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SHAUGHNESSEY NO.

REVIEW NO.

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DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. H. Jacoby (21)

PRODUCT NAME(S) Fosetyl - Al

COMPANY NAME Rhone-Poulenc Inc.

SUBMISSION PURPOSE Submission of data for support registration standard

SHAUGHNESSEY NO. 123301 CHEMICAL, & FORMULATION Aluminum tris (0-ethyl phosphonate) § A.I.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 9 1983

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

TO: Henry Jacoby, Product Manager 21
Registration Division, (TS-767c)

THRU: Raymond W. Matheny *RWM*
Head, Section 1
Ecological Effects Branch
Hazard Evaluation Division, (TS-769c)

THRU: Clayton Bushong *CB*
Branch Chief
Ecological Effects Branch
Hazard Evaluation Division, (TS-769c)

SUBJECT: Evaluation of Rainbow Trout and Daphnia magna LC₅₀ studies for
the Registration Standard for Aluminum tris (0-ethyl phosphonate)

As per your Registration Division Data Review Record the subject studies were evaluated and found to meet the guideline requirements. Hence, no further ecological effects data are required for the use patterns covered by this standard.

Dennis J. McLane
Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division, (TS-769c)

DATA EVALUATION RECORD

1. CHEMICAL: Aluminum tris (0-ethyl phosphonate)
2. FORMULATION: Technical 98.39%
3. CITATION: Conzelmann, P. (1983) Acute toxicity bioassay testing Fosetyl-al on rainbow trout, GSRI Project No. 413-B45-41 Gulf South Research Institute, New Iberia, Louisiana, Submitted by Rhone-Poulenc Inc., New Jersey, EPA. No. 359-705, Acc. no. 250499.
4. REVIEWED BY: Dennis J. McLane
Wildlife Biologist
EEB/HED

5. DATE REVIEWED: 8-4-83

6. TEST TYPE: 96-hour LC₅₀ for Rainbow Trout

7. REPORTED RESULTS:

The aquatic bioassay results are summarized below:

Concentrations	96-hour			Confidence Limits	
	<u>LC50</u>	<u>LC16</u>	<u>LC84</u>	<u>Lower</u>	<u>Upper</u>
Peak Height	80.0 ppm	60.5 ppm	105.0 ppm	52.5 ppm	122.0 ppm
Standard Curve	75.8 ppm	58.5 ppm	98.9 ppm	51.4 ppm	111.8 ppm

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound and satisfies the guideline requirements. The LC₅₀ of 75.8 ppm indicates a "slightly toxic" material to rainbow trout.

METHOD AND MATERIALS (excerpted from study)

Test Procedures

"The rainbow trout used were obtained from the Trout Lodge in McMillan Washington and air freighted to GSRI. After transport of the fish to the laboratory they were transferred to four 30 gallon aquaria, each equipped with an undergravel biological filter and a charcoal bubble-up filter. Prior to receipt of the rainbow trout the aquaria were filled with dilution water (buffered deionized/demineralized water) similar to that to be used in the toxicity test. The filtering system was activated and the water temperature was lowered to 12°C.

Fish were observed daily during holding and acclimation for signs of disease, stress, physical damage and mortality. Fish used in either the range finding test or definitive bioassays were taken only from an aquarium which was free of mortalities during the previous 10-14 day acclimation. During acclimation fish were fed a well-balanced diet of Purina trout chow and Tetra-Min tropical fish food in that Trout Lodge failed to provide fingerlings meal as in their normal procedures.

The testing was initiated on February 7, 1983 with a range-finding test at dosed concentrations of 62.5, 125, 250, 500 and 1000 ppm plus a control. One test vessel was set-up for each test level with five rainbow trout per vessel.

On the basis of the range-finding study, a definitive bioassay was started on February 28, 1983, testing dose concentrations of 62.5, 73.3, 83.9, 94.3, 104.4 and 114.3 ppm. The results of the chromatographic analyses of these dosages are presented in Table 4. Four test vessels with five trout per vessel were set-up for each test concentration and the control.

In an attempt to obtain a no effect level in response to the two control deaths, a second definitive bioassay was initiated on March 7, 1983 at dosed concentrations 40.0, 51.4 and 62.5 ppm.

On March 14, 1983 a third bioassay was begun to clarify the confusing results produced by the March 7-11 bioassay. In this bioassay the dosed concentrations tested were 0.4, 20.3, 40.6 and 62.5 ppm."

Statistical Analysis

Litchfield-Wilcoxon method was used to calculate the 96-hour LC₅₀ for both the peak height concentration and standard curve concentration.

Discussion and Results

Feb 7, 1983 Test

"By 24 hours all trout were dead in the four high doses. All trout in the control and 62.5 ppm level survived the duration of the test (96 hours)."

Feb 28, 1983 Test

"At the end of the bioassay (96 hours), all trout had perished in the three high doses, eight (50%) died in the 83.9 ppm level, one (5%) died in each of the 62.5 and 73.3 ppm levels and two (10%) died in the controls."

March 7, 1983 Test

"The results of the chromatographic analysis of these dosages are presented in Table 4. The mortalities in this bioassay were reversed from the expected in that eight (40%) died in the 40.0 ppm level, six (30%) died in the 51.4 ppm level, and five (25%) died in the 62.5 ppm level. All controls survived the test's duration. The results of this bioassay were judged to be erroneous and not included in the LC₅₀ calculations."

March 14, 1983 Test

"The results of the analyses of these dosages are presented in Table 4. At test termination none had perished in the control, 0.38 and 20.3 ppm levels and one died in each of the 40.6 and 62.5 ppm levels.

