

US EPA ARCHIVE DOCUMENT

## DATA EVALUATION RECORD

1. Chemical: Fosetyl-Al (Aliette)  
Aluminum tris (-O-ethyl phosphonate)
2. Test Material: 98.2% ai
3. Study Type: Acute toxicity for estuarine and marine organisms; 48-hr oyster embryolarvae EC<sub>50</sub>.
4. Study ID:  
Environmental Science and Engineering, Inc. (1985)  
Acute Toxicity of Fosetyl-Al to Embryos and Larvae of the Eastern Oyster (Crassostrea virginica). ESE Report No. 85-314-0200-2130. Submitted by RhonePoulenc Inc., Monmout Junction, NJ. Permit No. SF3267 Accession No. 073641.
5. Reviewed by:  
Thomas Armitage  
Fisheries Biologist  
EEB/HED  
Signature: Thomas Armitage  
Date: 7-27-85
6. Approved by:  
Raymond W. Matheny  
Supervisory Biologist  
EEB/HED  
Signature: Raymond W. Matheny  
Date: 7-22-85
7. Conclusions:  
The study is scientifically sound and with a 48-hr EC<sub>50</sub> = 1.9 ppm (95% ci 1.7 to 2.0), technical Aliette is moderately toxic to (Crassostrea virginica) on an acute basis.  
The study fulfills the guidelines requirement for a 48-hr oyster embryolarvae EC<sub>50</sub> determination.
8. Recommendations: N/A
9. Background:  
The study, a 48-hr EC<sub>50</sub> determination using Crassostrea virginica, was requested by EEB in order to complete a hazard assessment for the use of this product on citrus.
10. Discussion of Individual Test: N/A



11. Materials and Methods:

- a. Test animals - Oyster embryos used to initiate the test were obtained by induced spawning of sexually mature oysters. Adult oysters were obtained from the Horn Point Environmental Laboratory of the University of Maryland. The oysters were maintained in natural seawater at a salinity of 20 to 22 parts per thousand (ppt) and 21 °C prior to spawning. Individual, sexually mature female oysters were induced to spawn by placing them in 1.6 L glass chambers containing 1 L of dilution water at approximately 23 °C, and increasing the water temperature to approximately 30 °C in the presence of viable sperm stripped and/or released from a sexually mature male oyster.
- b. Test system - Test containers were glass Erlenmeyer flasks containing 1 L of test solution. All test concentrations and the controls were triplicated. Test concentrations were prepared by adding weighed portions into 3 L volumes of natural seawater, mixing, and splitting solutions into triplicate test containers. Each test container was inoculated with an estimated 17,200 embryos within 1 hr after fertilization and then maintained at 22 + 1 °C under fluorescent lighting on a photoperiod of 14 hrs light and 10 hrs dark. After 48 hrs of exposure, 10 ml samples were collected by automatic pipette while agitating, and larvae preserved with .4 ml of buffered formalin. The number of normally developed 48-hr larvae was determined by a Sedgewick-Rafter count from each triplicate test and control container.
- c. Dose - Static bioassay. Samples for confirmation of test concentrations were collected at test initiation and termination. Initial samples (15 ml) were collected from prepared 3 L volumes prior to dividing into triplicate flasks. Five ml samples were collected from each triplicate flask and composited at test termination. Seawater samples were treated with barium chloride to precipitate chloride. Samples were filtered and then analyzed on an ion chromatograph using an anion column and low strength eluent with a conductivity detector.
- d. Design - Static bioassay using 6 dose levels plus control (.78, 1.3, 2.2, 3.6, 6.0, and 10.0 ppm). The measured concentrations as percent of nominal concentrations ranged from 85 to 109 percent.

- e. Statistics - A computer program (Stephan, 1982), calculated the EC<sub>50</sub> value by moving average angle analysis, probit analysis, and binomial probability. The EC<sub>50</sub> reported by the authors was calculated using the moving average angle method.

12. Reported Results:

The study authors found that fosetyl-Al was acutely toxic to embryos and larvae at test concentrations of  $\geq 2.02$  ppm. The percentage reduction of normal larvae after 48 hrs of exposure ranged from 2 percent in .66 ppm to 100 percent in test concentrations  $\geq 6.52$  parts per million. A 7 percent increase in the number of normal larvae was observed in 1.30 parts per million. The 48-hr EC<sub>50</sub> was 1.9 ppm with 95 percent confidence limits of 1.7 to 2.0 parts per million.

13. Study Author's Conclusions/QA Measures

48-hr EC<sub>50</sub> = 1.9 ppm (95% ci = 1.7 - 2.0)

"The test data were reviewed by the Quality Assurance Unit to assure that the standard operating procedures and protocol used in the conduct of this test were followed. This report is an accurate reflection of the raw data."

14. Reviewer's Discussion and Interpretation of the Study

- a. Test procedures: The procedures followed were generally in accordance with protocol recommended by the guidelines. The following exceptions are noted. It is recommended that 20,000 to 30,000 oyster larvae per liter should be tested at each level. Test containers in this study were inoculated with an estimated 17,200 embryos/liter. Continuous monitoring of temperature was not conducted during the test, and not the 2 days specified by the protocol. These deviations from protocol are not expected to invalidate experimental results.
- b. Statistical Analysis: EEB statistical analysis (results attached) confirms the authors reported conclusion.
- c. Discussion/Results: With a 48-hr EC<sub>50</sub> = 1.9 ppm (95% ci 1.7 to 2.0), technical aliette is moderately toxic to Crassostrea virginica.
- d. Adequacy of Study
  - 1. Classification: Core for technical Alette.
  - 2. Rationale: Study is scientifically sound and was conducted in accordance with accepted protocol.
  - 3. Repairability: N/A

15. Completion of One-Liner for Study:

One-liner completed July 12, 1985.

16. CBI Appendix: N/A

ARMITAGE ALIETTE OYSTER EMBRYOLARVAE 48-HR EC50

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CON.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
10.1	15733	15733	100	0
6.52	15733	15733	100	0
3.62	16700	16633	99.5988	0
2.02	15882	13182	82.9996	0
1.3	15731	0	0	0
.66	15742	314	1.99466	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.75767

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	5.82042E-05	1.84667	1.83602 1.85737

RESULTS CALCULATED USING THE PROBIT METHOD

INTERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	5.5819	46244.6	0

A PROBABILITY OF 0 MEANS THAT IT LESS THAN 0.001.

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 9.52123  
 95 PERCENT CONFIDENCE LIMITS = -38.6358 AND 57.6782

LC50 = 1.72859  
 95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 1.27147  
 95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

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