05008271

DATA EVALUATION RECORD

1. CHEMICAL: Trifluralin

2. FORMULATION: 97% a.i.

3. CITATION: Macek, K.J. et al. (1976) Toxicity of four pesticides to water fleas and fathead minnows. Ecological Research Series. EPA-600/3-76-099. 57 pp.

4. REVIEWED BY: Les Touart
   Fisheries Biologist
   EEB/HED

5. DATE REVIEWED: 2/3/84

6. TEST TYPE: Aquatic invertebrate and fish life-cycle studies.

   A. TEST SPECIES" 1. Daphnia magna 2. Fathead minnow

7. REPORTED RESULTS: The MATC for Trifluralin was estimated to be >2.4 and <7.2 ppb for Daphnids and >1.9 and < 5.1 ppb for Fathead minnows.

8. REVIEWERS CONCLUSIONS: The study is scientifically sound and fulfills the guideline requirements for an acceptable fish and aquatic invertebrate chronic toxicity studies.

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Materials/Methods

Test Procedure

The test methods are consistent with current EPA guidelines for conducting chronic toxicity tests with aquatic organisms. Specifically for Daphnids: Test system - Mount & Brungs (1967) proportional diluter, flow-through; test vessel - glass battery, ARS; experimental design - 10 Daphnids/replicate, 4 replicates/concentration; age at initiation - < 24 hrs; duration - 64 days; environmental conditions - 19 ± 1°C, constant photoperiod.

Specifically for fathead minnows: Test system - Mount & Brungs proportional diluter, flow-through; test vessel - glass aquaria; experimental design - 40 fish/test chamber; age at initiation - 26 days; Duration - 61 weeks; environmental conditions - 19 ± 1°C, photoperiod = Evansville, Ind. Beginning with Dec. 1.

Statistical Analysis - ANOVA according to Steel and Torrie were performed on all measured biological parameters.

Discussion/Results

See tables. Based on the observed effects of Trifluralin on survival of Daphnia magna continuously exposed through three generations, the estimated MATC for this species is >2.4 <7.2 ppb. Based on the data derived from continuous exposure of fathead minnows to various concentrations of trifluralin, the maximum acceptable toxicant concentration for this species is >1.95 <5.1 ppb.

Calculated application factors for the water flea = 0.012-0.037 and for the fathead minnow = 0.017 - 0.044.

Reviewer's Evaluation

A. Test Procedure

The study generally followed acceptable procedures and represents state-of-the-art at the time the study was performed.

B. Statistical Analysis

Acceptable.

C. Discussion/Results

The data support the conclusions drawn.

D. Conclusions

1. Category: Core.

2. Rationale: N/A

3. Repairability: N/A

TABLE 17. MEAN[a] PERCENT SURVIVAL OF *Daphnia magna* CONTINUOUSLY EXPOSED TO TRIFLURALIN FOR 64 DAYS

Mean Measured Conc. (µg/l)	GENERATION[b] I			GENERATION II			GENERATION III		
	DAY			DAY			DAY		
	8	15	22	29	38	43	50	57	64
52.7	90	70	38	35	0	0	0	0	0
25.6	90	90	48	20	5	2	0	0	0
14.0	88	83	65	85	43	13	38	35	15
7.2	90	45	43	50	23	20	8	8	0
2.4	98	93	90	90	88	50	93	93	75
Control	100	85	85	95	98	80	80[c]	80	75

[a]Each value represents the mean of four replicates

[b]Duration of exposure for generations I, II, and III were days 1-22, 22-43, 43-64, respectively

[c]On day 47, two control containers over flowed with loss of animals. Mean survival is for remaining two replicates

TABLE 18. MEAN[a] PRODUCTION OF YOUNG PER FEMALE *Daphnia magna* CONTINUOUSLY EXPOSED TO TRIFLURALIN FOR 64 DAYS

Mean Measured Conc. (µg/l)	GENERATION[b] I		GENERATION II		GENERATION III	
	DAY		DAY		DAY	
	15	22	38	43	57	64
52.7	3	5	0	0	0	0
25.6	15	12	8	0	0	0
14.0	11	15	18	9	16	2
7.2	11	25	32	15	16	0
2.4	18	30	31	8	23	5
Control	13	29	30	13	12	9

