Date Out:

DP Barcode: D227616
Chemical Code: 129121

ENVIRONMENTAL FATE AND GROUND WATER BRANCH

To: A. Sibold/M. Johnson
Registration Division (H7505C)

From: G. Maske, Chemist
Environmental Risk Branch 1
Environmental Fate & Ground Water Branch/EFED (H7507C)

Thru: Arnet Jones, Branch Chief for 2331
Environmental Fate & Ground Water Branch/EFED (H7507C)

07/29/97

Attached, please find the EFGWB review of...

Common Name:	Fipronil	Trade name:	Chipco Gauntlet
Company Name:	Rhone-Poulenc Ag. Company		
ID #:	000264		
Purpose:	To review an amended leaching, adsorption/desorption study submitted to support registration of fipronil.		

Type Product:	Action Code:	EFGWB #(s):	Review Time:
Insecticide	175		1.5 days

STATUS OF STUDIES IN THIS PACKAGE:

Guideline #	MRID	Status[1]
163-1	44039003	A

STATUS OF DATA REQUIREMENTS ADDRESSED IN THIS PACKAGE:

Guideline #	Status[2]
163-1	S

[1]Study Status Codes: A=Acceptable U=Upgradeable C=Ancillary I=Invalid.
[2]Data Requirement Status Codes: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved W=Waived

1. CHEMICAL:

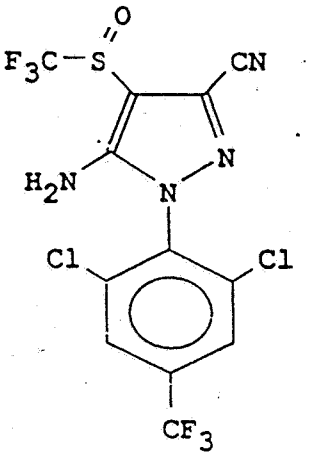
Chemical name: 5-Amino-3-cyano-1-(2,6-dichloro-4-trifluoromethyl)phenyl)-4-[1R,S)-trifluoromethyl)sulfinyl]-1H-pyrazole-3-carbonitrile

CAS no.: 120068-37-3

Common name: Fipronil

Trade name: Chipco Gauntlet

Chemical structure:



Physical/Chemical properties of active ingredient fipronil:

Physical characteristics:	White powder with mouldy smell
Molecular formula:	$C_{12}H_4F_6N_4Cl_2OS$
Molecular weight:	437.14
Melting point:	195.5-203°C
Vapor Pressure:	≈1 x 10^{-7} mm Hg
Solubility:	2.4 mg/L at 20°C
Octanol/water partition coefficient:	10,570

2: TEST MATERIAL:

See attached DER.

3. STUDY/ACTION TYPE:

This is a review of an adsorption/desorption mobility study submitted to support registration of fipronil.

4. STUDY IDENTIFICATION:

Godward, P.J., Quarmby, D.L., Austin, D.J., and Burr, C. MB 46,030-^{14}C: ADSORPTION/DESORPTION ON FIVE SOILS. Sponsored and Submitted by Rhone-Poulenc Agriculture Limited, Research Triangle Park, N.C.; Performed by Rhone-Poulenc Agriculture Limited, Ongar, Essex, England under Laboratory Project No. P91/084;

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Study completed on 6 April 1992; Amendment issued 23 May 1996; Received by EPA 17 June 1996; MRID 44039003.

5. REVIEWED BY:

Gail Maske
Chemist
OPP/EFED/ERB1

Signature: Gail Maske
Date: 24 July 97

6. APPROVED BY:

Arnet Jones
Branch Chief
OPP/EFED/ERB1

Signature: Arnet W Jones
Date: 07/29/97

7. CONCLUSIONS:

Review of Amended Adsorption/Desorption Mobility Study (163-1):
MRID 44039003

These mobility data are an addendum to a previous mobility study (MRID 43018801). This mobility study is scientifically valid. In addition, it can be used to partially fulfill the data requirement (163-1). Based on the acceptability of this adsorption/desorption study and the aged soil column leaching study (MRID 42918664), the data requirement is considered fulfilled at this time. No further mobility data for fipronil are needed.