Peak height concentrations resulted in a 96-hour LC₅₀ of 80.0 ppm with an LC₁₆ of 60.5 ppm and an LC₈₄ of 105.0 ppm. Lower and upper 95% confidence limits were 52.5 and 122.0 ppm, respectively. Standard curve concentrations resulted in a 96-hour LC₅₀ of 75.8 ppm with an LC₁₆ of 58.5 ppm and LC₈₄ of 98.9 ppm. The lower and upper 95% confidence limits for the standard concentrations were 51.4 and 111.8 ppm, respectively."

REVIEWER'S EVALUATION

Test Procedure

The study failed to report the test vessel material. Also, the pH values were very low. The February 28 test obtained values as low as 4.6 at 24 hours for the 114.3 ppm level. The lowest pH for 83.9 level (the highest concentration at which trout survived) was 5.6 ppm.

Statistical Analysis

In order to verify the statistical analysis two Lexitron - EEB calculations were performed. The first was with the February 28, 1983 test results. The binomial method and moving average method produced LC₅₀ values of 88.8 ppm and 82.1 ppm, respectively. The probit method did not produce a goodness of fit probability above .05 and should not be used. Since this data indicated 10% mortality at the control level Abbott's correction was used to compensate for the difference the second calculation performed used this same data with the addition of 20.3 and 40.6 mortality results. Thus, Abbott's correction was not needed. The computer could not determine a probit. After 25 iterations it could still not obtain convergence.

The binomial and moving average methods did provide the following LC₅₀ values 87.8 ppm and 76 ppm, respectively. Based on these two computer calculations this study meets the guideline intent in establishing and LC₅₀ for this material.

Discussion and Results

This study is scientifically sound and satisfies, the guideline requirements. The above discrepancies are not expected to dramatically change the toxicity category of the tested substance.

Conclusion

Category - Core

Rationale - The guideline requirements have been met.

Repairability: N/A

DATA EVALUATION RECORD

1. CHEMICAL: Aluminum tris (0-ethyl phosphonate)
2. FORMULATION: Technical 94.7%
3. CITATION: Spare, W. 1983. The acute toxicity of FOSETYL-AL to Daphnia magna Straus, Biospherics Protocol Number: AQ-103, Biospherics Project Number: 82-E-380 DMR, Submitted by Rhone-Poulenc Inc., New Jersey, EPA, No. 359-705, Acc. no. 250499.
4. REVIEWED BY: Dennis J. McLane
Wildlife Biologist
EEB/HED
5. DATE REVIEWED: 8-3-83
6. TEST TYPE: 48 hour LC₅₀ to Daphnia magna
7. REPORTED RESULTS:
The 48-hour LC₅₀ of 304 mg/l (178-465 mg/l) was calculated by the binomial probability method (Stephan, 1979).
8. REVIEWER'S CONCLUSIONS:
This study is scientifically sound and meets the guideline requirements. The LC₅₀ of 304 mg/l indicates that this material is practically non-toxic" to Daphnia magna.

METHODS AND MATERIALS (excerpted from study)

Test Procedure

"Based on the results of previous testing (See Biospherics Report No. 82-E-380DM), appropriate concentrations were determined for the definitive test. Five nominal concentrations (52, 86.4, 144, 240, and 400 mg/l) and a control were established, with four replicates of each. A 25 mg A.I./ml stock solution was prepared in deionized water. The stock was stirred overnight at room temperature to dissolve the material. Solutions were prepared by adding measured volumes of the stock solution to the water and mixing thoroughly. A bottom flocculent was noted at 400, 240, and 144 mg/l after mixing test material with dilution water. At 86.4 and 52 mg/l a flocculent was noted at 24 hours. Five neonates were randomly introduced into each 250 ml beaker containing 200 ml of test solution."

Statistical Analysis

"The concentration of test material lethal to 50 percent of the test population (LC₅₀) and 95 percent confidence limits were calculated for the 24 and 48 hour exposure period using the binomial probability method (Stephan, 1979). All calculations were based on average measured concentrations of the test material. At 0 time and at 48 hours (24 hours for the highest concentration) a composite sample from all replicates was collected for analysis. The 48 hour sample and the 24 hour sample from the highest concentration were collected without disturbing the bottom flocculent."

Discussion and Results

"The 48 hour LC₅₀ of 304 mg/l (178 - 465 mg/l) was calculated by the binomial probability method (Stephan, 1979). The compound exerted no observable sublethal effect on the daphnids swimming behavior. The 48 hour no observed effect concentration (NOEC) was 178 mg/l. The single mortality at 100 mg/l was considered random and not test material induced. All study raw data and calculations are stored in the project file located in the Biospherics Incorporated Archives."

REVIEWER'S EVALUATION

Test Procedure

The report failed to state the following items:

1. Test vessel material
2. Raw mortality data for exposed and control for each container.

Statistical Analysis

The EEB - Lexitron program was used to verify the reported results. As indicated by Biospherics, of the three methods considered (binomial, moving average, and probit), only the binomial method was appropriate.

Discussion and Results

This material produced an affect on the pH of the test wter.
The pH changes as follows:

Time	Measured Concentration (mg/l)					
	Control	63.7	100	178	277	465
Initial	7.0	7.0	6.5	6.0	5.0	4.8
48 hours	7.0	7.0	6.5	5.8	5.4	4.7a

Normal natural waters will drop to 5.6 pH due to the dissolved carbon dioxide. The guidelines state that satisfactory data should established an LC₅₀ greater than 100 mg/l or greater or and LC₅₀ value with 95 percent confidence intervals. In this case the 100 mg/l was performed at a pH which could be expected in naturally occurring ponds and establishes that the LC₅₀ is above 100 mg/l.

Conclusion

Category - Core

Rationale - The LC₅₀ is above 100 mg/l.

Repairability - N/A