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10/11/79

Date Out EFB:

To: Product Manager
TS-767 Ellenberger(19)

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

From: Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 241-EUP-93 9G2271

Chemical: tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone [3-[4-(trifluoromethyl) phenyl] - [2-[4-(trifluormethyl)phenyl] ethenyl] -2-propenylidene] hydrazone

Type Product: ~~Fire Ant Control Insecticide~~

Product Name: AC 217,300 Insecticide

Company Name: American Cyanamid Co.

Submission Purpose: cropland and noncropland

ZBB Code: Sec. 5

Date in: 10/2/79

Date Completed: 10/11/79

Deferrals To:

☐ Ecological Effects Branch

☐ Residue Chemistry Branch

☐ Toxicology Branch

1.0 Introduction

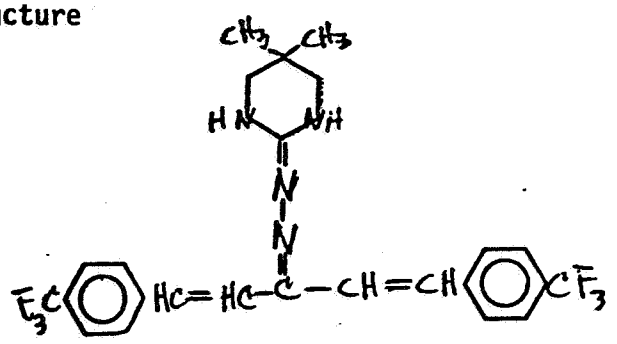
1.1 Chemical Name and Type Pesticide

Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone [3- [4-(trifluoromethyl) phenyl] -1- [2- [4-(trifluoromethyl) phenyl] ethenyl] -2-propenylidene] hydrazone, 0.5% a.i. Insecticide

1.2 Trade Name

AC 217,300, CL 217,300

1.3 Structure



1.4 Physical and Chemical Properties

Emp. For. = $N_4F_6C_{25}H_{24}$
Mol. Wt. = 494.5
Color and state = yellow, crystalline solid, odorless.

1.5 AC 217,300 Insecticide [redacted]
active ingredient (1.0 lb contains 0.08 oz of a.i.)

Applicant requests an experimental use permit for cropland and non-cropland in evaluating control of the imported fire ant in Ala, Ark, FLa, Ga, La,Miss, N.C., S.C., and Texas. A total of 120,000 acres will be treated.

2.0 Directions for Use

AC 217,300 insecticide should be applied with a granular pesticide applicator properly calibrated to assure accurate placement and proper dosage. Apply broadcast by scattering evenly over the infested area. Apply when ants are active (usually April through October). If necessary, apply retreatment 4 to 5 months after the first treatment.

INERT INGREDIENT INFORMATION IS NOT INCLUDED

Rate lb/A	Application
0.75-1.25 lb/A	Broadcast-single or split application with ground equipment or aircraft.

Dispose of container by incineration or in landfill or bury in a safe place. This product is toxic to fish. Keep out of lakes, streams, or ponds.

3.0 Discussion of Data

3.1 Hydrolysis

3.1.1 The Hydrolysis of Carbon-14 Labeled CL 217,300 in an Aqueous System. I.P. Kapoor, Acc #098985, Section D2, Exhibit 1.

Experimental Procedure

Using 10 ppm of CL 217,300 dissolved in 30% DME-buffer, the study was carried out in the dark at 35 C and at pH 3.3, 6.4, and 9.2. CL 217,300 labeled with C-14 in the benzylic (two) and in the pyrimidinyl(one) positions was used.

Analytical Procedure

TLC and liquid scintillation counting.

Results/Conclusions

The rate of hydrolysis is pH-dependent for both labels. For the benzylic labeled compound the half-lives were: 24.4 days at pH 3.3, 5.2 days at pH 6.4, and 4.8 at pH 9.2. For the pyriminidyl labeled compound the half-lives were: 20.8 days at pH 3.3, 3.6 days at pH 6.4, and 4.8 days at pH 9.2. Four degradation products were detected from each labeled parent. The benzylic-labeled study identified CL 98,724 as one of the degradates.

