DATA EVALUATION RECORD 3

5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole
§161-3

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 43588005
Ferreira, E.M. February 4, 1994. RPA 201772: Soil Photolysis. Rhone Poulenc Laboratory Project No. P93/122. Unpublished study performed by Rhone Poulenc, Essex, England, and submitted by Rhone Poulenc, North Carolina, U.S.

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CONCLUSIONS:

Degradation - Photodegradation on Soil

1. The soil photolysis study is acceptable and satisfies the 161-3 data requirement.

2. Benzyl-labeled ^{14}C-isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole] did not photodegrade on sandy loam soil by artificial light from a xenon lamp. The half-lives in sandy loam soil were 23 hours under irradiated conditions and 20 hours for the non-irradiated samples. The longer half-life in irradiated samples was probably a result of dehydration from the light that slowed the aerobic soil metabolism. In both irradiated and dark control soils, parent isoxaflutole declined from 95.4 % at zero time to non-detectable levels at 21 days. The identified

degradates were RPA-202248 (**isoxaflutole with the isoxazole-ring opened**) and RPA-203328 (**decarboxylated RPA-202248**). RPA-202248 increased to 75-79 % and 69-70 % of applied by 7-14 days in the irradiated and dark controls, respectively, and declined slightly at the sampling interval (31 days). RPA-203328 was first detected at 2 days in both irradiated and dark control samples, and increased to 26 % of applied in irradiated samples and 37 % of applied in dark control samples by 31 days. Volatiles did not exceed 0.2 % of the applied in the study. Unextracted residues did not exceed 9.1 % of applied in the study, and the material balance ranged from 89-102 % of applied in the study.

METHODOLOGY:

Benzyl-labeled ^{14}C-isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole; RPA 201772; radiochemical purity 98%, specific activity 679 MBQ/mmol (18.35 mCi/mMol, Rhone Poulenc)], and ^{13}C-RPA 201772 was made into an acetonitrile solution containing 0.73 mg/ml of RPA-201772. The final specific activity of the acetonitrile solution was 405 MBq/mmol or 10.96 mci/mmol. Four grams (oven-dry basis) of sieved (<2 mm) sandy loam soil were put into quartz dishes with a mean surface area of 5.7 sq cm at a depth of one (1) cm. Deionized water was added to each soil sample to bring the moisture capacity to 75 % of 1/3 bar moisture content (field capacity). Aliquots (0.04 ml) of the acetonitrile solution were added to each soil sample to give a nominal concentration of 7 ug/g soil. The quartz dishes were put into incubation units, which were then irradiated at 25 °C for 0, 3, 6, and 16 hours and for one (1) day of irradiation after soil treatment. Irradiation was accomplished using a Heraeus Suntest lamp with an intensity of 460 W/meter^2 and wavelengths of >290 nm, corresponding to a photoperiod of 16 hours of light/8 hours of darkness. Heat dissipation was accomplished with a water/ethylene glycol circulating water jacket system. Volatility traps were used to trap non-polar volatiles and CO_2. For the dark controls, the above procedure was used except for the lack of irradiation in an environmental chamber at 25 $\pm$ 1 °C. A second set of samples was irradiated under the same conditions with the intervals of 2, 7, 14, 21, and 31 days of irradiation .

The soil samples were shaken twice with 10 ml acetonitrile/water (1:1 v/v), and the extracts were filtered and combusted. Triplicate 50 ul aliquots were analyzed using LSC. The remaining extracts were dried, and reconstituted for analysis using HPLC and TLC. Following extraction of soil samples, the dried soils were then combusted and the radioactivity associated with the soil was trapped. LSC was used to analyze the contents of the combustion traps. More details about the analytical procedure may be seen in the attachments to this DER. Also, the specific chemical, physical, and microbiological properties of the soils used in this study may be seen in the Comments section.

DATA SUMMARY:

Benzyl-labeled ^{14}C-isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole] did not photodegrade on sandy loam soil by artificial light from a xenon lamp. The half-lives in sandy loam soil were 23 hours under irradiated conditions and 20 hours for the non-irradiated samples. The longer half-life in irradiated samples was probably a result of dehydration from the light that slowed the aerobic soil metabolism. In both irradiated and dark control soils, parent isoxaflutole declined from 95.4 % at zero time to non-detectable levels at 21 days. The identified degradates were RPA-202248 (**isoxaflutole with the isoxazole-ring opened**) and RPA-203328 (**decarboxylated RPA-202248**). RPA-202248 increased to 75-79 % and 69-70 % of applied by 7-14 days in the irradiated and dark controls, respectively, and declined slightly at the sampling interval (31 days). RPA-203328 was first detected at 2 days in both irradiated and dark control samples, and increased to 26 % of applied in irradiated samples and 37 % of applied in dark control samples by 31 days. Volatiles did not exceed 0.2 % of the applied in the study. Unextracted residues did not exceed 9.1 % of applied in the study, and the material balance ranged from 89-102 % of applied in the study.

COMMENTS:

1. Soil photolysis was not significant in this study, based on the longer half-life in irradiated samples and the detection of hydrolytic and metabolic degradates only. The photolytic degradates (Metabolites 14 and 20) formed in the aqueous photolysis study in this review (MRID 43588004) were not detected in this study.

2. The spectral irradiance and intensity of the xenon lamp "closely approximated" that of natural sunlight over the range of wavelengths between 290 and 750 nm.

3. The registrant did use different batches of the same soils in different studies to achieve consistency in results. These soils/sediments represent the range of soils that are normally used in agriculture in the U.S., even though they were from England. However, the registrant did not provide all the relevant information such as map location, biological activity, etc in each study.

4. The application rate was 3x the normal field application rate of 200 g ai/ha.

5. Samples from later sampling intervals were further extracted with acidified (pH 3) acetonitile/water. The 31 day sample was Soxhlet extracted.

6. The chemical and physical characteristics of the soils and sediment used in this study follow in the Table.

Property	Soil
Particle Size Distribution	93/7*
Sand (%)	54
Silt (%)	41
Clay (%)	5
Textural Class	
USDA	Sandy loam
ADAS	Sandy loam
Organic Carbon	1.3
Organic Matter (% OC *1.72)	2.2
pH (water, 1 M KCl)	7.1, 5.5
Cation Exchange (CEC, meq/100g)	5.7
Bulk Density	1.59
Moisture Holding Content at 1/3 bar	13.0
Fungi (organisms/g dry soil)	4.4×10^3
Bacteria (organisms/g dry soil)	2.6×10^6
Actinomycetes (organisms/g dry soil)	1.4×10^6
Soil Series	Norfolk

* 93/7-American Agricultural Services Inc., Lucama, North Carolina, U.S.

ISOXAFLUTOLE

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