DATA EVALUATION RECORD 4

5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole
§162-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 43588006
Ferreira, E.M., M.K. Jones, and S.E. Newby. October 13, 1994. Aerobic soil metabolism of RPA 201772. Rhone Poulenc Project No. P 92/332. Unpublished study performed by Rhone Poulenc, Essex, England, and submitted by Rhone Poulenc, N.C.

DIRECT REVIEW TIME = 9

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CONCLUSIONS:

Metabolism - Aerobic Soil

1. The aerobic soil metabolism study is acceptable and satisfies the 162-1 data requirement.

2. ^{14}C-Isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole] degraded in aerobic sandy loam and clay soils treated with 0.19 ug/g parent with calculated half-lives of 30 and 56 hours, respectively. Parent isoxaflutole declined to <10 % of applied by 7 days, and was non-detectable in sandy loam soil (<0.01 ppm) by 1 month in sandy loam soil. In clay soil, parent isoxaflutole declined to <10 % by 7 days, and was non-detectable by 14 days. The primary degradate, RPA-202248 (**isoxaflutole with the isoxazole-ring opened**) reached a maximum concentration of 79 % of

applied by 7 days in sandy soil, and declined to 5.9 % by the end of the study (365 days). In clay soil, RPA-202248 increased to a maximum concentration of 52 % by 7 days, and declined to 11.6 % by 365 days. The degradate RPA-203328 (dealklyated RPA-202248) reached a relatively constant maximum concentration of 52.5-64.6 % by 1-9 months in sandy loam soil, and declined to 47 % by 12 months. In clay soil, RPA-203328 reached a relatively constant maximum concentration of 30 % by 2-3 months, and declined to 9.9-17.4 % by 4-12 months. Unknown residues reached maximum concentrations of 3.37 % of applied in sandy loam soil and 4.7 % in clay soil. CO_2 reached 14 % of applied in volatility traps from sandy loam soil and 37 % from clay soil. Other volatiles did not exceed 0.19 % from either soil. Unextracted residues were a maximum of 15-19 % in the sandy soil at 6-12 months and 18.5-27.2 % at 1-12 months.

The calculated half-lives for the degradates RPA-202248 and RPA-203328 were 20 and 977 days for the sandy loam soil and 37 days and 289 days for the clay soil, respectively.

METHODOLOGY:

Solutions containing 7.6 ppm of isoxaflutole were prepared from ^{14}C-isoxaflutole (radiochemical purity of 98.6 %, specific activity of (51.06 uCi/mg) and ^{13}C-isoxaflutole (purity of 97.6 %). One hundred grams (dry weight basis) of sieved (2 mm) Norfolk sandy loam and Wallasea clay soils were weighed into flasks and adjusted to 75 % of 1/3 bar moisture holding capacity. The sandy loam (70 % sand, 24 % silt, 6 % clay, 0.9 % organic carbon, pH 6.6, CEC 4.9 meq/100 g) and clay soils (12 % sand, 39 % silt, 49 % clay, 4.5 % OC, pH 5.8, CEC 37.7) were then spiked to a nominal concentration of 0.19 ppm with parent isoxaflutole. The flasks were attached to volatility traps for both organics and CO_2. After incubating duplicate samples in darkness at 21 °C for 0, 2, and 6 hours, 1, 3, 7, and 14 days, and 1, 2, 3, 4, 6, 9, and 12 months, respectively, the soil samples were extracted by slightly different procedures depending on the soil texture. In the sandy loam soil, the soil was shaken twice with 95 ml of acetonitrile/water (1:1, v/v), centrifuged at 3000 rpm for 20 minutes, and decanted into a common container for each sample in a given sampling period. After decanting, the combined extracts were filtered and analyzed by LSC in triplicate. After removal of the acetonitrile solvent and the water from the extracts, the samples were reconstituted in acetonitrile/water for HPLC and TLC analysis. For those samples with <90 % recovery by the initial extraction procedure, other methods were employed to further extract the soil. For the clay soil, the extraction procedure was essentially the same except for different centrifuge speed and additional filtration. Bound residues and CO_2 were also measured in the study. HPLC and TLC were used to identify residues, and HPLC/MS were used to confirm the identity of parent isoxaflutole and the degradates RPA- 202248 and RPA-203328. Additional details about the extraction and analytical procedures may be found in the attached materials and methods. Also,