CL 217,300 is rapidly hydrolyzed at pH 6.4 with a half-life of 3.6-5.2 days. This data now differs from that of a preliminary study submitted earlier. Of the four radiospots (degradates) detected on each of the two chromatograms (one for each different label), two appeared identical (based upon position) and two appeared to be different. Only one of the radiospots was identified, which for the purposes of this experimental use submission, is acceptable.

3.2 Aerobic Soil Metabolism

3.3.1 Preliminary Aerobic Soil Metabolism of CL 217,300. I.P. Kapoor, Acc. #098985, Section D2, Exhibit 6.

Experimental Procedure

Study conducted in dark for one month using C-14 CL 217,300 at 5 ppm in sandy loam soil. The high dose (500 x field dose) was used to facilitate isolation and identification of products. Acetone and methanol extractions carried out.

Analytical Procedure

TLC and liquid scintillation counting.

Results/Conclusions

The various extractions regained 90.7% of the applied radioactivity. Acetone extracted 62.9% of the activity and methanol 9.0%. TLC of the acetone extract yielded two major (#1 and #2) and three minor radiospots. Spot #1 (87.1% activity of extract) was identified as parent; spot #2 had not been identified. Unextractable activity was 6.0% of applied dose.

A one month preliminary study in sandy loam soil indicates degradation into 2 major and 3 minor components.

3.3 Rotational Crop Studies

None are required since use will be on rangeland grasses and no crops will be rotated.

The following studies are not required for an EUP, but a brief review is given for informational purposes only.

3.4 Octanol-Water Partition

3.4.1 CL 217,300: Determination of Partition Coefficient in n- Octanol-Water Solvent System. S. H. Caballa. Acc #098985, Section D2, Exhibit 2.

The average partition coefficient was 206 at pesticide concentrations of 0.1, 0.5, and 1.0 ppm in the octanol phase. DDT has a coefficient of 9, 490.

3.5 Photodegradation

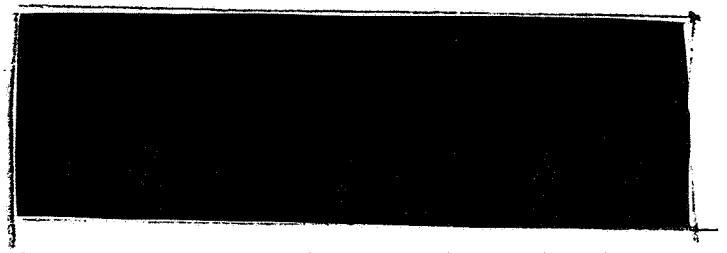
3.5.1 The Photolysis of Carbon-14 Labeled CL 217,300. I.P. Kapoor, Acc #098985, Section D2, Exhibit 3..

The half-life of the compound is 3.2 hrs under artificial light and 1.0 hr. under sunlight. Eight photodegradation products that resulted from exposure to artificial light were partially identified as:

I - Mol. wt. 189
II- CL 98,724
IV- CL 71,640
V - Mol wt. 350
VI - IX - Unknown

3.5.2 CL 217,300: The Photolysis of CL 217,300 Bait Formulation on Several Carriers. A. Markantonates. Acc. #098985, Section D2, Exhibit 4.

The photolysis rate was determined while the pesticide formulation was on six different carriers:



using four daylight lamps. The half-life ranged from about 12 hours to 32 hours. The longest half-life was exhibited by formulation #6 and was 32 hours. Formulation #1 and #3 had half-lives of 25.5 and 20.5 hours, respectively.