Due to an error (data reversed) discovered in the previous study Tables, an addendum was issued which included recalculation and reevaluation of the data Tables and data. In the original adsorption study (MRID 43018801), fipronil had a relatively high binding affinity to soil (26 to 148 mL/g) and hence a very low potential mobility in terrestrial and aquatic environments. However, recalculation of Freundlich coefficients resulted in Freundlich adsorption coefficients of 4.19, 9.32, 10.73, 14.32, and 20.69 mL/g for loamy sand, sandy clay loam, Speyer 2.2, and loam soils, respectively. Recalculated desorption coefficients for fipronil ranged from 7.25 to 21.51 mL/g. The corrected Freundlich coefficients suggest that fipronil has a low to moderate binding affinity (<5 mL/g) and hence may have potential mobility under some environmental conditions. Since batch equilibrium coefficients for fipronil are not correlated to soil organic matter content, the use of Koc partitioning model may not be reliable to estimate mobility across soil types.

ENVIRONMENTAL FATE ASSESSMENT

Available laboratory data indicate that below the soil surface fipronil dissipates by soil binding (Freundlich Kd for ads = 4.19 to 20.69 mL/g; Kocs = 427 to 1248) followed by slower biotic mediated processes (aerobic soil half-life=128 days; anaerobic aquatic half-lives=116-130 days). On soil surface or foliage the major route of degradation may be photolysis (aquatic photolysis half-life=3.63 hours, soil photolysis half-life=34 days) and/or soil binding followed by slower biotic mediated processes. These data indicate that fipronil is slightly mobile to relatively non-mobile in soils tested, but may be moderately persistent under some environmental conditions. Laboratory data indicate that fipronil degrades slowly under alkaline hydrolytic conditions (hydrolysis half-life at pH 9 =28 days), but does appear to be stable to hydrolysis at pH 5 and pH 7 (half-life = stable). Field data appear to support these laboratory data.

Half-lives of 1.1 to 1.5 months for bare soil and 0.4 to 0.5 months for turfed soil are reported in field data. Half-lives of 3.4 to 7.3 months were reported for in-furrow applications. In bare soil and in-furrow applications fipronil residues were detectable mainly in the 0 to 0.15 m soil depth. Field data for infurrow applications did report limited fipronil residues in the 0.15 to 0.45 m soil depth segments. Since fipronil absorbs to soil/sediment, the potential for ground water contamination is considered relatively low in most soils. Movement off-target would appear to be associated with sediment contained in surface water and run-off water.

There are limited data on the persistence and mobility of degradates. The data indicate that the metabolites are not mobile (≤4% of applied radioactivity in leachate) in soil. Half-lives of degradates could not be determined from the data. At termination of the study the degradates appeared to have reached their maximum concentrations. There were two major degradates, RPA 200766 (the amide) and MB 46136 (5-amino-1-(2,6-dichloro-4-trifluoromethylphenyl)-3-cyano-4-trifluoromethyl-sulphonyl-pyrazole), identified in the aerobic metabolism study at maximum concentrations of 27-38% and 14-24% of applied radioactivity, respectively. In the anaerobic aquatic study, the major degradates were MB 45,950 (5-amino-1-(2,6-dichloro-4-trifluoromethylphenyl)-3-cyano-4-trifluoromethyl-thio-pyrazole) and RPA 200766 which were detectable at maximum concentrations of ≈47% and ≈18% of applied radioactivity, respectively. In addition to the metabolites identified in the metabolism studies, degradation products MB 46513 (5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethyl-phenyl)-4-trifluoromethylpyrazole), MB 45350, and RPA 104615 (5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl)pyrazole-4-sulfonic acid (potassium salt)) were identified in the photolysis studies. Other minor metabolites were identified in laboratory studies at concentrations of <6% each.

Supplemental fish accumulation data indicate that fipronil bioconcentrated in fish with BCFs of 321, 164, and 575 for whole fish, edible tissues, and non-edible tissues, respectively. However, the depuration data indicate that these fipronil residues are almost completely eliminated (>96%) after 14 days of non-exposure. These data appear to be in agreement with the octonal/water coefficient (10,570). Storage stability data on tissue samples are needed to validate the analytical data.

