

US EPA ARCHIVE DOCUMENT

Cypermethrin file copy

DP Barcode : D181929  
PC Code No : 129064 & 109702  
EEB Out : JAN 24 1994

To: George LaRocca  
Product Manager 23  
Registration Division (H7505C)

From: Anthony F. Maciorowski, Chief  
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 279-3124  
Chemical Name : Cypermethrin and zeta cypermethrin  
Type Product : Insecticide - Synthetic Pyrethroid  
Product Name : Fury Technical  
Company Name : FMC Corporation  
Purpose : Review study conducted with cypermethrin (109702)  
and zetacypermethrin (129064)

Action Code : 575 Date Due : 04/15/94  
Reviewer : Renee Lamb

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)	424446-01	Y	122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(C)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur

P=Partial (Study partially fulfilled Guideline but additional information is needed)

S=Supplemental (Study provided useful information but Guideline was not satisfied)

N=Unacceptable (Study was rejected)/Nonconcur

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

JAN 24 1994

MEMORANDUM

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

**Subject:** Data review for Cypermethrin minus (129064) and  
Cypermethrin (109702)

**From:** Anthony F. Maciorowski, Branch Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7507C)

**To:** George LaRocca, PM 13  
Registration Division (H7505C)

The Ecological Effects Branch (EEB) has completed its review of the study submitted by FMC Corporation for Cypermethrin (109702) and Cypermethrin minus (129064). The study was submitted in order to compare cypermethrin minus with cypermethrin. The following is a summary of the data reviewed:

**CITATION:** Ward, Timothy J., Robert L. Boeri, and Mark A Palmieri. 1992. Acute toxicity of FMC 56701 Technical and Cypermethrin Technical to the Mysid, Mysidopsis bahia. FMC study number A91-3454. Submitted by FMC Corporation. Performed by EnviroSystems Division, Resource Analysts, Inc. Hampton, New Hampshire. MRID No. 424446-01.

**CONCLUSIONS:** Although there was contamination of the control vessels in the cypermethrin test, this study appears to be scientifically sound and fulfills the guideline requirement for a 96 hour acute toxicity study with the mysid shrimp. Since this study is being used as a comparison between the toxicity of cypermethrin and zeta cypermethrin, the LC<sub>50</sub> values are unlikely to change significantly in a new study. The reported LC<sub>50</sub> value for FMC 56701 and cypermethrin based on measured concentrations was 5 ng/L for both, and the NOEC was 2.5 ng/L and 3.9 ng/L, respectively. Therefore, both cypermethrin and zetacypermethrin (FMC 56701) are classified as very highly toxic to estuarine organisms.

If there are any questions, contact Renee Lamb at 305-5294.



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DP BARCODE: D181929

CASE: 048940  
SUBMISSION: S424231

DATA PACKAGE RECORD  
BEAN SHEET

DATE: 08/25/92  
Page 1 of 1

\* \* \* CASE/SUBMISSION INFORMATION \* \* \*

CASE TYPE: REGISTRATION ACTION: 575 CON REG FLW-UP DAT REQ HE  
CHEMICALS: 129064 Cyano(3-phenoxyphenyl) methyl(+/-) cis/trans 3-(2, 88.0000%

ID#: 000279-03124 FURY TECHNICAL  
COMPANY: 000279 FMC CORP.  
PRODUCT MANAGER: 13 GEORGE LARocca 703-305-6100 ROOM: CM2 204  
PM TEAM REVIEWER: ADAM HEYWARD 703-305-5021 ROOM: CM2 202  
RECEIVED DATE: 08/19/92 DUE OUT DATE: 12/07/92

\* \* \* DATA PACKAGE INFORMATION \* \* \*

DP BARCODE: 181929 EXPEDITE: N DATE SENT: 08/25/92 DATE RET.: / /  
CHEMICAL: 129064 Cyano(3-phenoxyphenyl) methyl(+/-) cis/trans 3-(2,2-dichloro  
DP TYPE: 001 Submission Related Data Package  
ADMIN DUE DATE: 11/03/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	08/26/92	/ /
BRAN: EEB	08/26/92	/ /
SECT: RS1	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

\* \* \* DATA REVIEW INSTRUCTIONS \* \* \*

Please review the attached ecological effects data (Mysid Shrimp)(GRN 72-3)(MRID Number 424446-01) submitted in support of the conditional registration of cypermethrin-s on cotton, lettuce and pecans.