[a]Each value represents the mean of four replicates

[b]Duration of exposure for generations I, II, and III were days 1-22, 22-43, 43-64, respectively

TABLE 25. SURVIVAL AND GROWTH OF FATHEAD MINNOWS (Pimephales promelas) AFTER 30 DAYS, 60 DAYS AND 61 WEEKS CONTINUOUS EXPOSURE TO TRIFLURALIN

Item	Mean measured trifluralin concentration (µg/l)											
	16.5		8.2		5.1		1.9		1.5		Control	
	A	B	A	B	A	B	A	B	A	B	A	B
30 DAYS												
% Survival	23	87	90	93	93	100	100	97	100	97	100	100
Total Length (mm)	19	20	24	22	20	21	22	20	17	18	21	21
S.D.[a]	6.2	5.0	7.3	5.0	5.1	5.4	5.2	4.3	4.2	3.8	4.3	3.5
60 DAYS												
% Survival[b]	0	0	85	93	93	100	100	95	100	93	100	100
Total Length (mm)	-	-	26	26	24	25	26	26	22	22	23	26
S.D.	-	-	6.2	5.2	6.4	5.8	5.2	5.2	4.7	4.3	5.1	5.0
61 WEEKS												
% Survival[c]	-	-	0	0	13	47	80	67	73	73	67	100
♂/♀	-	-	-	-	1/1	3/4	5/7	5/5	6/4	3/6	3/3	5/7
Extra ♂ removed	-	-	-	-	0	0	0	0	1	2	4	3
Total Length (mm)												
♂	-	-	-	-	60	60	66	55	65	63	60	63
♀	-	-	-	-	53	58	56	57	49	53	61	58
Total Weight (g)												
♂	-	-	-	-	2.0	3.0	3.6	2.2	3.3	3.3	3.7	2.8
♀	-	-	-	-	1.6	1.5	1.7	1.6	1.5	1.8	2.0	1.9

[a] Standard deviation

[b] Survival based on 40 fish per duplicate

[c] Survival based on 15 fish per duplicate after thinning at 60 days

TABLE 26. SPAWNING RESULTS, EGG HATCHABILITY, AND SURVIVAL AND GROWTH OF FATHEAD MINNOW (Pimephales promelas) FRY AFTER 30 AND 60 DAYS EXPOSURE TO VARIOUS CONCENTRATIONS OF TRIFLURALIN

Item	Mean measured trifluralin concentration (µg/l)											
	16.5		8.2		5.1		1.9		1.5		Control	
	A	B	A	B	A	B	A	B	A	B	A	B
# ♀ spawning	0	0	0	0	5	4	8	6	5	6	3	7
Mean spawning/♀	0	0	0	0	3	7	2	2	0	1	2	3
Mean eggs spawned/♀	-	-	-	-	225	432	64	104	0	20	55	229
Mean eggs/spawn	-	-	-	-	63	60	36	42	-	20	23	76
% Hatchability[a]	-	-	-	-	89	73	95	75	-	-	94	88
# Hatchability samples	0	0	0	0								
30 DAYS												
% Survival					83	60	56	-	-	-	-	84
Mean Total Length (mm)					16	19	19	-	-	-	-	17
S.D.[b]					3.5	3.2	2.1	-	-			3.6
60 DAYS												
% Survival					62	59	56	-	-	-	-	74
Mean Total Length (mm)					21	28	28	-	-	-	-	22
S.D.					5.4	4.8	4.6	-				5.7
# fry groups[c]					2	2	3	0	0	0	0	2

[a] Hatchability samples contained 50 one day old embryos

[b] Standard deviation

[c] Each larval group contained 40 one day old larvae