8. RECOMMENDATIONS:

The registrant should be informed of the following:

a. The adsorption/desorption mobility data is acceptable, and can be used to fulfill the data requirement (163-1). The environmental fate assessment was amended to reflect this amended adsorption/desorption data.

b. The current status of environmental fate data requirements to support the registration of fipronil on terrestrial food and feed and terrestrial non-food crops (including turf) is as follows:

Environmental Fate Data Requirements	Status of Data Requirement	MRID No.
Degradation Studies-lab		
161-1 Hydrolysis	Fulfilled (WGM;06/15/94)	42194701

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Environmental Fate Data Requirements	Status of Data Requirement	MRID No.
161-2 Photodegradation in water	Fulfilled (WGM;06/15/94)	42918661
161-3 Photodegradation on soil	Fulfilled (WGM;06/15/94)	42918662
161-1 Photodegradation in air[1]		
Metabolism Studies-lab		
162-1 Aerobic soil	Fulfilled (WGM;06/15/94)	42918663
162-2 Anaerobic soil[2]		
162-3 Anaerobic aquatic	Fulfilled (WGM;09/18/95)	43291706 43291707
Mobility Studies		
163-1 Leaching, Adsorption/ Desorption	Fulfilled (WGM;06/15/94)	42918664 43018801 44039003 00137544
163-2 Volatility-Lab[1]		
163-2 Volatility-Field[1]		
Dissipation Studies-field		
164-1 Soil	Fulfilled[3] (WGM:09/18/95)	43291705 43401103
Accumulation Studies		
165-4 in Fish	Not Fulfilled[4] (WGM;09/18/95)	43291706 43291707
Spray Drift Studies		
201-1 Droplet size spectrum	Reserved[5]	
202-1 Drift field evaluation	Reserved[5]	

[1] Based on the low vapor pressure ($\approx 1 \times 10^{-7}$ mm Hg), volatility data is not needed at this time.

[2] An acceptable anaerobic aquatic metabolism study will fulfill the anaerobic metabolism data requirement.

[3] The terrestrial field dissipation data requirement is fulfilled for applications rates ≤0.05 lb a.i./A. In addition, it is fulfilled for in-furrow applications of≤0.13 lb a.i./A. The suggested application rate of fipronil on corn is 0.13 lb a.i./A and on cotton is 0.1 to 0.15 lb. a.i./A and maximum seasonal application rate of 0.30 lb a.i./A on cotton. Additional terrestrial field dissipation data using different formulations are needed to support the end-product, higher application rate and to make a complete environmental fate assessment of the higher application rate and/or different application methods.

[4] Additional storage stability data are needed for tissue samples.

[5] The spray drift data requirements (201-1 & 202-1) are reserved at this time. Spray drift data are needed according to 40 CFR §158.142 when aerial applications and/or ground applications (e.g. mist blower) are proposed and it is expected that the detrimental effect levels of non-target organisms present are exceeded. Members (Rhone-Poulenc is one) of the Spray Drift Task Force may satisfy this data requirement through the task force if neither EFED/EEB nor HED/TOX require these data in advance of the Task Force's final report.

9. BACKGROUND:

Fipronil is a phenylpyrazole insecticide at present used to control mainly rootworms and/or wireworms in corn, thrips, plant bugs, and boll weevils in cotton, and mole crickets in turf. According to the manufacture's data, fipronil affects the gamma aminobutyric acid neurotransmission system by interfering with the passage of chloride. In addition, research data indicate that fipronil displays a higher potency in insect GABA chloride channel than in vertebrate GABA chloride channel which may indicate selective toxicity.

The application rate for fipronil is 0.13 lb a.i./A for control of rootworms and wireworms in corn, 0.025 to 0.38 lb a.i./A for foliar spray or 0.1 to 0.15 lb a.i./A for in-furrow control of plant bugs, boll weevils, and thrips in cotton, and 0.0125 lb a.i./A to 0.025 lb a.i./A for control of mole crickets in turf. For furrow applications fipronil is applied by ground equipment directly into the seed furrow behind the planter shoe. Slit-placement equipment is used for application of fipronil on infected turf. However, for cotton both in-furrow and foliar spray equipment is used for applications. The application rate for fipronil is approximately one-tenth of that of previous used insecticides, terbufos, and chlorpyrifos.

