7-18-88

DATA EVALUATION RECORD

MCPA STUDY 5

CHEM 030501 MCPA 162-3

BRANCH EAB

FORMULATION--00--ACTIVE INGREDIENT, MCPA acid

FICHE/MASTER ID 40461901
Obrist, J. 1987a. Anaerobic aquatic metabolism of MCPA. Laboratory Project ID HLA 6015-325. Unpublished study prepared by Hazelton Laboratories America, Inc. 75 p.

SUBST. CLASS = S

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REVIEWED BY: T. Colvin-Snyder TITLE: Staff Scientist

EDITED BY: K. Patten TITLE: Task Leader

APPROVED BY: W. Spangler TITLE: Project Manager

ORG: Dynamac Corporation
Rockville, MD
TEL: 468-2500

APPROVED BY: S. Simko
TITLE: Chemist
ORG: EAB/HED/OPP
TEL: 557-0237

S Simko
7/18/88

SIGNATURE:

CONCLUSIONS:

Metabolism - Anaerobic Aquatic

This study is acceptable and fulfills EPA Data Requirements for Registering Pesticides by providing information on the metabolism of MCPA acid under anaerobic aquatic conditions.

SUMMARY OF DATA BY REVIEWER:

Ring-labeled [^{14}C]MCPA acid (radiochemical purity 95.6%) plus nonradiolabeled MCPA (purity 99.4%), at 110 ppm (1:14.25 ratio, 220 µg/2 g soil), was relatively stable in an anaerobic lake water:sand sediment system (20 mL:2 g) incubated in the dark at 25 ± 2°C. MCPA ranged from 80.6 to 104.4% of the applied throughout the study, and 89.1% of the applied

remained undegraded at 374 days posttreatment. Radioactivity in the aqueous phase extracts (sediment and water samples) was ≤4.4% of the applied. Unextractable radioactivity in the sediment reached a maximum concentration of 2.4% of the applied at 374 days posttreatment. Volatiles totaled 2.4% of the applied at 374 days posttreatment.

DISCUSSION:

1. Volatiles in ethanolamine:2-ethoxyethanol trapping solutions were not characterized; the registrant assumed that this radioactivity was only carbon dioxide.

2. The water:sediment ratio was 10:1. It would have been preferable if a larger amount of sediment in relation to water had been used.

3. The method detection limit and recoveries from fortified samples were not reported.

4. TLC analyses were conducted using one solvent system; however, development of TLC plates in three solvent systems of different polarities is recommended for maximum confidence in separation of [^{14}C]compounds.

MATERIALS AND METHODS:

Ring-labeled [^{14}C]MCPA (radiochemical purity 95.6%, specific activity 67 mCi/mmol) plus unlabeled MCPA (205.2 μg, purity 99.4%) was applied at 110 ppm (1:14.25 ratio; total 220 μg/2 g soil) to sieved sand sediment (96% sand, 2% silt, 2% clay, 0.3% organic matter, pH 8.0, CEC 7 meq/100 g). Prior to treatment with [^{14}C]MCPA, the 2-g sediment samples had been flooded (33 days pretreatment) with 20 mL of lake water (pH 8.0-8.5, dissolved oxygen 10 ppm) and fortified (14 days pretreatment) with 0.25 g of glucose. The glass vials containing the samples were incubated in the dark at 25 ± 2°C in a chamber attached sequentially to ethylene glycol and ethoxyethanol:ethanolamine (1:1) trapping solutions (Figure 2); nitrogen gas was passed over the samples and through the trapping solutions. Soil, water, and trapping solutions were sampled at intervals up to 374 days posttreatment.

Water samples were acidified with 1.5 M phosphoric acid, then partitioned twice with methyl t-butyl ether. The methyl t-butyl ether and aqueous phases were analyzed for total radioactivity by LSC. The methyl t-butyl ether extracts were also analyzed along with a nonradiolabeled MCPA standard by TLC on silica gel plates developed in trichloromethane:-hexane:acetic acid (80:20:10). Radioactive zones were located and quantified using a linear analyzer; [^{14}C]MCPA was identified by comparison to the nonradiolabeled MCPA standard, which was visualized by fluorescent quenching.

The soil samples were extracted twice with methanol:water (4:1), the extracts were combined, and methanol was removed by rotoevaporation. The remaining solution was acidified with 1.5 M phosphoric acid and partitioned twice with methyl t-butyl ether. The methyl t-butyl ether and aqueous phases were analyzed by LSC and TLC as described previously. Extracted sediments were analyzed by LSC following combustion.

The trapping solutions were analyzed for total radioactivity by LSC.

MCPA

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