Shaughnessy No.: 109702

Date Out EAB: DEC - 4 1985

Signature:

TO: George Larocca
Product Manager #15
Registration Division (TS-767C)

FROM: Emil Regelman, Acting Chief
Review Section 3
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Attached please find the EAB Review of...

Reg./File No.: 10182-65

Chemical Name: Cypermethrin

Type Product: Insecticide

Product Name: Ammo; Cymbush 3E

Company Name: FMC Corporation

Purpose : Review/Evaluation field dissipation study; New uses, registration for cabbage and lettuce

ACTION CODE(s): 310

Date Received: 9/25/85

Date Completed: 11/26/85

Monitoring requested:

Monitoring voluntarily Done:

EAB # (s): 5746; 5961; 5957

TAIS Code: 61;65

Total Reviewing Time: 4.0 Day

Deferrals To:

_____ Ecological Effects Branch

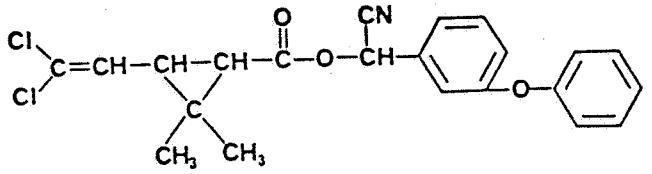
_____ Residue Chemistry Branch

_____ Toxicology Branch

1.0 Chemical:

Common Name: Cypermethrin
± a Cyano - 3 - phenoxybenzyl (±) cis, trans, 3 - (2,2 ± dichlorovinyl)- 2,2 - dimethylcyclopropanecarboxylate

1.1 Trade Name: Cymbush; Ammo (insecticide)



2.0 TEST MATERIAL:

Cypermethrin (2.5 lb/gal. E.C.) Ammo

3.0 STUDY/ACTION TYPE:

Addendum to cypermethrin for purpose of filling data gaps

4.0 STUDY INDENTIFICATION:

STUDY 1

Sterns, J.W. 1985a. Dissipation of cyperamide and m-phenoxybenzaldehyde residues in soils treated with ammo insecticide. RAN-0149. FMC Corporation, Agricultural Chemical Group, Philadelphia, PA.

Sterns, J.W. 1985b. Dissipation of cypermethrin, dichlorovinyl acid, and m-phenoxybenzoic acid residues in soil RAN-0148. FMC Corporation, Agricultural Chemical Group, Philadelphia, PA.

Two reports were combined into one review because they contain information about the same field dissipation studies. One report (Sterns, 1985b) contains information about the decline of cypermethrin and formation and decline of two degradates; the second report (Sterns, 1985a) contains information about two additional degradates.

5.0 REVIEWED BY:

John H. Jordan, Ph.D.
Microbiologist
EAB/HED/OPP

Signature John H. Jordan

Date December 4, 1985

6.0 APPROVED BY:

Emil Regelman
Acting Chief, Review Section 3
EAB/HED/OPP

Signature E Regelman

Date DEC - 4 1985

7.0 CONCLUSION:

The terrestrial field dissipation requirement has been satisfied by the study in section number 4.

a. According to EFB Action # 4148 (279 - GNET) of April 2, 1984, Ammo (2.5 lb/gal E.C.) data submitted previously and accepted by EAB in support of cypermethrin registration include:

5/14/81 Hydrolysis	4/29/82 Fish accumulation
4/29/82 Photolysis	4/29/82 Aerobic aquatic metabolism
5/14/81 Aerobic soil metabolism	4/29/82 Anaerobic aquatic metabolism
5/14/81 Anaerobic soil metabolism	5/14/82 Rotational crop*
5/14/81 Leaching	4/29/82 Adsorption/ desorption

*Not acceptable for sweet corn in Florida.

For the present use pattern, the data indicate that volatility, re-entry, and groundwater contamination are not potential problems; however, the Agency reserves the right to require additional data.