10. DISCUSSION:

See attached DER.

11. COMPLETION OF ONE-LINER:

See attached one-liners.

12: CBI APPENDIX:

N/A

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
FIPRONIL
Last Update on June 3, 1997
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head:	Date:

Common Name:FIPRONIL
Smiles Code:
PC Code # :129121 CAS #:120068-37-3 Caswell #:

Chem. Name :5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl-4-trifluoromethylsulphinyl pyrazole
Action Type:insecticide

Trade Names:
(Formul'tn): 1.5% granular
Physical State: white powder

Use :control of rootworm and wireworm in corn
Patterns :terrestrial food and feed
(% Usage) :approximately 0.13 lb a.i./A
:

Empirical Form: $C_{12}H_4Cl_2F_6N_4OS$
Molecular Wgt.: 437.14 Vapor Pressure: E -7 Torr
Melting Point : 195-203 C °C Boiling Point: °C
Log Kow : 4 pKa: @ °C
Henry's : E Atm. M3/Mol (Measured)

Solubility in ...				Comments
Water	2.40E	ppm	@20.0 °C	
Acetone	E	ppm	@ °C	
Acetonitrile	E	ppm	@ °C	
Benzene	E	ppm	@ °C	
Chloroform	E	ppm	@ °C	
Ethanol	E	ppm	@ °C	
Methanol	E	ppm	@ °C	
Toluene	E	ppm	@ °C	
Xylene	E	ppm	@ °C	
	E	ppm	@ °C	
	E	ppm	@ °C	

Hydrolysis (161-1)
[V] pH 5.0:STABLE
[V] pH 7.0:STABLE
[V] pH 9.0:28 DAYS
[ ] pH :
[ ] pH :
[ ] pH :

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Environmental Fate & Effects Division
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Photolysis (161-2, -3, -4)
[V] Water:3.63 HOURS OR 0.33 DAYS FLORIDA SUNLIGHT
[ ] :
[ ] :
[ ] :

[V] Soil :34 DAYS
[ ] Air :

Aerobic Soil Metabolism (162-1)
[V] 122-128 DAYS
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[V] t_{ℓ}=116 days by HPLC
[ ] t_{ℓ}=130 days by TLC
[ ]
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Aerobic Aquatic Metabolism (162-4)
[ ]
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Soil Partition Coefficient (Kd) (163-1)
[V] 4.19 MANNINGTREE UK LOAMY SAND SOIL
[V] 9.32 to 10.73 FOR FRENCH SANDY-CLAY-LOAM SOIL
[V] 14.32 FOR GERMAN LOAMY SAND SOIL
[V] 20.69 FOR MANNINGTREE UK LOAM SOIL
[V] Koc FOR SAME SOILS = 427 TO 1248
[ ]

Soil Rf Factors (163-1)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Laboratory Volatility (163-2)
[ ]
[ ]

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[V] tℓ=1.1 to 1.5 months for bare soil
[ ] tℓ=0.4 to 0.5 months for turfed soil
[V] tℓ=3.4 months for CA
[ ] =3.0 months for NE
[ ] =3.8 months for NC
[ ] =7.3 months for WA
[ ]
[ ]
[ ]
[ ]

Aquatic Dissipation (164-2)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Forestry Dissipation (164-3)
[ ]
[ ]

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Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
FIPRONIL
Last Update on June 3, 1997
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Long-Term Soil Dissipation (164-5)
[ ]
[ ]

Accumulation in Rotational Crops, Confined (165-1)
[ ]
[ ]

Accumulation in Rotational Crops, Field (165-2)
[ ]
[ ]

Accumulation in Irrigated Crops (165-3)
[ ]
[ ]

Bioaccumulation in Fish (165-4)
[S] BCF= 321, 164, 575 for whole fish, edible tissue, and non-edible
[ ] tissue, respectively.

