INERT INGREDIENT INFORMATION IS NOT INCLUDED

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 the water flea (Daphnia magna). Report # BW-81-6-923, 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: 12/21/81

6. TEST TYPE: 48-hour acute toxicity of formulated product to aquatic invertebrates.

Test species: Daphnia magna

7. REPORTED RESULTS: The 48-hour LC_{50} (and 95% C.I.) for the water flea exposed to L-676, 863-35U01 was 7.6 (5.9-9.9) ppm.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound and with an LC_{50} of 7.6 ppm, L-676, 863-35U01 is moderately toxic to Daphnia magna. This study is not adequate to fulfill the guideline requirement for formulated product testing with aquatic invertebrates. Undissolved test material in the test chambers may have caused the actual exposure concentrations to be somewhat less than the nominal concentrations. An LC_{50} cannot be calculated without the measured concentrations. There is presently no requirement for formulated product testing with this product.

Materials/Methods

Test Procedure

Daphnia magna were obtained from Laboratory stocks cultured at the testing facility. The culture water had a total hardness of 165 + 15 mg/l, alkalinity of 130 + 10 mg/l, pH range of 7.9-8.3, temperature of 21+1°C, DO >5.4 mg/l, and specific conductance of 400-600 umhos/cm. Toxicity testing was conducted in 2L glass jars containing 1000 ml of test solution. Dilution water was reconstituted from deionized water and had the same water quality as the culture water previously mentioned. A control jar containing dilution water was maintained. Test jars were not aerated. Fifteen Daphnia, <24 hours old, were randomly distributed to test jars. Mortalities were recorded at 24 and 48 hours and biological observations were made at 0,24, and 48 hours.

Statistical Analysis

The LC_{50} and 95% C.I. were estimated by a computer program, which utilized the binomial probability method.

Discussion/Results

The 48-hour $LC5_0$ and 95% C.I. for Daphnia exposed to L-676, 863-35U01 was estimated to be 7.6 (5.9-9.9) ppm. The no effect concentration was determined to be 3.5 ppm.

Reviewer's Evaluation

A. Test Procedure

Test procedures generally followed EPA-recommended protocol. Both EPA and ASTM recommend using soft water for aquatic bioassays, except when the intent is to study the effects of water quality on results of toxicity tests. The water used in this study was harder than recommended. The pH was also higher than recommended. Deviations from recommended water quality parameters can elevate LC_{50} values, which should be taken into account if risk assessments are done using this data. Reported pH was 8.1 for all concentrations at 48 hours and D.O. was 8.3-8.5 mg/l. Undissolved test material in test vessels indicates that actual test concentrations were probably some what lower than the nominal concentrations.

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)
9.9	15	10	66.66667	15.08789
5.9	15	7	46.66667	50
3.5	15	0	0	0.003051758
2.1	15	0	0	0.003051758
1	15	0	0	0.003051758

THE BINOMIAL TEST SHOWS THAT 3.5 AND +INFINITY 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 6.423962

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	0.1850533	7.046032	5.804737	9.275671

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	0.2357456	1	0.4016763

SLOPE = 5.062848
95 PERCENT CONFIDENCE LIMITS = 2.604651 AND 7.521045

LC50 = 7.349439
95 PERCENT CONFIDENCE LIMITS = 6.022686 AND 9.675914

LC10 = 4.124841
95 PERCENT CONFIDENCE LIMITS = 2.488032 AND 5.166275

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C. Discussion/Results

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

D. Conclusions

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

3. Repairability: None