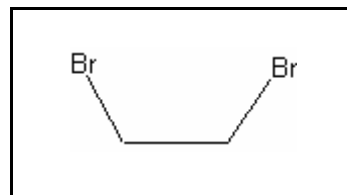




TIER I HUMAN HEALTH CANCER CRITERIA

ETHYLENE DIBROMIDE

CAS RN:	106-93-4
Water Solubility:	4,152 mg/L
Log K_{ow} :	1.74 ^P
Risk Associated Dose:	1.2×10^{-7} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class B2; Probable human Carcinogen



Standard

The human health cancer ethylene dibromide criterion for drinking water sources is 0.004 $\mu\text{g/L}$.
The human health cancer criterion for nondrinking water sources is 0.17 $\mu\text{g/L}$.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow}

$$\text{Log } K_{ow} = 1.74 \text{ (CLOGP)}, K_{ow} = 54.95$$

$$\text{Trophic level 3 FCM} = 1.0; \text{ trophic level 4 FCM} = 1.0$$

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

$$\text{Baseline BAF}_{T3} = (\text{FCM})(K_{ow}) = (1.0)(54.95) = 54.95$$

$$\text{Baseline BAF}_{T4} = (1.0)(54.95) = 54.95$$

$$\text{Human health BAF}_{T3} = [(54.95)(0.0182)+1](1.0) = 2.000$$

$$\text{Human health BAF}_{T4} = [(54.95)(0.0310)+1](1.0) = 2.704$$

Risk Associated Dose:

From the IRIS database:

$$\begin{aligned} \text{RAD} &= 0.00001/q1^* = 0.00001/85 \\ &= 1.2 \times 10^{-7} \end{aligned}$$

Where:

$$\begin{aligned} \text{RAD} &= \text{Risk Associated Dose (mg/kg/day)} \\ q1^* &= \text{Cancer Slope Factor} \end{aligned}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HCC} &= [(1.2 \times 10^{-7})(70)]/0.01 + [(0.0036)(2.000) + (0.0114)(2.704)] \\ &= \mathbf{0.17 \mu\text{g/L}} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HCC} &= [(1.2 \times 10^{-7})(70)]/2 + [(0.0036)(2.000) + (0.0114)(2.704)] \\ &= \mathbf{0.004 \mu\text{g/L}} \end{aligned}$$

References

1. USEPA 1997. Integrated Risk Information System (IRIS database) chemical file for ethylene dibromide (CASRN 106-93-4).
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

July 27, 1999 - Criteria first developed

April 19, 2000 – Fact sheet updated. No modifications made to criteria.

Contact Information

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