(4-21-2004)

Data Evaluation Report on the anaerobic biotransformation of penoxsulam (XDE-638) in water-sediment/soil system

PMRA Submission Number {.....} EPA MRID Number 45830725

Data Requirement: PMRA Data Code:
EPA DP Barcode: D288160
OECD Data Point:
EPA Guideline: 162-3

Test material:
Common name: Penoxsulam.
Chemical names:
IUPAC: 6-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy-s-triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluoro-o-toluenesulfonamide;
3-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluorotoluene-2-sulfonamide.
CAS : 2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide.
CAS No: 219714-96-2.
Synonyms: XDE-638 (Petitioner's code).
SMILES string: n1c(nc2n1c(ncc2OC)OC)NS(=O)(=O)c3c(cccc3C(F)(F)F)OCC(F)F.

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Company Code:
Active Code:
Use Site Category:
EPA PC Code: 119031

CITATION: Krieger, M.S., T.J. Meitl and J.L. Balcer. 2002. Anaerobic soil and sediment degradation of ^{14}C-XDE-638. Unpublished study performed, sponsored and submitted by Dow AgroSciences LLC, Indianapolis, IN. Dow AgroSciences Study No.: 990052. Experiment initiation July 15, 1999, and completion August 23, 2001 (p.6). Final report issued June 24, 2002.

(1)

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EXECUTIVE SUMMARY:

The biotransformation of [triazolopyrimidine-2-^{14}C]- and [phenyl-U-^{14}C]-labeled 2-(2,2-difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-trifluoromethyl)benzenesulfonamide (penoxsulam, XDE-638) was studied in a pond water-silty clay sediment (water pH 6.3, organic carbon not reported; sediment pH 5.1, organic carbon 0.97%) system from Arkansas for 365 days under anaerobic conditions in darkness at 25.2 ± 0.2°C. In addition, the biotransformation of [^{14}C]penoxsulam (both labels) was studied in a pond water-silt loam soil (water as described above; soil pH 5.8, organic carbon 1.17%) system from Arkansas and a distilled water-silty clay loam soil (water not characterized, soil pH 6.2, organic carbon 0.99%) system from Italy for 120 days under anaerobic conditions in darkness at 25.2 ± 0.2°C and 20.5 ± 0.02°C, respectively. Based on the water volume, [^{14}C]penoxsulam was applied at a nominal rate of 0.1 mg a.i./L. The sediment:water ratio used was 1:3 (50 g dry wt. sediment:150 mL water) and the soil:water ratio was 1:2 (50 g dry wt. soil:100 mL water). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-3 and in compliance with GLP Standards 40 CFR, Part 160. The test system consisted of 250-mL biometer flasks containing water-sediment/soil under static nitrogen atmosphere. Sodium hydroxide solution in the sidearm flask was used for the passive collection of CO_2. Volatile organic compounds were not trapped. The water-sediment/soil systems were pre-incubated 29 days. Following treatment, a single treated pond water-silty clay sediment system per label was collected after 0, 3, 7, 14, 30, 90, 181, 271 and 365 days of incubation. For the pond water-silt loam and distilled water-silty clay loam soil systems, a single treated system per label was collected after 0, 3, 7, 14, 30, 59 and 120 days. Water layers were filtered (0.45 µm), then analyzed directly. Sediment/soil samples were extracted 3-4 times with acetonitrile:0.1N HCl (90:10, v:v). Extracts were combined, with a sub-sample filtered (0.45 µm) and concentrated prior to HPLC analysis. Water layers, sediment/soil extracts, extracted sediment/soil and trapping solutions were analyzed for total radioactivity using LSC. Water layers and sediment/soil extracts were analyzed for [^{14}C]penoxsulam and its transformation products by reverse-phase HPLC. [^{14}C]Compounds were identified by comparison to unlabeled reference standards. Identifications were confirmed using LC/MS.

Conditions in both the water layers and sediment/soils were primarily reducing throughout the 1-year incubation for the pond water-silty clay sediment systems and the 4-month incubations for the pond water-silt loam and distilled water-silty clay loam soil systems. In the pond water-silty clay sediment systems, dissolved oxygen, redox potentials and pH in the water layers averaged 1.0 ± 0.8 mg/L, -109.1 ± 49.3 mV and 7.0 ± 0.8, respectively, with an average redox potential in the sediment of -162.9 ± 23.1 mV. In the pond water-silt loam soil systems, dissolved oxygen, redox potentials and pH in the water layers averaged 1.4 ± 1.1 mg/L, -120.7 ± 75.6 mV and 8.1 ± 0.2, respectively, with an average redox potential in the soil of -214.8 ± 70.5 mV. In the distilled water-silty clay loam soil systems, dissolved oxygen, redox potentials and pH in the water layers averaged 1.4 ± 0.9 mg/L, -109.1 ± 36.8 mV and 7.4 ± 0.3, respectively, with an average redox potential in the soil of -181.5 ± 18.2 mV.

Both labels behaved similarly in each of the three systems. Overall recoveries of radiolabeled material (both labels) averaged 101.2 ± 4.4% (range 91.7-109.4%) of the applied for the pond water-silty clay sediment systems, 100.7 ± 7.2% (92.4-117.7%) for the pond water-silt loam soil systems and 97.4 ± 5.1% (89.8-107.7%) for the distilled water-silty clay loam soil systems, with no consistent decrease in material balances over the study duration for any system. Following application of [^{14}C]penoxsulam to the water layer, [^{14}C]residues (both labels) partitioned into the silty clay sediment with average distribution ratios (water:sediment) of 4:1 at day 0, 2:1 at 1 week, 1:1 at 2-4 weeks and were 1:2-3 thereafter (up to 1 year). For the two water-soil systems (pond water-silt loam, distilled water-silty clay loam), [^{14}C]penoxsulam residues (both labels) partitioned from the water layer into the soil with average distribution ratios of 4:1 at day 0, 2:1 at 1 week, 1:1, at 2-4 weeks and were 1:2 at 2-4 months.

In pond water-silty clay sediment systems, [^{14}C]penoxsulam (both labels) in the total system decreased from 97.3-100.5% of the applied at day 0 to 58.0-69.7% at 3 days, 31.4-32.3% at 1 week, 7.1-10.8% at 2 weeks, 1.1-1.7% at 1 month and was not detected thereafter. In the water layer, [^{14}C]penoxsulam decreased from 77.2-83.2% at day 0 to 42.7-54.6% at 3 days, 21.9-22.7% at 1 week, 5.1-7.7% at 2 weeks, 1.1-1.3% at 1 month and was not detected thereafter, while in the sediment, [^{14}C]penoxsulam decreased from 17.3-20.1% at day 0 to 9.5-9.6% at 1 week, 2.0-3.1% at 2 weeks and was ≤0.4% at 1 month.

In pond water-silt loam and distilled water-silty clay loam soil systems, [^{14}C]penoxsulam (both labels) in the total systems decreased from 96.8-100.0% of the applied at day 0 to 33.7-51.5% at 1 week, 12.2-29.1% at 2 weeks, 1.9-10.8% at 1 month, 0.2-2.4% at 2 months and was ≤0.6% at study termination (4 months). In the water layers, [^{14}C]penoxsulam decreased from 75.5-84.2% at day 0 to 27.1-38.9% at 1 week, 9.9-22.0% at 2 weeks, 1.4-8.7% at 1 month, ≤2.0% at 2 months and was ≤0.6% at study termination. In the soils, [^{14}C]penoxsulam was detected at 15.2-21.9% at day 0, 6.3-12.6% at 1 week, 2.3-7.1% at 2 weeks, 1.7-2.1% at 1 month and was ≤0.4% thereafter.

Based on first-order linear regression analysis, [^{14}C]penoxsulam (both labels) dissipated from the water layer, sediment/soil and total system with calculated half-lives of *ca.* 5 days in the pond water-silty clay sediment systems, *ca.* 10 days in the pond water-silt loam soil systems, and 5-9 days in the distilled water-silty clay loam soil systems.

For both labels, two major nonvolatile transformation products, 2-(2,2-difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638) and 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA), were detected in all three systems. Two additional major products, 2-(2,2-difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (5,8-diOH) and methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl), were detected in the pond water-silty clay

sediment systems (both labels), with BSTCA-methyl detected as a minor product in both water-soil systems. One minor product for both labels in all three systems was 2-(2,2-difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST). Identifications of 5-OH-XDE-638, BSTCA, 5,8-diOH and BST were confirmed via LC/MS. BSTCA-methyl was only identified by comparison to the HPLC retention time of reference standard due to instability during isolation procedures. In addition, LC/MS analysis of one unidentified HPLC fraction (maximum 12.2% and 13.4% of applied in water layer and total system, respectively, of pond water-silty clay sediment systems; ≤3.9% in sediment/soil of any system) detected at least four compounds, three tentatively identified as 3-[[[(3-,4-, or 5-hydroxy)-2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (OH-BSTCA), 2-[[(5-hydroxy-8-methoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)amino]sulfonyl]-3-(2,2,2-trifluoroethoxy)benzoic acid (PCA-5-OH-XDE-638) and (3-, 4-, or 5-hydroxy)-2-[[(5-hydroxy-8-methoxy[1,2,4]tirazolo[1,5-c]pyrimidin-2-yl)amino]sulfonyl]-3-(2,2,2-trifluoroethoxy)benzoic acid (PHCA-5-OH-XDE-638) plus an unidentified compound of 464 m.w.

In pond water-silty clay sediment systems (both labels), 5-OH-XDE-638 was detected in the water layer, sediment and total system at maximums of 27.2-27.5% (2 weeks), 11.9% (1 week) and 38.5-37.5% (2 weeks), respectively, then was not detected at 3-12 months, except for two detections of 1.2% and 6.1% at 1 and 9 months, respectively, in [triazolopyrimidine-2-^{14}C]-label treated water. BSTCA increased to 20.3-30.5% at 3 months in the total system (16.5-25.4% in water, 3.8-5.1% in sediment) and was 21.1-21.3% (19.6-19.9% in water, 1.4-1.5% in sediment) at study termination. BSCTA-methyl increased to 11.1-14.6% at 2 weeks in the total system (8.5-10.5% in water, 2.6-4.1% in sediment), then was 12.1-12.7% at 1 month (11.8-12.1% in water, ≤0.9% in sediment) and not detected thereafter. 5,8-diOH was a maximum 10.7-11.3% at 1 year in the total system (9.4-9.7% in water, 1.3-1.6% in sediment). BST increased to 3.6-6.0% at 1 month in the total system (2.9-3.2% in water, 0.7-2.8% in sediment) and was ≤2.8% (≤1.8% in water, ≤1.2% in sediment) thereafter. Extractable [^{14}C]residues increased from 18.6-21.2% of the applied at day 0 to 27.2-28.3% at 1 week, then decreased to 5.0-6.3% at 1 year, while nonextractable [^{14}C]residues increased from 0.8-5.1% at 0-3 days to 58.4-68.6% at 6-9 months days and were 50.2-58.3% at study termination. Organic matter fractionation of 1-year extracted sediment found 16.8-18.1%, 32.8-39.5% and 0.6-0.7% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively. At study termination, volatilized $^{14}CO_2$ totaled ≤1.7% of the applied.

In pond water-silt loam soil systems (both labels), 5-OH-XDE-638 was detected in the water layer, soil and total system at maximums of 32.1-32.3% (1 month), 9.6-10.5% (2 weeks) and 40.8-42.4% (1 month), respectively, and was 11.2-15.8%, 3.1-4.4% and 14.3-20.2%, respectively, at study termination. BSTCA was detected in the water layer, soil and total system at maximums of 14.2-19.2%, 3.5-4.1% and 17.7-23.3%, respectively, at study termination. BSCTA-methyl was detected only once in 1-month [triazolopyrimidine-2-^{14}C]-label treated water at 4.9%. BST was detected in the total system at maximums of 2.4-3.4% (1.9-2.7% in water, 0.5-0.7% in soil) at 2 weeks and was ≤1.8% (≤1.8% in water, ≤0.9% in soil) thereafter.

Extractable [^{14}C]residues increased from 16.1-16.6% of the applied at day 0 to 21.8-27.8% at 3-7 days, then decreased to 9.3-9.5% at 4-months, while nonextractable [^{14}C]residues increased from 0.5-0.7% at day 0 to 44.6-51.6% at study termination. Organic matter fractionation of 4-month extracted soil found 8.7-9.9%, 34.0-37.6% and 1.9-4.1% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively. Volatilized $^{14}CO_2$ were detected at ≤0.4% of the applied at any sampling interval.

In distilled water-silty clay loam soil systems (both labels), 5-OH-XDE-638 was detected in the water layer, soil and total system at maximums of 24.0-24.8% (2 weeks), 7.5-9.4% (1-2 weeks) and 31.7-33.4% (2 weeks), respectively, decreasing to 4.1-4.8%, 1.2-1.4% and 5.3-6.2%, respectively, at 2 months and was not detected at study termination. BSTCA increased to 13.9-14.3%, 4.0-4.5% and 17.9-18.8% at 1 month in the water layer, soil and total system, respectively, and was 13.9-14.0%, 4.4-5.1% and 18.3-19.1%, respectively, at study termination. BSCTA-methyl increased to 2.8-6.3% at 2 weeks in the total system (2.3-4.4% in water, 0.5-1.9% in soil) and was not detected thereafter. BST was ≤4.0% in the total system (≤3.1% in water, ≤0.9% in soil) at any interval. Extractable [^{14}C]residues decreased from 22.8-23.2% of the applied at day 0 to 7.6-8.4% at study termination, while nonextractable [^{14}C]residues increased from 0.8-1.4% to 62.9-65.3% over the same interval. Organic matter fractionation of the 120-day extracted soil found 10.9-11.5%, 44.1-50.6% and 3.0-9.7% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively. Sodium pyrophosphate extraction of acetonitrile:HCl extracted soil released up to an additional 43.8% of the applied, with HPLC analysis detecting up to 29.4% of the applied as BSTCA. At study termination, volatilized $^{14}CO_2$ totaled ≤1.0% of the applied.

A transformation pathway was proposed by the study authors. Under anaerobic conditions, the 5-methoxy group on the triazolopyrimdine ring is converted to a hydroxy group to yield 2-(2,2-difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638; maximums of 24.8-32.3%, 9.4-11.9% and 33.4-42.4% in water layer, sediment/soil and total system, respectively). 5-OH-XDE-638 can yield either 2-(2,2-difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (5,8-diOH; 9.7%, 2.6% and 11.3% in water, sediment/soil and total system, respectively) or methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl; 4.4-12.1%, 1.9-4.1% and 6.3-14.6% in water, sediment/soil and total system, respectively). BSTCA-methyl then degrades to 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA; 14.3-25.4%, 4.1-5.1% and 19.1-30.5% in water, sediment/soil and total system, respectively) which then yields 2-(2,2-difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST; 2.7-3.2%, 0.9-2.8% and 3.4-6.0% in water, sediment/soil and total system, respectively).

