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FEB 21 1980

To: Product Manager 21
TS-767

Through: Dr. Gunter Zweig, Chief /s/
Environmental Fate Branch

From: Review Section No. 1 RWCook
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 239-EULT

Chemical: Captan
N-(trichloromethyl)thio-4-cyclohexene-1,2-dicarboximide

Type Product: Fungicide

Product Name: Ortho Soybean Seed Protectant (MO) Concentrate

Company Name: Chevron Chemical Company

Submission Purpose: Resubmission with environmental chemistry data.

EFB # 253 Action Code 52

ZBB Code: Sec. 3

Date in: 9-4-79

Date Completed: FEB 21 1980

Deferrals To:

☐ Ecological Effects Branch

☐ Residue Chemistry Branch

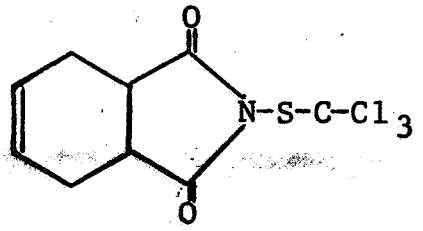
☐ Toxicology Branch

1. Introduction

Chemical Name and Type Pesticide: Captan, N-(trichloromethyl) Thio-4-cyclohexene-1,2-dicarboximide, Fungicide.

Product Name: Ortho Soybean Seed Protectant (MO) Concentrate

Chemical Structure



This is a resubmission of the registrant's soybean seed Protectant (MO) Concentrate, along with environmental chemical data, in response to deficiencies of a previous review.

2. Directions for Use

Soybeans: Use as a planter box treatment at the rate of 3 1/3 oz./100 lbs seed (2 oz./bushel).

When seed is planted at the rate of one bushel per acre, this will provide the needed ½ oz. of sodium molybdate per acre.

To achieve adequate coverage fill planter box only half full of seed, add half the required amount of ORTHO Soybean Seed Protectant (MO) Concentrate and mix thoroughly with a stick. Then put remainder of seed in the planter box and add the rest of the required amount of product, again mixing thoroughly. Better results are obtained by premixing seed with ORTHO Soybean Seed Protectant (MO) Concentrate in a suitable container, then pouring treated seed into planter box.

Treated seed must not be used for or mixed with food or animal feed, or processed for oil. Do not feed forage grown from treated seed. Seed commercially treated with this product must be labeled in accord with all applicable requirements of the Federal Seed Act.

3. Discussion of Data

Soil Persistence

Residue Test T-4546 with analysis of soil and crop samples, Chevron Chemical Co., Acc #240891, August 21, 1979.

Experimental Procedure

Chevron conducted a residue study in which soybean seeds were treated with the Seed Protectant Concentrate at the rate of 1 2/3 oz. a.i. per cut of seed (3 1/3 oz of formulation containing 50% captan per cut of seed). Trials were replicated 4 times. Each soil sample was a composite of 20 samples, 10 from within the rows and 10 from row middles. Soil cores 0 to 6 in. and 6 to 12 in. were taken 24 days, 72 days, and 168 days (harvest time) after treatment. Analysis was by GLC method RM-IF and the limit of detection was 0.03 ppm captan.

Results

No detectable residues were found in the soil samples at either sampling depth, nor in the soybeans harvested in the crop grown from the treated seed.

Conclusion

Captan residues did not occur in soil (after 24, 78, and 168 days) or soybean crops after planting treated seed. The captan was applied at the rate of only one oz. per acre (0.062 ppm).

Anaerobic Soil Metabolism

Anaerobic Soil Metabolism of Carbonyl-^{14}C Captan, D.E. Pack, Chevron Chemical Co., File No. 721.14, June 13, 1979, Acc. #240891.

Experimental Procedure

Oakley loamy soil (O.M. 1.4%) aliquots were placed in Mason jars, 100 ml water added, and the jars flushed with nitrogen. The jars were sealed and allowed to stand (25 C) for 8 weeks to become anaerobic. Samples were fortified with ^{14}C-captan (about 6 ppm), reflushed with nitrogen, sealed,and reincubated in dark. Metabolite characterization was accomplished by:

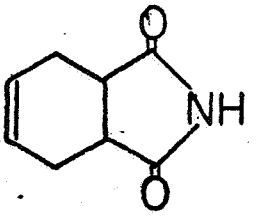
1. extraction of water with ethyl acetate and LSC analysis.
2. acidification of soil, ethyl acetate extractions, LSC analysis.
3. combustion of soil residue in Packard oxidizer.
4. metabolite quantitation by TLC and LSC.
5. identification by cochromatography and GC/MS.

The system to collect $^{14}CO_2$ involved a source of nitrogen, saturation with water, passage over soil sample, drying, absorption, and LSC analysis.

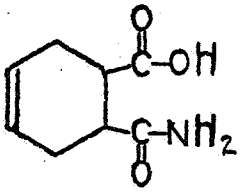
Results

Less than 9% of the dose was given off as $^{14}CO_2$ in 9 months. CO_2 was the only volatile metabolite. Captan was completely degraded after one week. The four major metabolites identified were:

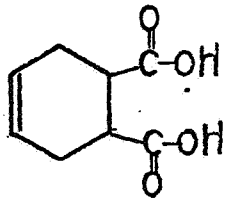
THPI: cis-4-cyclohenexel,2-dicarboximide



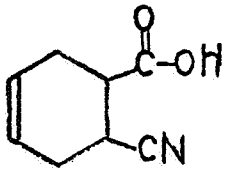
THPAm: cis-6-carboxy-3-cyclohexenecarboxamide



THPAI: cis-4-cyclohexene-1,2-dicarboxylic acid



THCY: cis-6-cyano-3-cyclohexenecarboxylic acid



Conclusion

Anaerobic degradation of captan yielded four metabolites and very little evolved HCO_2. Comment was made in the study that the anaerobic conditions created for 8 months were extreme and would probably never occur in nature. Aerobic degradative processes have been shown (95% CO_2 evolved over 9 months) to more completely break down captan.

4.

Executive Summary

Captan residues werenot found in soil or soybean crops; anaerobic degradation yielded 4 metabolites.

5.

Recommendations

EFB concurs that the submitted studies on soil residues and anaerobic soil metabolism satisfy these data requirements for this Soybean Seed Protectant formulation of Captan.

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Review Section #1