119,000	2.460	4
27,000	Cladoceran	27,000		2

Daphnia magna

References

1. Buccafusco, R.J., S.J. Ells, and G.A. LeBlanc 1981. Acute toxicity of priority pollutants to bluegill (Lepomis macrochirus). Bull. Environ. Contam. Toxicol. 24(5): 446-452.

2. Holcombe,G.W., G.L.Phipps, M.L.Knuth, and T.Felhaber 1984. The Acute Toxicity of Selected Substituted Phenols, Benzenes and Benzoic Acid Esters to Fathead Minnows Pimephales promelas. Environ. Pollut. Ser. A Ecol. Biol. 35(4):367-381.

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

4. Marchini,S., M.L.Tosato, T.J.Norberg-King, D.E.Hammermeister, and M.D.Hoglund 1992. Lethal and Sublethal Toxicity of Benzene Derivatives to the Fathead Minnow, Environ. Toxicol. Chem. 11(2):187-195.

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-through
S	Static
U	Unmeasured
M	Measured
EVISTRA	Evaluation and Interpretation of Suitable Test Results in AQUIRE (EPA quality checking method/database)

Revision History

July 15, 1999 Values first developed
September 18, 2001 New search for data. No studies added.

Contact Information

David B. Kallander
Water Quality Standards Section
Indiana Department of Environmental Management
100 North Senate Ave., P.O. Box 6015
Indianapolis, IN 46206-6015
(317) 233-2472
Email: dkalland@dem.state.in.us