In a supplemental experiment, the presence of penoxsulam, at 0.1 µg/L, had no impact on the microbial viability of the water-sediment/soil systems.

Results Synopsis:

System: Pond water-silty clay sediment from Arkansas.

Half-life (0- to 30-day data) in water: 4.9 days ($r^2 = 0.972$).
Half-life (0- to 14-day data) in sediment: 4.7 days ($r^2 = 0.945$).
Half-life (0- to 59-day data) in total system: 4.8 days (4.3 to 5.4 days at the 90% confidence interval; $r^2 = 0.981$).

Major transformation products: 2-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638).
3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]-sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA).
2-(2,2-Difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (5,8-diOH).
Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl).

Minor transformation products: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST).
CO_2.

System: Pond water-silt loam soil from Arkansas.

Half-life (0- to 59-day data) in water: 10.5 days ($r^2 = 0.978$).
Half-life (3- to 59-day data) in soil: 10.4 days ($r^2 = 0.980$).
Half-life (0- to 59-day data) in total system: 10.5 days (9.6 to 11.6 days at the 90% confidence interval; $r^2 = 0.983$).

Major transformation products: 2-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638).
3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]-sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA).

Minor transformation products: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST).
Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl).
CO_2.

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System: Distilled water-silty clay loam soil from Italy.
Half-life (0- to 30-day data) in water: 5.3 days ($r^2 = 0.997$).
Half-life (0- to 59-day data) in soil: 8.7 days ($r^2 = 0.897$).
Half-life (0- to 59-day data) in total system: 6.6 days (6.0 to 7.3 days at the 90% confidence interval; $r^2 = 0.979$).

Major transformation products: 2-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638).
3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]-sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA).
Minor transformation products: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST).
Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl).
CO_2.

Study Acceptability: The portions of this study conducted using the Arkansas pond water-silty clay sediment system and the Arkansas pond water-silt loam soil system are classified acceptable and can be used towards fulfillment of the anaerobic aquatic metabolism guideline, Subdivision N Guideline §162-3, data requirements for penoxsulam.

The portion of this study conducted using the Italian distilled water-silty clay loam soil system is classified supplemental. That portion of the study is scientifically valid, but cannot be used towards fulfillment of the anaerobic aquatic metabolism guideline, Subdivision N Guideline §162-3, data requirements for penoxsulam because an inappropriate test water was used for the distilled water-silty clay loam soil system.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: This study was reportedly conducted in accordance with USEPA Subdivision N Guidelines §162-2 and §162-3 (1982, p.19). However, all experiments within this study were actually conducted in the manner of an anaerobic aquatic metabolism study, guideline §162-3, not as an anaerobic soil metabolism study. The study was also conducted in accordance with EC Directive 91/414/EEC using SETAC-Europe Procedures for Assessing the Environmental Fate and Ecotoxicity of Pesticides, Section 1.2. The following

deviations from USEPA Subdivision N Guideline §162-3 were noted:

> For the distilled water-silty clay loam soil systems, distilled water, the test water used to flood the soil, is not considered representative of a natural water that would be found at an intended use site.

COMPLIANCE: This study was conducted in compliance with USEPA GLP Standards 40 CFR, Part 160 (1989) and OECD Principles of GLP (ISBN 92-64-12367-9, 1982; p.3). Signed and dated Data Confidentiality, GLP and Quality Assurance statements and a Certification of study authenticity were provided (pp.2-5).

A. MATERIALS:

1. Test Material: [Triazolopyrimidine-2-^{14}C]- and [phenyl-U-^{14}C]-labeled 2-(2,2-difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-trifluoromethyl)benzenesulfonamide (penoxsulam, XDE-638; pp.19-20; Figure 1, p.73).

Chemical Structure: See DER Attachment 1.

Description: Technical, solid (p.20).

Purity:

[Triazolopyrimidine-2-^{14}C]:
[TP-2-^{14}C]-label:
Radiochemical purity: ≥98.0% (p.20; Figure 4, p.78).
Batch No.: INV1456.
Analytical purity: Not reported.
Specific activity: 28.9 mCi/mmol.
Location of radiolabel: 2-C in triazolopyrimidine ring.

[Phenyl-U-^{14}C]:
[Ph-U-^{14}C]-label:
Radiochemical purity: ≥97.9% (p.20; Figure.3, p.77).
Batch No.: INV1475.
Analytical purity: Not reported.
Specific activity: 24.6 mCi/mmol.
Location of radiolabel: Uniformly in phenyl ring.

Storage conditions of test chemicals: Not reported.

Table 1: Physico-chemical properties of penoxsulam (XDE-638).

Parameter		Values	Comments
Molecular weight:		483 g/mol	
Water solubility:	pH 5:	5.66 mg/L	
	pH 7:	0.408 g/L	
	pH 9:	1.46 g/L	
	Unbuffered:	4.91 mg/L	
Organic solvent solubility:	DMSO[1]:	78.4 g/L	
	NMP[2]:	40.3 g/L	
	DMF[3]:	39.8 g/L	
	Acetone:	20.3 g/L	
	Acetonitrile:	15.3 g/L	
	Ethyl acetate:	3.23 g/L	
	Methanol:	1.48 g/L	
	Octanol:	0.035 g/L	
	Xylene:	0.017 g/L	
	Heptane:	<1µg/mL	
Vapor pressure:		7.16×10^{-16} mm Hg	At 25°C.
UV absorption:		Not reported.	
pK_a:		5.1	
log K_{ow}:	pH 5:	1:137	
	pH 7:	-0.602	
	pH 9:	-1.418	
	Unbuffered:	-0.354	
Stability of compound at room temperature:		Not reported.	

[1]Dimethyl sulfoxide.
[2]1-Methylpyrrolidone.
[3]N-N-Dimethylformamide.
Data obtained from p.21; Figure 1, p.73 of the study report.

2. Water-sediment/soil collection, storage and properties:

Table 2: Description of water-sediment/soil collection and storage.

Description		Arkansas Water-Sediment	Arkansas Soil	Italian Soil
Geographic location:		Farm pond in Arkansas County, Arkansas.	Fallow, dry-seeded rice growing cropland in Arkansas County, Arkansas.	Rice growing region in Greggio (Vercelli), Piemonte, Italy.
Pesticide use history at the collection site:		Not reported.	Propanil, Prowl, Grandstand; further details not reported.	Not reported.
Collection dates:		May 23, 1999[1], September 25, 2000[2].	May 23, 1999.	May 24, 1999.
Collection procedures:	Water-sediment:	Water-sediment samples collected via hand-trowel from 10-12 sites within a 50 x 50 square foot plot and placed in a 5-gallon plastic bucket for transport. Collected water:sediment ratio was *ca.* 2:1.		
	Soil:	Collected via hand-trowel from 10-12 sites within a 50 x 50 square foot plot and placed in a 5-gallon plastic bucket for transport.		
Sampling depth:	Water:	Not reported.		
	Sediment:	To 3-inch depth below organic/mineral interface.		
	Soil:	NA[3]	To 15-cm depth.	To 10-cm depth.
Storage conditions:		Stored at 25°C upon receipt at test facility.		
Storage length:		1999 sample: 50 days. 2000 sample: *ca.* 6 months.	48 days.	55 days.
Preparation:	Water:	Filtered through glass wool.		
	Sediment/soil:	2-mm sieved.		

[1]Water-sediment used for primary metabolism study.
[2]Water-sediment used for supplementary exaggerated rate experiments.
[3]Not applicable.
Data obtained from pp.22-23; Appendix A, p.101 of the study report.

Table 3: Properties of the water.

Property	1999 AR Pond Water		2000 AR Pond Water	
Temperature (°C):	Not reported.			
pH:	6.3		5.9	
Redox potential (mV):	Initial:	Final:	Initial:	Final:
	N/A[1]	N/A	N/A	N/A
Oxygen concentration (mg/L):	N/A		10.8	
Dissolved organic carbon (mg C/L):	Not reported.			
Hardness (mg $CaCO_3$/L):	216		36	
Electrical conductivity:	0.21 mS/cm		0.19 mmhos/cm	
Total suspended solids (mg/L):	110		8	
Alkalinity (mg $CaCO_3$/L):	45		6	
Biomass (mg microbial C/100 g, CFU or other):	Not reported.			

[1]Not analyzed.

Data obtained from Table 2, p.49 of the study report.

Table 4: Properties of the sediment/soil.

Property	1999 AR Sediment	2000 AR Sediment	AR Soil	Italian Soil
Sediment/soil texture:	Silty clay	Silty clay	Silt loam	Silty clay loam
% sand (2000-50 µm):	4.4	6	4.3	6.0
% silt (50-2 µm):	47.6	42	71.7	58.8
% clay (<2 µm):	48.0	52	24.0	35.2
pH:	5.1	4.4	5.8	6.2
Organic carbon (%):	0.97	0.4	1.17[1]	0.99
Organic matter (%):	0.60	1.5	2.02	2.06
CEC (meq/100 g soil):	21.91	24.1	16.54	10.73
Redox potential (mV):	Not reported.			
Bulk density, disturbed (g/cm^3):	1.23	1.17	1.11	1.23
Microbial activity (µg/g soil dry wt.):	N/A[2]	N/A	N/A	46.5
Biomass - heterotrophic plate count (CFU/g):	3.45×10^5	N/A	3.3×10^7	2.85×10^6
Soil Taxonomic classification:	N/A	N/A	Fine-silty, mixed, active, thermic Typic Endoaqualfs.	N/A
Soil Series:	N/A	N/A	Amagon	N/A

[1]Estimated by study authors using formula %OC = %OM/1.72 (Table 1, p.47).
[2]Not analyzed.
Data obtained from Table 1, p.47 of the study report.

B. EXPERIMENTAL CONDITIONS:

1. Preliminary experiments: None.

2. Experimental conditions:

Table 5: Study design.

Parameter			AR Sediment	AR Soil	Italian Soil
Duration of the test:			365 days.	120 days.	120 days.
Water: Filtered/unfiltered water: Type and size of filter used, if any:			AR pond water. Filtered. Glass wool.	AR pond water. Filtered. Glass wool.	Distilled. Filtered. Milli-Q.
Amount of sediment/soil and water per treatment:	Water:		150 mL.	100 mL.	100 mL.
	Sediment/soil:		50 g dry wt.	50 g dry wt.	50 g dry wt.
Water:sediment/soil ratio:			3:1 (150 mL:50 g).	2:1 (100 mL:50 g).	2:1 (100 mL:50 g).
Nominal application rate (mg a.i./L):			0.1	0.1	0.1
Actual application rate (mg a.i./L):	TP-label[1]:		0.0997 (14.96 µg a.i./150 mL water).	0.0979 (9.79 µg a.i./100 mL water).	0.0979 (9.79 µg a.i./100 mL water).
	Ph-label:		0.0993 (14.90 µg a.i./150 mL water).	0.0898 (8.98 µg a.i./100 mL water).	0.0898 (8.98 µg a.i./100 mL water).
Control conditions, if used:			Sterile controls were not used.		
No. of Replications:	Controls, if used:		Sterile controls were not used.		
	Treatments:		Single treated water-sediment/soil system per label for each sampling interval.		
Test apparatus (Type/material/volume):			Sediment/soil was transferred to 250-mL biometer flasks, amended with alfalfa (0.5 g) and flooded with water. The flask headspace of each system was purged with nitrogen, then the flasks were sealed and the systems pre-incubated for 29 days prior to treatment.		
Details of traps for CO_2 and organic volatiles, if any:			The sidearm flask of each biometer flask contained 0.2M NaOH solution (100 mL).		
If no traps were used, is the system closed/open?			Volatiles traps were used.		
Identity and concentration of co-solvent:			Water.		
Test material application:	Volume of test solution used/treatment:	TP-label:	260 µL of 0.058 µg/µL solution.	362 µL of 0.028 µg/µL solution.	362 µL of 0.028 µg/µL solution.
		Ph-label:	232 µL of 0.065 µg/µL solution.	227 µL of 0.044 µg/µL solution.	227 µL of 0.044 µg/µL solution.
	Application method:		Applied to water surface via positive displacement pipette, with no mixing.		
Any indication of the test material adsorbing to the walls of the test apparatus?			No indication.		
Biomass (mg microbial C/100 g, CFU or other) of controls:			No sterile controls were used.		

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Parameter		AR Sediment	AR Soil	Italian Soil
Biomass (mg microbial C/100 g, CFU or other) of treated systems:		See supplementary experiments below.		
Experimental conditions:	Temperature (°C):	25.2 ± 0.2°C.	25.2 ± 0.2°C.	20.5 ± 0.02°C.
	Continuous darkness (Yes/No):	Yes.		
Other details, if any:		None.		

[1]TP-label = [triazolopyrimidine-2-^{14}C]-label and Ph-label = [phenyl-U-^{14}C]-label.
Data obtained from pp.24-26; Table 3, p.50; Figure 2, p.76 of the study report.

3. Anaerobic conditions: The water-sediment/soil systems were incubated in sealed biometer flasks under nitrogen atmosphere for 29 days prior to application and following treatment. Upon collection, dissolved oxygen, redox potential and pH of the water layer and redox potential of the sediment/soil were measured at each sampling interval (p.27).

In Arkansas water-silty clay sediment (both labels), dissolved oxygen, redox potentials and pH in the water layers at day 0 posttreatment were 0.00-0.1 mg/L, -166.1 to -140.5 mV and 7.2, respectively, and redox potentials in the sediments were -208.8 to -199.5 mV (Table 7, p.54).

In Arkansas water-silt loam soil (both labels), dissolved oxygen, redox potentials and pH in the water layers at day 0 were 0.00 mg/L, -100.5 to -20.3 mV and 7.8-7.9, respectively, and redox potentials in the soils were -263.9 to -260.4 mV (Table 8, p.55).

In Italian water-silty clay loam soil (both labels), dissolved oxygen, redox potentials and pH in the water layers at day 0 were 0.1-0.8 mg/L, -163.8 to -122.2 mV and 7.0-7.1, respectively, and redox potentials in the soils were -222.6 to -190.7 mV (Table 9, p.56).

4. Supplementary experiments: Microbial viability. Mineralization of [^{14}C]-labeled butyric acid to $^{14}CO_2$ was used to assess microbial viability of the water-sediment/soil systems (p.23). Untreated water-sediment/soil systems were prepared and incubated alongside the treated systems. In addition for each sediment and soil type, one system was prepared and treated with unlabeled penoxsulam (purity 99.1%; Figure 1, p.73) at 0.102 mg a.i./L (p.23). For the Arkansas pond water-silty clay sediment systems, untreated systems were collected after 90, 120 181 and 271 days of incubation and the treated system after 365 days (Table 6, p.53). For Arkansas pond water-silt loam soil and Italian distilled water-silty clay loam soil systems, untreated systems were collected after 90 and 120 days of incubation and treated systems after 120 days. Upon collection, the systems were treated with [^{14}C]butyric acid (radiochemical purity 97.6%, specific activity 10.6 mCi/mmol, co-solvent not specified) at 0.1 mg a.i./L and incubated as described above (pp.21, 23). The flasks were collected at 14 days posttreatment and aliquots (2 mL x 3) of

the NaOH solution in the biometer sidearm flask were analyzed for total radioactivity by LSC (p.23).

