9/21/79

1. Chemical: Naled

2. Formulation: 91.6% (Technical)

3. Citation: Wheeler, R.E. (1978). 48 Hour Acute Static Toxicity of Naled (SX820) to 1st Stage Nymph Water Fleas (Daphnia magna Straus). Received 1-30-79

4. Reviewed by: C.M. Natella
Wildlife Biologist
EEB/HED

5. Date Reviewed: 9-21-79

6. Test Type: Acute Static 48 Hour Aquatic Invertebrate LC_{50}.

7. Reported Results: The 48 hour LC_{50} was 0.0003 mg Naled/l (95% c.i. 0.0004 to 0.0002).

8. Reviewers Conclusions: The study is scientifically sound and with an LC_{50} of 0.0003 mg/l (ppm) Naled is very highly toxic to aquatic invertebrates. This study does fill the requirements for an aquatic invertebrate acute LC_{50}.

Materials/Methods

Test Procedures

Procedures were based on protocols in "Methods for acute toxicity tests with fish, macro invertebrates, and amphibians" (EPA-660/3-75-009, 1975) and in EPA approved "Protocal for Daphnia LC_{50} Studies" (R.E. Wheeler, Chevron Chemical Company, 1978). The toxicant dilution series were done at a dilution factor of 0.6 within the effective toxicant concentration range established in preliminary range finding tests. Each treatment was replicated three times, each containing 10 Daphnia nymphs.

Statistical Analysis

Chi square statistical analysis was done to give a median lethal concentration (LC_{50}) after 24 and 48 hours exposure (based on 0 hour toxicant analytical data) both at the 95% confidence limits.

Discussion/Results

All data are based on analytical concentrations of Naled at 0 hours. The 48 hour exposure LC_{50} was 0.0003 mg Naled/l (95% c.i. 0.0002 to 0.0004). At 0.0005 mg/l analytical concentration, the mean percent mortality was 86.6 after 48 hours; at 0.0002 mg/l (nominal conc. 0.0003), mean percent mortality was 10 and at 0.0001 (nominal conc. 0.0002), mean percent mortality was 3.3 after 48 hours. There was no mortality at the lowest dosage level (nominal concentration of 0.0001 mg/l, analytical concentration the same), and no mortality in the controls.

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Reviewer's Evaluation

A. Test Procedure

The test procedure generally complies with the recommended EPA 1978 protocol. However, the pH of the water in some of the test vessels slightly exceeded the recommended range of 7.2 to 7.6 for soft water. The highest pH value, 7.8 was measured after 48 hours at the second lowest concentration.

B. Statistical Analysis

The LC_{50} was calculated by the EEB using the Finney Probit method. The two lowest concentrations (0.0002 and 0.0001 mg/l) were pooled since chemical analysis showed that the concentration of the test water at both levels was 0.0001 mg/l. The LC_{50} at 48 hours calculated by this method (0.000316 mg/l) agrees with the value obtained by the chi square method in the study (0.0003 mg/l). The 95% confidence limits on the LC_{50} obtained by the Probit method are 0.000268 and 0.000382. Confidence limits cited in the study are 0.0002 and 0.0004. The LC_{10} calculated by Finney Probit is 0.000176 mg/l, 95% confidence limits = 0.000133 and 0.000212. Slope is 5.02353.

C. Discussions/Results

The study is scientifically sound and shows that Naled is highly toxic to aquatic invertebrates.