

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD 7

5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole
S163-1

FORMULATION--00--ACTIVE INGREDIENT

STUDY ID 43588008

Newby, S.E., P.J. Godward, and M.K. Jones. January 10, 1995. RPA 201772:
Aged Leaching Study in Four Soils and a Sediment. Laboratory Report No.
P93/124. Unpublished study performed by Rhone Poulenc Agriculture,
Limited, Essex, England, and submitted by Rhone Poulenc, North Carolina.

REVIEWED BY: J. Breithaupt
TITLE: Agronomist
ORG: EFGWB/EFED/OPP
TEL: 703-305-5925

J. Breithaupt
4/13/95

SIGNATURE:

PEER REVIEWED BY: Stephanie Syslo
TITLE: Environmental Scientist
ORG: ERCB/EFED/OPP
TEL: 703-305-6355

Stephanie Syslo 6/14/95

SIGNATURE:

PEER REVIEWED BY: Karen McCormack
TITLE: Environmental Protection Specialist
ORG: ERCB/EFED/OPP
TEL: 703-308-1835

Karen McCormack 6/14/95

SIGNATURE:

CONCLUSIONS:

Aged Mobility - Leaching and Adsorption/Desorption

1. The aged soil column leaching study in this review satisfies the aged portion of the 163-1 data requirement.
2. Based on soil column leaching experiments, aged [¹⁴C]isoxaflutole residues were very mobile in sand, sandy loam, and clay loam soils with 0.1, 1.3, and 2.0 % OC, respectively. Parent isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole] was generally not found below 6 cm of soil depth, and was not detected in the leachate from any soil. The primary residue in the leachate was RPA-202248 (isoxaflutole with the isoxazole-ring opened) at 90, 43, and 75 % of applied radioactivity in the sand.

sandy loam, and clay soils, respectively. In addition to the high percentage of RPA-202248 reaching the leachate in the above soils, the remainder was uniformly distributed within the length of the columns. Although only 1.8 and 1.2 % of applied radioactivity reached the leachate in the silty clay soil and loam sediment (7.5 and 8.5 % OC, respectively), the radioactive residues were relatively uniform in concentration down to 9 inches of the 12 inch soil column. Therefore, significant leaching of RPA-202248 would eventually occur in the silty clay soil and loam sediment with 7.5-8.5 % OC. In the sandy loam soil, the degradate RPA-203328 (2-methanesulfonyl-4-trifluoromethyl benzoic acid, **dealkylated RPA-202248**) reached an average of 6.8 % in the leachate, but was not found in the leachate from any other soil.

METHODOLOGY:

Benzyl-labeled ^{14}C -isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl)isoxazole (RPA 201772; radiochemical purity 98.6%, specific activity 679 MBQ/mmol (18.35 mCi/mMol, Rhone Poulenc)], was made into acetonitrile solutions with that were added to 50 g of soil (≤ 2 mm in diameter) to achieve a soil concentration of 0.089 ug/g. Following aerobic aging of the soils at 20 °C for 0, 2, and 6 hours and 1 and 3 days, samples were extracted to determine the half-lives in the 4 soils and 1 sediment used in the study. After the determination of the half-life in each soil/sediment, duplicate samples of each soil/sediment treated at the same rate were incubated at 20 °C for the appropriate half-life.

The dimensions of the soil leaching columns were 5.1 cm in diameter (2 inches) by 36 cm in length (14.4 inches). After packing duplicate soil columns with untreated soil (30 cm, 12 inches), the columns were saturated with aqueous 0.01 M CaCl_2 . The appropriate aged soil was added to each column, the glass wool was placed on top of the aged soil, and the lid was put on each column. Volatility traps of ethylene glycol and KOH were attached to the leaching columns. Leaching was conducted at $22 \pm 1^\circ\text{C}$ for 5-9 days using a total of 1040 ml of aqueous 0.01 M CaCl_2 for each column. Leachates were collected daily, and the volume was recorded. LSC and HPLC were used to analyze the leachates, and LSC was used to measure the radioactivity in the volatility traps.

After the soil columns were leached and allowed to drain, the soil columns were sliced into 6 sections of 6 cm depth. Each section was split into 2 sections before being extracted and analyzed by HPLC. Selected extracts were analyzed by HPLC/MS to confirm chemical identities. Combustion was used to determine total radioactive CO_2 . Further details about the analytical methodology may be seen in the attached Materials and Methods from the study. Also, the exact soil and sediment characteristics may be seen in the Comments section of this DER.

DATA SUMMARY:

Based on soil column leaching experiments, aged [¹⁴C]isoxaflutole residues were very mobile in sand, sandy loam, and clay loam soils with 0.1, 1.3, and 2.0 % OC, respectively. Parent isoxaflutole [5-cyclopropyl-4-(2-methanesulphonyl-4-trifluoromethylbenzoyl) isoxazole] was generally not found below 6 cm of soil depth, and was not detected in the leachate from any soil. The primary residue in the leachate was RPA-202248 (**isoxaflutole with the isoxazole-ring opened**) at 90, 43, and 75 % of applied radioactivity in the sand, sandy loam, and clay soils, respectively. In addition to the high percentage of RPA-202248 reaching the leachate in the above soils, the remainder was uniformly distributed within the length of the columns. Although only 1.8 and 1.2 % of applied radioactivity reached the leachate in the silty clay soil and loam sediment (7.5 and 8.5 % OC, respectively), the radioactive residues were relatively uniform in concentration down to 9 inches of the 12 inch soil column. Therefore, significant leaching of RPA-202248 would eventually occur in the silty clay soil and loam sediment with 7.5-8.5 % OC. In the sandy loam soil, the degradate RPA-203328 (2-methanesulfonyl-4-trifluoromethyl benzoic acid, **dealkylated RPA-202248**) reached an average of 6.8 % in the leachate, but was not found in the leachate from any other soil.

