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

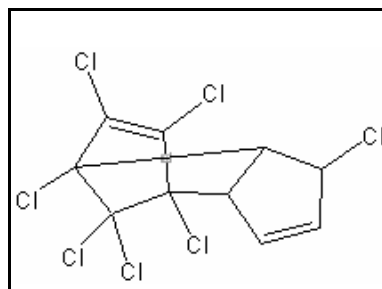## TIER II HUMAN HEALTH CANCER VALUES

HEPTACHLOR

CAS RN: 76-44-8
Water Solubility: 0.18 mg/L
Log K_{ow}: 4.60^P
Risk Associated Dose: 2.222×10^{-6} mg/kg/day
Carcinogenicity Weight-of-
Evidence Classification: Class B2; Probable human Carcinogen

Standard

The human health cancer heptachlor value for drinking water sources is 0.0016 µg/L. The human health cancer value for nondrinking water sources is 0.0016 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
　　Log K_{ow} = 4.60 (CLOGP method), K_{ow} = 39,811, BCF = 1,469, Percent lipid = 0.01
　　Trophic level 3 FCM = 1.950; trophic level 4 FCM = 1.459

f_{fd} = 1/(1+(0.00000024 kg/L)(K_{ow})) = 0.9905

Baseline BAF_{T3} = (1.950)[(1,469/0.9905)-1](1/0.01) = 287,028

Baseline BAF_{T4} = (1.459)[(1,469/0.9905)-1](1/0.01) = 220,055

Human health $BAF_{T3} = [(287{,}028)(0.0182)+1](0.9905) = 5{,}175$

Human health $BAF_{T4} = [(220{,}055)(0.0310)+1](0.9905) = 6{,}758$

Acceptable Daily Exposure:

From the IRIS database:

$$RAD = 0.00001/q1^* = 0.00001/ 4.5$$
$$= 2.222 \times 10^{-6} \text{ mg/kg/day}$$

Where:

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

Calculation of Criteria:

Non Drinking Water HCV $= [(2.222 \times 10^{-6})(70)]/0.01+[(0.0036)(5175)+(0.0114)(6758)]$

    $= 0.0016 \text{ μg/L}$

Drinking Water HCV $= [(2.222 \times 10^{-6})(70)]/2+[(0.0036)(5175)+(0.0114)(6758)]$

    $= 0.0016 \text{ μg/L}$

References

1.   USEPA 1993. Integrated Risk Information System (IRIS database) chemical file heptachlor (76-44-8).

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 7, 2000 - Criteria first developed

Contact Information

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