

US EPA ARCHIVE DOCUMENT

FILE

109702

Date Out EAB: 23 OCT 1984

TO: T. Gardner/Heyward
Product Manager 17
Registration Division
TS-767

FROM: Samuel Creeger, Chief *SC*
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division

Attached please find the environmental fate review of:

Reg./File No.: 279-3027

Chemical: Cypermethrin

Type Product: Insecticide

Product Name: Ammo[®] 2.5 EC

Company Name: FMC Corporation

Submission Purpose: Review field dissipation studies

ZBB Code: Other

ACTION CODE: 450

Date in: 7/10/74

EFB # 4452

Date Completed: 1/23/84

TAIS (level II) Days

63 1

Deferrals To:

- Ecological Effects Branch
- Residue Chemistry Branch
- Toxicology Branch

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1.0 INTRODUCTION

FMC Corporation has submitted a field dissipation study to comply with a requirement of the conditional registration of Ammo[®] 2.5 EC Insecticide (cypermethrin, as a. i) for use on cotton. The initial EAB review dated 4/29/82 recommended for conditional registration provided the registrant submit a field dissipation study which would identify the formation and decline of cypermethrin degradation products, 3-phenoxybenzoic acid (3-PBAcid) and DCVA. Subsequent reviews recommended that additional uses not be registered until this study is submitted and favorably reviewed.

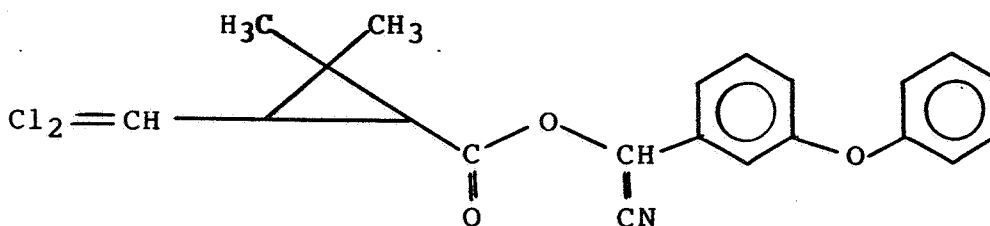
Also, a justification prepared by ICI on why such data were not needed and an additional field dissipation study were included.

1.2 Chemical

Common name: Cypermethrin

Chemical name: (\pm) *d*-Cyano-3-(phenoxyphenyl)methyl (\pm)-
cis,trans-3-(2,2-dichloroethenyl)-2,2-
dimethylcyclopropanecarboxylate

Chemical structure:



2.0 DIRECTIONS FOR USE

See previous EAB review dated 4/29/82. EAB assumes that the use directions have not changed since the original EAB review for the cotton use.

3.0 DISCUSSION

Data reviewed here are included in submission with Accession No. 253700.

3.1 ICI Discussion

This justification was reviewed by EAB in review dated 7/20/84. In this review, EAB concluded that the justification was not adequate to support a waiver of the study. Thus, EAB considered this data requirement still unfilled.

EAB could recommend for conditional registration of additional uses for cypermethrin provided the registrant agree to conduct a field dissipation study in two areas of typical use and analyze the soil for formation and decline of the cypermethrin degradation products.

3.2 Dissipation of Cypermethrin Residues in Soil. M. A. Tilka, April 29, 1982. FMC Study No. RAN-006. Reference 1.

This study was also reviewed by EAB in the review dated 7/20/84. EAB concluded that the study was deficient in that the soil samples were not analyzed for the degradation products. Also, the application rate was not according to the directions included in the label (one single application of 2 lb a. i./A compared to 0.06-0.12 lb a. i./A/application). However, the data show that the parent compound, cypermethrin, degrades in soil under field conditions.

Note: Regression analysis of the data (attached, Table 1) by EAB show that cypermethrin degrades in field soil with half-lives of:

<u>Soil</u>	<u>Half-life (days)</u>
Silt loam	57
loam	83
Clay loam	49

3.3 Dissipation of Dichlorovinyl Acid and m-Phenoxybenzoic acid Residues in Soil. G. R. Kinnee, et al., June 20, 1984. FMC Report No. RAN 0-129. Reference 2.

This study was also considered in the review dated 7/20/84. EAB concluded that the study was incomplete. It appeared that some soil samples were held for almost 2 years in frozen storage before analysis. Therefore, storage stability

data are needed for cis/trans-DCVA and 3-PBAcid for a period approximating the length of time the soil samples were held in storage. In order for this study to be acceptable, the storage stability data must show that no significant degradation of these residues occur during the storage period.

4.0 RECOMMENDATION

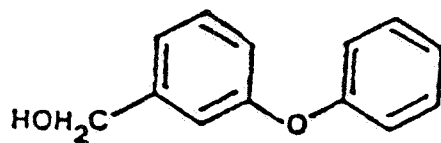
- 4.1 The data included in this submission have been previously reviewed by EAB. The studies were conducted in a sound scientific manner. However, they were found deficient. EAB does not consider the data requirement nor the condition for registration satisfied. See Sections 3.2 and 3.3, above for specific deficiencies.
- 4.2 Any additional uses of cypermethrin must be supported by this field dissipation study.
- 4.3 To satisfy the data requirement, a field dissipation study in two areas of typical use must be conducted. The soil should be analyzed for formation and decline of the degradation products.

In lieu of the study, the registrant can submit additional data to complete the submitted study. Storage stability data are needed covering a period approximating the time period the soil was stored frozen. To be acceptable, the data must show that residues of DCVA and 3-PBAcid are stable over the storage period.