\* \* \* ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION \* \* \*

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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## DATA EVALUATION RECORD

1. **CHEMICAL:** FMC 56701, Zetacypermethrin Shaughnessey Number: 129064; Cypermethrin Shaughnessey Number: 109702
2. **TEST MATERIAL:** Zetacypermethrin, 88.2% a.i., a viscous brown liquid; cypermethrin, 95.9% a.i., a viscous amber liquid.
3. **STUDY TYPE:** Acute toxicity of FMC 56701 Technical and Cypermethrin Technical to the mysid shrimp (Mysidopsis bahia)
4. **CITATION:** Ward, Timothy J., Robert L. Boeri, and Mark A Palmieri. 1992. Acute toxicity of FMC 56701 Technical and Cypermethrin Technical to the Mysid, Mysidopsis bahia. FMC study number A91-3454. Submitted by FMC Corporation. Performed by EnviroSystems Division, Resource Analysts, Inc. Hampton, New Hampshire. MRID No. 424446-01.
5. **REVIEWED BY:**  
 Renee Lamb  
 Biologist  
 EFED/EEB (H7507C)  
 Signature: *Renee Lamb*  
 Date: 9/30/92
6. **APPROVED BY:**  
 Ann Stavola  
 Section Head Section 5  
 EFED/EEB (H7507C)  
 Signature: *Ann Stavola*  
 Date: 1/21/94
7. **CONCLUSIONS:** Although there was contamination of the control vessels in the cypermethrin test, this study appears to be scientifically sound and fulfills the guideline requirement for a 96 hour acute toxicity study with the mysid shrimp. Since this study is being used as a comparison between the toxicity of cypermethrin and zeta cypermethrin, the LC<sub>50</sub> values are unlikely to change significantly in a new study. The reported LC<sub>50</sub> value for FMC 56701 and cypermethrin based on measured concentrations was 5 ng/L for both, and the NOEC was 2.5 ng/L and 3.9 ng/L, respectively. Therefore, both cypermethrin and zetacypermethrin (FMC 56701) are classified as very highly toxic to estuarine organisms.
8. **RECOMMENDATIONS:** N/A
9. **BACKGROUND:** This study is submitted in order to compare the toxicity of zetacypermethrin (129064) to cypermethrin (109702) to the mysid shrimp. This test replaces a previous study (MRID No. 419682-10) in which contamination of the

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control solution with test materials was experienced.

10. DISCUSSION OF INDIVIDUAL TESTS: N/A

11. MATERIALS AND METHODS:

- A. TEST ANIMALS: Juvenile mysids (<24 hr old at start of the test) from a single source.  
Acclimation: 14 days for the mysid cultures  
FMC 56701 - 24.6 - 24.7°C, DO > 7.3 mg/L.  
Cypermethrin - 20.5 - 20.9°C, DO > 7.7 mg/L.
- B. TEST SYSTEM: Temperature: 22 ± 1°C. Salinity: 11-17 ppt. Test chambers: 20-L glass aquaria containing 15 liters of test solution (water depth ≈ 18 cm). Randomly arranged in a water bath.  
Photoperiod: 16 hour light/8 hour dark.  
Diluter: Intermittent flow proportional; FMC 56701 - average of 5.8 media exchanges per 24 hours; Cypermethrin - average of 6.0 media exchanges per 24 hours, in each vessel. Aeration was not required.
- C. DOSAGE: The diluter was calibrated to deliver nominal concentrations of 3.75, 6.25, 10, 15, and 25 ng/L. There was a dilution water and a solvent (acetone) control.
- D. DESIGN: Twenty mysids were indiscriminately and equally distributed among two replicates of each treatment until each concentration contained 20 organisms.
- The number of dead organisms and the occurrence of sublethal effects were noted at 0, 24, 48, 72, and 96 hours. Dead organisms were removed when observed.
- Test concentrations were measured at 0, 48 and 96 hours.
- DO, pH, salinity and temperature were recorded daily in each chamber containing live animals. Temperature in one vessel was recorded continuously during each test.
- E. STATISTICS: Standard statistical procedures were used to determine the LC<sub>50</sub> values.

12. REPORTED RESULTS: No precipitate was observed in test vessels during either test, with the exception of the highest concentration during the cypermethrin test (appeared slightly golden colored at 48 hours). Mean measured concentrations of FMC 56701 were 1.6, 2.5, 3.5, 4.8, and 9.9 ng/L and of cypermethrin were 3.1, 3.9, 4.5, 6.0, and 10.0 ng/L (Table 2 and 3).

  
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Despite preventative measures, such as a closed system and changes to sample analysis and diluter design, there was slight test material contamination in the cypermethrin test. This contamination occurred primarily in the samples taken at 48 hours and averaged 1.2 ng/L in the control and 1.3 ng/L in the solvent control, levels which are less than one-half of the lowest mean measured concentration and barely above the detection limit of 1.0 ng/L (Table A.1 and A.2). The contamination had no apparent biological consequences (Table 5). Survival was 95% or greater in the control groups and the first two treatment levels.

