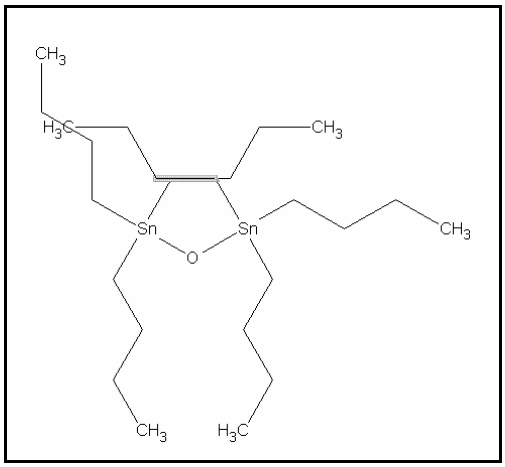
Indiana Department of Environmental Management
Office of Water – Water Quality Standards Section

TIER II HUMAN HEALTH NONCANCER VALUES

TRIBUTYLTIN OXIDE



CAS RN:	56-35-9
Water Solubility:	<0.1 g/100 mL at 21.5 C
Log K_{ow}:	4.25^{P}
Reference Dose:	0.0003 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class D; Not Classifiable.

Standard

The human health noncancer tributyltin value for drinking water sources is 3.3 µg/L. The human health noncancer value for nondrinking water sources is 5.4 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from EPA 1991)
Log K_{ow} = 4.25 (CLOGP), K_{ow} = 17782.79
BCF = 312, Percent lipid = 4.8; Trophic level 3 FCM = 1.315
Trophic level 4 FCM = 1.097;

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 0.996$

Baseline $BAF_{T3} = (1.067)[(312/0.996)-1](1/0.01) = 8556.584$

Baseline $BAF_{T4} = (1.014)[(312/0.996)-1](1/0.01) = 7131.571$

Human health BAF_{T3} = [(8556.584)(0.0182)+1](0.996) = 156.0638

Human health BAF_{T4} = [(7131.571)(0.0310)+1](0.996) = 221. 1349

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: decreased growth rate, food consumption, and organ weights

$$ADE = \frac{NOAEL}{UF} = \frac{0.03\ mg/kg\text{-}day}{100} = 0.0003\ mg/kg/d$$

Calculation of Criteria:

Non Drinking Water HNV = [(0.0003)(70)(0.8)]/0.01+[(0.0036)(156.064)+(0.0114)(221.13)]
= **5.4 μg/L**

Drinking Water HNV = [(0.0003)(70)(0.8)]/2+[(0.0036)(156.064)+(0.0114)(221.13)]
= **3.3 μg/L**

References

1. US EPA 1997. Integrated Risk Information System (IRIS database) chemical file for 1,2-dichlorobenzene (CAS # 56-35-9).

2. Miller, M.M., S.P. Wasik, G.-L. Huang, W.-Y. Shiu, and D. Mackay 1985. Relationships between octanol-water coefficient and aqueous solubility. Environ. Sci. Technol. 19: 522-529. (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

September 16, 1998 - Values first developed
September 27, 2000 – Values rechecked. NOAEL updated. Fact sheet updated.

Contact Information

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