UNDATED

DATA EVALUATION RECORD

CASE GS PROMETRYN STUDY 7 PM 25

CHEM 080805

BRANCH: ENVIRONMENTAL FATE AND GROUND-WATER

FORMULATION 00 - ACTIVE INGREDIENT

Saxena, A.M. 1988. Leaching Characteristics of ^{14}C-Prometryn Aged in Soil. Study No. HLA 6015-388. Performed by Hazleton Laboratories America, Inc. Submitted by Ciba Geigy Corporation. Accession Number 405737-13.

DIRECT RVW TIME =

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CONCLUSIONS:

This submission lacked information that is required to fully review the study; therefore, this study cannot be accepted to fulfill EPA data requirements for registering pesticides (Subdivision N Guidelines Section 163-1). The results indicate that prometryn is not very mobile in California sandy loam. The study did not generate information concerning the mobility of prometryn degradates. These conclusions are tentative pending submission of additional data.

MATERIALS AND METHODS:

Approximately 50 g of a California sandy loam (53.41 g at 6.6% moisture) was treated with 430 ul of a uniformly ring-labelled ^{14}C-prometryn solution (methanol) to give an application rate of 12.0 ug/g (3.92 x 10^7 total dpm). The characteristics of the soil were : 60% sand, 35% silt, 5% clay, 0.7% organic matter, 12.4% moisture at 0.33 bar, pH 4.6, CEC 3.4 meq/100 g, and 1.59 g/ml bulk density. Microbial assays were conducted to demonstrate that the soil was microbially active (610,000 Cfu/g aerobic). The test material presumably was made up using ^{14}C-prometryn (supplied by Ciba-Geigy Corporation) with a specific activity of 29.3 uCi/mg and a radiochemical purity of 98.6%, and nonradiolabeled prometryn (supplied by Ciba-Geigy Corporation), purity not specified. Procedures for preparing the solution of test material applied to the soil were not reported.

The treated soil was shaken in a biometer flask to disperse the pesticide. The methanol was evaporated using nitrogen. Water was added to bring the moisture content to 75% of field capacity and the flask was sealed with 10 ml of 10% NaOH in the sidearm. The flask was incubated (24-25° C) for 31 days. At days 1, 7, 15, 22, 29, and 32, the NaOH solution was replaced. Radioactivity in the sampled NaOH solutions was quantified by Liquid scintillation counting (LSC).

Following incubation, the soil was stirred and 5 subsamples (0.2 - 0.3 g) were removed. Radioactivity in the subsamples was quantified by combustion and LSC. A 4.11 g subsample of the soil was mixed with 15 ml of methanol:water (80:20) and stored frozen for 24 days. After storage, the sample was stirred for 30 minutes, centrifuged, and the supernatant decanted. The solids were extracted a second time (15 minutes stirring) using the same solvent mixture (10 ml). The two extracts were combined, the methanol was evaporated (rotary evaporator), about 5 ml of acetonitrile was added and then apparently reduced in volume. The extract was analyzed by thin-layer chromatography (TLC) using silica gel plates developed in isopropanol:water (98:2). Radioactivity was located and quantified by a radioactivity scanner. Nonradioactive prometryn was located by visualization under ultraviolet light.

Three soil columns, 3 inches in diameter and 14 inches high, were filled with soil and tamped. The columns were immersed in water and then removed and allowed to "drip dry". Approximately 8 g of the soil containing the aged ^{14}C-prometryn residues was layered on the top of each column. A thin layer of unfortified soil was placed over the treated soil and a piece of filter paper was placed over this. Water was applied to the top of the columns by peristaltic pump (rate not reported) for 4 days. Leachate was collected at 5 intervals (time unspecified) during the 4 day period and stored frozen (length of storage not reported) until analysis. Leachates were homogenized by stirring and then subsampled (duplicate samples) to quantify radioactivity using LSC.

After leaching the soil columns were divided into 12 1-inch sections, air dried, and weighed. Radioactivity in each section was determined by oxidation of duplicate subsamples and counting the ^{14}C released as $^{14}CO_2$ (LSC).

RESULTS:

Evolution of $^{14}CO_2$ during the soil aging of prometryn during 31 day was < 0.1%. Approximately 94% of the radioactivity in the aged soil was extractable with methanol:water (8:2). TLC analysis of the extract indicated that ~90% of the ^{14}C was associated with the parent prometryn (R_f = 0.90), 3% of the ^{14}C was found at R_f 0.77 (material unidentified).

Total leachate volume was approximately 20 to 22 column inches. The percolation rate was 0.18 to 0.31 inches/hr. Radioactivity in the leachate was not detected (< 34 dpm after background correction).

Analysis of the soil after leaching is summarized in Table 1. The highest percentage of radioactivity was found in the top 1 inch of soil

(where soil aged residue was applied). Amounts of radioactivity decreased with depth. At depths of 5 inches and lower, no radioactivity was detected. The material balance for ^{14}C ranged from 99.8 to 102.4% for the three replicate columns.

AUTHOR'S CONCLUSIONS:

The degradation of ^{14}C-prometryn during the 31-day incubation was minimal, and did not yield and major metabolites. The mobility of ^{14}C-prometryn and its aged residues was low in the California sandy loam. Radio-residues in the soil were not detected below 4 inches in the columns and were not detected in the leachate. Variation observed between replicate columns is thought to result from slight differences in the bulk densities of the soil. The average bulk density was 1.64 g/cm_3.

REVIEWER'S DISCUSSION:

Several aspects of this study are not adequately explained by the submission. The procedure for preparing test material solutions was not described, and the data (measured weight, volumes, radioactivity, purity of test materials, etc.) and sample calculations needed to review this procedure were not submitted. Therefore, the concentration of prometryn in the soil cannot be confirmed.

No data were submitted (nor references given) to demonstrate the validity of the TLC procedure in isolating prometryn and its degradates.

The description of radiation counting techniques was not adequate. The following information on liquid scintillation counting must be reported: method of quench correction, calibration (quench) curve, methods and date(s) of calibration, and sample calculations. No raw data (counts per minute, typical counting time, and quench measuring values such as H number, channels ratio, etc.) were submitted. At a minimum, representative raw data are necessary for EFGWB to estimate the reliability of the study results.

The results indicate that prometryn is not very mobile in the California sandy loam. Because of the low degradation of prometryn, this study does not provide data on the mobility of degradates. Conclusions from these results are tentative, pending the submission the data as specified above.

Table 1. Individual and Mean Percentage of Applied Radioactivity in the Soil Columns

Column Section Number[1]	Applied Radioactivity (%) Column Number 1	2	3	Mean
1	43.3	61.3	80.3	61.6
2	27.6	28.0	19.6	25.1
3	24.1	11.5	2.5	12.7
4	4.8	0.8	ND	1.9
5	ND	ND	ND	ND
6	ND	ND	ND	ND
7	ND	ND	ND	ND
8	ND	ND	ND	ND
9	ND	ND	ND	ND
10	ND	ND	ND	ND
11	ND	ND	ND	ND
12	ND	ND	ND	ND

ND Not detected.

[1] The soil depth (inches) in each column section = 1. The soil from each section was numbered consecutively 1 through 12, top to bottom.