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Data Evaluation Report
Ecological Effects Branch

- 1. Chemical: Arsenic Acid
- 2. Test Material: Arsenic Acid, purity 76.1% active ingredient, Lot No. 203, received 5/2/90.
- 3. Study Type: Static Acute Toxicity Test using Daphnia magna

4. Study Identification:

Study Director: LeLievre, Maura
 Study Laboratory: Springborn Laboratories, Inc.
 Study Date: July 3-5, 1990
 Study Identification: Springborn Study No. 10823.0490.
 Sponsor: Chemical Manufacturers Assoc., Washington, D.C.
 EPA Identification: MRID 416200-01

- 5. Reviewed by: Brian Montague, Fisheries Biologist
 Ecological Effects Branch
 Environmental Fate and Effects Division

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 1/2/91

- 6. Approved by: Les Touart, Acting Supervisory Biologist
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- 7. Conclusions: Arsenic acid displayed slight to moderate toxicity toward Daphnia magna in pH 8.1 dilution water. The EC⁵⁰ reported for this study is 15 mg ai/L with confidence intervals of 12 to 19 mg ai/L. The NOEC is 5 mg ai/L. The study is acceptable for registration purposes.

- 8. Recommendations: N/A

9. **Submission Purpose:** Submitted to satisfy reregistration guideline requirements for chromic arsenical wood preservative compounds.
10. **Study Methods/Protocol:** Protocol was Springborn protocol no. 010190/FIFRA 72-2 DM-5A modeled after FIFRA procedural guidelines.

Test Organisms: Daphnia magna \leq 24 hours old were obtained from laboratory culture stocks. The culture water was well water fortified to ASTM specifications for hardwater formulation. During culturing a 16D/8N photoperiod was maintained at 40-45 footcandle intensity. Trout food and algal suspension combinations were provided daily. Analysis of food solutions revealed no detectable pesticide contamination.

Test Solution Preparation and Dilution water:

Dilution water used for testing procedures was fortified well water with a pH of 8.1, total hardness of 170 mg/L as CaCO_3 , and conductivity of 500 microohms/cm. TOC was 2.2 mg/L. Water was maintained at $20 \pm 2^\circ\text{C}$.

Test solutions were prepared by first preparing a 100,000 mg/L (100 mg/ml) stock solution (1.000 gm ai of test material brought to volume of 10 ml in distilled water). Appropriate amounts of this stock solution were added to 1000 ml of dilution water to arrive at nominal concentrations of 20, 12, 7.0, 4.3, and 2.6 mg/L. Solutions were mixed by magnetic stirrer before initiation.

Test Methods and Materials: The 1000 ml test solutions were divided into five 200 ml test aliquots. One 200 ml sample was reserved for analysis of test concentrations. The four remaining 200 ml aliquots of each solution were added to four 250 ml glass beakers thus providing 4 replicates at each test concentration level. Four control vessels received only dilution water. Five test daphnids were impartially distributed to each beaker for a total of twenty daphnids per concentration level. Temperature was maintained by room temperature at $20 \pm 1^\circ\text{C}$. No aeration was employed nor were daphnids fed during exposure. Test organism observations, as well as temperature, pH, and dissolved oxygen measurements, were performed every 24 hours. Water parameter measurements were only performed in one replicate of each test concentration. Samples were removed at 0 and 48 hours for atomic absorption spectroscopy analysis of test material concentration.

11. **Reported Test Results:** Range finding tests prior to definitive testing yielded 48 hour mortality levels of 100% and 90% at 50 and 15 mg ai/L concentrations of the test material. No mortality was observed at 5 mg ai/L.

The definitive mean test mortality (immobilization) for 24 hours of exposure was 25%, 5%, and 5% for the 19, 12, and 6.3 mg ai/L measured test concentrations, respectively. Mortality for the 48 hour exposure period was 90%, 10% and 5% for the 19, 12, and 6.3 mg ai/L concentrations with no mortality in the 5.0 mg ai/L, 2.4 mg ai/L, or control test vessels. Lethargy was observed in one daphnid in the 5 ppm replicates. Surfacing, bottom resting, and erratic swimming behavior, and lethargy, were observed in the 3 highest measured test concentrations groups. Water quality parameters ranged from 7.4 - 8.3 for pH, and dissolved oxygen levels ranged from 8.8 - 9.1 mg/L for the 48 hour test period. Temperature measurements ranged from 20-21°C at 0, 24, and 48 hours.

12. **Study Author's Conclusions:** "The 48 hour EC₅₀ value was estimated by linear interpolation to be 15 mg ai/L with a 95% confidence interval calculated by binomial probability of 12-19 mg ai/L. The No Observed Effect Concentration for this study was 2.6 mg ai/L."

13. **Reviewer's Discussion:** The study appears to have been conducted in a scientifically sound manner and results support the study author's conclusions. The use of dilution water with a pH of 8.1 may have acted to slightly buffer the acidity of the test compound, but it is not felt that this dramatically affected the results. Arsenic acid would appear to display slight to moderate toxicity toward Daphnia magna under the alkaline water conditions used in this study.

Adequacy of Study:

Classification: Core

Rationale: The study has obtained results which support the study author's conclusions and was conducted within acceptable guideline procedures.