Exaggerated rate (1x, 5x, 10x and 25x) experiments. To facilitate the identification of nonvolatile transformation products, additional Arkansas pond water-silty clay sediment was collected (September 25, 2000), then water-sediment systems were prepared, pre-incubated and treated with [TP-2-^{14}C]penoxsulam at 1x, 5x, 10x and 25x the application rate as described above (p.29). At 30 days posttreatment, one system for each application rate was taken and the water layer analyzed by HPLC (described below). At 35 days posttreatment, duplicate systems treated at the 25x application rate were taken, combined, then water and sediment were separated by centrifugation (3,000 rpm, 10 minutes). The water layer was adjusted to pH 3 with glacial acetic acid, then divided between two C-18 SPE cartridges (10 g) previously conditioned with acetonitrile (50 mL) and water:acetic acid (99:1, v:v; 100 mL). The columns were eluted with acetonitrile, with the eluents combined and concentrated under nitrogen via turbovap at 35°C (p.30). Resulting residues were reconstituted in water:acetonitrile (95:5, v:v; 300 µL) and analyzed by LC/MS (described below).

5. Sampling:

Table 6: Sampling details.

Criteria	AR Sediment	AR and Italian Soils
Sampling intervals:	0, 3, 7, 14, 30, 90, 181, 271 and 365 days.	0, 3, 7, 14, 30, 59 and 120 days.
Sampling method:	Single treated water-sediment/soil system per label taken at each sampling interval. Each water-sediment/soil system was transferred to a centrifuge tube (type, volume not specified) for separation and extraction.	
Method of collection of CO_2 and volatile organic compounds:	Upon collection, the trapping solution was removed from the sidearm flask via vacuum aspiration.	
Sampling intervals/times for: Sterility check, if sterile controls are used: Redox potential, or other:	Sterile controls were not used. At each sampling interval, dissolved oxygen, redox potential and pH of the water layer and redox potential of the sediment/soil were measured upon collection.	
Sample storage before analysis:	Upon sampling, water layers and sediment/soil were separated and the sediment/soil extracted. Water layers, sediment/soil extracts and trapping solutions were analyzed by LSC the day of sampling. Sediment/soil extracts were analyzed by HPLC the day of extraction (sampling) or stored overnight at 6°C prior to HPLC analysis. Storage of water layers prior to HPLC analysis was not specified.	

Criteria	AR Sediment	AR and Italian Soils
Other observations, if any:	None.	

Data obtained from pp.26-27; Table 4, p.51 of the study report.

C. ANALYTICAL METHODS:

Separation of the sediment and water: Water was separated from sediment/soil by centrifugation (*ca.* 3,000 rpm, 10 minutes), then the water layer was decanted into a container (not described) and aliquots (1 mL x 3) were analyzed for total radioactivity by LSC (p.27).

Extraction/clean up/concentration methods: An aliquot (10 mL) of the water layer was filtered (0.45 µm PTFE syringe filter) prior to HPLC analysis (p.28; Figure 5, p.79).

Sediment/soil samples were extracted 3-4 times with acetonitrile:0.1N HCl (90:10, v:v). Extraction solvent volume was 70 mL per extraction (p.27; Tables 4-5, pp.51-52; Figure 5, p.79). Each extraction was done using a mechanical shaker for 1 hour. Sediment/soil and extract were separated by centrifugation (3,000 rpm, 10 minutes). Extracts were combined and aliquots (1 mL x 3) were analyzed for total radioactivity using LSC. At selected intervals (not specified), individual extracts were analyzed by LSC to assure complete recovery of extractable [^{14}C]residues (p.27). An aliquot (70 or 100 mL) of the combined extract was filtered (0.45 µm PTFE syringe filter) and concentrated using either rotary evaporation (temperature not specified) or under nitrogen via turbovap at 35-40°C (p.28). If the volume of the concentrated extract was <5 mL, then 1-2 mL of acetonitrile:water (95:5, v:v) was added. The resulting concentrated extract was filtered (0.2 µm syringe filter), then analyzed by LSC and HPLC.

Nonextractable residue determination: Extracted sediment/soil was air-dried, ground to homogenize, then aliquots (1 g, number of replicates not specified) were analyzed for total radioactivity by LSC following combustion (p.28).

To separate nonextractable [^{14}C]residues into humin, humic acid and fulvic acid fractions, aliquots (*ca.* 10 g) of the extracted sediment/soil were further extracted with 0.5M NaOH (50 mL) using a mechanical shaker for 24 hours at room temperature (p.28). Extract was separated from the sediment/soil by centrifugation (3,000 rpm, 15 minutes). The remaining sediment/soil pellet was combined with 0.5M NaOH (10 mL), centrifuged with removal of the NaOH rinse, then the pellet was rinsed with deionized water (10 mL) and centrifuged. The NaOH extract and rinses (NaOH and water) were combined, acidified to pH 2 and held at room temperature for 24 hours. The resulting precipitates (humic acids) were separated out by centrifugation. The supernatant (fulvic acids) was decanted, brought to volume (100 mL) with deionized water, then aliquots (5 mL x 3) were analyzed for radioactivity by LSC. The precipitate (humic acids) was re-dissolved in 0.5M NaOH (5 or 10 mL) and aliquots (1 mL x 3) were analyzed by LSC.

[^{14}C]Residues remaining in the extracted sediment/soil (humins) were quantified by LSC following combustion.

For the Italian soil, an additional sub-sample (weight not specified) of the acetonitrile:HCl extracted soil was further extracted with 0.1M sodium pyrophosphate (100 mL) with mechanical shaking for 45 minutes (p.29). The extract was lyophilized, the resulting residues were reconstituted in water (15-20 mL), then an aliquot was filtered and analyzed by HPLC.

Volatile residue determination: Aliquots (1 or 2 mL x 3) of the trapping solutions were analyzed for total radioactivity using LSC (p.26).

Total ^{14}C measurement: Total ^{14}C residues were determined by summing the concentrations of [^{14}C]residues measured in the water layers, sediment/soil extracts, extracted sediment/soil, and volatile trapping solutions (p.31).

Derivatization method, if used: A derivatization method was not employed.

Identification and quantification of parent compound: Filtered water layers and sediment/soil extracts were analyzed by reverse-phase HPLC under the following conditions: YMC ODS-AQ C-18 column (4.6 x 250 mm, 5 µm, 120 Å), gradient mobile phase combining (A) 1% aqueous acetic acid and (B) 1% acetic acid in acetonitrile [System 98/2: percent A:B at 0 min. 98:2 (v:v), 40 min. 30:70, 40.01 min. 5:95, 45 min. 5:95, 45.01 min. 98:2. System 70/30: percent A:B at 0 min. 70:30, 40 min. 30:70, 40.01 min. 5:95, 45 min. 5:95, 45.01 min. 70:30. System 95/5: percent A:B at 0 min 95:5, 30 min. 5:95, 35 min. 5:95, 40 min. 95:5, 45 min. 95:5], injection volume not specified, flow rate 1 mL/minute, UV detector not specified, IN/US β-RAM or Berthold Beta radioactivity detector (pp.22, 30; Table 5, p.52; Appendix B, p.103). Additionally, radio-chromatograms were constructed following fraction collection (0.5 - to 1.0-minute intervals) and LSC analysis (p.30). The study authors did not specify how parent [^{14}C]penoxsulam (XDE-638) was identified following HPLC. However, retention times were reported (Figure 6, p.80; Appendix b, p.103).

Identification of parent [TP-2-^{14}C]penoxsulam isolated from exaggerated rate systems (25x) was confirmed using LC/MS under the following conditions: YMC ODS-AQ column (4.6 x 250 mm, 5 µ), gradient mobile phase combining (A/C) 1% aqueous acetic acid and (B/D) 1% acetic acid in acetonitrile [Gradient 1: percent C:D at 0 min. 98:2 (v:v), 40 min. 30:70, 45 min. 98:2, 50 min. 98:2. Gradient 2: percent A:B at 0 min. 90:10, 55 min. 50:50, 58 min. 90:10, 60 min. 90:10], injection volume not specified, flow rate 1.0 mL/minute, Berthold LB509 radioactivity detector equipped with a 150-µL YG solid cell, post-LC column split ratio *ca.* 3:1 (RAM:MS), Micromass Quattro II or ThermoFinnigan LCQ Deca XP MS, electrospray ionization (ESI), alternating positive/negative with mass range 50-800 amu, positive or negative ESI with mass range 65-600 amu and scan rate of 1.5 seconds (Appendix E, pp.119-121). [^{14}C]Penoxsulam was identified by comparison to unlabeled reference standard (Appendix E, Figures 1-4, pp.127-130).

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Identification and quantification of transformation products: Transformation products were separated, quantified and identified as described for the parent (Figures 6-7, pp.80-81; Appendix B, p.103; Appendix E, p.119; Table 2, p.125; Figures 1-12, pp.127-138).

Detection limits (LOD, LOQ) for the parent compound and transformation products: The limits of quantification (LOQ) and detection (LOD) for LSC analysis of trapping solutions were reported as 0.065% and 0.017% of the applied, respectively (p.35). LOQ and LOD for LSC analysis of sediment/soil extracts were reported as 0.72% and 0.16% of the applied, respectively, and following soil combustion as 0.14% and 0.033% of applied, respectively (p.36). LOQ and LOD for HPLC analysis of sediment/soil extracts was reported as 0.00072% and 0.00016% of the applied, respectively (pp.36-37). LOQ/LOD for LSC and HPLC analyses of the water layers was not specified.

II. RESULTS AND DISCUSSION:

A. TEST CONDITIONS: Conditions in both the water layers and sediment/soils were primarily reducing (-200 to -50 mV) throughout the 365-day incubation for the Arkansas pond water-silty clay sediment and the 120-day incubations for the Arkansas pond water-silt loam and Italian distilled water-silty clay loam soils.

In Arkansas pond water-silty clay sediment systems (both labels), dissolved oxygen, redox potentials and pH in the water layers averaged (n = 18) 1.0 ± 0.6 mg/L (range 0.0-2.1 mg/L), -109.1 ± 49.3 mV (-182.9 to -25.3 mV) and 7.0 ± 0.8 (6.8-7.7, except for pH of 4.9 in 181-day systems), respectively, and redox potentials in the sediment averaged -162.9 ± 23.1 (-208.8 to -121.8 mV; Table 7, p.54).

In Arkansas pond water-silt loam soil systems (both labels), dissolved oxygen, redox potentials and pH in the water layers averaged (n = 14) 1.4 ± 1.1 mg/L (0.0-3.8 mg/L), -120.7 ± 75.6 mV (-229.6 to +82.9 mV) and 8.1 ± 0.2 (7.8-8.4), respectively, and redox potentials in the soil averaged -214.8 ± 70.5 mV (-270.6 to +26.6 mV; Table 8, p.55).

In Italian distilled water-silty clay loam soil systems (both labels), dissolved oxygen, redox potentials and pH in the water layers averaged (n = 14) 1.4 ± 0.9 mg/mL (0.1-2.7 mg/L), -109.1 ± 36.8 mV (-163.8 to -28.1 mV) and 7.4 ± 0.3 (7.0-7.8), respectively, and redox potentials in the soil averaged -181.5 ± 18.2 mV (-222.6 to -141.9 mV; Table 9, p.56).

B. MATERIAL BALANCE: For Arkansas pond water-silty clay sediment systems, recoveries of radiolabeled material averaged (n = 9) 102.6 ± 3.5% (range 94.9-108.2%) and 99.9 ± 4.8% (91.7-109.4%) of the applied in the [triazolopyrimidine-2-^{14}C]- and [phenyl-U-^{14}C]-label treated systems, respectively, with no consistent declines in material balances during the 365-day

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incubation (Table 10, p.57; Attachment 3). Following application of [^{14}C]penoxsulam (both labels) to the water layer, [^{14}C]residues partitioned into the sediment with average (n = 2) distribution ratios (water:sediment) of 4:1 at day 0, 2:1 at 7 days, 1:1 at 14-30 days and were 1:2-3 thereafter (Attachment 3).

For Arkansas pond water-silt loam soil systems, recoveries of radiolabeled material averaged (n = 7).98.5 ±.4.3% (range 93.1-105.3%) and 102.8 ± 8.7% (92.4-117.7%) of the applied in the [triazolopyrimidine-2-^{14}C]- and [phenyl-U-^{14}C]-label treated systems, respectively, with no consistent declines in material balances during the 120-day incubation (Table 11, p.58; Attachment 3). Following application of [^{14}C]penoxsulam (both labels) to the water layer, [^{14}C]residues partitioned into the soil with average (n = 2) distribution ratios (water:soil) of 5:1 at day 0, 2:1 at 7-14 days, 1:1 at 30-59 days and were 1:2 at 120 days (Attachment 3).

For Italian distilled water-silty clay loam soil systems, recoveries of radiolabeled material averaged (n = 7) 98.4 ± 3.1% (range 95.0-102.6%) and 96.3 ± 6.4% (89.8-107.7%) of the applied in the [triazolopyrimidine-2-^{14}C]- and [phenyl-U-^{14}C]-label treated systems, respectively, with no consistent declines in material balances during the 120-day incubation (Table 12, p.59; Attachment 3). Following application of [^{14}C]penoxsulam (both labels) to the water layer, [^{14}C]residues partitioned into the soil with average (n = 2) distribution ratios (water:soil) of 3:1 at 0-3 days, 2:1 at 7 days, 1:1 at 14 days, 1:2 at 30 days and were 1:3 thereafter (Attachment 3).

Table 7: Biotransformation of [^{14}C]penoxsulam (both labels), expressed as percentage of applied radioactivity (mean ± s.d.[1], n = 2), in Arkansas pond water-silty clay sediment under anaerobic conditions.

