

2-12-90

DATA EVALUATION RECORD

CHEMICAL: Resmethrin + piperonyl butoxide
Shaughnessey No. 097801

TEST MATERIAL: Scourge (18.36% resmethrin + 46.02% piperonyl butoxide w/w) MF formula II

STUDY TYPE: Acute toxicity test for Daphnia magna

STUDY I.D.: McAllister, W.A. (1984) Remesthrin: Acute toxicology of Scourge to (Daphnia magna) (432-667); **Laboratory I.D. #:** 31372; Prepared by Analytical Bio-Chemistry Laboratories, Inc., P.O. Box 1097, Columbia, Mo 65205 for Penick Corporation, 1050 Wall Street West, Lyndhurst, N.J. 07071; **MRID #:** 409912-08;

REVIEW BY:

Name: Tom A. Bailey
Title: Fishery Biologist
Organization: OPP/EFED/EEB

Signature: Tom A. Bailey
Date: 2-8-90

APPROVED BY:

Name: Henry Craven
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Signature: Henry T. Craven
Date: 2/12/90

CONCLUSIONS:

This study is scientifically sound and generally meets the requirements for an acute toxicity test for Daphnia magna. However, because of the rapid photodegradative properties of resmethrin, nominal concentrations could be unreliable. However this study will fulfill the requirement for a formulated product. The nominal 48-hour LC50 (95% C.I.) for Scourge was 0.10 mg/L (0.087-0.12). Due to abnormal effects observed during the 48-hour exposure, a NOEC could not be accurately determined.

RECOMMENDATIONS: N/A

BACKGROUND:

Acute toxicity to Daphnia magna was required for formulated material to fill data gaps.

DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: N/A

MATERIALS AND METHODS:

- a. **Test Animals** -Species: Daphnia magna Stage: 1st instar (<24-hours old) Source: ABC Laboratories.
- b. **Dosage** -Test material: mixed formulation of resmethrin (18.26%) and piperonyl butoxide (46.02%); Nominal concentrations: 0.032, 0.056, 0.10, 0.18, and 0.32 µg/L as Scourge. Diluent and solvent control groups utilized; Measured concentrations: actual concentrations were not determined; Dilution water: well water

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b. **Dosage** -Test material: mixed formulation of resmethrin (18.26%) and piperonyl butoxide (46.02%); Nominal concentrations: 0.032, 0.056, 0.10, 0.18, and 0.32 µg/L as Scourge. Diluent and solvent control groups utilized; Measured concentrations: actual concentrations were not determined; Dilution water: well water source, temperature = 15-20° C, dissolved oxygen = 9.2-10.2 mg/L, pH = 7.8-8.3, hardness (CaCO₃) = 225-275, alkalinity (CaCO₃) = 325-375, and conductivity = 700 µmhos/cm. These values represent seasonal variation and monthly ranges did not exceed 10%; Stock solution: 0.2g Scourge diluted with 100 mL of acetone.

c. **Study Design** -The protocol closely followed that outlined by "Standard Methods for Examination of Water and Wastewater" and "Standard Practice for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates and Amphibians" (1980). In a range-finding test, 10 organisms were exposed to each of 3 concentrations (0.01, 0.1, and 1.0 mg/L). Five concentrations were used in definitive tests and 10 organisms were exposed to each level of toxicant in duplicate. The daphnia were added to each test vessel. A solvent control, containing 0.032 mL acetone/200 mL test water, was used. Aliquots required for the measurements of dissolved oxygen, pH, and temperature were removed from one test vessel of the control, highest concentration, and lowest concentration on day 0 and day 2 of the study.

d. **Statistical Analysis** -LC50 values and corresponding 95% C.I. were determined with a computer program (Stephan 1982). The reported LC50s were calculated using the probit method.

REPORTED RESULTS:

LC50 values after 24-, and 48-hours of exposure were 0.26 and 0.1 mg/L respectively. Data was based on nominal concentrations. The NOEC based on the lack of mortality and abnormal effects was estimated to be <0.032 mg/L. Mortality and behavioral data for Daphnia magna exposed to Scourge are listed in attachment 1. Values of pH ranged from 8.3 to 8.7 and dissolved oxygen ranged from 8.8 at 20° C to 8.7 mg/L at 19° C, (96% to 95% saturation) for the duration of the test (attachment 2).

STUDY AUTHOR'S CONCLUSIONS/QA MEASURES:

The 48-hour LC50 for Scourge was 0.10 mg/L, which is highly toxic to Daphnia magna. The NOEC was <0.032 mg/L.

QA Statement: "The study was conducted following the intent of the GLP regulations and the final report was reviewed by Analytical Bio-Chemistry Laboratories' Quality Assurance Unit".

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REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. Test Procedure - The test procedures used in this study generally adhered to acceptable protocol. Listed below are discrepancies noted in the study.

***Holding and Acclimation**

- a. No mention of aeration during acclimation or testing
- b. No mention of whether feeding ceased during treatment.
- c. The report did not mention acclimation or holding temperatures.

***Water Quality**

- a. Several variables were excluded from the well water analysis without explanation: calcium, magnesium, sodium, potassium, and sulfate.
- b. Did not clarify which methods or protocols were used to measure water quality variables.
- c. The following water quality characteristics are above guideline criteria.

Characteristic	ABC level	Guideline Criteria
Conductivity	700 μ mhos/cm	<1 μ mhos/cm
Unionized ammonia	0.6 mg/L	<20 μ g/L
Lead	17.0 μ g/L	<1 μ g/L
Mercury	800 ng/L	<100 ng/L

***Test Procedure**

- a. Temperature, dissolved oxygen, and pH must be measured at the beginning of the test and every 48 hours thereafter to the end of the test in the control and the high, medium, and low toxicant concentrations as long as test organisms are present.
- b. Exact times of Daphnia mortality and behavior observations not reported.

B. Statistical Analysis - The reviewer calculated LC50 values from data submitted by the study author. The 48-hour LC50 value for Scourge was 0.10 mg/L (0.087-0.12 mg/L).

C. Discussion/Results - A 48-hour LC50 of 0.10 mg/L indicates that Scourge as a mixed formulation of Resmethrin 18.36% a.i. + Piperonyl butoxide 46.02% a.i. is highly toxic to daphnia.

D. Adequacy of the study - SUPPLEMENTAL for mixed formulation of Scourge with 18.36% a.i. as resmethrin and 46.02% a.i. as piperonyl butoxide.

Rationale - This study was scientifically sound, but due to rapid photodegradative properties, nominal levels of scourge were considered unreliable. Furthermore, levels for several key water quality characteristics exceeded criteria guidelines.

Reparability - N/A

COMPLETION OF ONE LINER FOR STUDY: yes

CBI APPENDIX: N/A

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