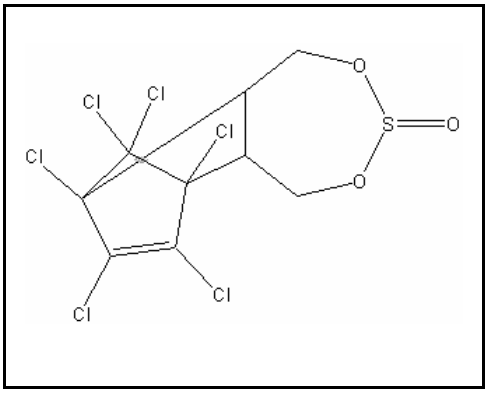
Indiana Department of Environmental Management
Office of Water Quality - Water Quality Standards Section

TIER I ACUTE AND CHRONIC AQUATIC LIFE CRITERIA

ENDOSULFAN

CAS RN: 115-29-7
Water Solubility: <0.1 g/100 mL at 23 C
Log K_{ow}: 3.65[P]



Standard

The procedures described in the Tier I methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of endosulfan does not exceed 0.05 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 0.10 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

Four Lowest GMAVs:

White sucker	3.2	µg/L
Stonefly	2.3	µg/L
Fathead Minnow	1.305	µg/L
Rainbow Trout	0.6643	µg/L

$S^2 = 2.5657$

$S = 1.6018$

L = -1.9980

A = -1.6398

FAV = 0.19

CMC = FAV/2 = **0.10 µg/L**

Chronic Aquatic Life:

FCV = FAV/FACR

FACR = 3.859 (Geometric mean of 11, 3, 2.8, 2.4)

FCV = 0.19/3.859 = **0.05 µg/L**

Data

Table 1. GMAVs and SMAVs for endosulfan

Genus Mean Acute Value (µg/L)	Species	Acute Values (µg/L)	Acute-Chronic Ratio	Reference Number
1,890	Snail *Aplexa hypnorum*	1,890		1
306.9	Cladoceran *Daphnia magna*	166	11	2
	Cladoceran *Daphnia magna*	218		3
	Cladoceran *Daphnia magna*	282		3
	Cladoceran *Daphnia magna*	250		3
	Cladoceran *Daphnia magna*	630		3
	Cladoceran	740		3

	Daphnia magna		
	Cladoceran Daphnia magna	378	3
	Cladoceran Daphnia magna	266	3
	Cladoceran Daphnia magna	158	3
	Cladoceran Daphnia magna	372	3
	Cladoceran Daphnia magna	328	3
	Cladoceran Daphnia magna	343	3
	Cladoceran Daphnia magna	271	3
	Cladoceran Daphnia magna	62	4
0.6643	Rainbow Trout Oncorhynchus mykiss	0.86	3
	Rainbow Trout Oncorhynchus mykiss	0.81	3
	Rainbow Trout Oncorhynchus mykiss	0.17	3
	Rainbow Trout Oncorhynchus mykiss	0.29	3
	Rainbow Trout Oncorhynchus mykiss	0.30	3
	Rainbow Trout Oncorhynchus mykiss	0.27	3
	Rainbow Trout Oncorhynchus mykiss	0.26	3

Rainbow Trout Oncorhynchus mykiss	0.41	3
Rainbow Trout Oncorhynchus mykiss	0.32	3
Rainbow Trout Oncorhynchus mykiss	0.42	3
Rainbow Trout Oncorhynchus mykiss	0.26	3
Rainbow Trout Oncorhynchus mykiss	0.24	3
Rainbow Trout Oncorhynchus mykiss	1.21	3
Rainbow Trout Oncorhynchus mykiss	0.94	3
Rainbow Trout Oncorhynchus mykiss	0.49	3
Rainbow Trout Oncorhynchus mykiss	0.80	3
Rainbow Trout Oncorhynchus mykiss	1.34	3
Rainbow Trout Oncorhynchus mykiss	2.43	3
Rainbow Trout Oncorhynchus mykiss	1.30	3
Rainbow Trout Oncorhynchus mykiss	0.63	3
Rainbow Trout Oncorhynchus mykiss	1.69	3
Rainbow Trout Oncorhynchus mykiss	1.63	3
Rainbow Trout Oncorhynchus mykiss	0.69	3

	Rainbow Trout Oncorhynchus mykiss	0.79		3
	Rainbow Trout Oncorhynchus mykiss	2.6		3
	Rainbow Trout Oncorhynchus mykiss	1.7		3
	Rainbow Trout Oncorhynchus mykiss	1.5		3
	Rainbow Trout Oncorhynchus mykiss	0.8		4
	Rainbow Trout Oncorhynchus mykiss	0.3		4
1.305	Fathead Minnow Pimephales promelas	1.2	3.0	3
	Fathead Minnow Pimephales promelas	1.01		3
	Fathead Minnow Pimephales promelas	0.29		3
	Fathead Minnow Pimephales promelas	0.45		3
	Fathead Minnow Pimephales promelas	0.76		3
	Fathead Minnow Pimephales promelas	0.73		3
	Fathead Minnow Pimephales promelas	0.81		3
	Fathead Minnow Pimephales promelas	1.67		3
	Fathead Minnow Pimephales promelas	1.57		3
	Fathead Minnow	0.75		3

	Pimephales promelas		
	Fathead Minnow Pimephales promelas	1.00	3
	Fathead Minnow Pimephales promelas	2.35	3
	Fathead Minnow Pimephales promelas	3.45	3
	Fathead Minnow Pimephales promelas	2.10	3
	Fathead Minnow Pimephales promelas	3.2	3
	Fathead Minnow Pimephales promelas	1.7	3
	Fathead Minnow Pimephales promelas	1.48	3
	Fathead Minnow Pimephales promelas	1.9	3
	Fathead Minnow Pimephales promelas	0.97	3
	Fathead Minnow Pimephales promelas	1.35	3
	Fathead Minnow Pimephales promelas	1.20	3
	Fathead Minnow Pimephales promelas	3.2	3
	Fathead Minnow Pimephales promelas	2.5	3
3.2	White sucker Catostomus commersoni	3.0	4
	White sucker Catostomus commersoni	3.5	4

3.7	Guppy Poecilia reticulata	3.7		5
3.811	Bluegill Lepomis macrochirus	3.3		5
	Bluegill Lepomis macrochirus	4.4		5
5.9	Scud Gammarus lacustris	5.8		6
	Scud Gammarus fasciatus	6.0		7
2.3	Stonefly Pteronarcys californica	2.3		8
88	Damselfly Ischnura sp.	71.8		4
	Damselfly Ischnura sp.	107		4
	Mysid Shrimp Mysidopsis bahia		2.8	9
	Sheepshead Minnow Cyprinodon variegatus		2.4	9

References

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Acronyms/Abbreviations

CAS RN	Chemical Abstract Service Registry Number
K_{ow}	Octanol-Water Partition Coefficient
P (superscript)	Predicted value
SAV	Secondary Acute Value
GMAV	Genus Mean Acute Value
SAF	Secondary Acute Factor
SMC	Secondary Maximum Concentration
SCC	Secondary Continuous Concentration
SACR	Secondary Acute-Chronic Ratio

FT	Flow-through
S	Static
U	Unmeasured
M	Measured
EVISTRA	Evaluation and Interpretation of Suitable Test Results in AQUIRE (EPA quality checking method/database)

Revision History

September 29, 1999 Values first developed
May 16, 2001 New search for data. No new studies added.

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