Compound		Sampling times (days)								
		0	3	7	14	30	90	181	271	365
Penoxsulam (XDE-638)	water	80.2 ± 3.0	48.6 ± 5.9	22.3 ± 0.4	6.4 ± 1.3	1.2 ± 3.0	ND[2]	ND	ND	ND
	sediment	18.7 ± 1.4	15.2 ± 0.1	9.6 ± 0.0	2.6 ± 0.6	≤0.4	ND	ND	ND	ND
	system[3]	98.9 ± 1.6	63.8 ± 5.8	31.9 ± 0.4	9.0 ± 1.9	1.4[4] ± 0.3	ND	ND	ND	ND
5-OH-XDE-638[5]	water	2.3 ± 0.1	15.9 ± 1.1	25.2 ± 0.5	27.3 ± 0.1	20.6 ± 1.1	≤1.2	ND	≤6.1	ND
	sediment	1.0 ± 0.2	6.0 ± 1.0	11.9 ± 0.0	11.3 ± 0.0	4.7 ± 0.1	ND	ND	ND	ND
	system	3.3 ± 0.3	21.9 ± 2.0	37.1 ± 0.5	38.6 ± 0.1	25.3 ± 1.0	≤1.2	ND	≤6.1	ND
5,8-diOH[6]	water	ND	ND	ND	ND	ND	ND	6.0 ± 2.3	≤4.9	9.6 ± 0.1
	sediment	ND	ND	ND	ND	≤0.5	ND	1.2 ± 0.2	1.6 ± 1.0	1.5 ± 0.1
	system	ND	ND	ND	ND	≤0.5	ND	7.2 ± 2.5	4.1[4] ± 3.5	11.0 ± 0.3
BSTCA-methyl[7]	water	ND	ND	2.3 ± 0.3	9.5 ± 1.0	12.0 ± 0.2	ND	ND	ND	ND
	sediment	ND	ND	2.2 ± 0.7	3.3 ± 0.9	≤0.9	ND	ND	ND	ND
	system	ND	ND	4.4 ± 0.9	12.8 ± 1.7	12.4[4] ± 0.3	ND	ND	ND	ND
BSTCA[8]	water	ND	ND	2.4 ± 0.1	2.8 ± 0.1	4.3 ± 0.5	20.9 ± 4.5	16.3 ± 0.7	17.7 ± 0.9	19.7 ± 0.2
	sediment	ND	ND	≤0.5	0.7 ± 0.1	2.2 ± 0.7	4.5 ± 0.7	1.7 ± 0.1	2.3 ± 0.5	1.4 ± 0.0
	system	ND	ND	2.7[4] ± 0.4	3.6 ± 0.1	6.5 ± 0.2	25.4 ± 5.1	18.0 ± 0.8	20.0 ± 1.3	21.2 ± 0.1
BST[9]	water	ND	ND	≤1.2	1.7 ± 0.1	3.0 ± 0.2	ND	≤1.8	≤1.8	ND
	sediment	ND	ND	≤0.5	≤0.7	1.7 ± 1.0	ND	0.8 ± 0.4	0.9 ± 0.1	0.7 ± 0.1
	system	ND	ND	≤1.7	2.1[4] ± 0.5	4.8 ± 1.2	ND	1.7[4] ± 0.5	1.8[4] ± 1.0	0.7 ± 0.1
Unknowns (R_t = *ca.* 12-13 min.)[10]	water	ND	ND	ND	ND	ND	10.3 ± 1.9	5.6 ± 0.0	≤2.4	ND
	sediment	ND	ND	ND	ND	≤0.3	0.9 ± 0.3	1.4 ± 0.0	ND	ND

Compound		Sampling times (days)								
		0	3	7	14	30	90	181	271	365
Additional Unknowns[11]	system	ND	ND	ND	ND	≤0.3	11.2 ± 2.3	7.0 ± 0.1	≤2.4	ND
	water	ND	2.9 ± 0.3	6.1 ± 0.0	5.1 ± 0.3	1.8 ± 0.1	5.8 ± 0.7	ND	ND	ND
	sediment	ND	1.5 ± 0.1	2.8 ± 0.1	2.0 ± 0.2	ND	0.9 ± 0.2	ND	≤1.4	0.5 ± 0.0
	system	ND	4.4 ± 0.2	9.0 ± 0.0	7.0 ± 0.0	1.8 ± 0.1	6.6 ± 0.8	ND	≤1.4	0.5 ± 0.0
Total extractable sediment residues		19.9 ± 1.3	24.2 ± 1.1	27.7 ± 0.5	21.3 ± 0.5	12.2 ± 0.1	8.6 ± 0.3	6.9 ± 0.5	5.9 ± 0.5	5.6 ± 0.6
Total CO_2		0.0 ± 0.0	0.0 ± 0.0	≤0.1	≤0.2	0.5 ± 0.3	0.8 ± 0.5	0.9 ± 0.5	1.0 ± 0.4	1.2 ± 0.6
Total volatile organics		–[12]	--	--	--	--	--	--	--	--
Nonextractable sediment residues		3.3 ± 1.8	2.7 ± 1.9	11.1 ± 0.9	24.9 ± 3.6	45.1 ± 1.1	55.1 ± 1.8	60.4 ± 2.0	64.2 ± 4.4	54.3 ± 4.1
Total % recovery	water	82.8 ± 2.9	70.3 ± 4.9	61.2 ± 0.9	54.0 ± 0.9	44.3 ± 0.9	41.3 ± 1.3	35.6 ± 1.1	27.3 ± 1.8	36.5 ± 0.7
	sediment[4]	23.2 ± 0.6	27.0 ± 0.7	38.9 ± 1.4	46.2 ± 4.0	57.4 ± 1.1	63.8 ± 1.5	67.4 ± 1.6	70.1 ± 4.9	59.9 ± 3.4
	system	106.0 ± 3.5	97.3 ± 5.6	100.1 ± 2.3	100.3 ± 3.1	102.1 ± 1.6	105.8 ± 2.1	103.8 ± 2.1	98.4 ± 3.5	97.6 ± 2.2

[1] Means as reported by study authors (with some exceptions, Reviewer's Comment No. 11.iii), but standard deviations calculated by reviewer.
[2]Not detected; LOD for sediment/soil extracts was reported as 0.00016% of the applied radioactivity (p.36); LOD for HPLC analysis of water layers was not reported.
[3]Entire system; water + sediment. [4]Mean as determined by reviewer (Attachment 3).
[5]2-(2,2-Difluoroethoxy-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (Figure 1, p.74).
[6]2-(2,2-Difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (Figure 1, p.75).
[7]Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (Figure 1, p.75).
[8]3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (Figure 1, p.74).
[9]2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)-benzenesulfonamide (Figure 1, p.74).
[10]This fraction was determined via LC/MS to consist of ≥4 separate components; OH-BSTCA, PCA-5-OH-XDE-638, PHCA-5-OH-XDE-638 plus a compound of 464 m.w. (Table 13, p.60; Figures 10-11, pp.84-85).
[11]Reported as sum of five HPLC peaks (Appendix C, p.106). [12]Not trapped.
Data obtained from p.36; Table 10, p.57; Table 13, p.60; Figure 1, pp.74-75; Appendix C, pp.105-106 of the study report and Attachment 3.

Table 8: Biotransformation of [^{14}C]penoxsulam (both labels), expressed as percentage of applied radioactivity (mean ± s.d.[1], n = 2), in Arkansas pond water-silt loam soil under anaerobic conditions.

Compound		Sampling times (days)						
		0	3	7	14	30	59	120
Penoxsulam (XDE-638)	water	82.9 ± 1.3	59.5 ± 0.8	36.9 ± 2.0	20.6 ± 1.4	8.6 ± 0.1	1.6 ± 0.4	≤0.6
	soil	15.5 ± 0.3	18.1 ± 2.1	11.5 ± 1.1	6.2 ± 0.9	1.9 ± 0.2	0.4 ± 0.0	ND[2]
	system[3]	98.4 ± 1.6	77.5 ± 1.2	48.4 ± 3.1	26.9 ± 2.2	10.5 ± 0.3	2.0 ± 0.5	≤0.6
5-OH-XDE-638[4]	water	ND	9.8 ± 1.1	19.3 ± 0.8	27.4 ± 1.1	32.2 ± 0.1	23.7 ± 1.5	13.5 ± 2.3
	soil	ND	4.2 ± 0.6	8.0 ± 0.2	10.1 ± 0.4	9.4 ± 0.7	7.6 ± 0.9	3.7 ± 0.7
	system	ND	14.0 ± 1.8	27.3 ± 1.0	37.5 ± 0.6	41.6 ± 0.8	31.3 ± 2.5	17.2 ± 3.0
BSTCA-methyl[5]	water	ND	ND	ND	ND	≤4.9	ND	ND
	soil	ND	ND	ND	ND	ND	ND	ND
	system	ND	ND	ND	ND	ND	ND	ND
BSTCA[6]	water	ND	ND	2.4 ± 0.1	2.9 ± 0.1	7.9 ± 3.5	13.1 ± 2.2	16.7 ± 2.5
	soil	ND	ND	0.8 ± 0.2	1.0 ± 0.1	3.4 ± 0.4	2.8 ± 0.2	3.8 ± 0.3
	system	ND	ND	3.2 ± 0.3	3.9 ± 0.2	11.4 ± 3.9	15.9 ± 2.3	20.5 ± 2.8
BST[7]	water	ND	ND	1.3 ± 0.6	2.3 ± 0.4	≤1.8	ND	ND
	soil	ND	ND	0.5 ± 0.1	0.6 ± 0.1	≤0.8	0.6 ± 0.0	≤0.9
	system	ND	ND	1.8 ± 0.5	2.9 ± 0.5	1.3[8] ± 0.5	0.6 ± 0.0	≤0.9
Unknowns (R_t = *ca.* 12-13 min.)[9]	water	ND	ND	ND	ND	ND	6.2 ± 0.1	≤2.7
	soil	ND	ND	ND	ND	1.2 ± 0.1	1.6 ± 0.2	ND
	system	ND	ND	ND	ND	1.2 ± 0.1	7.8 ± 0.3	≤2.7
Additional Unknowns	water	2.0 ± 0.2	1.8 ± 0.6	3.9 ± 0.5	4.5 ± 0.1	2.4 ± 1.6	1.4 ± 0.2	≤1.4
	soil	0.7 ± 0.0	1.2 ± 0.4	1.9 ± 0.1	1.4 ± 0.1	1.0 ± 0.3	0.5 ± 0.1	≤0.2

Compound		Sampling times (days)						
		0	3	7	14	30	59	120
	system	2.7 ± 0.2	3.0 ± 1.0	5.8 ± 0.5	5.9 ± 0.5	3.4 ± 1.4	1.9 ± 0.1	≤1.6
Total extractable soil residues		16.3 ± 0.3	24.8 ± 3.0	23.7 ± 0.6	19.9 ± 1.2	18.1 ± 1.8	14.4 ± 1.5	9.4 ± 0.1
Total CO_2		0.0 ± 0.0	0.0 ± 0.0	≤0.1	≤0.1	≤0.4	≤0.2	≤0.3
Total volatile organics		–[10]	--	--	--	--	--	--
Nonextractable soil residues		0.6 ± 0.1	2.9 ± 1.0	6.7 ± 0.1	14.2 ± 2.6	29.9 ± 0.8	39.6 ± 2.8	48.1 ± 3.5
Total % recovery	water	85.5 ± 1.0	74.6 ± 1.0	65.4 ± 0.9	59.0 ± 0.6	62.1 ± 4.6	51.0 ± 3.9	38.0 ± 1.1
	soil[11]	17.0 ± 0.1	27.7 ± 4.0	30.4 ± 0.5	34.1 ± 1.4	48.0 ± 2.6	54.1 ± 4.3	57.5 ± 3.4
	system	102.4 ± 1.0	102.3 ± 3.1	95.8 ± 0.5	93.1 ± 0.7	110.3 ± 7.5	105.2 ± 8.3	95.6 ± 2.5

[1] Means as reported by study authors (with some exceptions, Reviewer's Comment No. 11.iii), but standard deviations calculated by reviewer.
[2]Not detected; LOD for sediment/soil extracts was reported as 0.00016% of the applied radioactivity (p.36); LOD for HPLC analysis of water layers was not reported.
[3]Entire system; water + sediment.
[4]2-(2,2-Difluoroethoxy-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (Figure 1, p.74).
[5]Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (Figure 1, p.75).
[6]3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (Figure 1, p.74).
[7]2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)-benzenesulfonamide (Figure 1, p.74).
[8]Mean as determined by reviewer.
[9]This fraction was determined via LC/MS to consist of ≥4 separate components; OH-BSTCA, PCA-5-OH-XDE-638, PHCA-5-OH-XDE-638 plus a compound of 464 m.w. (Table 13, p.60; Figures 10-11, pp.84-85).
[10]Not trapped.
[11]Attachment 3.
Data obtained from p.36; Table 11, p.58; Table 14, p.61; Figure 1, pp.74-75; Appendix C, pp.107-108 of the study report and Attachment 3.

Table 9: Biotransformation of [^{14}C]penoxsulam (both labels), expressed as percentage of applied radioactivity (mean ± s.d.[1], n = 2), in Italian distilled water-silty clay loam soil under anaerobic conditions.

Compound		Sampling times (days)						
		0	3	7	14	30	59	120
Penoxsulam (XDE-638)	water	76.2 ± 0.8	47.5 ± 0.3	27.3 ± 0.1	10.0 ± 0.1	1.5 ± 0.0	ND[2]	ND
	soil	21.7 ± 0.2	12.5 ± 1.0	6.8 ± 0.5	2.6 ± 0.3	0.5 ± 0.1	0.2 ± 0.0	ND
	system[3]	98.0 ± 0.9	60.0 ± 0.7	34.0 ± 0.3	12.6 ± 0.4	2.0 ± 0.0	0.2 ± 0.0	ND
5-OH-XDE-638[4]	water	ND	13.4 ± 0.0	23.0 ± 0.2	24.4 ± 0.4	11.9 ± 0.2	4.4 ± 0.4	ND
	soil	ND	4.1 ± 0.3	7.8 ± 0.3	8.1 ± 1.3	3.7 ± 0.2	1.3 ± 0.1	ND
	system	ND	17.5 ± 0.4	30.8 ± 0.1	32.6 ± 0.9	15.6 ± 0.0	5.7 ± 0.4	ND
BSTCA-methyl[5]	water	ND	ND	ND	3.4 ± 1.1	ND	ND	ND
	soil	ND	≤0.4	0.9 ± 0.0	1.2 ± 0.7	ND	ND	ND
	system	ND	≤0.4	0.9 ± 0.0	4.6 ± 1.7	ND	ND	ND
BSTCA[6]	water	ND	1.7 ± 0.0	3.6 ± 0.4	3.7 ± 0.1	14.1 ± 0.2	11.9 ± 0.6	13.9 ± 0.1
	soil	ND	0.6 ± 0.1	1.5 ± 0.0	3.0 ± 0.5	4.3 ± 0.3	3.6 ± 0.1	4.7 ± 0.4
	system	ND	2.3 ± 0.2	5.1 ± 0.4	6.7 ± 0.4	18.3 ± 0.4	15.6 ± 0.5	18.7 ± 0.4
BST[7]	water	ND	ND	≤1.3	2.1 ± 0.4	ND	ND	≤3.1
	soil	ND	≤0.2	0.6 ± 0.0	0.9 ± 0.0	≤0.7	0.7 ± 0.1	≤0.9
	system	ND	≤0.2	1.3[8] ± 0.7	3.0 ± 0.4	≤0.7	0.7 ± 0.1	≤4.0
Unknowns (R_t = *ca.* 12-13 min.)[9]	water	ND	ND	ND	ND	ND	ND	ND
	soil	ND	ND	ND	ND	≤3.7	3.6 ± 0.3	ND
	system	ND	ND	ND	ND	≤3.7	3.6 ± 0.3	≤2.7
Additional Unknowns	water	2.2 ± 0.1	3.5 ± 0.2	6.3 ± 0.3	4.9 ± 0.4	ND	ND	ND
	soil	1.1 ± 0.0	2.0 ± 0.1	2.7 ± 0.0	1.8 ± 0.1	0.5 ± 0.0	≤0.2	ND

