

US EPA ARCHIVE DOCUMENT

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Record No.

128825  
Shaughnessey No.

                      
Review No.

EEB REVIEW

DATE: IN 11-18-87 OUT 09-29-88

FILE NUMBER 279-3055

DATE OF SUBMISSION 10-22-87

DATE RECEIVED BY HED 11-18-87

RD REQUESTED COMPLETION DATE 01-29-88

EEB ESTIMATED COMPLETION DATE 01-29-88

RD ACTION CODE 331

TYPE PRODUCT Insecticide (synthetic pyrethroid)

DATA ACCESSION NO. 403835-01

PRODUCT MANAGER G. LaRocca (15)

PRODUCT NAME Bifenthrin

COMPANY NAME FMC

SUBMISSION PURPOSE Supplementary study addressing effects  
on oyster embryo-larvae

SHAUGHNESSEY NO. CHEMICAL %AI

128822 bifenthrin

ECOLOGICAL EFFECTS BRANCH REVIEW

Bifenthrin  
Diflubenzuron

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

The registrant has submitted an estuarine mollusc acute toxicity test to support pending registration.

101 Hazard Assessment

101.4 Acceptability of Data

The registrant has submitted an estuarine mollusc acute toxicity test (48-hr embryo-larvae EC50) [EPA Accession No. 403835-01] in response to data requests previously made by the Ecological Effects Branch. The submitted study is determined to be acceptable and does fulfill the Guidelines requirement for an acute estuarine mollusc toxicity test. An EC50 of 285 ppb is sufficient to characterize bifenthrin as highly toxic to molluscs.

103 Conclusion

The Ecological Effects Branch has reviewed the submitted estuarine mollusc acute toxicity test and has determined that it is acceptable.

*LTJ* 9-24-88  
Les Touart, Fisheries Biologist  
Section 1  
Ecological Effect Branch  
Environmental Fate and Effects Division

Raymond Matheny, Head *Raymond W. Matheny* 9/29/88  
Section 1  
Ecological Effects Branch  
Environmental Fate and Effects Division

*James W. Akerman* 10/3/88  
James W. Akerman, Chief  
Ecological Effect Branch  
Environmental Fate and Effects Division

DATA EVALUATION RECORD

1. CHEMICAL: Bifenthrin
2. TEST MATERIAL: 88.35% a.i. technical
3. TEST TYPE: Eastern oyster embryo-larvae toxicity test
4. STUDY IDENTIFICATION: Ward, G. S. and E. V. Dose. (1987)  
Acute toxicity of FMC 54800 Technical to embryos and larvae of the Eastern oyster (Crassostrea virginica). Unpublished report prepared by Environmental Science and Engineering, Inc. for FMC Corporation. [EPA Accession No. 403835-01]
5. REVIEWED BY:  
Les Touart  
Fisheries Biologist  
Ecological Effects Branch  
Signature:   
Date: 7-27-88
6. APPROVED BY:  
Raymond Matheny  
Supervisory Biologist  
Ecological Effects Branch  
Signature:   
Date: 9/29/88
7. CONCLUSIONS:  
The study is acceptable and it fulfills the Guidelines requirement for an estuarine mollusc acute toxicity test. The 48-hr EC50 was estimated to be 285 ppb.
8. RECOMMENDATIONS: N/A
9. BACKGROUND:
10. DISCUSSION OF INDIVIDUAL TESTS: N/A

11. METHODS AND MATERIALS:

A. Test Organisms: Eastern oyster, Crassostrea virginica

Age/Size at test initiation: embryos

Source: University of Maryland, Horn Point Environmental  
Laboratory

B. Dosage Form:

Solvents/Vehicles: acetone

C. Referenced Protocol:

Test Levels: 0.77, 1.3, 2.2, 3.6, 6.0, 10 and 17 ppm  
nominal with appropriate controls.  
Measured test concentrations included  
<0.0235, 0.126, 0.448, 2.265, 1.490, 1.895 and  
1.995 ppm.

Number per level: 20,370/replicate, 3 replicates/level

Temperature: 22 ± 1 degrees C

Dissolved Oxygen: 6.5 - 7.4 ppm

pH: 8.0 - 8.3

Salinity: 19 ppt

Source of Dilution Water: filtered natural seawater diluted  
with well water

Test Vessels/Test System: 1 liter glass beakers

Aeration: none

Photoperiod: 16 hrs. light

Observation period: 48 hours

Statistical Methods: EC50 estimated by graphical  
interpolation

12. REPORTED RESULTS:

Refer to the attached table.

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:

"48-hour EC50 was 0.285 mg/L"

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY:

A. Test Procedures: The methods used were generally consistent with recommended procedures.

B. Statistical Analysis: N/A

C. Discussion/Results: The data generally support the conclusions drawn.

D. Adequacy of Test:

1. Validation Category: Core

2. Rationale: N/A

3. Repairability: N/A

15. COMPLETION OF ONE-LINER FOR TEST

Table 3-1. Measured Concentrations of FMC 54800 Technical During a 48-Hour Exposure of Embryos and Larvae of the Eastern Oyster (*Crassostrea virginica*)

Nominal concentrations (mg/L; ppm)	Measured Concentrations (mg/L; ppm)			Percent of nominal
	Day 0	Day 2	Average	
0.77	<0.0235	<0.0221	<0.0235	3
1.3	0.142	0.111	0.126	10
2.2	0.441	0.455	0.448	20
3.6	2.410	2.120	2.265	63
6.0	1.450	1.530	1.490	25
10	1.830	1.960	1.895	19
17	1.500	2.490	1.995	12
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dilution Water	<0.0235		<0.0235	
.091 (Control Spike A)	0.090	---	0.090	99
.091 (Control Spike B)	0.103	---	0.103	113
.091 (Matrix)	0.108	---	0.108	119

Source: ESE, 1987.

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Table 3-2. Number of Normally Developed Larvae After 48 Hours of Exposure to FMC 54800 Technical and Percentage Reduction as Compared to the Solvent Control

Measured Concentrations (mg/L; ppm)	Mean Number of Normal Larvae		Percentage Reduction of Normal 48-Hour Larvae (%)
	Mean	SD*	
Control	16,600	1,840	+5
Solvent Control	15,800	1,290	---
<0.0235	17,100	2,770	+8
0.126	13,100	2,040	-17
0.448	3,690	1,750	-77 <sup>a</sup>
2.265	3,330	1,960	-79 <sup>a</sup>
1.490	1,920	1,510	-88 <sup>a</sup>
1.895	750	874	-95 <sup>a</sup>
1.995	0	--	-100 <sup>a</sup>

\*SD = Standard deviation.

<sup>a</sup>Statistically different ( $p \geq 0.95$ ) than the solvent control.

Source: ESE, 1987.

Touart Capture Eastern oyster 09-29-88

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1.995	100	100	100	0
1.895	100	95	95	0
1.49	100	88	88	0
.448	100	77	77	0
.126	100	17	17	0
.0235	100	0	0	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 .2557306

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	1.042386E-02		.2904476	.248041

3381613

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.1622128	4.67207	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

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

SLOPE = 2.27327  
95 PERCENT CONFIDENCE LIMITS = 1.357695 AND 3.188844

LC50 = .2950626  
95 PERCENT CONFIDENCE LIMITS = .1576649 AND .4699919

LC10 = 8.151686E-02  
95 PERCENT CONFIDENCE LIMITS = 2.237016E-02 AND .1536329

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