US EPA ARCHIVE DOCUMENT

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

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Chemical ID # : 004006
DP Barcode # : D228126

MEMORANDUM

TO: George Larocca, PM # 13
RD

FROM: Laura Parsons, Agronomist, CRS1 Laura Parsons
EFGWB/EFED

THROUGH: Pauline Wagner, Branch Chief Pauline Wagner 1/15/97
Paul J. Mastradone, Section Head, CRS1
EFGWB/EFED

SUBJECT: Imiprothrin: New Chemical Registration.

The EFGWB review for the synthetic pyrethroid insecticide, imiprothrin, is attached to this memo. The sponsor, Sumitomo Chemical Company is seeking registration of imiprothrin as an indoor use insecticide for crack, crevice, and spot treatment. The hydrolysis data submitted are acceptable and this study fulfills the required data base for indoor use chemicals.

Imiprothrin hydrolyses rapidly under alkaline conditions (pH 9, half-life <1 day), hydrolyses slowly under neutral conditions (pH 7, half-life 59 days) and is stable under acidic conditions (pH 5, no degradation).

Date Out:
Chemical Code: 004006
DP Barcode: D228126

ENVIRONMENTAL FATE AND GROUND WATER BRANCH

Review Action

To: George Larocca, PM # 13, RD
Linda Deluise, RD

From: Paul Mastradone, Section Head
CRS1/EFGWB/EFED

Through: Pauline Wagner, Branch Chief
EFGWB/EFED

Attached, please find the EFGWB review of imiprothrin.

Common name:	Imiprothrin	**Trade name:**	Pralle
Company name:	Sumitomo Chemical Co., Osaka, JAPAN		
ID #	004006		
Purpose:	Review of studies for environmental fate data requirements in support of registration for use of imiprothrin as a spot treatment for crawling insects.		

Type Product:	**Action Code:**
indoor, insecticide spot and crack treatment	100

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STATUS OF STUDIES IN THIS PACKAGE:		
Guideline #	MRID	Status[1]
161-1	43750738	A

STATUS OF DATA REQUIREMENTS ADDRESSED IN THIS PACKAGE:	
Guideline #	Status[2]
161-1	S

[1]Study Status Codes: A=Acceptable, U=Upgradeable C=Ancillary I=Invalid.

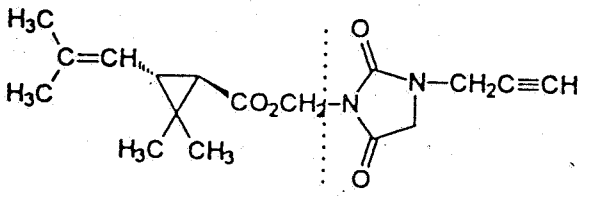
[2]Data Requirement Code: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved W=Waived.

Common name: Imiprothrin

CAS number: 72963-72-5 (racemic)

Chemical name: 2,5-dioxo-3-(prop-2-ynyl)imidazolidin-1-ylmethyl (1R)-trans-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate

Structure:



IMIPROTHRIN

Formulations: information not provided

Mode of action: methylation inhibitor

Physical/Chemical properties:

Molecular formula:	information not provided
Molecular weight:	information not provided
Physical state:	information not provided
Log P_{ow}:	information not provided
pKa:	information not provided
Vapor pressure:	information not provided
Solubility at 20 C:	0.0935 mg/mL (93.5 ppm) at 25 C

2. TEST MATERIAL:

Studies 1: Active ingredient.

3. STUDY/ACTION TYPE:

Review of studies to fulfill environmental fate data requirements for: hydrolysis.

4. STUDY IDENTIFICATION:

Shah, J.F. 1995. A hydrolysis study of [alc-^{14}C]-imiprothrin. Ricerca Project No. 94-0167. Unpublished study performed by Ricerca, Inc. Painesville, OH and submitted by Sumitomo Chemical Co. Chuo-ku, Osaka, JAPAN. MRID 43750738 DP Barcode D228126.

5. REVIEWED BY:

Laura Parsons, Agronomist
CRS1/EFGWB/EFED/OPP

Signature: Laura Parsons

Date: 1/15/97

6. APPROVED BY:

Paul Mastradone, Section Chief
CRS1/EFGWB/EFED/OPP

Signature: Paul J Mastradone

Date:

7. CONCLUSION:

Data Requirement Status: This request is for review of environmental fate data for

imiprothrin as a crack and crevice treatment (indoor use). Only hydrolysis studies are required for indoor use chemicals and since an acceptable hydrolysis study has been submitted, EFGWB considers the environmental fate requirements to be complete for the use of imiprothrin as an indoor crack and crevice treatment only. Additional uses of imiprothrin will require additional supporting environmental fate data.

