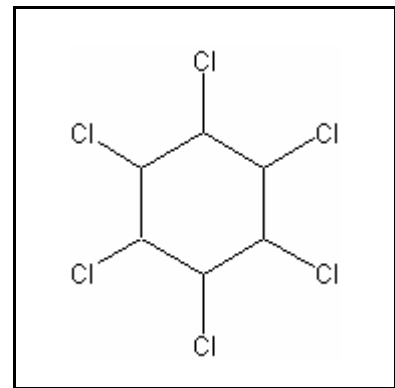




TIER II HUMAN HEALTH CANCER VALUES

HEXACHLOROCYCLOHEXANE

CAS RN:	608-73-1
Water Solubility:	
Log K_{ow} :	3.69 ^P
Risk Associated Dose:	5.6×10^{-6} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class C; Possible human Carcinogen



Standard

The human health cancer hexachlorocyclohexane value for drinking water sources is 0.093 $\mu\text{g/L}$.
The human health cancer value for nondrinking water sources is 0.18 $\mu\text{g/L}$.

Calculations

Bioaccumulation Factor

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

Log K_{ow} = 3.69 (slow-stir method), K_{ow} = 4898

Trophic level 3 FCM = 1.128; trophic level 4 FCM = 1.033

$$f_{fd} = 1/(1+(0.00000024 \text{ kg/L})(K_{ow})) = 0.9988$$

$$\text{Baseline BAF}_{T3} = (\text{FCM})(K_{ow}) = (1.128)(4898) = 5,525$$

$$\text{Baseline BAF}_{T4} = (1.033)(4898) = 5,059$$

$$\text{Human health BAF}_{T3} = [(5,525)(0.0182)+1](0.9988) = 101.4$$

$$\text{Human health BAF}_{T4} = [(5,059)(0.0310)+1](0.9988) = 157.7$$

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Liver and kidney pathology

$$\begin{aligned} \text{RAD} &= 0.00001/q1^* = 0.00001/ 1.8 \\ &= 5.6 \times 10^{-6} \text{ mg/kg/day} \end{aligned}$$

Where:

RAD = Risk Associated Dose (mg/kg/day)
q1* = Cancer Slope Factor

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HCV} &= [(5.6 \times 10^{-6})(70)]/0.01+[(0.0036)(101.4)+(0.0114)(157.7)] \\ &= \mathbf{0.18 \mu\text{g/L}} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HCV} &= [(5.6 \times 10^{-6})(70)]/2+[(0.0036)(101.4)+(0.0114)(157.7)] \\ &= \mathbf{0.093 \mu\text{g/L}} \end{aligned}$$

References

1. USEPA 1993. Integrated Risk Information System (IRIS database) chemical file hexachlorocyclohexane (608-73-1).
2. Leo, A. and D. Weininger 1997. Daylight Software CLogP Version 3.15+ for Unix Pomona Medical Chemistry Project, Pomona College, Claremont, CA. Distributed by Daylight Chemical Information Systems, Inc., 3952 Claremont St., Irving, CA 92714 (Reference for the Log K_{ow})

Acronyms

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

March 9, 2000 - Values first developed

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