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Compound		Sampling times (days)						
		0	3	7	14	30	59	120
	system	3.3 ± 0.1	5.5 ± 0.3	9.0 ± 0.3	6.7 ± 0.3	0.5 ± 0.0	≤0.2	ND
Total extractable soil residues		23.0 ± 0.2	19.9 ± 1.2	21.3 ± 0.4	18.2 ± 1.2	14.0 ± 0.3	11.3 ± 0.4	8.0 ± 0.4
Total CO_2		0.0 ± 0.0	0.0 ± 0.0	≤0.1	≤0.2	0.2 ± 0.2	0.3 ± 0.2	0.6 ± 0.3
Total volatile organics		–[10]	--	--	--	--	--	--
Nonextractable soil residues		1.1 ± 0.3	5.8 ± 0.5	11.0 ± 1.1	24.8 ± 2.3	52.8 ± 2.5	56.6 ± 5.5	64.1 ± 1.2
Total % recovery	water	79.1 ± 1.1	69.7 ± 0.7	61.4 ± 1.6	50.6 ± 0.7	38.1 ± 0.5	27.1 ± 0.6	22.2 ± 0.4
	soil[11]	24.1 ± 0.1	25.7 ± 0.7	32.3 ± 0.8	43.0 ± 1.1	66.8 ± 2.8	68.0 ± 5.1	72.1 ± 0.8
	system	103.2 ± 1.0	95.4 ± 1.4	93.8 ± 2.4	93.7 ± 1.8	105.1 ± 2.5	95.3 ± 5.5	94.9 ± 0.1

[1] Means as reported by study authors (with some exceptions, Reviewer's Comment No. 11.iii), but standard deviations calculated by reviewer.
[2]Not detected; LOD for sediment/soil extracts was reported as 0.00016% of the applied radioactivity (p.36); LOD for HPLC analysis of water layers was not reported.
[3]Entire system; water + sediment.
[4]2-(2,2-Difluoroethoxy-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (Figure 1, p.74).
[5]Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (Figure 1, p.75).
[6]3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (Figure 1, p.74).
[7]2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)-benzenesulfonamide (Figure 1, p.74).
[8]Mean as determined by reviewer.
[9]This fraction was determined via LC/MS to consist of ≥4 separate components; OH-BSTCA, PCA-5-OH-XDE-638, PHCA-5-OH-XDE-638 plus a compound of 464 m.w. (Table 13, p.60; Figures 10-11, pp.84-85).
[10]Not trapped.
[11]Attachment 3.
Data obtained from p.36; Table 12, p.59; Table 15, p.62; Figure 1, pp.74-75; Appendix C, pp.109-110 of the study report and Attachment 3.

C. TRANSFORMATION OF PARENT COMPOUND: In Arkansas pond water-silty clay sediment systems, [^{14}C]penoxsulam (both labels) in the total system decreased from 97.3-100.5% of the applied at day 0 posttreatment to 58.0-69.7% at 3 days, 31.4-32.3% at 7 days, 7.1-10.8% at 14 days, 1.1-1.7% at 30 days and was not detected at 90-365 days (Attachment 3). In the water layer, [^{14}C]penoxsulam decreased from 77.2-83.2% at day 0 to 42.7-54.6% at 3 days, 21.9-22.7% at 7 days, 5.1-7.7% at 14 days, 1.1-1.3% at 30 days and was not detected thereafter (Appendix C, pp.105-106). In sediment extracts, [^{14}C]penoxsulam decreased from 17.3-20.1% at day 0 to 9.5-9.6% at 7 days, 2.0-3.1% at 14 days and was ≤0.4% at 30 days.

In Arkansas pond water-silt loam soil systems, [^{14}C]penoxsulam (both labels) in the total system decreased from 96.8-100.0% of the applied at day 0 to 45.3-51.5% at 7 days, 24.7-29.1% at 14 days, 10.1-10.8% at 30 days, 1.5-2.4% at 59 days and was ≤0.6% at 120 days (Attachment 3). In the water layer, [^{14}C]penoxsulam decreased from 81.6-84.2% at day 0 to 34.9-38.9% at 7 days, 19.3-22.0% at 14 days, 8.4-8.7% at 30 days, 1.1-2.0% at 59 days and was ≤0.6% at 120 days (Appendix C, pp.107-108). In soil extracts, [^{14}C]penoxsulam increased from 15.2-15.8% at day 0 to 16.0-20.1% at 3 days, then decreased to 10.4-12.6% at 7 days, 5.4-7.1% at 14 days, 1.7-2.1% at 30 days, 0.4% at 59 days and was not detected at 120 days.

In Italian distilled water-silty clay loam soil systems, [^{14}C]penoxsulam (both labels) in the total system decreased from 97.1-98.9% of the applied at day 0 to 59.3-60.7% at 3 days, 33.7-34.3% at 7 days, 12.2-13.0% at 14 days, 1.9% at 30 days, 0.2% at 59 days and was not detected at 120 days (Attachment 3). In the water layer, [^{14}C]penoxsulam decreased from 75.5-77.0% at day 0 to 27.1-27.4% at 7 days, 9.9-10.1% at 14 days, 1.4-1.5% at 30 days and was not detected thereafter (Appendix C, pp.109-110). In soil extracts, [^{14}C]penoxsulam decreased from 21.6-21.9% at day 0 to 11.5-13.5% at 3 days, 6.3-7.2% at 7 days, 2.3-2.9% at 14 days, 0.4-0.5% at 30 days, 0.2% at 59 days and was not detected at 120 days.

HALF-LIFE/DT50: Half-life values for the dissipation of [^{14}C]penoxsulam (both labels plotted together) from the water layer, sediment/soil and total system of the treated systems were determined using linear regression analysis based on first-order kinetics as calculated by Excel Microsoft Excel version 9.0 (Attachment 3). Half-life values determined by the reviewer were in close agreement with those determined by the study authors using first-order linear regression analysis as calculated by Microsoft Excel with both labels plotted together (pp.41-42; Table 21, p.68; Figure 23, p.97). DT90 (90% decline time) values for penoxsulam in the water layer, sediment/soil and total system were also determined by the study authors (Table 21, p.68).

Table 10: Half-life ($t_{1/2}$) values of penoxsulam in anaerobic water-sediment/soil systems.

System		First-order Linear[1]			DT90 (days)
		Half-life	Regression equation	r^2	
Arkansas pond water-silty clay sediment	water	0- to 30-day data: 4.9 days observed: *ca.* 3 days posttreatment	y = -0.1403x + 4.19	0.972	16.5
	sediment	0- to 14-day data: 4.7 days observed: 3-7 days posttreatment	y = -0.1469x + 3.09	0.945	15.7
	total system	0- to 30-day data: 4.8 days observed: 3-7 days posttreatment	y = -0.1440x + 4.49	0.981	16.1
Arkansas pond water-silt loam soil	water	0- to 59-day data: 10.5 days observed: 3-7 days posttreatment	y = -0.0660x + 4.19	0.978	35.1
	soil	3- to 59-day data: 10.4 days observed: 7-14 days posttreatment	y = -0.0668x + 2.88	0.980	35.4
	total system	0- to 59-day data: 10.5 days observed: *ca.* 7 days posttreatment	y = -0.0659x + 4.42	0.983	35.1
Italian distilled water-silty clay loam soil	water	0- to 30-day data: 5.3 days observed: <3 days posttreatment	y = -0.1314x + 4.25	0.997	17.6
	soil	0- to 59-day data: 8.7 days observed: 3-7 days posttreatment	y = -0.0793x + 2.50	0.897	29.1
	total system	0- to 59-day data: 6.6 days observed: 3-7 days posttreatment	y = -0.1048x + 4.27	0.981	22.0

[1]Data used for half-life calculations obtained from Appendix C, pp.105-110 of the study report (see Attachment 3).
[2]DT90 values obtained from Table 21, p.68 of the study report.

The study authors also determined first-order, non-log transformed dissipation half-lives for penoxsulam (both labels plotted together) in the total system of 4.3 days (r^2 = 0.995), 7.4 days (r^2 = 0.994) and 4.4 days (r^2 = 0.999) for the Arkansas silty clay sediment, Arkansas silt loam soil and Italian silty clay loam soil, respectively, with DT90 values of 14.4 days, 24.6 days and 14.6 days, respectively (p.42; Table 22, p.69; Figure 24, p.98).

TRANSFORMATION PRODUCTS: Two major nonvolatile transformation products for both labels in all three systems were 2-(2,2-difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638) and 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA; Appendix E, p.119). Two additional major products detected in the Arkansas pond water-silty clay sediment systems (both labels) were 2-(2,2-difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (5,8-diOH) and methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl; Figure 1, p.75). BSTCA-methyl was detected as a minor product in both water-soil systems. One minor product for both labels in all three systems was 2-(2,2-difluoroethoxy)-N-1H-1,2,4-

triazole-3-yl-6-(trifluoromethyl) benzenesulfonamide (BST). Identifications of 5-OH-XDE-638, BSTCA, 5,8-diOH and BST were confirmed via LC/MS (p.40; Appendix E, pp.119-138). BSTCA-methyl was only identified by comparison to the HPLC retention time of reference standard, because the compound was not stable during sample preparation for LC/MS analysis (p.40). LC/MS analysis of one unidentified HPLC fraction (retention time *ca.* 12-13 minutes; Figures 10-11, pp.84-85) detected at least four compounds; three tentatively identified as 3-[[[(3-,4-, or 5-hydroxy)-2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (OH-BSTCA), 2-[[(5-hydroxy-8-methoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)amino]sulfonyl]-3-(2,2,2-trifluoroethoxy)benzoic acid (PCA-5-OH-XDE-638) and (3-, 4-, or 5-hydroxy)-2-[[(5-hydroxy-8-methoxy[1,2,4]tirazolo[1,5-c]pyrimidin-2-yl)amino]sulfonyl]-3-(2,2,2-trifluoroethoxy)benzoic acid (PHCA-5-OH-XDE-638) plus a compound of 464 m.w. (pp.40-41; Tables 13-15, pp.60-62; Appendix E, p.119).

The study authors determined first-order, non-log transformed dissipation half-lives for 5-OH-XDE-638 (both labels plotted together) in the total system of 7.8 days ($r^2 = 0.878$), 19.5 days ($r^2 = 0.670$) and 5.1 days ($r^2 = 0.795$) for the Arkansas silty clay sediment, Arkansas silt loam soil and Italian silty clay loam soil, respectively, with DT90 values of 25.9 days, 64.7 days and 17.0 days, respectively (p.42; Table 22, p.69; Figure 24, p.98).

In Arkansas pond water-silty clay sediment systems, 5-OH-XDE-638 (both labels) was detected in the total system at maximums of 38.5-38.7% of the applied at 14 days (maximum 27.2-27.5% in water at 14 days and 11.9% in sediment at 7 days) decreasing to 24.3-26.3% at 30 days (19.5-21.7% in water, 4.6-4.8% in sediment), with the [phenyl-U-^{14}C]-label not detected thereafter, and the [triazolopyrimidine-2-^{14}C]-label detected at ≤6.1% (water layer only) at 90-271 days and not detected at 365 days (Appendix C, pp.105-106; Attachment 3). BSTCA increased to 20.3-30.5% at 90 days in the total system (16.5-25.4% in water, 3.8-5.1% in sediment) and was 21.1-21.3% (19.6-19.9% in water, 1.4-1.5% in sediment) at study termination (365 days). BSCTA-methyl increased to 11.1-14.6% at 14 days in the total system (8.5-10.5% in water, 2.6-4.1% in sediment), then was 12.1-12.7% at 30 days (11.8-12.1% in water, ≤0.9% in sediment) and not detected thereafter. 5,8-diOH was a maximum 10.7-11.3% at 365 days in the total system (9.4-9.7% in water, 1.3-1.6% in sediment). BST increased to 3.6-6.0% at 30 days in the total system (2.9-3.2% in water, 0.7-2.8% in sediment) and was ≤2.8% (≤1.8% in water, ≤1.2% in sediment) thereafter. The HPLC fraction consisting of tentatively identified OH-BSTCA, PCA-5-OH-XDE-638 and PHCA-5-OH-XDE-638 and unidentified m.w. 464 compound was detected at a maximum 8.9-13.4% at 90 days in the total system (8.3-12.2% in water, 0.6-1.2% in sediment). Additional unknowns (up to five compounds) were detected at a total maximum of 8.9-9.0% at 7 days in the total system (6.1% in water, 2.8-2.9% in sediment), then were 1.7-7.1% at 14-90 days (1.7-6.4% in water, ≤2.2% in sediment) and ≤1.4% (sediment only) thereafter.

In Arkansas pond water-silt loam soil systems, 5-OH-XDE-638 (both labels) was detected in the total system at maximums of 40.8-42.4% of the applied at 30 days (maximum 32.1-32.3% in water at 30 days and 9.6-10.5% in soil at 14 days) decreasing to 14.3-20.2% at 120 days (11.2-

15.8% in water, 3.1-4.4% in soil; Appendix C, pp.107-108; Attachment 3). BSTCA increased to 17.7-23.3% at study termination (120 days) in the total system (14.2-19.2% in water, 3.5-4.1% in soil). BSCTA-methyl was detected only once in 30-day [triazolopyrimidine-2-^{14}C]-label treated water at 4.9%. BST increased to 2.4-3.4% at 14 days in the total system (1.9-2.7% in water, 0.5-0.7% in soil) and was ≤1.8% (≤1.8% in water, ≤0.9% in soil) thereafter. HPLC fraction consisting of tentatively identified OH-BSTCA, PCA-5-OH-XDE-638 and PHCA-5-OH-XDE-638 and unidentified m.w. 464 compound was detected at a maximum 7.5-8.1% at 59 days in the total system (6.1-6.3% in water, 1.4-1.8% in soil). Total additional unknowns increased to 6.1-6.3% at 7-14 days in the total system (3.4-4.6% in water, 1.3-2.0% in soil), then decreased to ≤1.6% at 120 days (≤1.4% in water, ≤0.2% in soil).

