Date Out EFB OCT - 9 1979

To: Product Manager Gee (17)
TS-767

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.: 100-EUP-AL, 9G 2230 / 100-EUP-AA, 9G 2230

Chemical: N-Cyclopropyl-1,3,5-triazine-2,4,6-triamine (CGA 72662)

Type Product: Larvicide

Product Name:

Company Name: Ciba-Geigy Corp.

Submission Purpose: Poultry, beef cattle, sheep and hog manure

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ZBB Code: Sec. 5

Date in: 7/23/79

Date Completed: 8-6-79

Deferrals To:

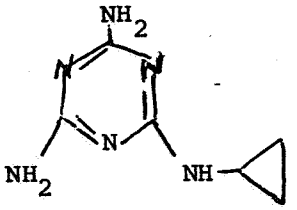
Ecological Effects Branch

Residue Chemistry Branch

Toxicology Branch

1. Introduction

Applicant proposes experimental use permit for the insecticide (larvicide) N-cyclopropyl-1,3,5-triazine-2,4,6-triamine. The company code name is CGA-72662. The structure is



The material is to be used as a feed-through larvicide in poultry, with application either in poultry feed or water.
In addition, the soluble concentrate formulation can be applied as topical surface spray on manure of poultry, beef cattle, sheep and hogs.

2. Directions for Use

No labels or specific directions were included in the submission routed to EFB. From other information, the general directions for use are deduced. Two formulations of CGA-72662 will be tested.

0.3% Premix to be mixed into final poultry ration to provide 1.5-5.0 ppm, about 1-3 pounds of 0.3 Premix per ton of finished poultry rations.

5% SCO (soluble concentrate) to be mixed with poultry drinking water at rate of 5 ppm. For hot periods, this could be equivalent to 20 ppm in feed since up to 4 pounds of water are consumed per pound of feed.

The 5% SCO can also be applied as a topical surface spray on manure of poultry, beef cattle, sheep and hogs, at the rate of 0.05%-0.1% active ingredient, at a rate of 1/2 to 1 gallon finished spray per 100 square feet. (About 0.9 lbs - 3.6 pounds active per acre.)

3. Discussion of Data

Hydrolysis of CGA-72662 under Laboratory Conditions. by N. Burkhard
Project Report 17/79 May 10, 1979

^{14}C-CGA-72662 was added to 0.1 N HCl, 0.1 N NaOH and to buffered solutions of pH 5, 7, and 9 at concentration of 100 ppm. Samples were maintained at 30, 50 and 70°C for periods up to 28 days.

No significant hydrolysis of CGA-72662 occured during 28 days at pH 5, 7 or 9 at 30°C, 50°C or 70°C.

In unbuffered 0.1 N HCl, CGA-72662 was hydrolyzed with calculated half-life of 106 and 7.7 days at 50°C and 70°C. Basic conditions (0.1 N NaOH) showed 70°C calculated halflife at 80 days.

The acidic (0.1 N HCl) conditions showed hydrolysis product 2-amino-4-cyclopropylamino-6-hydroxy-s-triazine, while basic (0.1 N NaOH) conditions showed both the monohydroxy triazine (above) and the dihydroxy triazine 2-cyclopropylamino-4,6-dihydroxy-s-triazine.

The applicant concludes that hydrolysis is not an environmentally significant pathway of degradation.

Photolysis of CGA-72662 in Aqueous Solutions under Artificial Sunlight Conditions. By N. Burkhard, Project Report 18/79 May 10, 1979.

Aqueous solutions containing 100 ppm ^{14}C-CGA-72662 (presumably radiolabeled in the triazine ring), both with 1% acetone (photosensitizer) and without photosensitizer, were exposed in a photochemical reactor to artificial sunlight for periods up to 168 hours. A mercury vapor lamp was used, with light below 290 nm absorbed prior to sample exposure. Solutions had an initial pH 6.6 and were maintained at 25°C.

