Received 6/23/86

Shaughnessy No.: 123301

Date Out EAB: JUN 18 1986

Signature:

TO: Henry Jacoby
Product Manager #21
Registration Division TS-767C

FROM: Emil Regelman, Supervisory Chemist
Review Section #3
Exposure Assessment Branch
Hazard Evaluation Division

Attached please find the environmental fate review of:

Reg./File No.: 359-706

Chemical Name: Fosetyl-AL

Type Product: Fungicide

Product Name: Aliette

Company Name: Rhone Poulenc

Purpose : Response to EPA review.

ACTION CODE(s): 336

EAB # (s): 6470

Date Received: 5/12/86

TAIS Code: 44

Date Completed: 6/18/86

Total Reviewing Time: 1.0 Day

Monitoring requested:

Monitoring voluntarily Done:

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

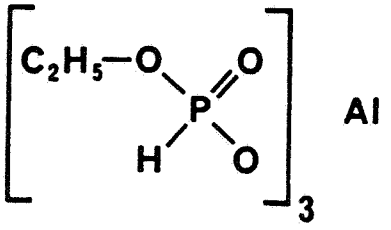
_____ Toxicology Branch

1. CHEMICAL: Common Name: Fosetyl-AL

Chemical Name: Aluminum tris (O-ethyl phosphonate)

Trade Name: Aliette

Structure:



FORMULATIONS:

Fosetyl-AL Technical - 95%
Wettable Powder - 80%

Physical/Chemical Properties

Empirical formula: $C_6H_{18}AlO_9P_3$
Molecular weight: 354
Physical state: White crystalline solid
Vapor pressure: a mineral salt (not applicable)

Solubility:	120 g/L	in water
	0.920 g/L	in methanol
	< 0.005 g/L	in ethyl acetate
	0.013 g/L	in acetone
	0.005 g/L	in benzene
	0.045 g/L	in methylglycol

Density: 0.4g/ml (80% W.P.)

Stability: Stable under dry conditions for a minimum of three months (a) 50°C

2. TEST MATERIAL: Aluminum tris-O-[1- ^{14}C] ethylphosphonate (Radiopurity- 98%)

3. STUDY ACTION TYPE: Response to review by EAB - see study - Chabassol, Y. 1984- MRID- 00147361 - Anaerobic aquatic metabolism.

4. STUDY INDENTIFICATION:

Chabassol, Y. 1984. Fosetyl-Al: Anaerobic aquatic metabolism study: Ref. No AG/CRLD/AN/241.84. Unpublished study prepared by Rhone - Poulenc Agrochimie Lyon, France.

5. REVIEWED BY:

John H. Jordan, Ph.D.
Microbiologist
Review Section #3, EAB/HED/ OPP

Signature: John Jordan

Date: 6/18/86

6. APPROVED BY:

Emil Regelman
Supervisory Chemist
Review Section #3 EAB/HED OPP

Signature: E Regelman

Date: JUN 19 1986

7. CONCLUSION:

Groundwater data-call-in for Aliette (fosetyl-AL) was not triggered, therefore, there are no concerns about groundwater contamination. The short aerobic half-life, <3 hrs.,and the relatively fast anaerobic decomposition,14-40 hrs., preclude groundwater concerns.

The anaerobic aquatic metabolism study (00147361) satisfies the anaerobic soil metabolism requirement. A field dissipation study is not required because of the short 1/2 -life; both the aerobic and anaerobic soil metabolism studies show rapid dissipation and metabolism.

8. RECOMMENDATIONS:

Registrant should be informed of the decisions in Section 7, Conclusion.

9. BACKGROUND:

A. Introduction:

Registrant requested clarification of:
(a) Anaerobic aquatic requirement status
(b) Requirements for a dissipation study
(c) Groundwater contamination potential

B. Directions for use

Forestyl-Al is applied as a diluted foliar spray, as a soil drench, as a propagule dip, and as preplant soil incorporation . The foliar spray is applied to nonbearing citrus at 4.0 lb ai/A per application (4 application/year), pineapple at 2.0-6.0 lb ai/A per application (4 application/year), turf at 8.7 and 17.4 lb ai/A per application (26 and 27 applications/year), and ornamentals at 2.0-4.0 lb/100 gal (<12 application/year). For the pineapple dip treatment, 2.0 lb ai/100 gal are adequate to treat propagules required to plant 1 acre. The soil drenches and incorporations are designed for the treatment of potting mixtures and potted plants only. The drenches are applied at 0.8-1.6 lb ai/1000 ft^2 (monthly); the incorporations are applied at 5.2-10.4 oz/yd^2 (1 application/year).

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

See study (attached) and Conclusion, Section 7.

11. COMPLETION OF ONE-LINER:

One-liner completed but not updated to include new uses.

12. CBI APPENDIX:

No CBI included except the (original) hard copy referenced in Section 4.

CASE GS 0260 FOSETYL-AL STUDY PM --

CHEM 123301 Fosetyl-Al

BRANCH EAB DISC --

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID 00147361 CONTENT CAT 01

Chabassol, Y. 1984. Fosetyl-Al: anaerobic aquatic metabolism study: Ref. No. AG/CRLD/An/241.84. Unpublished study prepared by Rhone-Poulenc Agrochimie, Lyon, France.

SUBST. CLASS = S.

