DATA EVALUATION RECORD

STUDY 4

CHEM 030703 Naptalam sodium salt §162-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 00145416
Gerecke, D.R., J.A. Lacadie, D.G. Dzialo, and R.A. Cardona. 1978. Aerobic soil study of ^{14}C-Alanap in sandy loam soil. Project No. 7761. Unpublished study performed by Uniroyal Chemical Company, Inc., Naugatuck, CT, and submitted by Uniroyal Chemical Company, Inc., Middlebury, CT.

DIRECT REVIEW TIME = 5

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CONCLUSIONS:

Metabolism - Aerobic Soil

1. The study is acceptable and fulfills the 162-1 data requirements.

2. 1-Naphthyl-labeled [^{14}C]naptalam (radiochemical purity 95.3%), at 3 ppm, degraded with an observed half-life of <3 days (estimated at 2.5 days) in sandy loam soil that was incubated in the dark at 25 C and 75% of 0.33 bar moisture for 182 days. Naptalam decreased from 89.8% of the applied immediately posttreatment to 36.8% at 3 days and 6.8% at 14 days; $\leq$1.5% was detected at 92-182 days (Table II). The major nonvolatile degradate was N-1-naphthylphthalimide; the other nonvolatile degradate identified was 1-naphthylamine.

a process that does not appear to be light catalysed, can account for the majority of the observed breakdown regardless of extraction methods.

This study indicates that the photolytic breakdown of naptalam on the surface of soil is a slow process with a half life of approximately 56 days of continuous irradiation. The major pathway for the disappearance of naptalam appears to be through soil binding, as the bulk of the degradation observed in this study can be attributed to this process.

METHODOLOGY:

Portions (25 g) of air-dried sandy loam soil (74.6% sand, 18.6% silt, 6.8% clay, 2.0% organic matter, pH 5.9, CEC 7.3 meq/100 g) were weighed into flasks and treated at 3 ppm with 1-naphthyl-labeled [^{14}C]naptalam (radiochemical purity 95.3%, specific activity 1.77 mCi/mmole, source unspecified) dissolved in acetone. The acetone was evaporated, and the soil was thoroughly mixed and adjusted to 75% of 0.33 bar moisture. Each flask was capped with a "trapping tower" that consisted of (from bottom to top) a polyurethane foam plug to trap volatile organics, a layer of drierite, two layers of ascarite to trap CO_2, and a final layer of drierite (Figure 4). The flasks were placed in an incubation oven and maintained at 25 C in darkness. Water was added to the flasks twice each week to maintain the soil moisture content. Duplicate flasks of soil were removed at 0, 3, 7, 14, 30, 92, and 182 days posttreatment.

Soil samples were air-dried, then Soxhlet-extracted with acetonitrile followed by N-propanol:water (71:29, v:v) for 3 hours with each solvent. The extracts were combined and aliquots were analyzed for total radioactivity by LSC. Unextractable [^{14}C]residues in the extracted soil were quantified by LSC following combustion. To quantify volatile organics, the polyurethane foam plugs from the trapping towers were analyzed for total radioactivity by LSC following combustion. To quantify evolved $^{14}CO_2$, the ascarite from the trapping towers was placed in a flask connected to a continuous air-flow system (Figure 5). Concentrated hydrochloric acid was added to the ascarite while passing nitrogen through the flask; the exiting nitrogen was then passed through two traps containing combustion cocktail. Aliquots of the combustion cocktail were analyzed for radioactivity by LSC.

Additional aliquots of the combined soil extracts were analyzed using one-dimensional TLC on silica gel sheets developed in chloroform:acetone:formic acid (70:30:0.5, v:v:v). Areas of radioactivity were located using unlabeled reference standards that were cochromatographed with the samples and visualized under UV light. Radioactivity was quantified by cutting strips from the sheets and analyzing the strips by LSC. To confirm the presence of the degradate N-1-naphthylphthalimide, an aliquot of the extract from the 3-day soil sample was analyzed by two-dimensional TLC on a silica gel plate developed in the first dimension with toluene:ethanol (95:5, v:v) and in the second dimension with chloroform:acetone:formic acid (70:30:0.5, v:v:v). Areas of radioactivity were visualized using autoradiography and identified by comparison with unlabeled N-1-naphthylphthalimide that was cochromatographed with the sample.

DATA SUMMARY:

1-Naphthyl-labeled [^{14}C]naptalam (radiochemical purity 95.3%), at 3 ppm, degraded with an observed half-life of <3 days in sandy loam soil that was incubated in the dark at 25 C and 75% of 0.33 bar moisture for 182 days. Naptalam decreased from 89.8% of the applied immediately posttreatment to 36.8% at 3 days and 6.8% at 14 days; ≤1.5% was detected at 92-182 days (Table II). The major nonvolatile degradate was

N-1-naphthylphthalimide,

which accumulated to a maximum of 20.5% of the applied at 3 days posttreatment then decreased to 8.1% by 182 days. The only other nonvolatile degradate identified was

1-naphthylamine,

which accumulated to a maximum of 7.0% of the applied at 7 days post-treatment then decreased to 1.7-2.6% at 92-182 days. Radioactivity present as unidentified polar material ranged from 3.5-4.7% of the applied at 3-30 days posttreatment and 0.7-1.1% at 92-182 days. At 182 days posttreatment, $^{14}CO_2$ totaled 5.8% of the applied and unextractable [^{14}C]residues were 56.6% (Table I).

During the study, material balances decreased from 96.6% of the applied at day 0 to 77.9% at 182 days (Table I).

COMMENTS:

1. The study is acceptable and fulfills the 162-1 data requirement.

2. In this study, the sample extracts were analyzed using two-dimensional TLC with two solvent systems. Radioactive areas on the TLC plates were identified only by comparison with the location of known reference standards chromatographed on the same plates. EFGWB prefers that [^{14}C]residues in samples be analyzed by an additional chromatographic methods (such as HPLC, or GC), and that specific compounds isolated by chromatography be identified using a confirmatory method such as MS in addition to comparison with the R_f of reference standards.

STUDY AUTHOR(S)'S RESULTS AND/OR CONCLUSIONS

(INCLUDING PERTINENT TABLES AND FIGURES)

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