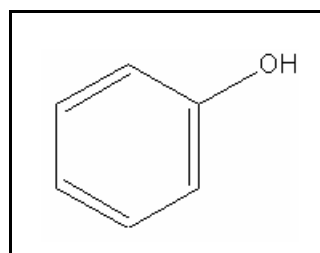




TIER II HUMAN HEALTH NONCANCER VALUES

PHENOL

CAS RN: 108-95-2
Water Solubility: 8.28 g/100 mL
Log K_{ow} : 1.11
Reference Dose: 0.6 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification: Class D; not classifiable



Standard

The human health noncancer phenol value for drinking water sources is 2,000 µg/L. The human health noncancer value for nondrinking water sources is 2,300 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)

Log K_{ow} = 1.11 (reverse-phased HPLC), K_{ow} = 12.88, BCF = 1,382, Percent lipid = 4
Trophic level 4 FCM = 1.0; trophic level 3 FCM = 1.0

$$f_{fd} = 1/(1+(0.00000024 \text{ kg/L})(K_{ow})) = 1.0$$

$$\text{Baseline BAF}_{T3} = (1.0)[(1382/1.0)-1](1/0.04) = 3452$$

$$\text{Baseline BAF}_{T4} = (1.0)[(1382/1.0)-1](1/0.04) = 3452$$

$$\text{Human health BAF}_{T3} = [(3452)(0.0182)+1](1.0) = 629$$

$$\text{Human health BAF}_{T4} = [(3452)(0.0310)+1](1.0) = 1071$$

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: reduced fetal body weights in rats

$$\text{ADE} = \frac{\text{NOAEL}}{\text{UF}} = \frac{60 \text{ mg/kg-day}}{100} = 0.6 \text{ mg/kg/d}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HNV} &= [(0.6)(70)(0.8)]/0.01 + [(0.0036)(629) + (0.0114)(1071)] \\ &= 2,300 \text{ } \mu\text{g/L} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HNV} &= [(0.6)(70)(0.8)]/2 + [(0.0036)(629) + (0.0114)(1071)] \\ &= 2,000 \text{ } \mu\text{g/L} \end{aligned}$$

References

1. Stephen, C.E. 1993. Derivation of Proposed Human Health and Wildlife Bioaccumulation Factors for the Great Lakes Initiative. Environmental Research Laboratory, Office of Research and Development, U.S. EPA, Duluth, MN.
2. USEPA 1990. Integrated Risk Information System (IRIS database) chemical file for phenol (108-95-2).
3. Miller, M.M., S.P. Wasik, G.-L. Huang, W.-Y. Shiu, and D. Mackay 1985. Relationships between octanol-water coefficient and aqueous solubility. Environ. Sci. Technol. 19: 522-529. (Reference for the Log K_{ow})

Acronyms/Abbreviations

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
CAS RN	Chemical Abstract Service Registry Number
FCM	Food Chain Multiplier
IRIS	Integrated Risk Information System
K _{ow}	Octanol-Water Partition Coefficient
LOAEL	Lowest observed adverse effect level
NOAEL	No observed adverse effect level
P (superscript)	Predicted value
UF	Uncertainty factor

Revision History

July 14, 1999 - Values first developed.

September 14, 2000 – Values reviewed. No modifications.

Contact Information

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