In Italian distilled water-silty clay loam soil systems, 5-OH-XDE-638 (both labels) was detected in the total system at maximums of 31.7-33.4% of the applied at 14 days (maximum 24.0-24.8% in water at 14 days and 7.5-9.4% in soil at 7-14 days) decreasing to 5.3-6.2% at 59 days (4.1-4.8% in water, 1.2-1.4% in soil) and was not detected at 120 days (Appendix C, pp.109-110; Attachment 3). BSTCA increased to 17.9-18.8% at 30 days in the total system (13.9-14.3% in water, 4.0-4.5% in soil) and was 18.3-19.1% at 120 days (13.9-14.0% in water, 4.4-5.1% in soil). BSCTA-methyl increased to 2.8-6.3% at 14 days in the total system (2.3-4.4% in water, 0.5-1.9% in soil) and was not detected thereafter. BST was ≤4.0% in the total system (≤3.1% in water, ≤0.9% in soil) at any interval. HPLC fraction consisting of tentatively identified OH-BSTCA, PCA-5-OH-XDE-638 and PHCA-5-OH-XDE-638 and unidentified m.w. 464 compound was detected at ≤3.9% at 30-59 days in the soil only and was not detected at all other intervals. Total additional unknowns increased to 8.7-9.3% at 7 days in the total system (5.9-6.6% in water, 2.7-2.8% in soil), then decreased to ≤0.6% (soil only) at 30 days.

NONEXTRACTABLE AND EXTRACTABLE RESIDUES: In Arkansas silty clay sediment, extractable [^{14}C]residues (both labels) increased from 18.6-21.2% of the applied at day 0 to 27.2-28.3% at 7 days, then decreased to 5.0-6.3% at 365 days (Table 10, p.57). Nonextractable [^{14}C]residues increased from 0.8-5.1% at 0-3 days to 58.4-68.6% at 181-271 days and were 50.2-58.3% at study termination. Organic matter fractionation of the 365-day extracted sediment found 16.8-18.1%, 32.8-39.5% and 0.6-0.7% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively (Table 19, p.66).

In Arkansas silt loam soil, extractable [^{14}C]residues (both labels) increased from 16.1-16.6% of the applied at day 0 to 21.8-27.8% at 3-7 days, then decreased to 9.3-9.5% at 120 days (Table 11, p.58). Nonextractable [^{14}C]residues increased from 0.5-0.7% at day 0 to 44.6-51.6% at study termination. Organic matter fractionation of the 120-day extracted soil found 8.7-9.9%, 34.0-37.6% and 1.9-4.1% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively (Table 19, p.66).

In Italian silty clay loam soil, extractable [^{14}C]residues (both labels) decreased from 22.8-23.2% of the applied at day 0 to 7.6-8.4% at 120 days, while nonextractable [^{14}C]residues increased

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from 0.8-1.4% to 62.9-65.3% over the same interval (Table 12, p.59). Organic matter fractionation of the 120-day extracted soil found 10.9-11.5%, 44.1-50.6% and 3.0-9.7% of the applied associated with the humin, fulvic acid and humic acid fractions, respectively (Table 19, p.66). Sodium pyrophosphate extraction released up to 43.8% of the applied previously nonextractable [^{14}C]residues, with HPLC analysis detecting up to 29.4% of the applied as BSTCA (p.40; Table 20, p.67).

VOLATILIZATION: Formation of volatilized of $^{14}CO_2$ (both labels) was not significant for any system totaling ≤1.7% of the applied radioactivity at study termination (Tables 10-12, pp.57-59). Volatile [^{14}C]organic compounds were not trapped.

TRANSFORMATION PATHWAY: A transformation pathway was proposed by the study authors (p.43; Figure 25, p.99). Under anaerobic aquatic conditions, the 5-methoxy group on the triazolopyrimdine ring is converted to a hydroxy group to yield 2-(2,2-difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide (5-OH-XDE-638). 5-OH-XDE-638 can yield either 2-(2,2-difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide (5,8-diOH) or methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate (BSTCA-methyl). BSTCA-methyl then degrades to 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid (BSTCA) which then yields 2-(2,2-difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide (BST).

Table 11: Chemical names for identified transformation products of penoxsulam (XDE-638) in anaerobic water-sediment/soil.

Applicant's code	CAS Number	Chemical Name(s)	Chemical formula	Molecular weight	SMILES string
5-OH-XDE-638	None	CAS: 2-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]-triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide.		469	n1c(nc2n1c(ncc2OC)O)NS(=O)(=O)c3c(cccc3C(F)(F)F)OCC(F)F
		IUPAC: 6-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo-s-triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluoro-o-toluenesulfonamide.			
5,8-diOH	None	CAS: 2-(2,2-Difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide		455	n1c(nc2n1c(ncc2O)O)NS(=O)(=O)c3c(cccc3C(F)(F)F)OCC(F)F
		IUPAC: none			
BSTCA-methyl	None	CAS: Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate		430	n1c(nc(n1)C(OC)=O)NS(=O)(=O)c2c(cccc2C(F)(F)F)OCC(F)F
		IUPAC: Methyl 3-[6-(2,2-difluoroethoxy)-α,α,α-trifluoro-o-toluenesulfonamido]-s-triazole-5-carboxylate			
BSTCA	None	CAS: 3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid		416	n1c(nc(n1)C(O)=O)NS(=O)(=O)c2c(cccc2C(F)(F)F)OCC(F)F
		IUPAC: 3-[6-(2,2-Difluoroethoxy)-α,α,α-trifluoro-o-toluenesulfonamido]-s-triazole-5-carboxylic acid			
BST	None	CAS: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazol-3-yl-6-(trifluoromethyl)-benzenesulfonamide		372	n1c(ncn1)NS(=O)(=O)c2c(cccc2C(F)(F)F)OCC(F)F
		IUPAC: 6-(2,2-Difluoroethoxy)-α,α,α-trifluoro-N-s-triazol-3-yl-o-toluene sulfonamide			

Data obtained from Figure 1, pp.74-75 of the study report.

D. SUPPLEMENTARY EXPERIMENT-RESULTS: Microbial viability. Following addition of [^{14}C]butyric acid to untreated Arkansas pond water-silty clay sediment systems after 90-271

days of incubation and to untreated Arkansas pond water-silt loam and Italian distilled water-silty clay loam soil systems after 90-120 days of incubation, 44-76% and 40-52% of the applied, respectively, was volatilized as $^{14}CO_2$ (Table 6, p.53). Following addition of [^{14}C]butyric acid to Arkansas pond water-silty clay sediment systems at 365 days after treatment with unlabeled penoxsulam and to Arkansas pond water-silt loam and Italian distilled water-silty clay loam soil systems at 120 days posttreatment, 69% and 57-59% of the applied, respectively, was volatilized as $^{14}CO_2$ (Table 6, p.53).

Exaggerated rate experiments. These systems were used to isolate parent penoxsulam and its transformation products for identification confirmation via LC/MS as described above.

III. STUDY DEFICIENCIES: For the portion of this study conducted using the Arkansas pond water-silty clay sediment systems, no significant deficiencies that affect the study results were identified.

For the portions of this study conducted using the Arkansas pond water-silt loam soil and Italian distilled water-silty clay loam soil systems, the studies were not conducted for a full year. It is preferred that the studies be conducted until patterns of formation and decline of the degradates in the water and soil are established or for 1 year, whichever comes first.

For the Italian distilled water-silty clay loam soil systems, distilled water, the test water used to flood the soil, is not considered representative of a natural water that would be found at an intended use site. This study is scientifically valid. The portion of the study using the Arkansas pond water-silty clay sediment systems and the Arkansas pond water-silt loam soil systems can be used towards fulfillment of the anaerobic aquatic metabolism guideline, Subdivision N Guideline §162-3, data requirements for penoxsulam. The portion of the study using the Italian distilled water-silty clay loam soil systems can not be used to fulfill the guideline requirements.

IV. REVIEWER'S COMMENTS:

1. Although the study authors reported that the experiments were conducted in accordance with USEPA Subdivision N Guidelines §162-2 and 162-3, no portion of this study was actually conducted as an anaerobic soil metabolism study because the test sediment and soils were flooded and incubated under nitrogen atmosphere for 29 days prior to application of [^{14}C]penoxsulam to the water layer (pp.24-25). In order to conduct an anaerobic soil metabolism study according to Subdivision N Guideline §162-2, the test soil is treated with the test chemical and aged aerobically for 30 days or one half-life, whichever comes first, then converted to anaerobic conditions by flooding and/or conversion to a nitrogen atmosphere.

2. For each label, a single treated water-sediment/soil system was collected at each sampling interval in this study. Replicate (duplicate) sampling at each collection interval is preferred, so that normal variability can be quantified and outliers identified. The study authors reported that the dual labels sampled (one system per label at each interval) achieved duplicate replication (p.26). However, had any of the transformation products not contained both ring structures, then this approach would have been inappropriate.

3. A foreign, Italian, soil was used in this study and classified as a silty clay loam according to the USDA soil classification system.

4. Radioactivity (both labels) unaccounted for following HPLC analyses of the water layers and sediment/soil extracts was detected at maximums of 7.1-7.9% and 2.9-3.0% of the applied, respectively, for the Arkansas pond water-silty clay sediment, 7.7-13.6% and 1.4-1.5%, respectively, for the Arkansas pond water-silt loam and 10.3-11.1% and 2.4-4.6%, respectively, for the Italian distilled water-silty clay loam soil (Attachment 3). However, unresolved radioactivity during HPLC analyses appear to account for the majority of the unaccounted for [^{14}C]residues (Figures 8-21, pp.82-95).

5. The study authors reported that transformation products BSTCA-methyl and 5,8-diOH degraded after 2-3 days even in frozen storage. Therefore, all extracts were analyzed by HPLC the same day or within one day of sampling (p.26).

6. Detection limits (LOD, LOQ) for LSC and HPLC analyses of the water layers were not specified.

7. According to N. Wolfe, *et al.* (see reference below), redox potentials in the range of +400 to +800 mV are considered strongly oxidizing, +200 to +400 mV moderately oxidizing, -50 to +200 mV moderately reducing, -200 to -50 mV reducing, and -400 to -200 mV strongly reducing.

8. The study authors reported the field application rate for penoxsulam as 15-50 g a.i./ha, dependent on timing of application, target weeds and the crop (p.20). The 150 g a.i./ha treatment rate selected for this study, although three times the maximum seasonal application rate (50 g a.i./ha), was chosen to allow for sufficient material for detection of parent penoxsulam and its transformation products. Assuming overspray of a body of water 15 cm (6 inches) in depth, an application of 150 g a.i./ha (0.134 lb a.i./cre) would be equivalent to an aqueous concentration of 0.1 µg/mL (pp.16, 20).

9. 6-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy-s-triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluoro-o-toluenesulfonamide was identified as an IUPAC name of penoxsulam by the study authors (Figure 1, p.73). 3-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluorotoluene-2-sulfonamide identified as an IUPAC name of penoxsulam by the

Compendium of Pesticide Common Names (http://www.hclrss.demon.co.uk/penoxsulam.html). 2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide was identified as the CAS name of penoxsulam by the study authors, the USEPA/OPP Chemical Database (http://www.cdpr.ca.gov/cgi-bin/epa/chemidetriris.pl?pccode=119031) and the Compendium of Pesticide Common Names. CAS Reg. No. 219714-96-2 for penoxsulam was verified with the USEPA/OPP Chemical Database.

10. The study authors determined apparent (non-equilibrium) K_d values (L/kg) for penoxsulam and it transformation products (p.43; Tables 23-25, pp.70-72). The median apparent K_d values for penoxsulam were reported as 0.58 L/kg (range 0.21-0.80 L/kg), 0.34 L/kg (range 0.25-0.47 L/kg) and 0.29 L/kg (range 0.24-0.38 L/kg) for the Arkansas silty clay sediment, Arkansas silt loam soil and Italian silty clay loam soil, respectively.

    For the Arkansas silty clay sediment, reported apparent K_d values for penoxsulam transformation products were as follows: 0.38-0.80 L/kg for 5-OH-XDE-638, 0.14-1.65 L/kg for BSTCA-methyl, 0.25-0.59 L/kg for 5,8-diOH, 0.12-1.39 L/kg for BSTCA and 0.39-1.55 L/kg for BST (Table 23, p.70).

    For the Arkansas silt loam soil, reported apparent K_d values for penoxsulam transformation products were as follows: 0.35-0.56 L/kg for 5-OH-XDE-638, 0.24-0.90 L/kg for BSTCA and 0.25-0.92 L/kg for BST (Table 24, p.71).

    For the Italian silty clay loam soil, reported apparent K_d values for penoxsulam transformation products were as follows: 0.28-0.41 L/kg for 5-OH-XDE-638, 0.22-0.54 L/kg for BSTCA-methyl, 0.32-0.97 L/kg for BSTCA and 0.29-0.60 L/kg for BST (Table 25, p.72).

11. The following typographical errors/discrepancies were noted in this study:

    i) In Figure 16 (p.90), a chromatogram of HPLC analysis of 120-day water from a [triazolopyrimidine-2-^{14}C]-label treated Arkansas pond water-silt loam soil system, an Unknown was detected at 10.2% of HPLC recovered. The 120-day water layer contained 39.1% of the applied radioactivity (Table 11, p.58), therefore the Unknown comprised 3.99% of the applied. However, in Appendix C (p.108), a value of 1.4% of applied was reported.

    ii) In Tables 7-9 (pp.54-56), the study authors calculated overall averages plus/minus standard deviations for system parameters (pH, dissolved oxygen, redox potential). However, the study authors calculated the standard deviation using the "sample" standard deviation function equivalent to the "n-1 weighted" standard deviation which should only be used when data are taken from a sample of a population. The reviewer re-determined

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the standard deviation using the "population" standard deviation function which is used when data are taken from the entire population (Attachment 3).

iii) The study authors' reported mean values were presented in this review unless there was a discrepancy of >0.1% of the applied between the value reported by the study authors and that determined by the reviewer, in which case, the value determined by the reviewer was presented in this review (Attachment 3). Usually the discrepancy between the value determined by the study authors and the reviewer was due to the following: at sampling intervals where there was a detect and a nondetect, the study authors reported the detect as the "mean" (Tables 13-15, pp.60-62; Appendix C, pp.105-110).

Standard deviations were not provided by the study authors, therefore, the values were determined by the reviewer (Attachment 3).

In addition, the study authors provided LOD and LOQ values for HPLC analysis of the sediment/soil extracts, but not for the aqueous (water) layers. Therefore, when there was a detect and a nondetect at a sampling interval the value was reported as less than or equal to the detect.

