(10-5-87)

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DATA EVALUATION REPORT

1. Chemical: Cyhalothrin ✓ 128867 PC Code

2. Test Material: Technical, 91.8% ai

3. Study/Action Type: Freshwater Fish Acute Toxicity
Species: Bluegill sunfish (Lepomis macrochirus) A8

4. Study Identification: Cyhalothrin: Determination of Acute Toxicity to Bluegill Sunfish, by L.F. Reynolds. Prepared by ICI, Ltd., August 1984. Submitted by Coopers Animal Health Inc., Kansas City, MO. EPA Acc No. 073221.

5. Review By: Ann Stavola
Aquatic Biologist
HED/EEB
Signature: Ann Stavola
Date: May 6, 1985

6. Approved By: Dougals Urban
Supervisory Biologist
HED/EEB
Signature: Douglas J Urban
Date: 10/5/87

7. Conclusions:

The study is scientifically sound, and with an LC_{50} value of 0.46 (0.42-0.50) ug/l cyhalothrin is very highly toxic to warmwater fish. The study fulfills EPA's guideline requirements for acute toxicity tests with a warmwater fish.

8. Recommendations: N/A

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9. Background: This study was submitted to support a request for EUP's on Grenade 5% and Grenade 20% insecticides.

10. Materials and Methods:

A. Test Animals: Bluegill sunfish (Lepomis macrochirus) from Sea Plantations Inc., Salem, Mass. Mean weight of 0.49 g (range of 0.23 to 0.84 g) and mean length of 27.2 mm (range of 23 to 34 mm). Fish were held for 7 days prior to testing and were acclimatized for 2 days at the test temperature of 22°C. There were 20 fish at each test concentration and negative and solvent controls.

B. Dose: The test material was cyhalothrin (PP 563) with a purity of 91.8%. Stock concentrates were made up daily by dissolving 0.25 g of cyhalothrin in 250 g of a 50/50 acetone-water mixture.

C. Study Design: This was a continuous flow-through system. The fish were held in 20-liter aquaria, and the test solutions were renewed at the rate of 200 ml/minute. A 95% exchange of the test solutions occurred within 4 1/2 hours. The nominal concentrations were: 3.2, 1.8, 1.0, 0.75, 0.56, 0.32 µg/l, a solvent control and a fresh-water control. Actual concentrations were routinely measured during the 96-hr. exposure period.

D. Statistics: The data were analyzed by Finney's probit analysis.

11. Reported Results:

Nominal Conc. (µg/l)	Mean Measured Conc. (µgl)	Percent Mortality 24h	48h	72	96h
3.2	2.47	100	100	100	100
1.8	1.36	95	100	100	100
1.0	0.77	25	75	100	100
0.75	0.57	0	45	90	90
0.56	0.40	0	0	10	20
0.32	0.19	0	0	0	0
Solvent Control	<0.05	0	0	0	0
Freshwater Control	<0.05	0	0	0	5

Time	LC_{50} (µg/l)	(95% CI µg/l)
24h	0.92	0.82-1.05
48h	0.63	0.57-0.70
72h	0.48	0.44-0.52
96h	0.46	0.42-0.50

The general toxic symptoms noted in this study were loss of equilibrium, quiescence, darkening in color, coughing and erratic swimming. The fish exposed to 0.19 µg/l were normal throughout the test period.

D.O. levels ranged form 7.6 to 8.6 µg/l, and pH ranged from 7.5 to 8.4.

12. Study Authors' Conclusions/QA Measures

96-hour LC_{50} (95% CI) = 0.46 (0.42-0.50) µg/l

"The conduct of this study has been inspected/audited in accordance with ICI's policies and procedures for Good Laboratory Practice."

13. Reviewer's Discussion

A. Test Procedure: The protocol followed the procedures recommended by EPA in Methods for Acute Toxicity Tests with Fish, Macroinvertebrates and Amphibians, EPA-660/3-75-009, April 1975.

B. Statistical Analysis: The 96-hour (LC_{50} value was recalculated using EEB's computer program. Our result of 0.44 (0.37-0.51) µg/l from the moving average method agrees with the reported result.

C. Discussion/Results

A 96-hr LC_{50} value of 0.46 ug/l indicates that technical cyhalothrin is very highly toxic to warmwater fish.

D. Adequacy of the Study

1. Classification: Core

2. Rationale: The test fulfills EPA's guideline requirements.

STAVOLA CYHALOTHRIN BLUEGILL ACUTE

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
2.47	20	20	100	9.53674E-05
1.36	20	20	100	9.53674E-05
.77	20	20	100	9.53674E-05
.57	20	18	90	.0201225
.4	20	4	20	.590897
.19	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT .4 AND .57 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .462854

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
5	.0418233	.438513	.369879	.507532

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	.189205	1	.999949

SLOPE = 13.9467
95 PERCENT CONFIDENCE LIMITS = 7.88022 AND 20.0132

LC50 = .460032
95 PERCENT CONFIDENCE LIMITS = .420138 AND .501122

LC10 = .373016
95 PERCENT CONFIDENCE LIMITS = .305704 AND .410595

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