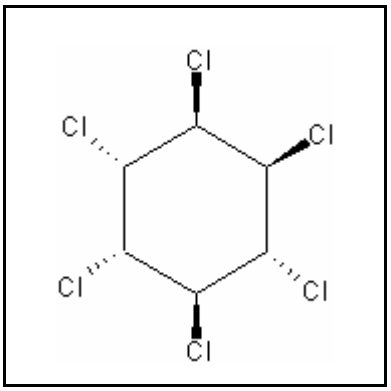
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER II HUMAN HEALTH CANCER VALUES

ALPHA-HEXACHLOROCYCLOHEXANE

CAS RN:	319-84-6
Water Solubility:	2 mg/L
Log K_{ow}:	3.69^{P}
Risk Associated Dose:	1.6 x 10^{-6} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class B2; Probable human Carcinogen



Standard

The human health cancer *alpha*-hexachlorocyclohexane value for drinking water sources is 0.027 µg/L. The human health cancer value for nondrinking water sources is 0.051 µg/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

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

Baseline $BAF_{T3} = (FCM)(K_{ow}) = (1.128)(4898) = 5{,}525$

Baseline $BAF_{T4} = (1.033)(4898) = 5{,}059$

Human health BAF_{T3} = [(5,525)(0.0182)+1](0.9988) = 101.4

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

$RAD = 0.00001/q1^* = 0.00001/ 6.3$
$= 1.6 \times 10^{-6}$ mg/kg/day

Where:

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

Calculation of Criteria:

Non Drinking Water HCV =[(0.000909)(70)]/0.01+[(0.0036)(101.4)+(0.0114)(157.7)]

= **0.027 μg/L**

Drinking Water HCV = [(0.000909)(70)]/2+[(0.0036)(101.4)+(0.0114)(157.7)]

= **0.051 μg/L**

References

1. USEPA 1993. Integrated Risk Information System (IRIS database) chemical file alpha-hexachlorocyclohexane (319-84-6).

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 8, 2000 - Values first developed

Contact Information

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