Bioaccumulation in Non-Target Organisms (165-5)
[ ]
[ ]

Ground Water Monitoring, Prospective (166-1)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)
[ ]
[ ]
[ ]

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Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
FIPRONIL
Last Update on June 3, 1997
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Field Runoff (167-1)
[ ]
[ ]
[ ]
[ ]

Surface Water Monitoring (167-2)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Droplet Spectrum (201-1)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Field Evaluation (202-1)
[ ]
[ ]
[ ]
[ ]

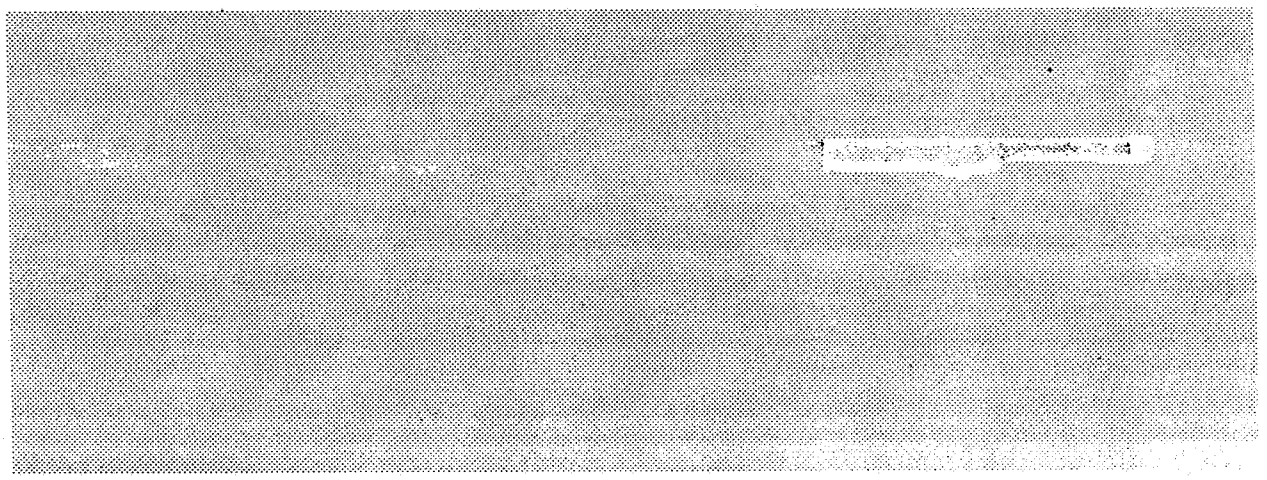
Degradation Products

FIPRONIL AMIDE FOR HYDROLYSIS
MB 46513 FOR PHOTOLYSIS
MB 45897, RPA 200766, RPA 105048, MB 46136, RPA 104615, MB45950, MB 46058 FOR AEROBIC METABOLISM

SEE ATTACHED FOR CONFIGURATIONS

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
FIPRONIL
Last Update on June 3, 1997
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Comments



References: ENVIRONMENNTAL FATE STUDIES, FARM CHEMICAL HANDBOOK
Writer : GML

DATA EVALUATION RECORD

STUDY 1

CHEM 129121 FIPRONIL §163-1

STUDY ID 44039003

Godward, P.J., Quarmby, D.L., Austin, D.J., and Burr, C. MB 46,030-^{14}C: ADSORPTION/DESORPTION ON FIVE SOILS. Sponsored and Submitted by Rhone-Poulenc Agriculture Limited, Research Triangle Park, N.C.; Performed by Rhone-Poulenc Agriculture Limited, Ongar, Essex, England under Laboratory Project No. P91/084; Study completed on 6 April 1992; Amendment issued 23 May 1996; Received by EPA 17 June 1996.

RECT REVIEW TIME = 2.8 days

REVIEWED BY: G. Maske
TITLE: Chemist
ORG: OPP/EFED/ERB1
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SIGNATURE:

APPROVED BY: A. Jones
TITLE: Branch Chief
ORG: OPP/EFED/ERB1

Signature:_____

Date:_____

CONCLUSIONS:

Mobility - Leaching, Adsorption/Desorption

These mobility data are an addendum to a previous mobility study (MRID 43018801). This mobility study is scientifically valid. In addition, it can be used to partially fulfilled the data requirement (163-1). Based on the acceptability of this adsorption/desorption study and the aged soil column leaching study (MRID 42918664), the data requirement is considered fulfilled at this time. No further mobility data for fipronil are needed.

