Shaughnessy No.: 109702
Date Out of EFGWB: JAN 30 1990

TO: George LaRocca/Adam Heyward
Product Manager # 15
Registration Division (H7505C)

FROM: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review #2
Environmental Fate and Groundwater Branch/EFED (H7507C)

THRU: Hank Jacoby, Chief
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of:

Reg./File #(s): 279-3027

Common Name: Cypermethrin-Minus

Chemical Name: (±) α-cyano-(3-phenoxyphenyl)methyl(±)-cis,trans-3-(2,2-dichloroethenyl)-2,2,-dimethylcyclopropanecarboxylate

Type of Product: Insecticide

Product Name: N/A

Company Name: FMC Corporation

Purpose: Evaluate registrant request for waiver of data requirements for Cypermethrin-Minus

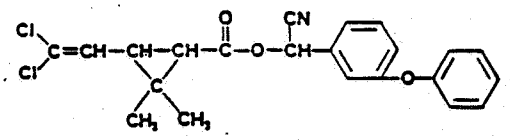
Date Received: 12/20/89 Action Code: 350

EFGWB #(s): 90-0241 Total Reviewing Time: 3

Deferrals to: _____ Ecological Effects Branch/EFED
_____ Science Integration & Policy/EFED
_____ Non-Dietary Exposure Branch/HED
_____ Dietary Exposure Branch/HED
_____ Toxicology Branch I/HED
_____ Toxicology Branch II/HED

1. CHEMICAL:
Common Name: Cypermethrin-Minus
Chemical Name: (±)α-cyano-(3-phenoxyphenyl)methyl(±)-cis,trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate
Type of Product: Insecticide
Trade Name: N/A

Chemical Structure:



Physical/Chemical Properties
molecular formula: $C_{22}H_{19}Cl_2NO_3$
molecular weight: 416.28
physical state: Pure isomers are colorless crystals (mixed isomers are viscous semisolids)
aqueous solubility: 0.2 ppm @ 20° C

2. TEST MATERIAL: N/A

3. STUDY/ACTION TYPE: Request for waiver of data requirements for Cypermethrin-Minus(improved isomer spectrum)

4. STUDY IDENTIFICATION: N/A

5. REVIEWED BY:
Bruce Kitchens, Chemist
Environmental Chemistry Review Section #2 Date: 1/29/90
Environmental Fate and Groundwater Branch/EFED

6. APPROVED BY:
Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2 Date: JAN 30 1990
Environmental Fate and Groundwater Branch/EFED

7. CONCLUSIONS: EFGWB concurs with the registrant's request to bridge the environmental fate data requirements for Cypermethrin-Minus (improved isomer spectrum) with the current Cypermethrin data.

The registrant claims that Cypermethrin-Minus has the same common

(chemical) name, the same cis/trans isomer ratio, the same optical activity, the same isomer composition, and the same technical CFS/impurity profile as Cypermethrin, they also report that the ratio of biologically active isomers is changed, that the new formulation's insecticidal activity has increased twofold, and that Cypermethrin-Minus will only require 0.05 lbs. a.i./acre as compared to 0.1 lbs a.i./acre for Cypermethrin. EFGWB concludes that Cypermethrin-Minus should behave environmentally the same as Cypermethrin.

8. RECOMMENDATIONS: Inform registrant of concurrance with the request to bridge data requirements for Cypermethrin-Minus with those already in place for Cypermethrin.

9. BACKGROUND: This submission is in response to the suggestion that the registrant submit a more detailed chemical explanation on the nature of the isomer enrichment in the new formulation and its effects on the use rates (See reg./file # 279-3026, -3027 8/15/88). The current submission is also a request for a waiver of of environmental fate data requirements for Cypermethrin-Minus.

10. DISCUSSION: This submission does address the concerns of the previous action (reg./file # 279-3026, -3027 8/15/88). The registrant details the isomer enrichment by explaining that the percent isomer content was increased in one isomer and decreased in another isomer and thereby increasing the insecticidal activity of Cypermethrin-Minus twofold. The increased insecticidal activity has allowed the application rate to decrease from 0.1 to 0.05 lbs. a.i./acre. See attached tables.

11. COMPLETION OF ONE-LINER: N/A

12. CBI INDEX:
Not applicable.

TABLE 1

		ISOMER	% CONTENT IN CYPE	% CONTENT IN CYPE-S
1	CIS 1	1 R-CIS-R	14	3
2		1 S-CIS-S	14	22
3	CIS 2	1 R-CIS-S	11	22
4		1 S-CIS-R	11	3
5	TRANS 1	1 R-TRANS-R	14	3
6		1 S-TRANS-S	14	22
7	TRANS 2	1 R-TRANS-S	11	22
8		1 S-TRANS-R	11	3
			100	100

TABLE 2

BIOLOGICAL ACTIVITY

	ISOMER	ACTIVITY INDEX	% CONTENT IN CYPE	% CONTENT IN CYPE-S
CIS 1	1 R-CIS-R	0.6	14	3
	1 S-CIS-S	0.03	14	22
CIS 2	1 R-CIS-S	13.5	11	22
	1 S-CIS-R	0.04	11	3
TRANS 1	1 R-TRANS-R	0.4	14	3
	1 S-TRANS-S	0.03	14	22
TRANS 2	1 R-TRANS-S	3.2	11	22
	1 S-TRANS-R	0.01	11	3
			100	100

* AVERAGE RELATIVE POTENCY ON 5 LEPIDOPTEROUS SPECIES (VERSUS PERMETHRIN)

TABLE 3

	ISOMER	ACTIVITY INDEX	% ISOMER CONTENT
CIS 2	1 R-CIS-S	13.5	11
TRANS 2	1 R-TRANS-S	3.2	11
			22
			44

ACTIVE ISOMER CONTENT IN CYPERMETHRIN = 22%

ACTIVE ISOMER CONTENT IN CYPE-S = 44%

BIOLOGICAL ACTIVITY RATIO $= \frac{44}{22} = 2$

TABLE 4

EXPOSURE TO MAN AND THE ENVIRONMENT

CYPE MAX USE RATE (LBS AI/A) - 0.10

ISOMER	% CONTENT	EXPOSURE (LBS AI/A)
1 R-CIS-R	14	0.014
1 S-CIS-S	14	0.014
1 R-CIS-S	11	0.011
1 S-CIS-R	11	0.011
1 R-TRANS-R	14	0.014
1 S-TRANS-S	14	0.014
1 R-TRANS-S	11	0.011
1 S-TRANS-R	11	0.011
	100	0.100

CYPE-S MAX USE RATE (LBS AI/A) - 0.05

ISOMER	% CONTENT	EXPOSURE (LBS AI/A)
1 R-CIS-R	3	0.0015
1 S-CIS-S	22	0.011
1 R-CIS-S	22	0.011
1 S-CIS-R	3	0.0015
1 R-TRANS-R	3	0.0015
1 S-TRANS-S	22	0.011
1 R-TRANS-S	22	0.011
1 S-TRANS-R	3	0.0015
	100	0.05