8.0 RECOMMENDATIONS:

Registration can be granted for the registrant's specific request:

1) cabbage-10182-65
2) lettuce-10182-65

9.0 BACKGROUND:

Purpose of submission by FMC Corporation is registration of cypermethrin for use on cabbage and lettuce (new uses), and submission of additional data (field dissipation) to fill data gap. Previous reviews pertaining to registration are referenced in section 4, above.

The rotation crop data are not adequate to support use on sweet corn in Florida because of the additional number of applications (23) required.

A letter is on file from ICI Americas, Inc. authorizing the use of their data to support the registration application of FMC Corporation.

10. DISCUSSION OF INDIVIDUAL TESTS:

The study is referenced in section 4, and details of the methods, results, conclusions are in the Dynamac report attached, TASK I- November 15, 1985.

11. COMPLETION OF ONE-LINER:

A one-liner has been initiated.

12. CBI APPENDIX:

No CBI involved in this section except the hard copies

DYNAMAC
CORPORATION

CYPERMETHRIN

Final Report

Task 1: Review and Evaluation of Individual Studies

Contract No. 68-01-6679

NOVEMBER 15, 1985

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
Enviro Control Division
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

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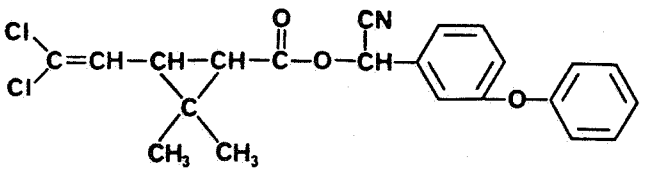
CYPERMETHRIN

AMMO, BARRICADE, CCN52, CYMBUSH, CYPERKILL, FOLCORD, IMPERATOR, KAFIL SUPER, NRDC 149, PP383, SIPERIN, RIPCORD



± α Cyano-3-phenoxybenzyl (±) cis, trans, 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate

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Two reports were combined into one review because they contain information about the same field dissipation studies. One report (Sterns, 1985b) contains information about the decline of cypermethrin and formation and decline of two degradates; the second report (Sterns, 1985a) contains information about two additional degradates.

CONCLUSIONS:

Field Dissipation - Terrestrial

1. This study is scientifically valid.

2. Cypermethrin (2.5 lb/gal EC), at 2.0 lb ai/A, dissipated with a half-life of 7-30 days in the upper 6 inches of loam soils located in California and Arkansas; cypermethrin was $\leq$0.15 ppm in the 6- to 12-inch depth and did not appear to leach. The degradates cyperamide, dichlorovinyl acid, m-phenoxybenzoic acid, and m-phenoxybenzaldehyde were $\leq$0.04 ppm at all sampling intervals.

3. This study fulfills EPA Data Requirements for Registering Pesticides by providing information on the dissipation of cypermethrin under field conditions.

MATERIALS AND METHODS:

Cypermethrin (Ammo, 2.5 lb/gal EC) was applied at 2.0 lb ai/A to unvegetated field plots of loam soil (29.0% sand, 50.0% silt, 21.0% clay, 0.9% organic matter, CEC 20 meq/100 g) located near Davis, California, on August 28, 1984, and unvegetated field plots of loam soil (30.9% sand, 46.7% silt, 22.4% clay, 0.9% organic matter, CEC 6.6 meq/100 g) located near Marion, Arkansas, on September 12, 1984 (field plots not further characterized). Soil samples (0- to 6- and 6- to 12-inch depth) were taken approximately 0, 7, 14, 30, 60, and 90 days posttreatment, and stored at -18 C until analysis.

The soil was mixed throughly, and a subsample was extracted twice with hexane:acetone (1:1, v:v) for ~5 minutes in a blender. The extracts were filtered, combined, and partitioned with water. The water phase was extracted with hexane, and the hexane was combined with the hexane:acetone phase. The extracted water was discarded. The hexane:acetone was filtered through anhydrous sodium sulfate, then eluted through an activated Florisil column with hexane:methyl-t-butyl ether (85:15, v:v). The eluate was analyzed for cypermethrin using a GC equipped with a ^{63}Ni electron capture detector.