Biological and water quality data are presented in Tables 4, 5, B.1 and B.2. Control mysids had an average wet weight of 2 mg to 4 mg. Maximum loading rate during either test was  $\approx$  3 mg/L.

Exposure of mysids to FMC 56701 resulted in a 96 hour  $LC_{50}$  of 5 ng/L (4 - 6 g/L); exposure of mysids to cypermethrin resulted in a 96 hour  $LC_{50}$  of 5 ng/L (5 - 6 g/L), based on measured concentrations. The NOEC is 2.5 ng/L for FMC 56701 and 3.9 ng/L for cypermethrin (measured concentrations). The ratio in the acute 96 hour  $LC_{50}$  values based on the measured concentrations was 1.0. Nominal and measured  $LC_{50}$  values are presented in Tables 6 and 7, respectively.

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

The report has a quality assurance statement signed by a quality assurance officer.

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

A. **TEST PROCEDURE:** This test is in accordance with EPA's SEP protocol with the following exception:

○ There was contamination of the controls in the cypermethrin test.

B. **STATISTICAL ANALYSIS:** The mortality data was analyzed using EEB's Toxanal program.

C. **DISCUSSION/RESULTS:** Although there was contamination of the control vessels in the cypermethrin test, this study appears to be scientifically sound and fulfills the guideline requirement for a 96 hour acute toxicity study with the mysid shrimp. Since this study is being used as a comparison between the toxicity of cypermethrin and zeta cypermethrin, the  $LC_{50}$  values are unlikely to change significantly in a new study. The study author's calculated  $LC_{50}$  value for FMC 56701 and cypermethrin are slightly different than the reviewer's calculations (see attached), the difference ( $< 1$ ) is

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irrelevant in that this is a comparison of toxicities. The reported LC<sub>50</sub> value for FMC 56701 and cypermethrin based on measured concentrations was 5 ng/L for both, and the NOEC was 2.5 ng/L and 3.9 ng/L, respectively. Therefore, both cypermethrin and zetacypermethrin (FMC 56701) are classified as very highly toxic to estuarine organisms.

**D. ADEQUACY OF STUDY:**

- (1) CLASSIFICATION: core
- (2) RATIONALE: N/A
- (3) REPAIRABILITY: N/A

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r lamb FMC 56701 MYSID

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB: (PERCENT)
9.899999		20	17	85
.1288414				
4.8	20	12	60.00001	25.17223
3.5	20	4	20	.5908966
2.5	20	0	0	9.536742E-05
1.6	20	1	5	2.002716E-03

THE BINOMIAL TEST SHOWS THAT 3.5 AND 9.899999 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 4.450351

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.2084196	4.819006	3.702098	5.95717

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
4	.1180313	1

GOODNESS OF FIT PROBABILITY  
.126957

SLOPE = 4.218153  
95 PERCENT CONFIDENCE LIMITS = 2.768978 AND 5.667328

LC50 = 5.132855  
95 PERCENT CONFIDENCE LIMITS = 4.327592 AND 6.394686

LC10 = 2.566135  
95 PERCENT CONFIDENCE LIMITS = 1.831476 AND 3.137039

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r lamb CYPERMETHRIN MYSID

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
10.3	20	20	100	9.536742E-05
6	20	13	65	13.1588
4.5	20	5	25	2.069473
3.9	20	1	5	2.002716E-03
3.1	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 4.5 AND 10.3 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 5.396441

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RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	8.448128E-02		5.568876	5.094919
6.162673				

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
GOODNESS OF FIT PROBABILITY		
5	.152655	1
.8837358		

SLOPE = 10.57668  
95 PERCENT CONFIDENCE LIMITS = 6.444257 AND 14.70911

LC50 = 5.417073  
95 PERCENT CONFIDENCE LIMITS = 4.996598 AND 6.074492

LC10 = 4.108556  
95 PERCENT CONFIDENCE LIMITS = 3.520322 AND 4.489378

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# Cypermethrin Review

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Page \_\_\_\_\_ is not included in this copy.

Pages 10 through 20 are not included in this copy.

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The material not included contains the following type of information:

- \_\_\_\_\_ Identity of product inert ingredients.
  - \_\_\_\_\_ Identity of product impurities.
  - \_\_\_\_\_ Description of the product manufacturing process.
  - \_\_\_\_\_ Description of quality control procedures.
  - \_\_\_\_\_ Identity of the source of product ingredients.
  - \_\_\_\_\_ Sales or other commercial/financial information.
  - \_\_\_\_\_ A draft product label.
  - \_\_\_\_\_ The product confidential statement of formula.
  - \_\_\_\_\_ Information about a pending registration action.
  - \_\_\_\_\_ FIFRA registration data.
  - \_\_\_\_\_ The document is a duplicate of page(s) \_\_\_\_\_.
  - \_\_\_\_\_ The document is not responsive to the request.
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The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

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