

US EPA ARCHIVE DOCUMENT

12-12-94

MRID No. 404675-02

DATA EVALUATION RECORD

1. CHEMICAL: Mancozeb.
Shaughnessey No. 014504.
2. TEST MATERIAL: Dithane Flowable (F-45); Lot No. 2-4262; 37% active ingredient; a tan liquid.
3. STUDY TYPE: 72-2(b) - Freshwater Invertebrate Static Acute Toxicity Test. Species Tested: *Daphnia magna*.
4. CITATION: Forbis, A.D. 1987. Acute Toxicity of Dithane Flowable (F-45) to *Daphnia magna*. Final Report No. 36282. Rohm and Haas Report N. 87RC-0041. Prepared by Analytical Bio-Chemistry Laboratories, Inc., Columbia, MO. Submitted by Rohm and Haas Company, Spring House, PA. EPA MRID No. 404675-02.
5. REVIEWED BY:

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| William Erickson, Biologist Ecological Effects Branch Environmental Fate and Effects Division | Signature: <i>W. Erickson</i> Date: 12/12/94 |
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6. APPROVED BY:

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| Henry T. Craven, Section Head 4 Ecological Effects Branch Environmental Fate and Effects Division | Signature: <i>Henry T. Craven</i> Date: 12/12/94 |
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7. CONCLUSIONS: This study is not scientifically sound and does not fulfill the guideline requirement for an acute aquatic freshwater-invertebrate toxicity test with a formulated product. Due to precipitation in test solutions, the actual concentrations of test material to which the daphnids were exposed are unknown.
8. RECOMMENDATIONS: A solvent should be used to increase solubility. The actual concentrations to which the organisms are exposed should be verified.
9. BACKGROUND: The Mancozeb Registration Standard of November 17, 1986 required testing with a typical flowable concentrate.
10. DISCUSSION OF INDIVIDUAL TESTS: N/A.

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7/24/91

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5. **REVIEWED BY:**

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Henry T. Craven, M.S.
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Signature: *H.T. Craven* 12/12/94
Date:

7. **CONCLUSIONS:** This study is not scientifically sound. Due to precipitation in some of the test solutions, the actual concentrations of test material the daphnids were exposed to are unknown. Under the conditions of the test and based on nominal concentrations of the formulated product, the 48-hour EC₅₀ of 8.5 mg a.i./L (23 mg/L as whole test product) classifies Dithane Flowable (F-45) as moderately toxic to Daphnia magna. The NOEC after 48 hours of exposure was 0.21 mg a.i./L.

8. **RECOMMENDATIONS:** N/A.

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11. MATERIALS AND METHODS:

- A. **Test Animals:** First instar *Daphnia magna* (less than 24 hours old) were obtained from in-house cultures maintained in well water. At least every three days prior to testing, adult *Daphnia magna* were fed algae (*Selenastrum capricornutum*) and supplemented with a suspension of Tetramin[®], cereal leaves, vitamin solution, and yeast.
- B. **Test System:** Vessels used in the test were 250-mL glass beakers containing 200 mL of aged well water (controls) or test solution. The characteristics of the culture/test dilution water are given in Table 1 (attached). The vessels were held in a temperature controlled area ($20^{\circ}\pm 2^{\circ}\text{C}$) on a 16-hour daylight photoperiod with 30-minute dawn/dusk simulations. The light intensity was maintained at 50-70 ft-candles.
- C. **Dosage:** Forty-eight-hour static test. Based on a preliminary test, eight nominal concentrations (0.56, 1.0, 1.8, 3.2, 5.6, 10, 18, and 32 mg/L) and a dilution water control were used. The concentrations made were based on the total product (tested as a formulation). Stock solutions were prepared in the test water. No solvent was used.
- D. **Design:** Two beakers were used for each concentration and ten daphnids were used per beaker. All concentrations were observed once at 24 and 48 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, 0.56, 3.2, 10, and 32 mg/L test concentrations at 0 and 48 hours.
- E. **Statistics:** The 48-hour median effective concentration (EC_{50}) and associated 95% confidence interval (C.I.) were calculated using a computer program developed by Stephan et al. (1978).

12. **REPORTED RESULTS:** "At 0-hours, the 1.8, 3.2, 5.6, 10, 18, and 32 mg/L test concentrations appeared to form a suspension. A precipitate was present in the 18 and 32 mg/L test concentrations throughout the 48-hour study." The percent effect and water quality measurements are given in Table 4 (attached). The 48-hour EC_{50} value, based on nominal concentrations, was 23 mg/L (95% C.I. = 19-29 mg/L) by the moving average method. The no-observed-effect

concentration (NOEC), based on the lack of mortality and abnormal effects, was 0.56 mg/L after 48 hours.

The dissolved oxygen concentration was 8.3-8.7 mg/L or 98-102% of saturation at 21°C. The pH ranged from 8.2 to 8.4. The temperature remained 21°C throughout the test.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The author presented no conclusions.

Quality Assurance and Study Compliance 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:

No solvent was used to increase the solubility of the test material.

The hardness of the dilution water (206-275 mg/L as CaCO₃) was greater than recommended (<200 mg/L).

The test temperature was not monitored continuously as recommended.

The D.O. was greater than 100% of saturation at the beginning of the test (102%). The SEP recommends that the D.O. be between 60 and 100% of saturation during the first 48 hours of the test.

The length of time between solution preparation and test initiation was not given and the method used to transfer daphnids to test solutions was not included in the report.

No observations on pretest mortality and the health of the source culture(s) were given in the report.

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:** None.

- C. Discussion/Results: Precipitates (in the form of cloudy solutions) were present in all but one of the test solutions (0.56 mg/L) at test initiation. After 48 hours, only the two highest concentrations (18 and 32 mg/L) had a precipitate. It seems likely that precipitates were present in the preliminary test solutions (1.0, 10, and 100 mg/L) but the performing laboratory chose not to address this problem in the definitive study. A solvent should have been used to increase the solubility of the test material. The concentrations of the active ingredient should have been measured.

This study is not scientifically sound. Due to precipitation in some of the test solutions, the actual concentrations of test material the daphnids were exposed to are unknown.

D. Adequacy of the Study:

- (1) Classification: Invalid.
- (2) Rationale: Precipitates were present in the test solutions but the concentrations of the active ingredient of the test material in the test solutions were not measured.
- (3) Repairability: No.

15. COMPLETION OF ONE-LINER FOR STUDY: Yes, 12/09/94.