EEB files

4-15-93

MRID No. 147865

DATA EVALUATION RECORD

1. **CHEMICAL:** Triadimefon
   Shaughnessey No.: 109901

2. **TEST MATERIAL:** Bayleton 50% Wettable Powder; Batch No. 1030212; 50% active ingredient; a tan powder.

3. **STUDY TYPE:** Freshwater Invertebrate Static Acute Toxicity Test. Species Tested: Daphnia magna

4. **CITATION:** Forbis, A.D., L. Georgie, and D. Burgess. 1984. Acute Toxicity of Bayleton 50% WP to Daphnia magna. Study No. 32027. Prepared by Analytical Bio-Chemistry Laboratories, Inc., Columbia, MO. Submitted by Mobay Chemical Corporation, Stilwell, KS. EPA MRID No.147865.

5. **REVIEWED BY:**

   Dennis J. McLane, Wildlife Biologist — Signature: [signature] 3-15-93
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6. **APPROVED BY:**

   Les Touart, Chief, Section 1 — Signature: [signature] 4-15-93
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7. **CONCLUSIONS:** This study is not scientifically sound and does not meet the guideline requirements for an acute static toxicity test for freshwater invertebrates. Since the test chemical was partially insoluble, the actual concentrations to which the daphnids were exposed is unknown. Also hard water may have reduce the availability of the product to the organism.

8. **RECOMMENDATIONS:** The test should be repeated using a flow-through system, or using a static system with chemical analysis of test solutions.

9. **BACKGROUND:**

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A

11. **MATERIALS AND METHODS:**

MRID No. 250-147865 (00)

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5. **REVIEWED BY:**

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7. **CONCLUSIONS:** This study is scientifically sound but does not meet the guideline requirements for an acute static toxicity test for freshwater invertebrates. Based on nominal concentrations, the 48-hour LC_{50} was 16.4 mg/L. Therefore, Bayleton 50% WP is classified as slightly toxic to Daphnia magna. The NOEC was determined to be 5.6 mg/L. Since the test chemical was partially insoluble, the actual concentrations to which the daphnids were exposed is unknown.

9 hrs

A. **Test Animals:** Test animals were obtained from in-house cultures. Adult Daphnia magna were fed algae (Selenastrum capricornutum) at least every three days prior to testing. Adults were supplemented with a suspension of trout chow. First instar Daphnia magna were selected for the test.

B. **Test System:** Aliquots of a stock solution (20 mg Bayleton 50% WP per mL) were mixed with ABC aged well water to give a final volume of 200 mL of test solution in each 250-mL beaker. Deionized water was used in the preparation of the stock solution. The characteristics of the well water are given in Table 1 (attached). The beakers were kept under conditions listed for the cultures above.

Dilution water hardness, alkalinity and conductivity were reported as 225-275 mg/L as $CaCO_3$, 325-375 mg/L as $CaCO_3$, and 700 µmhos/cm, respectively (Table 1, attached).

The daphnids were not fed during the test.

C. **Dosage:** Forty-eight-hour static test. Based on a preliminary test, five nominal concentrations (3.2, 5.6, 10, 18, and 32 mg/L) and a dilution water control.

D. **Design:** Two beakers were used for each concentration. Ten daphnids were carefully transferred into each beaker within 30 minutes of test solution preparation. All concentrations were observed once every 24 hours for mortality and abnormal effects such as surfacing, clumping together, and lying on the bottom of the chambers. The temperature, dissolved oxygen (D.O.), and pH were measured in the control at the beginning of the test and in the control, high, medium and low concentrations after 48 hours. The test concentrations were not measured. All test containers were held in a controlled temperature area at 20°±2°C. The lighting in the area was 50-70 ft-candles on a 16 hour daylight photoperiod.

E. **Statistics:** The 48-hour median lethal concentration (LC_{50}) and associated 95% confidence interval (C.I.) were calculated using a computer program developed by Stephan et al. (1978).

12. **REPORTED RESULTS:** No mortality occurred within the first 24 hours (Table 3, attached). The 48-hour LC_{50} for Bayleton 50%

WP based on nominal concentrations was 16.4 mg/L (95% C.I.=14.1-19.0 mg/L. The slope of the dose-response curve was given as 7.9. The no-observed-effect concentration (NOEC), based on the lack of mortality and abnormal effects, was 5.6 mg/L after 48 hours.

Oxygen saturation ranged from 82 to 95% at 20°C. The pH values of the treated chambers ranged from 8.1 to 8.6 and were consistent with the control.

The solutions in the 18 and 32 mg/L test chambers turned cloudy after the addition of the compound stock solution (raw data sheet, page 12, attached).

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

The author presented no conclusions.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedures were generally in accordance with protocols recommended by the guidelines, but deviated from the SEP as follows:

Cloudiness in the test containers indicated precipitation of the chemical. Samples of the test solutions should have been taken to quantify the actual amount of chemical the daphnids were exposed to.

The dilution water hardness (225-275 mg/L as $CaCO_3$) deviated significantly from the value recommended in the SEP (40-48 mg/L as $CaCO_3$).

The test temperature was not monitored continuously as recommended.

Pretest mortality and condition of the Daphnia magna cultures (i.e. presence of ephippia) were not reported.

First instar Daphnia magna used in tests should be from the fourth or later broods of a given parent. The author did not indicate which brood was the source of the test animals.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the EC_{50} values and obtained comparable results (see attached printout).

C. **Discussion/Results:** The hardness of the test dilution water may have significantly modified the toxicity of Bayleton 50% WP. It does appear to have modified the solubility of the chemical. The report states that a stock solution of 20,000 mg/L (0.200 g in 10 mL) was prepared in deionized water. However, upon mixing the stock with the dilution water, a cloudy precipitate occurred in the 18 and 32 mg/L concentrations. Also, if the formulation contains a surfactant, the surfactant may not be as effective in hard water as would be expected in soft water. Hence, a runoff event caused by rain would be expected to increase the availability of the product and potentially the toxicity.

The SEP clearly states that test solutions should be chemically analyzed to determine the exact concentrations of pesticides especially if the test material was insoluble or precipitated out of solution. Chemical measurements were not made.

The boundary between moderate toxicity and slight toxicity is given in the SEP as 10 mg/L. The reported LC_{50} is close to this boundary. Any additional mortality resulting from complete solubility of the test material could change the descriptive classification of the chemical. This study should be repeated under flow through conditions or conditions which ensure the solubility of the test material.

The 48-hour LC_{50} of 16.4 mg/L (based on nominal concentrations) classifies Bayleton 50% WP as slightly toxic to Daphnia magna. The slope of the probit line was 7.9.

D. **Adequacy of the Study:**

(1) **Classification:** Invalid

(2) **Rationale:** No measurements were taken to ensure the quantity of test material in solution even though solubility problems were encountered.

(3) **Repairability:** No.

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 01-17-91.