The following acceptable study was reviewed in this package:
Hydrolysis: 161-1 [^{14}C]Imiprothrin hydrolyzed rapidly under alkaline conditions with a calculated half-life of 17.9 hours in a pH 9 buffer. In pH 7 buffer, hydrolysis was slower with a calculated half-life of 58.6 days; imiprothrin was stable to hydrolysis at pH 5. There was only one degradate which accounted for more than 10% of the radioactivity at pH 7 and 9: this compound was identified as N-carbamoyl-N-propargylglycine (CPG). The schematic of a proposed degradation pathway is attached to this memo.

7.5. Environmental Fate Assessment:

Imiprothrin degrades by pH sensitive hydrolysis with calculated half-lives of <1 day at pH 9 and approximately 59 days at pH 7. Degradation did not occur at pH 5. No assessment of the further abiotic or biotic degradation or environmental mobility is possible from the submitted data.

8. RECOMMENDATIONS:

The registrant should be informed that the environmental fate data base is fulfilled for imiprothrin as a crack and crevice treatment. Additional data may be necessary if there are further uses of imiprothrin.

9. BACKGROUND:

10 DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

Refer to attached reviews.

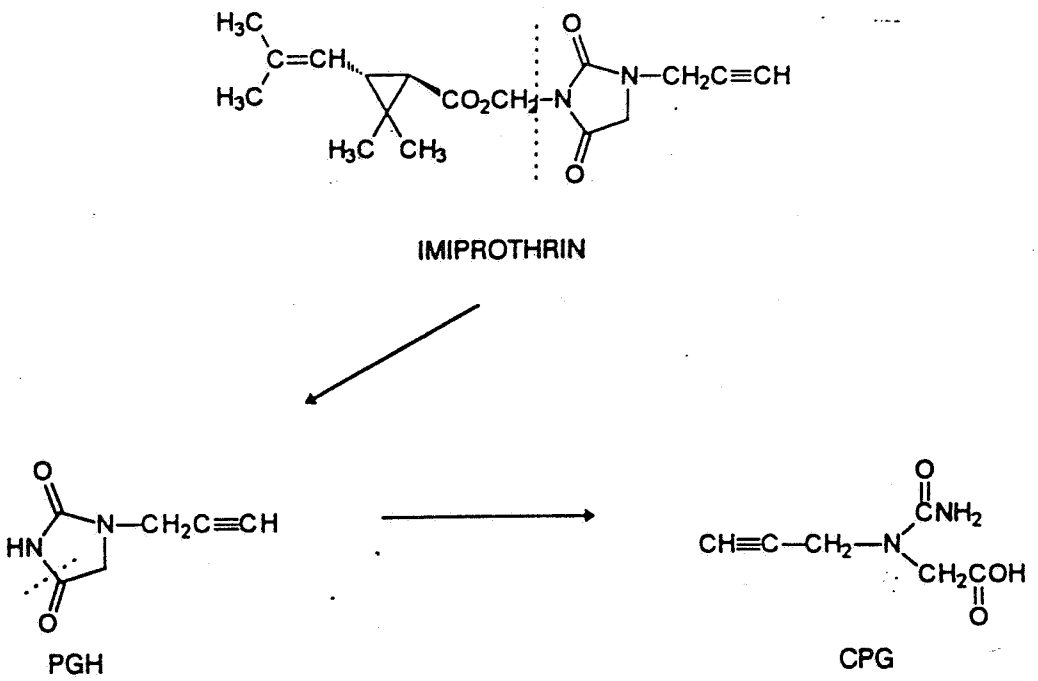
11 COMPLETION OF ONE-LINER:

12 CBI APPENDIX:

All data reviewed here are considered "company confidential"

FIGURE 17

ROUTE OF HYDROLYSIS
pH 7 AND pH 9



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DATA EVALUATION RECORD

STUDY 1

CHEM 004006 Imiprothrin 161-1

FORMULATION--00--ACTIVE INGREDIENT

DP Barcode D228126
STUDY ID 43750738
Shah, J.F. 1995. A hydrolysis study of [alc-^{14}C]-imiprothrin. Ricerca Project No. 94-0167. Unpublished study performed by Ricerca, Inc. Painesville, OH and submitted by Sumitomo Chemical Co. Chuo-ku, Osaka, JAPAN.

REVIEWED BY: Laura Parsons
ORG: EFGWB Review Section I

APPROVED BY: Paul Mastradone
ORG: Chief, EFGWB Review Section I

CONCLUSIONS:

Degradation -- Hydrolysis

1. This data can be used to fulfill data requirements for hydrolysis of imiprothrin.

2. [^{14}C]Imiprothrin hydrolyzed rapidly under alkaline conditions with a calculated half-life of 17.9 hours in a pH 9 buffer. In pH 7 buffer, hydrolysis was slower with a calculated half-life of 58.6 days; imiprothrin was stable to hydrolysis at pH 5.