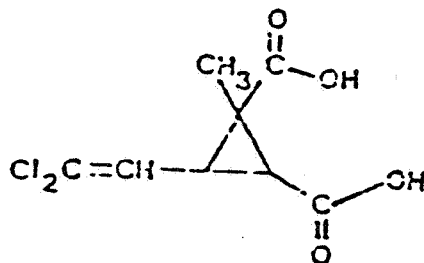


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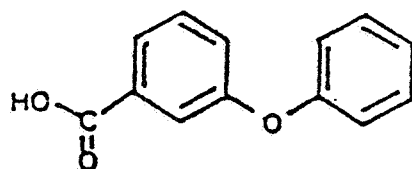
Structural Formulas of Degradation Products



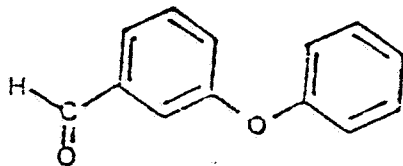
(I) 3-phenoxybenzyl alcohol



(II) 3-(2,2-dichlorovinyl)-1-methylcyclopropane-1,2-dicarboxylic acid
Cis/trans-DCVA



(III) 3-phenoxybenzoic acid



(IV) 3-phenoxybenzaldehyde

REGRESSION ANALYSIS OF RESIDUE DECLINE DATA

DATE:

TITLE: Ammo 2.5 EC RAN-0046

REMARKS: Dissipation of Cypermethrin Residues in Soil
April 24, 1982 FMC Report

FILE NAME: Study I - Silt loam RESIDUE LEVELS IN PPM INTERVALS IN DAYS

DATA ENTRIES 1 TO 7

2.55 at 0 DAYS	.68 at 14 DAYS	.38 at 181 DAYS	.01 at 360 DAYS
.93 at 7 DAYS	.58 at 30 DAYS	.05 at 273 DAYS	

N= 7 SUM X= 865 SUM X²= 238035 SUM Y=-8.63536 SUM Y²= 32.4452 SUM X*Y=-2673.08
For the 95% confidence level, the appropriate 't' VALUE=2.0039 (For a one tailed test)

DF=5 CORRELATION COEFFICIENT=.949979 CORRELATION COEFFICIENT SQUARED=.902461
Y-INTERCEPT= .27962 RELATIVE % ERROR OF THE SLOPE= 14.7% % LOSS PER DAY= 1.22%

SLOPE= -.012, its UPPER 95% CL= -.009 and its LOWER 95% CL= -.016
HALF LIFE= 56.6 DAYS, its UPPER 95% CL= 80.2 DAYS and its LOWER 95% CL= 43.7 DAYS

DAY ZERO LEVEL=1.323 PPM, its UPPER 95% CL=5.731 PPM and its LOWER 95% CL=.305 PPM
DATA ENTRIES 1 TO 7

.6 at 0 DAYS	.32 at 14 DAYS	.12 at 90 DAYS	.01 at 359 DAYS
.29 at 7 DAYS	.32 at 30 DAYS	.08 at 181 DAYS	

REGRESSION ANALYSIS OF RESIDUE DECLINE DATA

DATE:

TITLE:

REMARKS:

FILE NAME: Study II - loam RESIDUE LEVELS IN PPM INTERVALS IN DAYS

DATA ENTRIES 1 TO 8

.6 at 0 DAYS	.32 at 14 DAYS	.12 at 90 DAYS	.12 at 274 DAYS
.29 at 7 DAYS	.32 at 30 DAYS	.08 at 181 DAYS	.01 at 359 DAYS

N= 8 SUM X= 955 SUM X²= 245963 SUM Y=-15.399 SUM Y²= 40.9678 SUM X*Y=-2940.99
For the 95% confidence level, the appropriate 't' VALUE=1.9415 (For a one tailed test)

DF=6 CORRELATION COEFFICIENT=.901983 CORRELATION COEFFICIENT SQUARED=.813574
Y-INTERCEPT=-.927307 RELATIVE % ERROR OF THE SLOPE= 19.5% % LOSS PER DAY= .83%

SLOPE= -.008, its UPPER 95% CL= -.005 and its LOWER 95% CL= -.012
HALF LIFE= 82.9 DAYS, its UPPER 95% CL= 133.7 DAYS and its LOWER 95% CL= 60.1 DAYS

DAY ZERO LEVEL=.396 PPM, its UPPER 95% CL=1.421 PPM and its LOWER 95% CL=.11 PPM

REGRESSION ANALYSIS OF RESIDUE DECLINE DATA

DATE:

TITLE:

REMARKS:

FILE NAME: *Table III - Clay loam* RESIDUE LEVELS IN PPM INTERVALS IN DAYS

DATA ENTRIES 1 TO 7

.48 at 0 DAYS	.36 at 14 DAYS	.08 at 91 DAYS	.01 at 277 DAYS
.59 at 7 DAYS	.11 at 29 DAYS	.02 at 189 DAYS	

N= 7 SUM X= 607 SUM X²= 121817 SUM Y=-15.5335 SUM Y²= 49.6238 SUM X*Y=-2326.85
For the 95% confidence level, the appropriate 't' VALUE=2.0039 (For a one tailed test)

DF=5 CORRELATION COEFFICIENT=.957006 CORRELATION COEFFICIENT SQUARED=.915861
Y-INTERCEPT=-.990848 RELATIVE % ERROR OF THE SLOPE= 13.6% % LOSS PER DAY= 1.41%

SLOPE= -.014, its UPPER 95% CL= -.01 and its LOWER 95% CL= -.018
HALF LIFE= 48.9 DAYS, its UPPER 95% CL= 67.2 DAYS and its LOWER 95% CL= 38.5 DAYS

DAY ZERO LEVEL=.371 PPM, its UPPER 95% CL=1.152 PPM and its LOWER 95% CL=.12 PPM.