DIRECT RVW TIME = 16 (MH) START-DATE END DATE

REVIEWED BY: L. Binari
TITLE: Staff Scientist
ORG: Dynamac Corp., Rockville, MD
TEL: 468-2500

APPROVED BY: J. Jordan
TITLE: Microbiologist
ORG: EAB/HED/OPP
TEL: 557-0578

SIGNATURE: J. Jordan DATE: 6/12/86

CONCLUSIONS:

Metabolism - Anaerobic Aquatic

1. This study is scientifically valid.

2. [^{14}C]Fosetyl-Al, at 22 to 25 ppm, degraded in water:silty clay loam and water:sandy loam with half-lives of ~40 and ~14 hours, respectively. After 240 hours in the silty clay loam system, evolved $^{14}CO_2$ accounted for ~48% of the total radioactivity. Fosetyl-Al in the aqueous fraction comprised ~7% of the total radioactivity.

3. This study fulfills EPA Data Requirements for Registering Pesticides by providing information on the degradation of [^{14}C]fosetyl-Al in anaerobic aquatic systems using a silty clay loam soil and a sandy loam soil.

MATERIALS AND METHODS:

Silty clay loam (12.7% sand, 54.7% silt, 32.6% clay, 3.9% organic matter, pH 6.8) and sandy loam (62.3% sand, 20.2% silt, 13.6% clay, 3.6% organic matter, pH 5.3) soils were sieved (<2 mm) prior to use. To establish anaerobic conditions 5.0 g of soil, 50 mg of alfalfa meal, and 20 ml of water were combined in a glass centrifuge bottle which was capped and

stored in the dark at 20 ± 2°C for 29 to 34 days. Once anaerobic conditions were established, 1.0 ml of a 22 to 25 ppm aqueous solution of [^{14}C]fosetyl-Al (radiochemical purity 98%; specific activity 25.5 µCi/mg) was added. The centrifuge bottle was then stoppered, the contents were homogenized for 10 min., and the bottle was attached to a gas collection system having three successive traps. A stream of nitrogen was bubbled through the aqueous phase in the centrifuge bottle, and then was passed through two traps which contained 0.1 N sodium hydroxide and through a third trap which held concentrated sulfuric acid. The test systems were maintained at 20 ± 2°C in the dark. Samples from the silty clay loam test systems were collected immediately after homogenization and at 2, 5, 8, 16, 32, 120, and 240 hours after treatment. Samples from the sandy loam test systems were collected immediately after homogenization and at 3, 8, 17, and 32 hours after treatment.

Radioactivity in the gas trap solutions and the aqueous phase of the test systems was determined by LSC. The first gas trap solution (0.1 N sodium hydroxide) and the aqueous phase were analyzed by HPLC equipped with a radiometric detector. $^{14}CO_2$ was determined in the first gas trap solution by LSC counting before and after barium carbonate precipitation.

Soil samples were extracted successively with the following reagents: 0.1 N sulfuric acid, water, 0.1 N ammonium hydroxide, water, and methanol. The extracted soil samples were analyzed using LSC following combustion.

REPORTED RESULTS:

Under anaerobic aquatic conditions, [^{14}C]fosetyl-Al (22 to 25 ppm) degraded in silty clay loam and sandy loam with half-lives of ~40 and ~14 hours, respectively. After 240 hours in the silty clay loam, a substantial portion of the applied radioactivity had evolved as $^{14}CO_2$ (~48%) and only a small amount of the parent compound (~7%, 1.5 ppm) remained in the aqueous fraction (Table 1). A similar pattern of degradation occurred in the sandy loam.

DISCUSSION:

An experiment was performed using the ammonium salt of [^{14}C]fosetyl in which ethanol and CO_2 were identified as degradates of fosetyl in the aqueous fraction of the silty clay loam test system. That experiment was not reviewed because the active ingredient, fosetyl-Al, was not used. In addition, the formation of phosphorous acid, a possible degradate of fosetyl-Al, was not monitored during the study. However, since the major degradates of fosetyl-Al appear to be CO_2, ethanol, phosphorous acid, and aluminum, further studies on degradate identification are considered unnecessary.

Table 1. Distributions (% of applied) of radioactivity following application of [^{14}C]fosetyl-Al to anaerobic aquatic test systems.

Fraction	Incubation time (hours)							
	0	2/3[a]	5	8	16/17[a]	32	120	240
				Silty clay loam				
Volatiles ($^{14}CO_2$)	--	0.3	0.7	0.9	1.9	5.9	27.1	48.1
Aqueous phase	89	90.1	85.9	86.2	82.0	70.9	51.5	22.5
Fosetyl[b]	89(18.7)[b]	87(18.2)	77(16.2)	80(16.9)	73(15.4)	50(10.6)	25(5.2)	7(1.5)
Soil sediment								
Extracted[c]	9.4	10.1	9.2	8.8	7.9	8.7	9.5	11.3
Bound	1.0	1.4	2.0	1.8	1.7	3.1	4.1	5.3
Total	99.1	101.8	97.6	97.7	93.5	88.6	92.2	87.1
				Sandy loam				
Volatiles ($^{14}CO_2$)	--	0.6	--	2.4	7.7	16.6	--	--
Aqueous phase	85.9	78.8	--	77.4	60.5	43.3	--	--
Fosetyl[b]	86(20.1)	70(16.4)		64(15.0)	44(10.3)	13(3.0)		
Soil sediment								
Extracted[c]	13.8	11.0	--	10.7	14.2	14.0	--	--
Bound	0.3	1.5	--	2.8	5.0	6.0	--	--
Total	100.0	91.9	--	93.3	87.4	79.9	--	--

[a] Silty clay loam samples taken at 2 and 16 hours, sandy loam samples taken at 3 and 17 hours.

[b] ppm Fosetyl in parenthesis.

[c] Believed to be water-associated radioactivity which remained in soil after the aqueous fraction was removed.