

7-6-81

PROPRIETARY
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Date Out EFB: 0 6 JUL 1981

To: Product Manager 12 Ellenberger
TS-767

From: *for* Dr. Willa Garner *W.V. M...*
Chief, Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 464-448, 464-523

Chemical: Chlorpyrifos

Type Product: Insecticide

Product Name: Dursban

Company Name: Dow

Submission Purpose: Review of chlorpyrifos soil studies

ZBB Code: cond reg follow up

ACTION CODE: 570

Date in: 5/20/81

EFB # 845, 846

Date Completed: 0 6 JUL 1981

TAIS (level II)

Days

Deferrals To:

67

4

Ecological Effects Branch

Residue Chemistry Branch

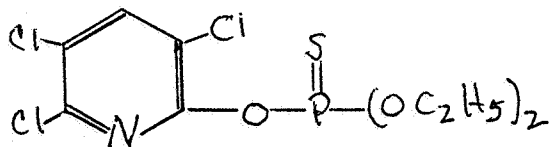
Toxicology Branch

1.0 Introduction

Chemical Name and Type Pesticide: Chlorpyrifos, 0,0-diethyl 0-(3,5,6-trichloro-2-pyridyl) phosphorothioate, Insecticide.

Trade Name: DURSBAN

Chemical Structure:



This submission is a conditional registration follow-up to supply required EC data (Anaerobic Soil Metabolism). This data gap was cited in the reviews of 5/5/80 (add use of Lorsban on tobacco), 6/10/80 (field crop use), 4/14/81 (use on tomatoes), and 7/26/78 (sorghum and tree fruit/nut crops).

2.0 Directions for Use

None submitted.

3.0 Discussion of Data

3.1 AEROBIC AND ANAEROBIC SOIL METABOLISM

Degradation of Chlorpyrifos in Soil Under Aerobic/Aerobic/Anaerobic, and Anaerobic Condition, H.D. Bidlack, November 29, 1979 Acc. #241547.

Experimental Procedure

Aerobic. Table 1 shows the properties and sources of the soils tested. Samples were collected from the top 6 inches of soil and stored in dark at 1°C. 50g lots in biometer flasks were treated with 6.7 ppm chlorpyrifos, water added to obtain 75% of 1/3 bar moisture, and the flask connected to a CO₂ trap and O₂ manifold. Incubation was at 25°C in the dark. Soils were sampled periodically for one year.

Aerobic/Anaerobic. For these conditions 100g. samples of only Commerce loam or Stockton clay adobe soil were tested. The first 30 days incubation was aerobic. Flooding of the alfalfa-enriched soil established anaerobic conditions for the remainder of the year. Flasks were also purged with dry N₂ gas.

Anaerobic. Ground alfalfa leaves were added to Stockton and Commerce Soils, which were flooded with water, purged with N₂, and incubated in dark at 25°C. When anaerobic gasses began, the samples were spiked with chlorpyrifos. The CO₂ traps were also recharged.

Analysis of the soils involved extraction with diethyl ether (acidified with phosphoric acid) followed by liquid scintillation counting and thin layer chromatography.

Results

Tables 1-5 give properties of the test soils and the pertinent results of the study.

The mean 50% degradation time for chlorpyrifos was 63 days and ranged from 11 to 141 days in seven different soils under aerobic conditions. In two typical rice producing soils studied under anaerobic conditions, the 50% degradation times were 39 and 51 days, while in the same two soils under aerobic/anaerobic conditions the 50% degradation times were 15 and 58 days.

Major degradation products under aerobic conditions were CO₂ and 3,5,6-trichloro - pyridinol along with minor amounts of 3,5,6-trichloro-2-methoxypyridine. Anaerobically, little CO₂ was formed and 3,5,6-trichloro-2-pyridinol predominated as the breakdown product. Methylation of the pyridinol to form 3,5,6,-trichloro-2-methoxy pyridine was not observed.

Conclusion

Degradation of chlorpyrifos, in a wide variety of soils, proceeds fairly rapidly both aerobically and anaerobically.

The study satisfies this EC data requirement.

4.0 Recommendations

EFB concurs with the submitted aerobic and anaerobic soil metabolism study as satisfying our environmental chemistry data requirements for this parameter.

Herbert L. Manning

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Review Section #1
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