

Date Out EFB:

MAY 27 1981

FILE COPY

To: Product Manager LaRocca (15)
TS-767

From: Dr. Willa Garner *lll*
Chief, Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 241-260

Chemical: Amdro

Type Product: Insecticide

Product Name: Amdro

Company Name: Cyanamid

Submission Purpose: conditional registration follow up-effect on microbes and soil photolysis

ZBB Code: other

ACTION CODE: 570

Date in: 3/25/81

EFB # 801

Date Completed: MAY 27 1981

TAIS (level II) Days

Deferrals To:

64

3

 Ecological Effects Branch

 Residue Chemistry Branch

 Toxicology Branch

Date Out EFB: MAY 27 1981

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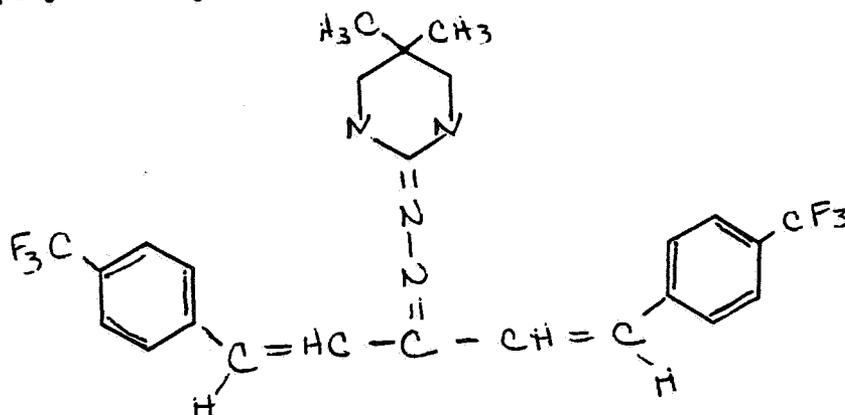
Deferrals To: :
: Ecological Effects Branch :
: Residue Chemistry Branch :
: Toxicology Branch :

64 3

1.0 INTRODUCTION

American Cyanamide has submitted environmental fate data for review to satisfy data requirements for a conditional registration.

2.0 AMDRO = tetrahydro-5,5-dimethyl-2(1H)-pyrimidone(3-(trifluoromethyl)phenyl)-1-(2-(4-(trifluoromethyl)phenyl)ethenyl)-2-propenylidene)hydrazone, AC 217,300, CL 217,300



3.0 DISCUSSION OF DATA

3.1 Effects of the Insecticide AC 217,300 on Soil Microorganisms. R.M. Atlas, 12/22/80. Accession No. 244585.

Amdro (97.7% pure a.i.) was tested at 6 g ai/acre, the normal field application rate and a 60 g ai/acre by dissolving in ethanol and diluting with water and added to soil to achieve a 60% water holding capacity. All experiments, including controls, were run in duplicate. The soil was classified loamy sand with a 0.64% organic carbon content.

3.1.1 Experimental Procedures

Four different procedures were utilized to enumerate the indigenous microorganism at 0, 7, 14, 21, and 42 days following application. The procedures were a) direct counts, b) aerobic heterotrophic mesophiles, c) mesophilic fungal propagules, and d) anaerobic mesophilic heterotrophs.

Results

No significant effect on the count of soil microorganisms was noted.

3.1.2 Experimental Procedures

Eleven pure cultures of microorganisms including bacteria, actinomycetes, thermophile, fungi, and yeasts were used to test the effect of Amdro on the growth of soil microorganisms. The study lasted 24 hrs.

Results

The addition of Amdro had no significant effect on the growth of those microorganisms.

3.1.3 Experimental procedures

The measurement of the effect of Amdro on the carbon, nitrogen, and sulfur cycling by soil microbes.

CO₂ produced as a result of conversion of organic matter was determined. In addition the effects on the mineralization of gelatin, glucose, cellulose and chitin were studied.