INERT INGREDIENT INFORMATION IS NOT INCLUDED

3.6 Mobility

3.6.1 Mobility of CL 217,300 I.P. Kapoor, Acc #098985, Section D2, Exhibit 5.

Preliminary laboratory soil mobility studies using soil thin layer plates were carried out for CL 217,300 labeled in the benzylic carbons. The results indicate that CL 217,300 is immobi in Princeton sandy loam and Wisconsin silt loam soils; there was no movement from the origin.

3.7 Effects of Microbes on Pesticide

3.7.1 CL 217,300: The effect of soil microorganisms on Carbon-14 labeled CL 217,300. S.H. Caballa, Acc #098985, Section D2, Exhibit 7.

A sandy loam soil containing 5.0 ppm of benzylic-labeled CL 217,300 was incubated 30 days at room temperature. Labeled CO_2 collected was 3% of the applied dose. TLC analysis showed 62% of the parent CL 217,300 as a sole carbon source. It was concluded that microbial metabolism of CL 217,300 resulted from cometabolism.

3.8 Bioaccumulation

3.8.1 CL 217,300: Biodegradability, Environmental Fate, and Ecological Magnification of Carbon-14 Labeled CL 217,300 in a Model Ecosystem. S.H. Caballa, Acc. #098985, Section D2, Exhibit 8.

The bioaccumulation potential (BAP) (ratio of residues in organism to that in water) for Cl 217,300, as compared with mirex, was measured for mosquito fish. Over a 3-week exposure peiod the BAP for CL 217,300 remained at an average of about 100, while the BAP for mirex averaged 1764. An ecosystem containing a soil/water interface was set up separately for C-14 labeled CL 217,300 and mirex to determine bioconcentration factors for various components. Comparing CL 217,300 vs mirex it was found: algae (170 vs 5042), Daphnia (311 vs 1123), mosquito larvae (571 vs 1993), snails (569 vs 15,320), and fish (95 vs 2326).

3.9 Range Grass Residues

3.9.1 CL 217,300: Residues of CL 217,300 in Range Grass Grown in Soil Treated with Carbon-14 labeled compound at Gainesville, Florida. P.E. Gatterdam, Acc #098985, Section D2, Exhibit 9.

The principal findings were:

1. maximum residues of 0.03 ppm after 37 days.
2. total residues less than 0.01 ppm at 3 and 4 month interval.
3. no apparent build-up of bound residue.

4.0 Conclusions

4.1 Hydrolysis

CL 217,300 is rapidly hydrolyzed at pH 6,4 with a half-life of 3.6-5.2 days.

4.2 Aerobic Soil Metabolism

Five degradates were detected after a one month preliminary study.

4.3 Octanol-Water Partition

The average partition coefficient was 206.

4.4 Photodegradation

T 1/2 was 3.2 hours under artificial light and 1.0 hour under sunlight.

Study of the pesticide formulation on six different carriers under daylight lamps gave a T 1/2 range from 12-32 hours.

4.5 Mobility

Pesticide was immobile in sandy loam and silt loam soils.

4.6 Effects of Microbes on Pesticide

While microbial breakdown occurs, CL 217,300 is not used as a sole carbon source, so degradation is a result of cometabolism.

4.7 Bioaccumulation

The bioaccumulation potential averaged 100 for CL 217,300 and 1764 for mirex in a study using the mosquito fish.

4.8 Range Grass Residues

Maximum residues of 0.03 ppm after 37 days.

5.0 Executive Summary

CL 217,300 hydrolyzes rapidly (T 1/2 3.6-5.2 days at pH 6.4), is metabolized (5 degradates) in aerobic soil, has an octanol-water partition coefficient of 206, has a T 1/2 of 1.0 hour in sunlight, is immobile in sandy loam and silt loam soil, degrades as a result of metabolism by microbes, had a bioaccumulation potential of 100 vs 1764 for mirex in the mosquito fish, and had a maximum range grass residue of 0.03 ppm after 37 days.

6.0 Recommendations

The proposed use of AC 217,300 under the experimental use program is acceptable.

Herbert L. Manning

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Review Section #1
Environmental Fate Branch