Due to an error (data reversed) discovered in the previous study Tables, an addendum was issued which included recalculation and reevaluation of the data Tables and data. These recalculated data resulted in considerably lower Freundlich constants and K_{oc}s. However, the final assessment of the mobility data only changed slightly. Fipronil appears to be slightly mobile to relatively non-mobile in the five foreign soils tested. In the previous mobility data assessment, fipronil appeared to be relatively non-mobile. The amended study reported adsorption K_{oc} values ranging from 427 to 1248 mL/g. In addition, the amended study reported Freundlich constants of 4.19, 9.32, 10.73, 14.32, and 20.69 mL/g for Manningtree loamy-sand UK, France sandy-clay-loam 1, French sandy-clay-loam 2, Speyer 2.2, and Manningtree loam UK soils, respectively. The original Ks and K_{oc} values ranged from 26.2 and 2671 mL/g to 148.6 and 7818 mL/g, respectively. The new K values ranged from 4.19 to 20.69 with an mean K_{oc} of 727 mL/g. The lowest organic matter content soils had the highest K_{oc} values. Furthermore, the desorption K values (7.25 to 21.51) were similar to those for adsorption for all five desorptions. Each desorption phase showed an increase in desorption for most soils. The reported batch equilibrium data indicate fipronil is relatively non-mobile to slightly mobile in terrestrial soil and aquatic environments.

MATERIALS AND METHODS:

Test Material: [^{14}C]radiolabelled fipronil, uniformly labelled in the benzene ring, was obtained from Rhone-Poulenc Agriculture. A specific activity of 19.62 mCi/mmole and radiochemical purity of 95.5% was reported.

Reference Standards: Non-radiolabelled standards of MB 46030, MB 45950, MB 45897, MB 46136, MB 46513, RPA 200766, RPA 105048, and RPA 104615 were obtained from Rhone-Poulenc Agriculture for analytical purposes. No chemical purities were reported for potential degradates. However, the non-radioactive fipronil had a reported chemical purity of 99.3%. Another non-radiolabelled, MB 46030 (parent fipronil), standard, which was obtained from Rhone-Poulenc Agrochimie, St. Fons, Lyon, France, had a reported chemical purity of 95.4%.

Test Solutions: The stock solution was diluted with 0.005 M aqueous calcium chloride to obtain test solutions of 1, 0.2, 0.05, and 0.01 µg/mL MB 45030. Concentrations were determined by LSC.

Soil: A total of five soils were used for the study. Two soils were obtained from Manningtree, UK, two from France, and one (Speyer 2.2) from Germany. See Tables 1 and 2 for soil characterization. It should be noted that the soil with soil reference number 91/8 is a loamy-sand soil by USDA classification of soil textures. Each soil was air-dried to a contant weight and sieved through a 2 mm sieve.

Test System: Adsorption/desorption test methodology.

METHODOLOGY:

After each test solution was analyzed by LSC, a 10 mL aliquot (0.005 M calcium chloride + the test solution aliquot (See Table 3)) of the appropriate test solution was applied to duplicate 2.5 gram aliquots of each air dried test soil in separate test tubes. Nominal concentrations of the test material applied to the soil test tubes were 0.01, 0.05, 0.2, and 1 µg/mL. The treated soil test tubes were stoppered, reweighed, and wrapped in aluminum foil (to avoid photolysis). The prepared soil test tubes were then shaken vigorously for 24 hours to ensure complete suspension of the test soils and centrifuged. Supernatants were decanted into separate vials and taken in triplicate aliquots (0.05, 0.25, or 1.0 mL) for LSC analysis.

The desorption phase was carried out by adding 10 mL of 0.005 M aqueous calcium chloride to each of the soil test tubes after the supernatant was removed. The soil test tubes were again stoppered, shaken for 1 hour, and centrifuged. After centrifugation, the supernatant was decanted and triplicate aliquots (0.05 to 3.0 mL) submitted for LSC analysis. This entire desorption phase was repeated four times.

After completion of the desorption phase, each test soil residue was extracted with acetonitrile. The acetonitrile phases from each test soil was decanted and triplicate aliquots (0.05, 0.25, or 1.0 mL) of the acetonitrile phase extracts were submitted for LSC analysis. Extracted soil residues were then weighed, mixed, and ground prior to being submitted to combustion and radioactivity analysis.