At the termination of the experiment, material balances for the soil columns/leachates ranged from 83.7 to 107.4% of the applied. There was significant degradation of parent isoxaflutole in all the soils and the sediment used in the study. In general, the shorter half-lives were associated with the higher pH soils (pH's 6.9-7.8) than in the lower pH soils (pH 4.8-5.9). The only exception was the silty clay soil (pH 4.9) with an unusually-high biomass amount, possibly indicating an unusually high microbial population. The main degradate formed was RPA-202248 (**isoxaflutole with the isoxazole-ring opened**). RPA-202248 was a significant degradate in both the hydrolysis and aerobic soil metabolism studies in this review, and formed more rapidly as the pH increased.

COMMENTS:

1. There was significant degradation of parent isoxaflutole in all the soils and the sediment used in the study. In general, the shorter half-lives were associated with the higher pH soils (pH's 6.9-7.8) than in the lower pH soils (pH 4.8-5.9). The only exception was the silty clay soil (pH 4.9) with an unusually-high biomass amount, possibly indicating an unusually high microbial population. The main degradate formed was RPA-202248 (**isoxaflutole with the isoxazole-ring opened**). RPA-202248 was a significant degradate in both the hydrolysis and aerobic soil metabolism studies in this review, and formed more rapidly as the pH increased.
2. The anaerobic aquatic metabolism degradate, RPA-205834, was detected in small quantities (<1 %) in the loam sediment column only, indicating an area of reduced conditions.
3. There was no significant loss of radioactivity from volatilization in the aerobic aging studies. Therefore, the remainder of the radioactivity after aerobic aging was essentially the initial application rate.

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

Property	Soil				
	93/22/02*	94/17/02	94/05/02 (Aquatic sediment)	93/32/02	93/02/02
Particle Size Distribution					
Sand (%)	54	96	28	9	26
Silt (%)	41	2.0	51	48	47
Clay (%)	5	2.0	21	43	27
Textural Class					
USDA	Sandy loam	Sand	Loam	Silty clay	Clay loam
Soil Series (U.K.)	Not Applicable	Blackwood	Tendring	Wallasea	Faulkbourne
Soil Series (U.S.)	Norfolk, NC	D	C	A**	B
Organic Carbon	1.3	0.1	8.5	7.5	2.0
Organic Matter (% OC *1.72)	2.2	0.2	14.7	12.7	3.4
pH (0.01 M CaCl ₂)	5.5	7.8	5.9	4.8	6.9
Cation Exchange (CEC, meq/100g)	5.7	5.4	13.0	15.7	12.2
Biomass (ug/g)	123	5	976	1314	366
Bulk Density	1.47	1.56	0.75	0.8	0.9

* 93/22/02-American Agricultural Services Inc., Lucama, N.C., 27851, U.S.
 94/17/02-Hurdle Drove Farm, West Row Fen, Bury St. Edmunds, Suffolk, U.K. (Map reference TL 672777)
 94/05/02-Aldhams Farm, Lawford, Manningtree, Essex, U.K. (Map reference TL 100301)
 93/32/02-West Tilbury Marshes, Essex, U.K. (Map reference TL 660773)
 94/02/02-Boarded Barns Farms, Ongar, Essex, U.K. (Map reference TL 557047)

5

**

U.S. Soil Series

- A. Godfrey, WA, Moag, OR, and Wilhite, IN.
- B. Bogart, OH, Centerburg, OH, Conowingo, MD, Haney, OH, Lehigh, PA, Mount Lucas, PA, Reaville, PA, Thackery, OH, Tuscola, MI, Vaughnsville, OH, and Williamstown, IN.
- C. Alvin, IL, Boyer, MI, Burnsville, MN, Council, WI, Dryden, MI, Eleva, WI, Elmdale, MI, Hillsdale, MI, Lamont, IA, Lapeer, MI, Mecan, WI, Oshtemo, MI, Perrin, MI, and Wyocena, WI.
- D. Arlova, IL, Carrols, WA, Contad, IN, Forbar, CA, Gothenbur, NE, Heceta, OR, Junius, NY, Stafford, NY, Tryon, NE, Tyre, MI, and Wanser, WA.

ISOXAFLUTOLE

Page _____ is not included in this copy.

Pages 7 through 35 are not included in this copy.

The material not included contains the following type of information:

- Identity of product inert ingredients.
 - Identity of product impurities.
 - Description of the product manufacturing process.
 - Description of quality control procedures.
 - Identity of the source of product ingredients.
 - Sales or other commercial/financial information.
 - A draft product label.
 - The product confidential statement of formula.
 - Information about a pending registration action.
 - FIFRA registration data.
 - The document is a duplicate of page(s) _____.
 - The document is not responsive to the request.
-

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
