TIER I WILDLIFE VALUE FOR DIELDRIN

The dieldrin wildlife value for waters within the Great Lakes Basin is 7.1×10^{-5} µg/L.

Calculations:

BAF - from field measured BSAF (from Stephan 1995)
Log K_{ow} = 5.299 (slow-stir method), K_{ow} = 199,067
Trophic level 3 FCM = 14.39
Trophic level 4 FCM = 26.67;

f_{fd} = 1/(1+(0.00000024 kg/L)(K_{ow})) = 0.34928

Baseline BAF_{T3} = 4,180,000

Baseline BAF_{T4} = 19,300,000

Human health BAF_{T3} = ((4,180,000)(0.0646)+1)(0.34928) = 257,716

Human health BAF_{T4} = ((19,300,000)(0.1031)+1)(0.34928) = 1,899,099

Avian Values (mg/L)

Test Dose: 0.3 mg/kg/d (from Davison and Sell 1994)

Uncertainty factor = 10 (interspecies extrapolation)

Biomagnification factor = 16 (from Braums and Norstrom 1989)

WV (kingfisher) = ((0.3)(0.15)(1/10))/(0.017+(0.0672 x 257,716)+(0.0672 x 0)) = 2.6×10^{-7}

WV (gull) = ((0.3)(1.1)(1/10))/(0.063+(0.192 x 257,716)+(0.048 x 0)) = 2.3×10^{-7}

WV (eagle) = ((0.3)(4.6)(1/10))/(0.16+(0.371 x 257,716)+(0.0928 x 1,899,099)+(0.0283 x 257,716 x 16)+(0.0121*0))
= 3.6×10^{-7}

WV (birds) = 2.8×10^{-7}

Mammalian Values (mg/L)

Test Dose: 0.05 mg/kg/d (from Walker et al. 1969)
Uncertainty factor = 10 (interspecies extrapolation)

WV (Mink) = $((0.05)(0.8)(1/10))/(0.081+(0.159 \times 257{,}716)+(0.0177 \times 0)) = 9.8 \times 10^{-8}$

WV (Otter) = $((0.05)(7.4)(1/10))/(0.6+(0.976 \times 257{,}716)+((0.244 \times 1{,}899{,}099)) = 5.2 \times 10^{-8}$

WV (mammals) = 7.1×10^{-8}

Wildlife Value

WV = 7.1×10^{-5} µg/L (lower of avian and mammalian wildlife values)

References:

1. Stephen, C.E., 1995. Great Lakes Water Quality Initiative Technical Support Document for the Procedure to Determine Bioaccumulation Factors. EPA-820-B-95-005.

Davison, K.L. and J.L. Sell 1974. DDT thin shells of eggs from mallard ducks maintained on ad libitum or controlled-feeding regimes. Arch. Environ. Contam. Toxicol. 2(3): 222-232.

Walker, A.I.T., D.E. Stevenson, J. Robinson 1969. The toxicology and pharmacodynamics of dieldrin (HEOD): Two-year oral exposures of rats and dogs. Toxicol. Appl. Pharmacol. 15:345-373.

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