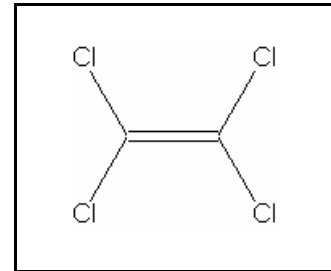




TIER I HUMAN HEALTH NONCANCER CRITERIA

TETRACHLOROETHYLENE

CAS RN: 127-18-4
Water Solubility: 0.015 g/100 mL at 25 °C
Log K_{ow} : 2.53
Reference Dose: 0.014 mg/kg/day
Carcinogenicity Weight-of-
Evidence Classification:



Standard

The human health noncancer tetrachloroethylene criterion for drinking water sources is 320 µg/L. The human health noncancer criterion for nondrinking water sources is 1,700 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 2.53 (shake-flask), K_{ow} = 338.8, BCF = 49, Percent lipid = 4.8
Trophic level 3 FCM = 1.010; trophic level 4 FCM = 1.002

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

$$\text{Baseline BAF}_{T3} = (1.010)[(49/1.0)-1](1/0.048) = 1010.084$$

$$\text{Baseline BAF}_{T4} = (1.002)[(49/1.0)-1](1/0.048) = 1002.083$$

$$\text{Human health BAF}_{T3} = [(1010.084)(0.0182)+1](1.0) = 19.38$$

$$\text{Human health BAF}_{T4} = [(1002.083)(0.0310)+1](1.0) = 32.06$$

Acceptable Daily Exposure:

From the IRIS database:

$$\text{ADE} = \frac{\text{NOAEL}}{\text{UF}} = \frac{14 \text{ mg/kg-day}}{1000} = 0.014 \text{ mg/kg/d}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HNC} &= [(0.014)(70)(0.8)]/0.01+[(0.0036)(19.7)+(0.0114)(32.2)] \\ &= \mathbf{1,700 \text{ } \mu\text{g/L}} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HNC} &= [(0.014)(70)(0.8)]/2+[(0.0036)(19.7)+(0.0114)(32.2)] \\ &= \mathbf{320 \text{ } \mu\text{g/L}} \end{aligned}$$

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. Veith, G.D. et al. 1980. An evaluation of using partition coefficients and water solubility to estimate bioconcentration factors for organic chemicals in fish. In: Aquatic Toxicology, ASTM STP 707. Eaton et al. (Eds).

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 9, 1997 - Criteria first developed.

September 20, 2000 – Fact sheet updated. No modifications to criteria

Contact Information

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