METHODOLOGY:

Three 0.01 M buffer solutions were prepared at pH 5 (sodium acetate), pH 7 (sodium phosphate) and pH 9 (sodium borate); the prepared buffers were sterilized by autoclaving.

The sterilized buffers were dispensed into sterile vials with each vial receiving 4 mL; [alc-^{14}C]labeled imiprothrin dissolved in acetonitrile was added to vial at 4 ug material per vial giving a 1 ppm solution. The vials were capped and placed in a chamber at 25 $\pm$ 1 C for incubation in the dark.

Duplicate samples were removed for analysis at intervals; pH 5 and 7 samples were removed at 0, 1, 3, 7, 10, 14, 21, and 30 days posttreatment and pH 9 samples were removed at 1, 3, 5, 7, 9, 11, 13, 25, 27, 28, 33, 55, 56, and 123 hours post-treatment.

Samples were analyzed by HPLC on a Zorbax column eluted with a linear gradient of trifluoroacetic acid in acetonitrile and trifluoroacetic acid in water. Radioactive flow was detected with a calcium fluoride cell; UV detection was at 220 nm.

Additional pH 9 hydrolysis samples were also set up at 21 and 22 ppm of a mixture of alcohol-[^{14}C]labeled and non-labeled imiprothrin. These samples were incubated for 125 hours and the samples were analyzed by TLC and MS. TLC analysis was carried out on silica gel plates developed with chloroform:methanol:ethanol (9:1:1) or butanol:ethanol:water (6:1:1). Reference standards were visualized with iodine vapor. Radioactive areas were scanned with a linear analyzer. Samples were fractionated on a HPLC column; fractions were collected and analyzed by thermospray MS.

DATA SUMMARY:

[^{14}C]Imiprothrin hydrolyzed rapidly under alkaline conditions with a calculated half-life of 17.9 hours (r^2 =0.99) in a pH 9 buffer. In pH 7 buffer, hydrolysis was slower with a calculated half-life of 58.6 days (r^2 = 0.99); imiprothrin was stable to hydrolysis at pH 5.

The same degradates were observed in both the pH 7 and 9 solutions. Only N-carbamoyl-N-propargylglycine (CPG) was greater than 10% of the radioactivity in either set of buffers. 1-propargylimidazolidine-2,4-dione (PGH) was also detected in minor amounts.

At pH 7, imiprothrin was 99-100% of the radioactivity immediately posttreatment, 88-89% at 10 days, 77-78% at 21 days, and 70% at 30 days posttreatment (Table VIII). CPG was first detected at 1 day posttreatment at 1% of the applied radioactivity, 11-12% at 10 days, 20-21% at 21 days and was 26% at 30 days posttreatment. PGH was $\leq$1% prior to 10 days, was 1% at 10 and 13 days, and was 1-2% at 21 and 30 days posttreatment. An unidentified degradate made up 1-2% of the applied at 21 and 30 days posttreatment. For the pH 7 data, there 4 replicates per time interval.

At pH 9, imiprothrin was 100% of the applied radioactivity at time 0, 82% at 5 hours, 68% at 10 hours, 40% at 25 hours, 35% at 28 hours, 11% at 55 hours,

and 1% at 123 hours posttreatment (Table IX). CPG was <1% of the applied radioactivity at time 0, 17% at 5 hours, 30% at 10 hours, 57% at 25 hours, 62% at 28 hours, 83% at 55 hours, and 90% at 123 hours posttreatment. PGH was first detected at 0.4% at 2 hours, was 1% at 5 hours, 2% at 10 hours, 3% at 25-28 hours, and 4% at 55 and 123 hours posttreatment. The unidentified degradate was a maximum of 5% of the applied at 123 hours posttreatment. For the pH 9 data, single samples were taken at 27 time intervals between 0 and 123 hours.

COMMENTS AND DISCUSSION:

1. Preliminary tests were conducted to ensure that imiprothrin did not adsorb to glass surfaces. LSC analysis of solutions incubated for 24 hours in glass vials showed 98-105% recovery without additional rinsing.

2. Minor polar degradate was isolated and tentatively identified on by HPLC on a Zorbax column eluted with a linear gradient of acetonitrile and PIC A (tetrabutylammonium hydrogen sulfate). Radioactive flow was detected with a calcium fluoride cell; UV detection was at 220 nm.

Information Withheld

Page _____ is not included in this copy.

Pages 10 through 20 are not included in this copy.

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) _____.

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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.