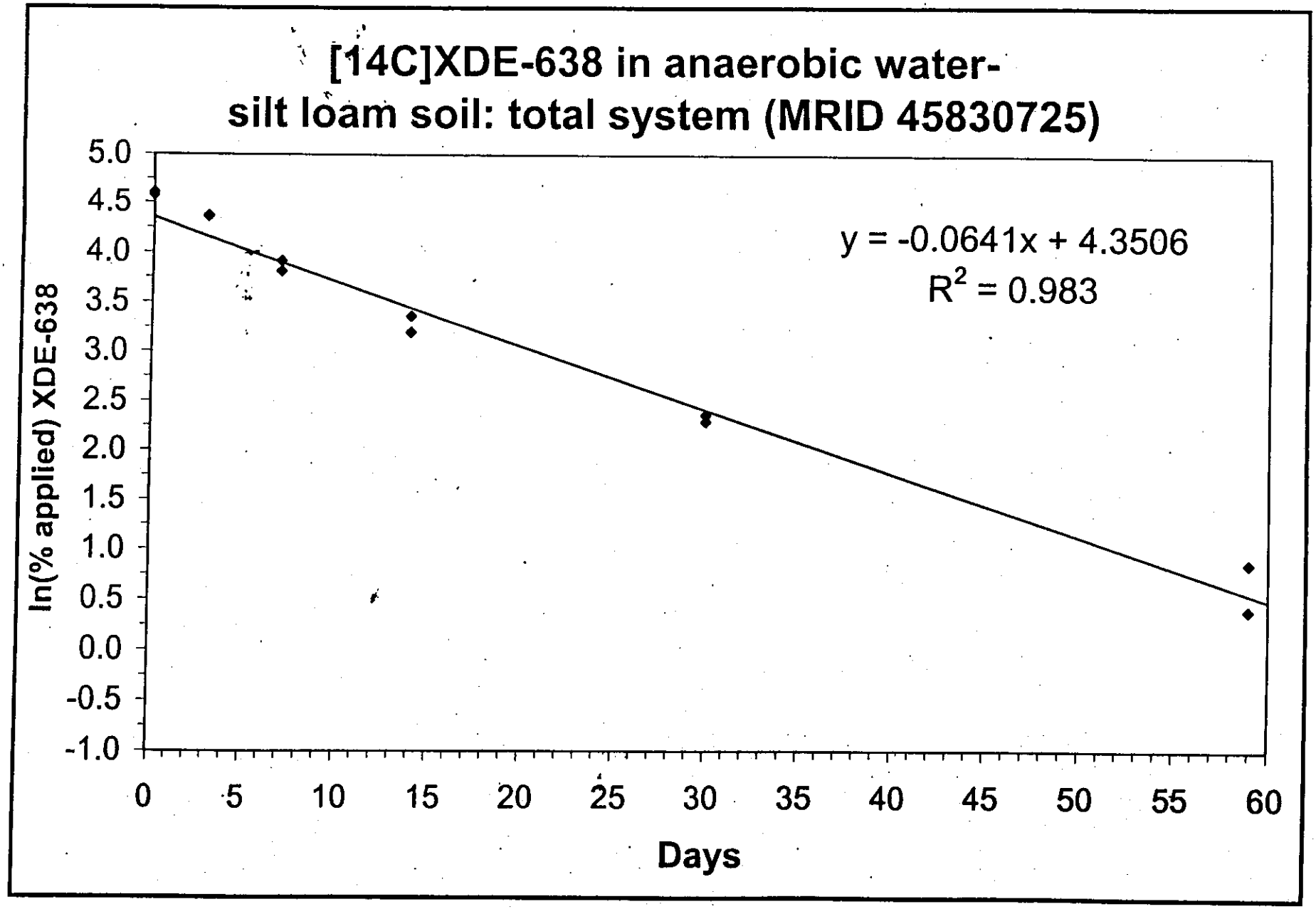
V. REFERENCES:

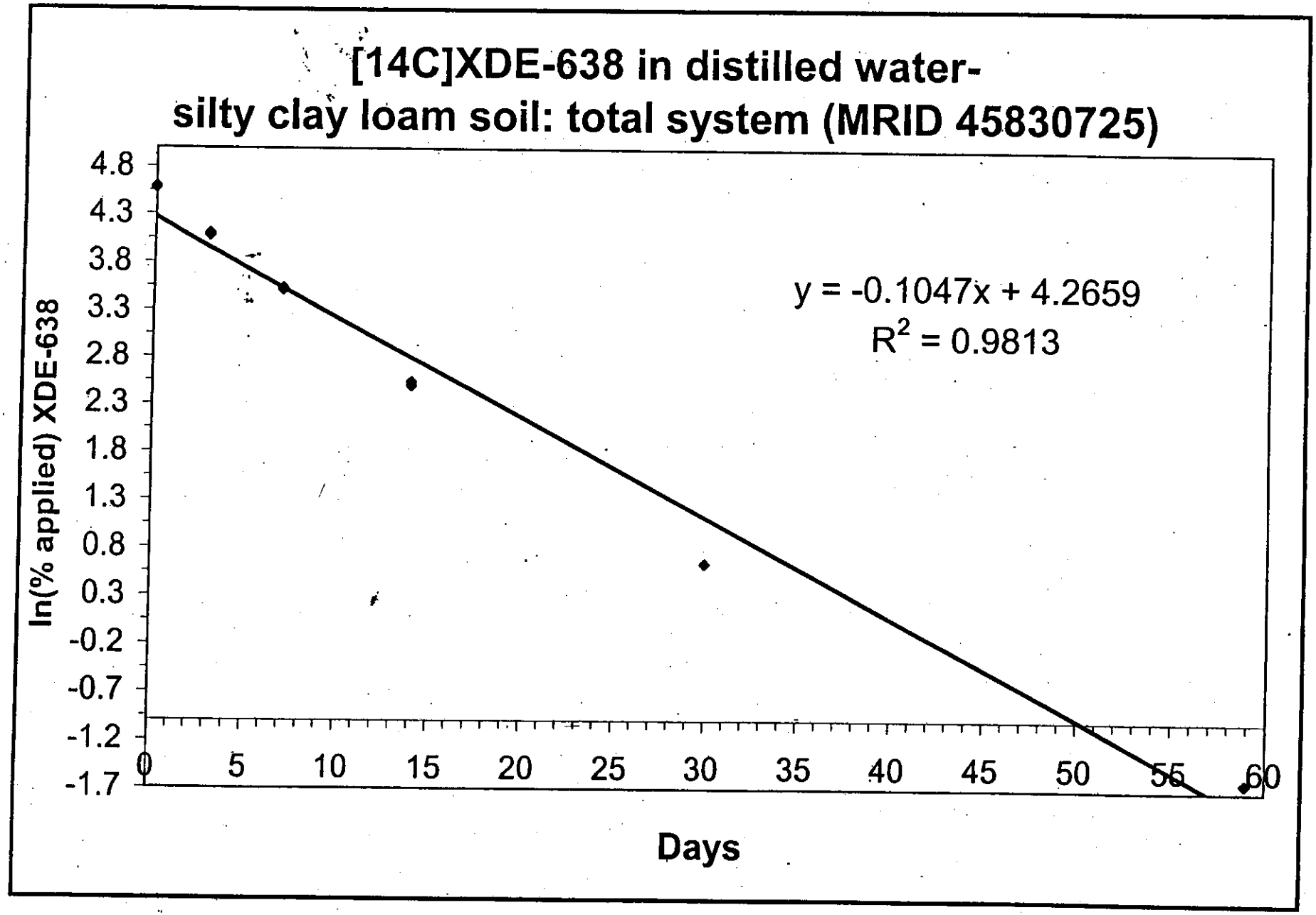
1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 162-3, Anaerobic Aquatic Metabolism Studies. Office of Pesticide and Toxic Substances, Washington, DC. EPA 540/9-82-021.

2. U.S. Environmental Protection Agency. 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 540/09-90-078.

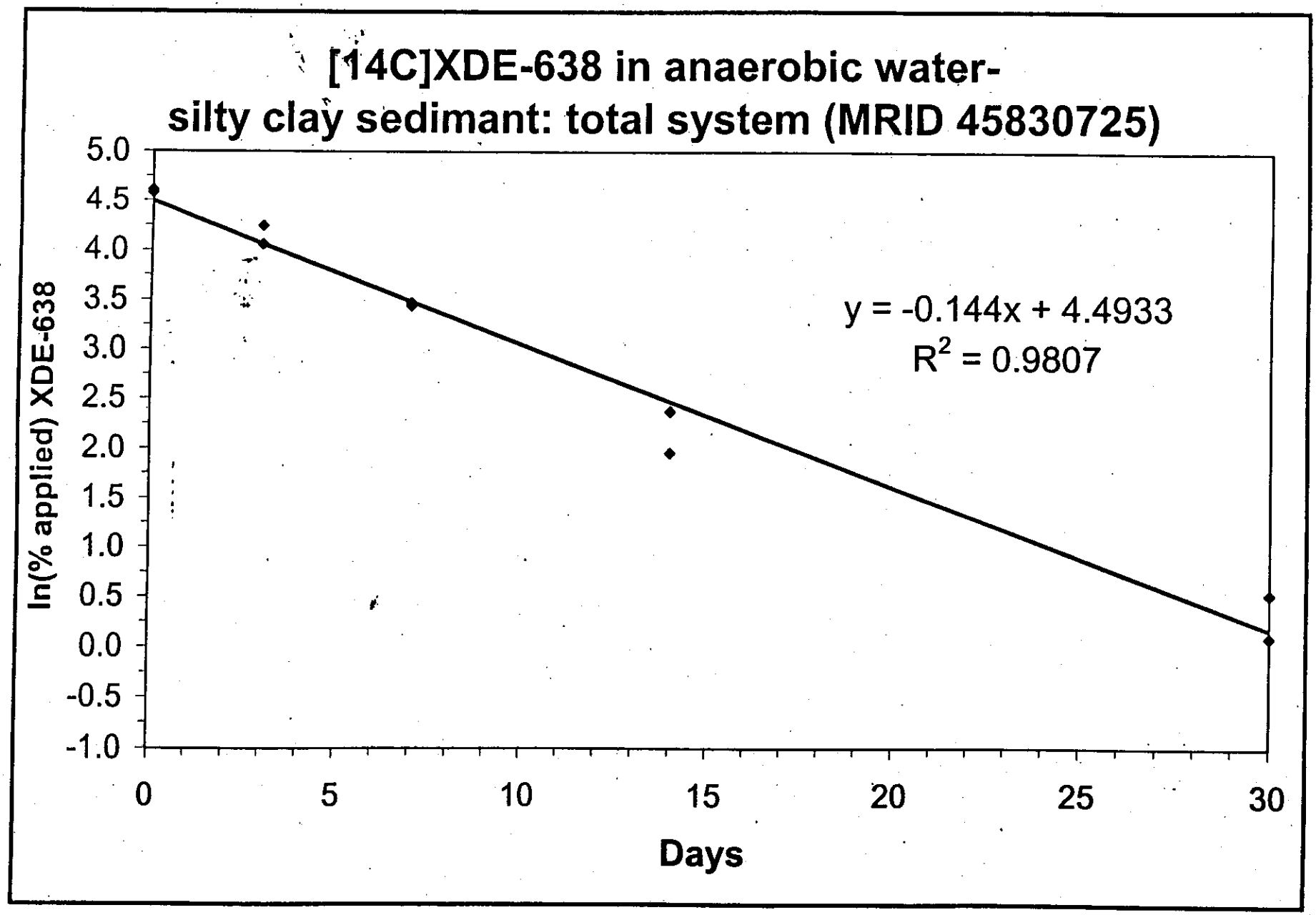
3. U.S. Environmental Protection Agency. 1993. Pesticide Registration Rejection Rate Analysis - Environmental Fate. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 738-R-93-010.

4. Wolfe, N., *et al.* 1990. Abiotic transformations in water, sediments and soil. *In* Pesticides in the Soil Environment, Soil Science Society of America, pp.103-110.


[14C]XDE-638 in anaerobic water-silt loam soil: total system (MRID 45830725)
y = -0.0641x + 4.3506
R2 = 0.983
ln(% applied) XDE-638
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
5
10
15
20
25
30
35
40
45
50
55
60
Days


[14C]XDE-638 in distilled water-
silty clay loam soil: total system (MRID 45830725)
ln(% applied) XDE-638
4.8
4.3
3.8
3.3
2.8
2.3
1.8
1.3
0.8
0.3
-0.2
-0.7
-1.2
-1.7
0
5
10
15
20
25
30
35
40
45
50
55
60
Days
y = -0.1047x + 4.2659
R2 = 0.9813

37


[14C]XDE-638 in anaerobic water-silty clay sedimant: total system (MRID 45830725)
ln(% applied) XDE-638
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
5
10
15
20
25
30
Days
y = -0.144x + 4.4933
R2 = 0.9807

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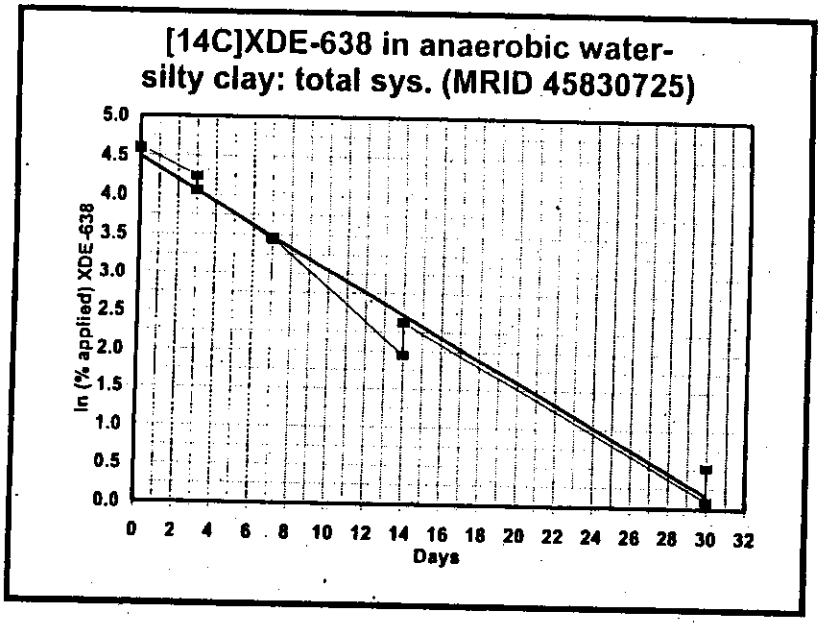
Attachment 1

Quattro Pro Graphs and Spreadsheets

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.
[^{14}C]Penoxsulam (both labels).
Total system
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App)
0	TP-2	97.3	4.577799
0	Ph-U	100.5	4.610158
3	TP-2	69.7	4.2442
3	Ph-U	58.0	4.060443
7	TP-2	31.4	3.446808
7	Ph-U	32.3	3.475067
14	TP-2	7.1	1.960095
14	Ph-U	10.8	2.379546
30	TP-2	1.1	0.09531
30	Ph-U	1.7	0.530628
90	TP-2	ND	ERR
90	Ph-U	ND	ERR
181	TP-2	ND	ERR
181	Ph-U	ND	ERR
271	TP-2	ND	ERR
271	Ph-U	ND	ERR
365	TP-2	ND	ERR
365	Ph-U	ND	ERR



0- to 30-day data

Regression Output:

Constant	4.49
Std Err of Y Est	0.241521
R Squared	0.981
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.1440
Std Err of Coef.	0.007148

half-life **4.8 days**

*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 105 of study report and Attachment 1.