Test samples were analyzed by HPLC and GC-MS. The mobile phases used for HPLc were methanol/water (40:60 + 1% ammonium acetate) and pure methanol.

To determine the stability of fipronil adsorption phase extracts were concentrated by freeze drying, redissolved in methanol, and analyzed by TLC. TLC analysis was performed on the concentrated adsorption and first desorption extracts from the test soils treated at the 1.0 µg/mL level. The TLC mobile phase used was dichloromethane/acetone/ethyl acetate (95:2:3;v/v/v). In addition, one TLC plate was redeveloped with methanol to determine if the degradate RPA 104615 was present in the radioactive material remaining at the origin. The reference standard for parent material was applied along side of the test samples for comparison.

DATA SUMMARY:

Freundlich constant (K) and organic carbon basis (K_{oc}) values of 4.19 mL/g, and 1248 mL/g for UK Manningtree loamy-sand, 9.32 mL/g and 800 mL/g for France sandy-clay-loam 1, 10.73 mL/g and 673 mL/g for French sandy-clay-loam 2, 14.32 mL/g and 427 mL/g for German Speyer 2.2, and 20.69 and 486 for UK Manningtree loam soils, respectively, indicate that fipronil is slightly mobile to relatively non-mobile (mean K_{oc} value = 727) in the test soils. The slopes (1/n) values for the adsorption phase ranged from 0.947 to 0.969 (See Table 5). In the amended study there still appeared to be a negative correlation between the K_{oc} and organic matter content. The soils with high organic matter (German Speyer and Manningtree loam) had low K_{oc} values (427 and 486, respectively). In addition, there does not appear to be a correlation between soil texture and K and K_{oc} values. The two loamy-sand soils had very different K (14.32 and 4.19) and K_{oc} (427 and 1248) values.

The desorption values were of similar order to the adsorption values. In addition, the desorption values slowly increased (if at all) with each of the four desorption phases. Therefore, the study authors believed that processes involved in adsorption and desorption are similar for fipronil (See Tables 6 to 10).

The mean material balance (See Table 4) for the treated fipronil test soils at all concentrations ranged from 91.85 to 99.14. Individual recoveries of applied radioactivity for soil test tubes ranged from 86.50 to 106.34.

The TLC and HPLC chromatograms indicated that parent fipronil was the principal adsorbate and desorbate (1st desorption). The lack (below detection level) of other fipronil residues (degradation products) was confirmed by MS.

COMMENTS:

1. The registrant found that an error had been made in the data of the adsorption/desorption (MRID 43018801) submitted to the Agency in 1994. Some of the data had been reversed which resulted in significantly different Freundlich constants and K_{oc}s. The original Ks and K_{oc} values ranged from 26.2 and 2671 mL/g to 148.6 and 7818 mL/g, respectively. The new K values ranged from 4.19 to 20.69 with an mean K_{oc} of 727 mL/g.

2. The aged soil column leaching study (MRID 42918664) used the same five soils as the adsorption/desorption study. The results of the column leaching study indicated that fipronil is slightly mobile to relatively non-mobile. Of applied radioactivity, ≥85% remained in the top 0 to 8 cm segment of the soil columns except for the Manningtree

loamy-sand soil. In the Manningtree loamy-sand soil, >80% of applied radioactivity remained in the 0 to 14 cm segment of the soil column.

3. Foreign soils were used for the study. However, the USDA soil characterizations were given and the USDA soil texture could be determined for all five test soils. The soil called Manningtree UK sandy loam soil was determined to be a loamy sand soil by USDA classification. The soil is referred to as a Manningtree UK loamy sand in this DER. Furthermore, based on OM content and CED, these soils may not reflect U.S. soils. Therefore, these test results may not reflect U.S. test soils.

4. A Manningtree sandy loam soil was used in the aerobic and anaerobic metabolism studies as per guidelines for CFR 40 (158.290). This soil is similar to the Manningtree loamy sand soil used in this mobility study. Use of the same soils in the laboratory studies allows for better comparative data.

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Finished Version

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