1,2824

DATA EVALUATION RECORD

1. CHEMICAL: Avermectin B_1

2. FORMULATION: Avermectin B_1 Fire ant Bait (100 mg/lb [redacted]

3. CITATION: EG & G Bionomics, 1981. Acute toxicity of L-676, 863-35U01 to bluegill (Lepomis macrochirus). Report # BW-81-6-909 Submitted to Merck Sharp & Dohme, Rahway N.J. Accession No. 246358 in 618-EUP-10.

4. REVIEWED BY: Mary L. Gessner
Fishery Biologist
HED/EEB

5. DATE REVIEWED: 12/17/81

6. TEST TYPE: 96-hour acute toxicity of formulated product to bluegill

Test species: bluegill sunfish

7. REPORTED RESULTS: The 96-hour LC_{50} (and 95% C.I.) for bluegill exposed to L-676, 863-35U01, was 260 (180-390) ppm.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound and with an LC_{50} of 207 ppm is practically non-toxic to bluegill sunfish. This study is not adequate to fulfill the guideline requirement for formulated product testing with warm water fish. Undissolved test material in the test chambers may have caused actual exposure concentrations to be somewhat less than the nominal concentrations. An LC_{50} cannot be calculated without the measured concentrations. There is persently no requirement for formulated product testing with this product.

Materials/Methods

Test Procedure

Fish were obtained from a commercial supplier and held in a 1700 l epoxy-coated raceway under a photoperiod of 16 hours light and 8 hours darkness. Fish were fed, ad libitum, daily except during the 48 hours prior to testing. There was 0.4% mortality in the test fish population during the 2 days prior to testing. Water in the holding tank had 24 mg/l ($CaCO_3$) hardness, alkalinity of 22 mg/l, specific conductance of 80-105 umhos/cm, pH of 6.6-6.7, D.O. of 91-100% saturation. Test fish were held under these conditions for 14 days.

Testing was conducted in 19.6 L glass jars containing 15L of test solution. Dilution water was reconstituted water with the following chemical characteristics: total hardness - 42 mg/l, alkalinity - 29 mg/l, pH -7.4, specific conductance - 140 umhos/cm. Test tanks were maintained at 22 + 1°C, with no aeration. Ten bluegill with a mean weight of 0.34 (0.11-0.68) g and mean length of 31 (26-36) mm were randomly distributed to test jars. Fish were not fed during the exposure. Mortalities were recorded and removed, and biological observations were made at 0,24,48,72, and 96 hours.

Statistical Analysis

The computer program utilized estimated LC_{50} and 95% C.I. values using one of three statistical methods in the following order of preference: moving average angle analysis, probit analysis, binomial probability. In this case, the moving average angle method was used.

Discussed/Results

The 96-hour LC_{50} and 95% confidence intervals for bluegill exposed to L-676, 863-35U01 was 260 (180-390) mg/l. The no effect level was determined to be <58 mg/l.

Reviewer's Evaluation

A. Test Procedure

Test procedure generally followed EPA-recommended protocol.

B. Statistical Analysis

Data analysis was verified by the Stephan's program, with the following results:

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
750	10	10	100	0.09765625
450	10	6	60	37.69531
270	10	6	60	37.69531
160	10	4	40	37.69531
97	10	0	0	0.09765625
58	10	2	20	5.46875

THE BINOMIAL TEST SHOWS THAT 5.8 AND 750 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 207.8461

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
5	0.2135763	255.561	177.8833	409.3895

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	0.2063881	1	0.1313761

SLOPE = 2.373845
95 PERCENT CONFIDENCE LIMITS = 1.295408 AND 3.452282

LC50 = 230.2437
95 PERCENT CONFIDENCE LIMITS = 156.839 AND 347.0922

LC10 = 67.17238
95 PERCENT CONFIDENCE LIMITS = 22.57128 AND 108.1643
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C. Discussion/Results

An unspecified amount of test material remained undissolved at the bottom of the test vessel at each treatment level. Given the fact that this material is insoluble in water and that no solvent was used to get the material into solution, actual test concentrations were probably somewhat less than the reported nominal concentrations. There is presently no requirement for formulated product testing on bluegill sunfish with this chemical.

D. Conclusions

1. Category: Supplemental (LC_{50} = 207 ppm)

2. Rationale: The calculated LC_{50} was based on nominal concentrations. These levels may not have been maintained throughout the test due to this chemicals low solubility in water and the presence of undissolved material in the jars.

3. Repairability: None