12-1-88

DATA EVALUATION RECORD

STUDY 4

CHEM 059101 Chlorpyrifos §161-3

FORMULATION--00--ACTIVE INGREDIENT

FICHE/MASTER ID 00149224
Yackovich, P.R. and J.H. Miller. 1984. Photodegradation of chlorpyrifos on Commerce soil surface: GH-C 1699. Unpublished study prepared by Dow Chemical U.S.A. 22 p.

FICHE/MASTER ID 00153082
Yackovich, P, P. McCall, and J. Miller. 1985. Photodegradation of chlorpyrifos on Commerce soil surface. Study No. GH-C 1699R. Unpublished study prepared by Dow Chemical USA. 26 p.

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CONCLUSIONS:

Degradation - Photodegradation on Soil

This study is scientifically sound and provides supplemental information towards the registration of chlorpyrifos. This study does not fulfill EPA Data Requirements for Registering Pesticides because the artificial light source is not similar to that of sunlight.

SUMMARY OF DATA BY REVIEWER:

[^{14}C]Chlorpyrifos, at ≈0.06 µg/plate, degraded with a half-life of 3-6 days on loam soil irradiated with artificial light. In contrast, ≈55% of the applied chlorpyrifos remained undegraded on loam soil incubated in the dark for 12 days. The major degradation product in both irradiated

(≈50% of applied on day 12) and nonirradiated (≈45% of applied on day 12) soil was...

3,5,6-trichloro-2-pyridinol.

2-methoxypyridine

...was detected (≈5% of applied) in the irradiated soil but not in the nonirradiated soil. In irradiated soil, <4% of the applied was bound to the soil, ≤2.3% was evolved as $^{14}CO_2$, and no volatiles were detected.

DISCUSSION:

1. The artificial light source (General Electric mercury arc sunlamp Model #GC4011) is not similar to sunlight at 300-400 nm (Figure 3). The spectral energy distribution was not provided for the rest of the visible light spectrum. In addition, the intensity of the light source was reported over the range of 290-320 nm only instead of over the entire visible light spectrum. The intensity of 1.5 W/cm^2 provided by the light source is 5.8x that of sunlight (0.26 W/cm^2) over the 290-320 nm range.

2. The pH and CEC of the soil were not provided.

3. The detection limits and the reported recoveries from fortified samples were not provided.

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MATERIALS AND METHODS

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MATERIALS AND METHODS:

A slurry (2:1) of Commerce loam soil (36% sand, 50% silt, 14% clay, 0.68% organic carbon, soil pH and CEC not specified) and distilled water was poured onto glass plates (9-cm diameter), forming a 3-mm-thick layer. The plates were dried for at least 4 days. [^{14}C]Chlorpyrifos (purity >99%, specific activity 14.2 mCi/mM, Dow Chemical U.S.A.) dissolved in acetone was dripped on the soil surface at ≈0.06 µg/plate. The plates were placed inside water-jacketed glass chambers maintained at 25°C and through which air flowed at 10 mL/minute. Air from the chamber was passed through a polyurethane plug to trap volatiles other than $^{14}CO_2$ and through Carbosorb to trap $^{14}CO_2$. The treated plates were irradiated for up to 12 days with a General Electric mercury arc sunlamp Model #CG4011. Similarly treated plates were incubated under the same conditions in the dark. Duplicate soil plates were sampled after 0, 1, 3, 6, and 12 days of irradiation.

Soil was scraped from the plates, mixed with 1 M phosphoric acid (20 mL) and extracted four times with diethyl ether. Aliquots of the combined ether extracts and the extracted phosphoric acid were analyzed for total radioactivity using LSC. The remaining ether extracts were concentrated by distillation and fractionated using HPLC. The separated compounds were identified by comparison with standard solutions and quantified using LSC. The extracted soil was analyzed for total radioactivity using LSC following combustion.

The polyurethane plug was extracted with acetone (100 mL) and the extract was analyzed for ^{14}C-volatiles using LSC. The Carbosorb was analyzed directly for $^{14}CO_2$ using LSC.

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Pages 5 through 30 are not included.

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____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

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