

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

09 NOV 1993

EEB *R. Rose*

- 1. **CHEMICAL:** Hexaflumuron. Shaughnessey Number: 118202.
- 2. **TEST MATERIAL:** Radiolabelled XRD 473; 1-(3,5-dichloro-4-(1,1,2,2-tetrafluoroethoxy)phenyl)-3-(2,6-difluorobenzoyl) urea; CAS No. 86479-06-3; REF. 6HD-1130-69a; specific activity of 10.18 mCi/mmole; radiopurity of 99+%; a white solid.
- 3. **STUDY TYPE:** 72-2. Freshwater Invertebrate Toxicity Test. Species Tested: *Daphnia magna*.
- 4. **CITATION:** Mayes, M.A. 1992. The Acute Toxicity of XRD 473 to *Daphnia magna*: Summary Evaluation and Original Study (Conducted in 1987). Study performed by Aquatox Ltd., Suffolk, England. Submitted by DowElanco. EPA MRID No. 426485-13.
- 5. **REVIEWED BY:**
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 Date: 17 June 93
- 6. **APPROVED BY:**
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 Date: 12/23/93
- 7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for an acute toxicity study using freshwater invertebrates. Based on 48-hour measured and derived concentrations, the 48-hour EC₅₀ was 0.111 µg/l which classifies XRD 473 as very highly toxic to *Daphnia magna*. The NOEC could not be determined.
- 8. **RECOMMENDATIONS:**
- 9. **BACKGROUND:**
- 10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A.

11. MATERIALS AND METHODS:

- A. Test Animals:** *Daphnia magna* were obtained from laboratory cultures. The daphnid cultures were maintained in ground water (hardness of 50 mg/l as CaCO₃) at a temperature of 20 ±2°C. The photoperiod was 16 hours of light with 30-minute dawn/dusk simulation periods. The cultures were provided *Chlorella vulgaris* and yeast daily.
- B. Test System:** The test chambers were covered, 120-ml crystallizing dishes containing 100 ml of test solution and were held in a water bath during the test. The dilution water was ground water. The test conditions were comparable to those under which the cultures were maintained. Test solutions were not aerated during the test.

A concentrated solution of radiolabelled test material was prepared by dissolving the test substance in acetone. Further dilutions with acetone and dilution water were made to prepare the test solutions.

- C. Dosage:** Forty-eight-hour static test. Six nominal test concentrations (0.03, 0.04, 0.07, 0.12, 0.19, and 0.32 µg/l) were selected for this test. In addition, a dilution water control and a solvent control were included. The solvent control contained approximately 100 mg/l of acetone, the amount equivalent to that used in the exposure concentrations.
- D. Design:** Five daphnids (6-24 hours old) were added to each of four replicate vessels. The daphnids were not fed during the test. Observations of immobility, mortality, and floating daphnids were recorded at 3, 24, and 48 hours during the test.

Temperature, pH, and dissolved oxygen concentrations (DO) were measured in samples of each test solution prior to test initiation and at 48 hours from samples of pooled replicate solutions. Hardness and alkalinity of the dilution water were measured at test initiation and termination. The temperature was also measured continuously in an additional test vessel containing water.

The stock solution, three test concentrations (0.03, 0.07, 0.32 µg/l nominal), and the acetone control were measured for concentrations of the test material at 0 and 48 hours using liquid scintillation counting.

- E. **Statistics:** The EC_{50} and its 95% confidence interval (C.I.) were calculated using the moving average method.
12. **REPORTED RESULTS:** Forty-eight hour measured concentrations for the three exposure solutions were 0.030, 0.056, and 0.170 $\mu\text{g}/\text{l}$ (Table 6, attached). Estimates derived from these measured values for the intermediate concentrations were 0.037, 0.085, and 0.119 $\mu\text{g}/\text{l}$.

By test termination, 5-100% of the daphnids were affected (i.e., immobile, dead, or floating) in the exposure solutions (Table 3, attached). The control and solvent control daphnids showed no signs of lethal or sublethal effects. Based on 48-hour measured and derived concentrations, the 48-hour EC_{50} (95% C.I.) was 0.111 (0.103-0.120) $\mu\text{g}/\text{l}$.

During the test, the test solutions had a pH of 7.70-8.15, a DO of 98-101% of saturation, and a temperature of 19.8-20.0°C. The hardness and alkalinity of the dilution water were 48-49 and 48-52 mg/l as CaCO_3 , respectively.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**
The data indicate that XRD 473 is very highly toxic to daphnids.

A GLP compliance and quality assurance statement were included in the report, indicating that the study was conducted in accordance with 40 CFR Part 160.

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

- A. **Test Procedure:** The test procedures were generally in accordance with the SEP.
- B. **Statistical Analysis:** The 48-hour EC_{50} and its 95% confidence interval were calculated using EPA's Toxanal computer program and the 48-hour measured and derived concentrations. The reviewer obtained results similar to those of the author (printout, attached).
- C. **Discussion/Results:** The actual measured concentrations of test material in three of the six exposure solutions were not determined. However, for this study it is acceptable since the analytical measurement is not required for a static test and the concentrations derived for these solutions were more conservative than the nominal concentrations.

There were several minor inconsistencies between the summary report and the original report. These discrepancies did not affect the validity of the study.

This study is scientifically sound and meets the guideline requirements for an acute toxicity study using freshwater invertebrates. Based on 48-hour measured and derived concentrations, the 48-hour EC_{50} was 0.111 $\mu\text{g}/\text{l}$ which classifies XRD 473 as very highly toxic to *Daphnia magna*. The NOEC could not be determined since sublethal effects or mortality occurred at all exposure concentrations.

D. Adequacy of the Study:

- (1) Classification: Core.
- (2) Rationale: N/A.
- (3) Repairability: N/A.

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes; 4 June 1993.