DATA EVALUATION RECORD

STUDY 2

CHEM 041101 Ethoprop §161-3

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 43833501

Gorman, Mike. 1995. Determination of the Photolysis Rate of [^{14}C]Ethoprop on the Surface of Soil - **Supplemental Study**. ABC Report No. 38140-1. Unpublished study performed by ABC Laboratories, Inc., Columbia, Missouri. Submitted by Rhone-Poulenc Ag Company, North Carolina.

REVIEWED BY: Dana Spatz
TITLE: Chemist
ORG: ERB-IV/EFED/OPP

SIGNATURE: 1-13-98

CONCLUSIONS:

Degradation - Photodegradation on Soil - Supplemental Study

1. The purpose of this abbreviated study (day 0 and day 30 sampling only) was to provide confirmatory residue identification. A photodegradation on soil study reviewed by EFED on 4/5/90 (M. Carpenter, 1989; 41270704) did not satisfy the data requirement because the study lacked confirmatory residue identification.

   The Photodegradation on Soil data requirement is **satisfied** by this study together with the Carpenter study.

2. [^{14}C]Ethoprop photodegraded only slightly on sandy loam soil that was irradiated with artificial light for 30 days (12 hrs light:12 hrs dark) at approximately 24°C. Degradates were less than 10% of applied radioactivity. The estimated half-lives, calculated based on the Carpenter study, were 308 days in the exposed soil and 2090 days in the dark control soil.

3. The results demonstrate that photolysis on soil is not a significant route of dissipation for ethoprop.

METHODOLOGY:

0.350 ml of [^{14}C]Ethoprop (radiochemical purity 99.5%, specific activity 30.1 µCi/mmole) at a concentration of 32.5 µg/ml was used to dose the sandy loam soil (56% sand, 26% silt, 18% clay, 1.6% o.m., pH 6.8, CEC 11.6 meq/100 g). Twelve 20-ml scintillation vials were used as the test containers, each with 1.0 g of soil. 400 µL of water was added to the soil and the soil was allowed to air dry. A soil depth of 1-2 mm was achieved. Moisture content was adjusted to 75% of field moisture capacity at 1/3 bar on weekly intervals by addition of water on a weight basis. Humidified air continuously flushed the test systems at a rate of 100 ml/min. and the volatiles were trapped in a series of gas washing bottles, one containing ethylene glycol, one with 1 N H_2SO_4, and two with 1 N KOH. Three tubes served as 0-hour samples. One sample was used to verify microbial activity at time 0. Four samples were placed into a dark chamber and served as nonexposed controls. The other four samples were placed into another photolysis chamber with the lamp positioned directly above the soil surface. The tubes were irradiated in a 12-hr exposed, 12-hr dark sequence by a filtered Atlas 6500 watt xenon arc lamp at 25°C for 30 days. The study samples were placed so that the irradiation reaching them was approximately the intensity of sunlight at equinox 40° N.

At 0, 2, and 30 days the soil samples were extracted 3 times with 3-ml portions of methanol. The supernatant from each addition was transferred to a 10-ml graduated cylinder. The extract was brought to a final volume of 10 ml with methanol. Each extract was assayed for radioactivity by LSC. The nonextractable radioactivity was determined by combustion radioanalysis. Trapping solutions were analyzed by LSC for ^{14}C-volatiles. Analyses were conducted within 24 hours of sampling. Extracts were prepared for co-chromatographic analysis by mixing radiolabeled and nonradiolabeled standards with selected samples.

The samples were analyzed by LSC, RP-HPLC, and two-dimensional TLC. LSC was used to determine the total ^{14}C-radioactivity in samples. HPLC (Waters C18 column, water and acetonitrile mobile phase) was used as a primary method to quantitate and confirm the presence of ^{14}C-ethoprop and its degradates. 2D-TLC (silica gel, acetonitrile:acetone:water and ethanol:water) was used as a confirmatory method.

DATA SUMMARY:

After 30 days of exposure, the soil extracts had an average of 83.9% ^{14}C-ethoprop by HPLC. Approximately 27% of the radioactivity was recovered as volatile residues from extracting the 30 day exposed test system and tubing. The ^{14}C-volatile radioactivity was found to be ethoprop. The identity of ethoprop was confirmed by 2D-TLC. The degradates in the soil extracts comprised <10% of the applied radioactivity. No degradation was apparent in the dark controls. This supplemental study confirmed the original study conclusion that Ethoprop is photolytically stable on soil.

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Based on the original Carpenter study (41270704), extrapolated half-lives were 308 days and 2090 days for the exposed and dark control samples, respectively.

COMMENTS:

1. The UV spectrum of ethoprop in pH 7 TRIS buffer was provided. Ethoprop absorbs primarily below 310 nm.

2. The solubility of ethoprop in water was reported to be 843 mg/L at 21°C.

3. On day 2 of the study, the cooling system failed and the soil temperature was 41.6°C. One exposed and one nonexposed sample were then removed from the test systems and analyzed. No degradation or apparent problems had occurred due to the temperature fluctuation.

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