No photodegradation of CGA-72662 occurred in non-sensitized (acetone-free) samples up to 168 hours.

Photosensitized reactions showed photolytic halflife of about 10 hours. At 6 hours irradiation, parent compound constituted 60% of initial ^{14}C, and remainder was the photolysis product melamine (2,4,6-triamino-s-triazine).

Environmental photodegradation of CGA-72662 in aqueous solutions containing natural photosensitizers is expected to occur.

Biological Report for the Metabolism of -^{14}C-CGA-72662 in Beef Manure. By G. Brown, V. Seim. Report No. BIOL-78008 Dec. 8, 1978.

This report describes beef manure collection, treatment with ^{14}C-CGA-72662, fly seeding, incubation, and sampling. It reports the efficacy of fly larva control. The treated manure described in this report was subjected to metabolism experiments reported elsewhere.

Biological Report for the Metabolism of -^{14}C-CGA-72662 in Chicken Manure by V. Seim, G. Brown. Report No. BIOL-78006 Sept 22, 1978

This report describes chicken manure collection, treatment with ^{14}C-CGA-72662, fly seeding, incubation and sampling. It reports the efficacy of fly larva control. The treated manure described in this report was subjected to metabolism experiments reported elsewhere.

Radioassay of ^{14}C in Biological Materials by Combustion Using the Harvey Biological Material Oxidizer (BMO) by P. Hermes, Method AG-252, 8-14-73.

This report discusses the operation of the combustion oxidizer. There is no directly relevant environmental fate information on CGA-72662 in this report.

Separation of Polar Triazine Herbicide Metabolites on an Aminex A-5 Cation Exchange Column. By P. Halama, B. Simoneaux, Method AG-248, 6-20-73.

This report describes the separation of polar water soluble triazine metabolites in extracts of biological materials. There is no directly relevant environmental fate information on CGA-72662 in this report.

Statistical Methods in the Measurement of Radioactivity. By M. Wolf, D. Sumner. Method AG-276, 1-31-74.

This report discusses the statistical procedures for interpreting experimental results of radiological investigations. There is no directly relevant environmental fate information on CGA-72662 in this report.

Metabolism of Topically Applied ^{14}C-CGA-72662 in Chicken Manure. M5-21-2TM by B. Simoneaux, J.E. Cassidy.
Report No. ABR-79024 April 3, 1979

and

Metabolism of Topically Applied ^{14}C-CGA-72662 in Beef Manure. M5-21-1TM by B. Simoneaux, J.E. Cassidy.
Report No: ABR-7904 May 15, 1979

Both studies, conducted in similar manner, determined ^{14}C-CGA-72662 metabolism in chicken or beef manure after application as a topical spray at a rate of 0.1% active ingredient in 1 gallon of spray per 100 square feet. Fresh manure was added daily to maintain biological activity, and samples taken at 1,7, 14, and 21 days posttreatment. Manure was extracted with acetonitrile: water, and TLC used to separate metabolites. Radioassay by LSC, and ion exchange chromatography.

Results - Chicken Manure

There is no evidence of metabolism of CGA-72662 in chicken manure for 21 days. Material balance averaged 104% and acetonitrile extractable ^{14}C averaged 99% over the 21 day interval. No detectable amounts of metabolites were present in TLC or ion exchange chromatography.

Results - Beef Manure

Acetonitrile - extractable ^{14}C declined to 78% at 21 days, while non-extractables increased to 13%. Material balance declined from 99% to 91%. Parent compound accounted 64-69% of applied ^{14}C at 21 days by TLC and ion exchange chromatography. Two less basic metabolites (unidentified) each were present at less than 5% at 21 days. Authors speculate that the increase in non-extractable ^{14}C with time is due to selective adsorption of metabolites, since the non-extractable ^{14}C increase is closely balanced by decrease in parent compound CGA-72662.