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The remaining soil was mixed with methanol:water (1:1, v:v) for 5 minutes in a blender and then filtered. The extract was adjusted to pH 8.3 with sodium hydroxide and partitioned twice with methylene chloride.

The methylene chloride fractions were combined, and an aliquot was extracted with 0.01 N sodium hydroxide. The resulting aqueous phase was concentrated, refluxed with 1.0 N hydrochloric acid for one hour, cooled, and eluted through a Baker-10 Octadecyl (C 18) column with methylene chloride. The sample was derivatized, eluted through an activated Florisil column with hexane:ether (9:1, v:v), concentrated, and diluted with hexane. The sample was analyzed for dichlorovinyl acid and m-phenoxybenzoic acid using a GC equipped with a MS detector. The remaining methylene chloride fraction from the original partitioning step was dried with anhydrous sodium sulfate, concentrated, and redissolved in ethyl acetate. The sample was filtered through a Darco G60:Attaclay (1:5) column, concentrated, and analyzed for cyperamide using a GC equipped with a ^{63}Ni electron capture detector.

The aqueous fractions from the original partitioning step were combined, concentrated, and acidified with hydrochloric acid. The acidified sample was refluxed for one hour, cooled, and eluted through a Baker-10 Octadecyl (C 18) column with methylene chloride. The sample was derivatized, eluted through an activated Florisil column with hexane:ether (9:1, v:v), concentrated, and redissolved in hexane. The sample was analyzed for m-phenoxybenzaldehyde using a GC equipped with a MS detector. Recoveries from fortified soil samples averaged 86% for cypermethrin, 77% for cis-dichlorovinyl acid, 83% for trans-dichlorovinyl acid, 78% for m-phenoxybenzoic acid, 82% for cyperamide, and 87% for m-phenoxybenzaldehyde. The detection limit was 0.01 ppm.

REPORTED RESULTS:

Rainfall amounts and average daily temperatures for the two locations are presented in Table 1.

Cypermethrin, at 2.0 lb ai/A, dissipated with a half-life of 7-30 days in the upper 6 inches of the two loam soils; it was <0.15 ppm in the 6- to 12-inch depth of soil at all sampling intervals (Table 2). Dichlorovinyl acid (cis and trans), m-phenoxybenzoic acid, and cyperamide were each <0.04 ppm at all sampling intervals; m-phenoxybenzaldehyde was not detected (<0.01 ppm) during the study.

DISCUSSION:

1. Field test data, such as plot size, slope of the fields, and depth of the water table, were incomplete.

2. The pH of the soil was not specified.

3. The soils, which were described in the hardcopies as loam-silt loam and silt loam soils, are loam soils according to the USDA textural classification system and are referred to as such in this report.

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4. The study was not conducted according to actual use conditions. Cypermethrin was applied to bare soil and the plots remained unvegetated during the study, although the study was designed to fulfill data requirements for dissipation with terrestrial food crops such as soybeans, lettuce, corn, cabbage, pecans, cotton, and sunflowers.

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Table 1. Meteorological data.

Interval following treatment (days)	Rainfall during interval (inches)	Temperature (F)
	Davis, California	
0-8	0.21	76
9-17	0	77
18-30	0.04	74
31-58	0.59	62
	Marion, Arkansas	
0-7	0.11	69
8-14	0.97	70
15-29	2.14	65
30-59	8.53	64
60-90	6.30	43

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30-59	8.53	64
60-90	6.30	43

Table 2. Cypermethrin in loam soils located in California and Arkansas that were treated with cypermethrin (2.5 lb/gal EC) at 2.0 lb ai/A.[a]

Sampling interval (days)	Sampling depth (inches)	
	0-6	6-12
	Davis, California	
0	1.22	0.12
8	0.73	0.06
17	0.95	0.01
30	0.37	0.05
58	0.30	0.03
89	0.33	ND[b]
	Marion, Arkansas	
0	1.00	0.08
7	0.42	0.06
14	0.62	ND
29	0.43	ND
59	0.18	ND
90	0.16	ND

[a] Average of duplicate samples.

[b] Not detected, detection limit was 0.01 ppm.

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