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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] degraded in aerobic sandy loam and clay soils treated with 0.19 ug/g parent with calculated half-lives of 30 and 56 hours, respectively. Parent isoxaflutole was non-detectable in sandy loam soil (<0.01 ppm) by 1 month in sandy loam soil, and declined to <10 % of applied by 7 days. In clay soil, parent isoxaflutole was non-detectable by 14 days. The primary degradate, RPA-202248 (**isoxaflutole with the isoxazole-ring opened**) reached 79 % of applied by 7 days in sandy soil, and declined to 5.9 % by the end of the study (365 days). In clay soil, RPA-202248 increased to 52 % by 7 days, and declined to 11.6 % by 365 days. The degradate RPA-203328 (**dealklyated RPA-202248**) reached a relatively constant maximum concentration of 52.5-64.6 % by 1-9 months in sandy loam soil, and declined to 47 % by 12 months. In clay soil, RPA-203328 reached a relatively constant maximum concentration of 30 % by 2-3 months, and declined to 9.9-17.4 % by 4-12 months. Unknown residues reached maximum concentrations of 3.37 % of applied in sandy loam soil and 4.7 % in clay soil. CO_2 reached 14 % of applied in volatility traps from sandy loam soil and 37 % from clay soil. Other volatiles did not exceed 0.19 % from either soil. Unextracted residues were a maximum of 15-19 % in the sandy soil at 6-12 months and 18.5-27.2 % at 1-12 months.

The calculated half-lives for the degradates RPA-202248 and RPA-203328 were 20 and 977 days for the sandy loam soil and 37 days and 289 days for the clay soil, respectively.

Material balances in the study ranged from 91 to 108 % for sandy loam soil and 93-103 % for clay soil.

COMMENTS:

1. The registrant did use the same soils in many different guideline studies to achieve consistency in results. These soils/sediments are similar to 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 location, map location, biological activity, etc in each study.

2. The biomass content of the soils in this study changed in different directions with time. In the sandy loam soil, the biomass content increased about 40 %, while there was an approximate 50 % decrease in biomass in the clay soil. However, the registrant did not state how the biomass content was determined. In future studies, the method of determining biomass content should either be stated or summarized.

3. The ERCB reviewer did not observe the inclusion of any storage stability data in the study. However, in this case, this is not significant because parent isoxaflutole degraded rapidly in the other submitted laboratory studies.

4. 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*	93/6
Sand (%)	70	12
Silt (%)	24	39
Clay (%)	6	49
Textural Class		
USDA	Sandy loam	Clay
ADAS	Sandy loam	Silty clay
Organic Carbon	0.9	4.5
Organic Matter (% OC *1.72)	1.5	7.6
pH (water, 1 M KCl)	6.6, 5.7	5.85, 4.6
Cation Exchange (CEC, meq/100g)	4.9	38
Bulk Density	1.54	0.88
Moisture Holding Content at 1/3 bar	13.0	51.0
Fungi (organisms/g dry soil)	3.2×10^3	5.1×10^3
Bacteria (organisms/g dry soil)	2.9×10^6	2.2×10^6
Actinomycetes (organisms/g dry soil)	3.4×10^6	3.4×10^6

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Biomass (ug/g soil)		
Beginning of study	123	989
End of Study	174	504
Soil Series	Norfolk	Wallasea

* 93/7-American Agricultural Services Inc., Lucama, North Carolina, U.S.
93/6-Cooper Shaw Road, West Tilbury Marshes, Essex, U.K.

ISOXAFLUTOLE

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