For N₂ fixation, the C₂H₂-C₂H₄ assay was used. For nitrification, NO₃⁻ concentrations were determined after the soil was amended with NH₄H₂PO₄.

Powdered S was added to soil portions to determine the effect on S oxidation. On specified days, SO₄⁻² was extracted and analyzed spectrophotometrically.

Results

No significant effects on respiration or mineralization were noted.

Amdro had no effect on N cycling functions.

No effect on S oxidation was noted.

3.1.4 Experimental Procedures

The activity of dehydrogenase and alkaline phosphatase in soil was determined as a result of Amdro application. Dehydrogenase enzymes convert 2,3,5,-triphenyltetrazolium chloride to 2,3,5-triphenyl formazan (TPF). Units of hydrogenase activity were computed as TPF units formed. These units were then converted to ul H₂/g soil/day. ←

Phosphatase activity was measured by determining the p-nitrophenol formed after incubated soils were brought to pH 8 with NaOH and 0.1 nmoles p-nitrophenyl phosphate. Units of phosphate activity were calculated and corrected to a g⁻¹ soil basis.

Results

No apparent effect on either enzyme activity.

3.1.5 Conclusions

EFB believes this study on the effects of Amdro on soil microbes to be valid.

No adverse effects of Amdro on microbe numbers and growth, enzyme activities, and on microbial cycling of carbon, nitrogen, and sulfur are to be expected.

- 3.2 Amdro Fire Ant Insecticide (CL 217, 300). Photolysis in Distilled Water. Lee, A and Mallipudi, M., 3/13/81, Accession Number 244585.

Experimental Procedures

200 ppm of carbon-14 labeled Amdro (benzylic label) was exposed to artificial sunlight at 27°C for various time intervals up to 90 minutes. A 90 min control experiment was run in the dark. Analyses of photolysates of C-14 labeled Amdro was by HPLC. Photodegradation products were identified by TLC or by TLC cochromatography and confirmed by mass spectrometry.

Results

The half-life was determined to be 42 min. None of the degradation products (16 radioactivity peaks) exceeded 10% of the total radioactivity.

Conclusions

This is a valid study. Results indicate that Amdro rapidly photodegrades in distilled water under artificial sunlight and is expected to behave in a similar manner in the environment.

- 3.3 Amdro Fire Ant Insecticide (CL 217, 300): Photolysis on Soil Thin-Layer Plates (Benzylic Carbon-14 Labeled). Barringer, D.F., 3/18/81. Accession Number 244605.

Experimental Procedures

10 ppm of benzylic C-14 labeled Amdro was applied to sandy loam soil at 27°C for various time intervals up to 7 days on a 20x20-cm soil thin-layer plate with a 0.75 mm layer of soil. Analyses of photolysates was by HPLC. Radioactivity was determined by liquid scintillation counting.

Results

At the end of 7 days at least 15 measureable components other than the parent were found. None of the degradation products exceeded 10% of the parent. The half-life is estimated to be approximately 5 days.

Conclusions

This is a valid study. Results indicate that Amdro is expected to photodegrade fairly rapidly in soil.

4.0 EXECUTIVE SUMMARY

- 4.1 Amdro does not appear to have any adverse effects on soil microorganisms in terms of numbers, growth rates, and activities at amounts up to 10 times the proposed rate to application.
- 4.2 Photodegradation in water is rapid with a half-life of 42 min producing only minor degradates.
- 4.3 Photolysis on soil thin-layer plates produced no major degradates. Half-life was determined to be 5 days.

5.0 RECOMMENDATIONS

The following data gaps still exist concerning the use of AMDRO in non-crop terrestrial situation:

- 1) Hydrolysis - all degradates constituting more than 10% of total must be identified.
- 2) Fish accumulation - flow through/bluegill; to be valid, the study must be done with all of the test chemical in solution, either by running below AMDRO water solubility (preferable), or by using carrier solvents such as used in toxicity determinations.

EFB request that data gaps above be listed as conditions for the registration of AMDRO.

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