CGA-72662: Environmental Impact Statement to support an Experimental Use Permit. By L.G. Ballantine
Report No. ABR-79061 June 8, 1979

This report summarizes the environmental fate studies reported elsewhere. This report proposes the additional environmental chemistry studies to support full registration.

Discussion of the Applicants Proposed Studies.

The applicant states that the use of CGA-72662 as a poultry feed-through larvicide is not a specific use category as defined in the July 10, 1978 proposed Guidelines. Such statement is correct.

Proposed studies include:

1. Soil Metabolism.
   A 50/50 mixture of soil/manure will be incubated under aerobic, and sterile conditions for a period of six months. Radioassay and characterization of ^{14}C.

2. Effects of CGA-72662 on Soil Microbes.
   A functional approach study of nitrification, nitrogen fixation, and celluose, starch and protein degradation will be conducted on soil/manure mixture.

3. Activated Sludge Metabolism.

4. Leaching studies in soil columns using soil/manure mixture.

5. Bluegill fish accumulation study in flow-through system, even though the reported octanol/water coefficient is 0.8.

The applicant argues that field dissipation and crop uptake studies are not necessary, since the actual amounts are extremely small. Applicant calculates that chicken manure from 5 ppm feed would result in 0.2 ppm in 0-3 inch soil layer, if the manure is field-applied at 20-tons/acre. Based on the same assumptions, it can be calculated that chicken manure from chickens watered with 5 ppm in drinking water may result in up to 0.8 ppm in 0-3 inch soil layer (using applicant's statement that 5 ppm in water can be equivalent to up to 20 ppm in feed and water/feed ratio may be 4/1 in hot weather).

The applicant proposes that crop uptake study be omitted since "Based on previously conducted triazine studies, the crop uptake of total triazine residues would not reach detectable levels."

4. Conclusions

The larvicide N-cyclopropyl-1,3,5-triazine-2,4,6-triamine is stable to hydrolysis under environmental conditions.

Under photolytic conditions, the larvicide N-cyclopropyl-1,3,5-triazine-2,4,6-triamine is stable in unsensitized experiments. However, when acetone is present as a sensitizer, the compound photodegrades with a halflife of about 10 hours, producing 2,4,6-triamino-s-triazine. Since many naturally occuring materials are reported to be sensitizers to a certain degree, it is expected that CGA-72662 will photodegrade in environmental waters but the rate will be variable and unknown due to the variability of the naturally occuring materials.

The degradation of CGA-72662 is relatively slow in beef manure over 21 days, and did not occur in chicken manure over 21 days.

5. Recommendations

EFB concurs with the proposed experimental use of CGA-72662, N-cyclopropyl-1,3,5-triazine-2,4,6-triamine as a feed premix for poultry and as soluble concentrate in poultry drinking water and topical spray on manure.

EFB agrees with the applicant's conclusion that the proposed use pattern is not specifically categorized. The proposed environmental chemistry studies appear to be reasonable basis for determining the environmental fate of the active ingredient, however, some comment is necessary.

1. In the proposed study of the soil metabolism of CGA-72662 in soil/manure mixtures, the outside limit of six months may not be satisfactory. The experiment may need to be extended for more than six months, to fulfill the intent of the soil metabolism data requirement. Extension or termination of the experiment has to be based upon interpretation and evaluation of test results, rather than a preselected calendar interval.

2. In regard to the applicant's statements concerning omission of field dissipation study and rotational crop uptake study, an a priori determination to omit the field dissipation study appears to be premature. Again, the interpretation and evaluation of the soil metabolism study must be considered. The statement that uptake into rotational crops is not expected to occur, based upon "previously conducted triazine studies" should be supported by more specific data or reference. It should also be pointed out that terrestrial crop or non-crop uses, if proposed in the future, would have to be supported by such field dissipation and rotational crop uptake data.

Cee Ann Davis

R.W. Cook 8-6/79
Review Section #1
Environmental Fate Branch