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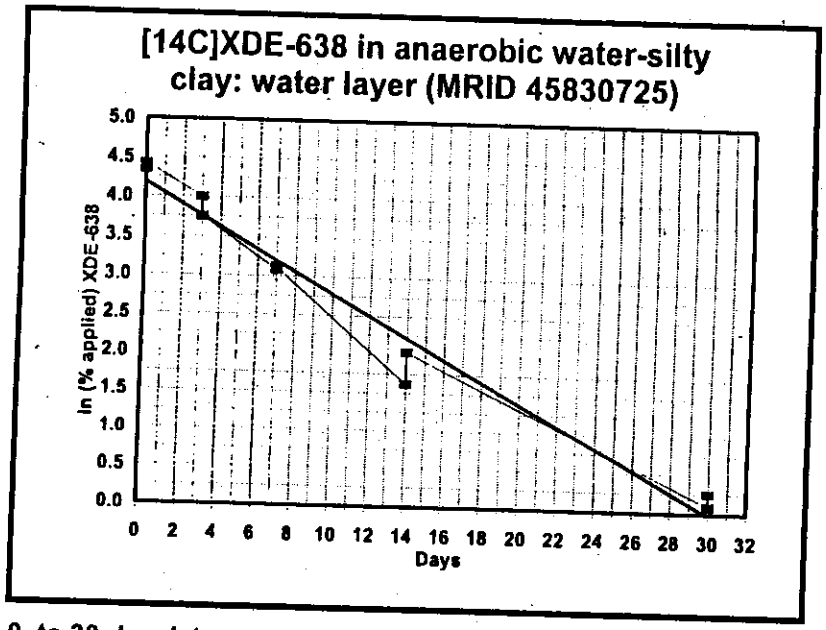
Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.
[^{14}C]Penoxsulam (both labels).
Water layer.
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App
0	TP-2	77.2	4.346399
0	Ph-U	83.2	4.421247
3	TP-2	54.6	4.000034
3	Ph-U	42.7	3.754199
7	TP-2	21.9	3.086487
7	Ph-U	22.7	3.122365
14	TP-2	5.1	1.629241
14	Ph-U	7.7	2.04122
30	TP-2	1.1	0.09531
30	Ph-U	1.3	0.262364
90	TP-2	ND	ERR
90	Ph-U	ND	ERR
181	TP-2	ND	ERR
181	Ph-U	ND	ERR
271	TP-2	ND	ERR
271	Ph-U	ND	ERR
365	TP-2	ND	ERR
365	Ph-U	ND	ERR



0- to 30-day data

Regression Output:

Constant	4.19
Std Err of Y Est	0.281895
R Squared	0.972
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.1403
Std Err of Coef.	0.008343

half-life **4.9 days**

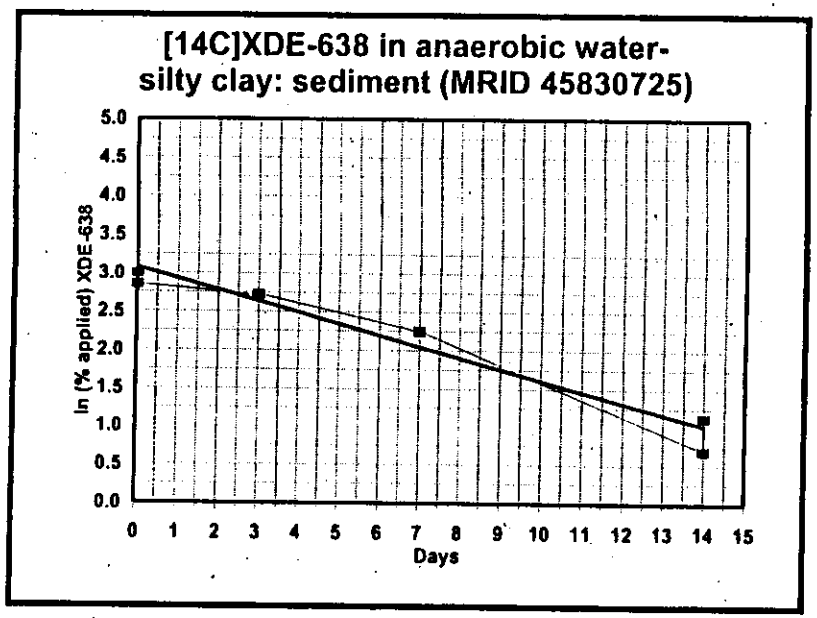
*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 105 of study report.

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.
[^{14}C]Penoxsulam (both labels).
Sediment layer
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App
0	TP-2	20.1	3.00072
0	Ph-U	17.3	2.850707
3	TP-2	15.1	2.714695
3	Ph-U	15.3	2.727853
7	TP-2	9.5	2.251292
7	Ph-U	9.6	2.261763
14	TP-2	2.0	0.693147
14	Ph-U	3.1	1.131402
30	TP-2	ND	ERR
30	Ph-U	0.4	-0.91629
90	TP-2	ND	ERR
90	Ph-U	ND	ERR
181	TP-2	ND	ERR
181	Ph-U	ND	ERR
271	TP-2	ND	ERR
271	Ph-U	ND	ERR
365	TP-2	ND	ERR
365	Ph-U	ND	ERR

LOQ = 0.00016% of applied (p. 36).



0- to 14-day data

Regression Output:

Constant	3.09
Std Err of Y Est	0.214807
R Squared	0.945
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-0.1469
Std Err of Coef.	0.014482

half-life 4.7 days

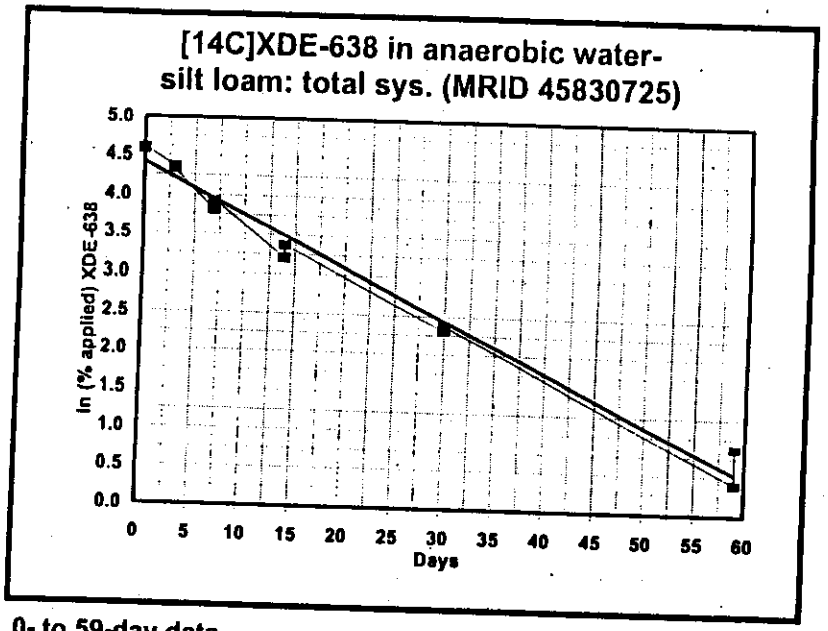
*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 105 of study report.

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.
[^{14}C]Penoxsulam (both labels).
Total system
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App
0	TP-2	96.8	4.572647
0	Ph-U	100.0	4.60517
3	TP-2	78.8	4.366913
3	Ph-U	76.3	4.334673
7	TP-2	45.3	3.813307
7	Ph-U	51.5	3.941582
14	TP-2	24.7	3.206803
14	Ph-U	29.1	3.370738
30	TP-2	10.1	2.312535
30	Ph-U	10.8	2.379546
59	TP-2	1.5	0.405465
59	Ph-U	2.4	0.875469
120	TP-2	ND	ERR
120	Ph-U	0.6	-0.51083

LOQ = 0.00016% of applied (p. 36).



0- to 59-day data

Regression Output:

Constant	4.42
Std Err of Y Est	0.191834
R Squared	0.983
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	-0.0659
Std Err of Coef.	0.002709

half-life **10.5 days**

*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 107 of study report and Attachment 1.

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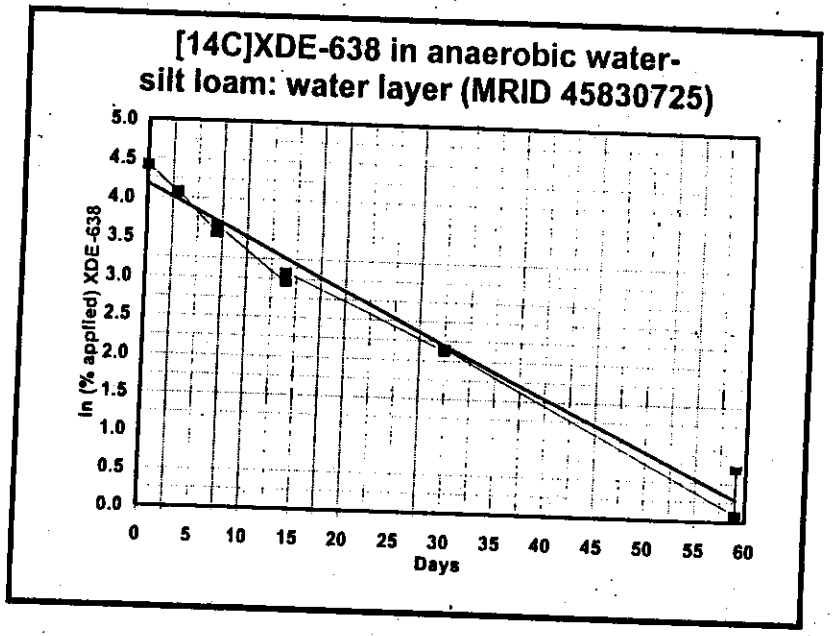
Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) In Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.
[^{14}C]Penoxsulam (both labels).
Water layer
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App
0	TP-2	81.6	4.401829
0	Ph-U	84.2	4.433195
3	TP-2	58.7	4.07244
3	Ph-U	60.3	4.099332
7	TP-2	34.9	3.552487
7	Ph-U	38.9	3.660994
14	TP-2	19.3	2.960105
14	Ph-U	22.0	3.091042
30	TP-2	8.4	2.128232
30	Ph-U	8.7	2.163323
59	TP-2	1.1	0.09531
59	Ph-U	2.0	0.693147
120	TP-2	ND	ERR
120	Ph-U	0.6	-0.51083

LOQ = 0.00016% of applied (p. 36).



0- to 59-day data

Regression Output:

Constant	4.19
Std Err of Y Est	0.220983
R Squared	0.978
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	-0.0660
Std Err of Coef.	0.003121

half-life **10.5 days**

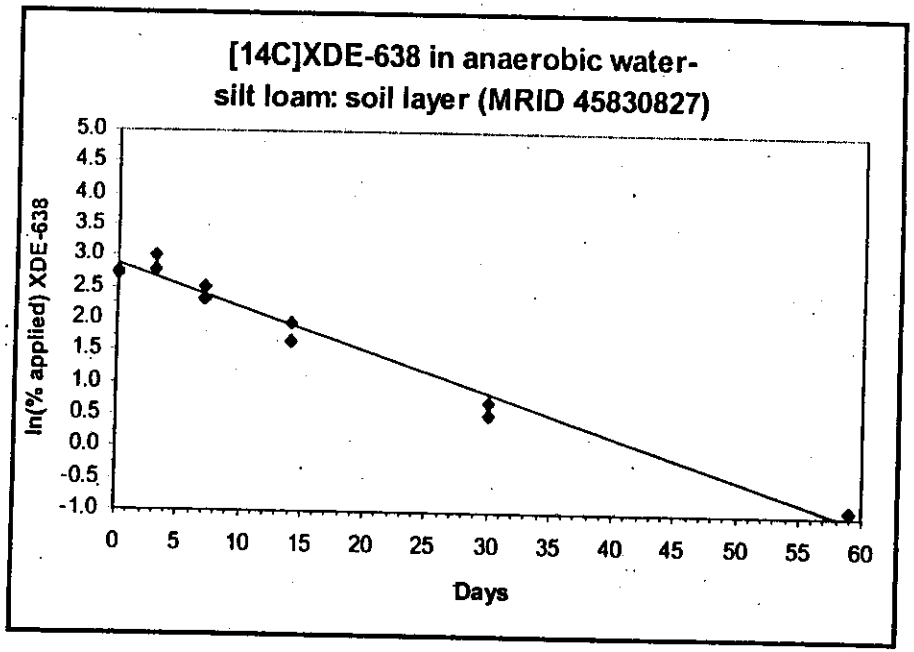
*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 107 of study report.

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.
[^{14}C]Penoxsulam (both labels).
Soil layer
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App)
0	TP-2	15.2	2.721295
0	Ph-U	15.8	2.76001
3	TP-2	20.1	3.00072
3	Ph-U	16.0	2.772589
7	TP-2	10.4	2.341806
7	Ph-U	12.6	2.533697
14	TP-2	5.4	1.686399
14	Ph-U	7.1	1.960095
30	TP-2	1.7	0.530628
30	Ph-U	2.1	0.741937
59	TP-2	0.4	-0.91629
59	Ph-U	0.4	-0.91629
120	TP-2	ND	ERR
120	Ph-U	ND	ERR

LOQ = 0.00016% of applied (p. 36).



3- to 59-day data

Regression Output:

Constant	2.88
Std Err of Y Est	0.217258
R Squared	0.980
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.0668
Std Err of Coef.	0.003367

*AR = Applied Radioactivity

half-life 10.4 days

Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 107 of study report.

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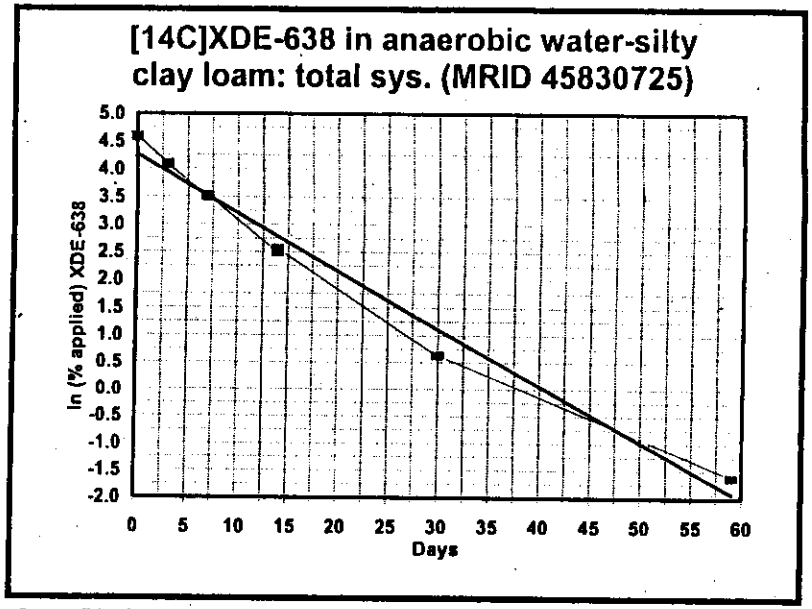
Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.
[^{14}C]Penoxsulam (both labels).
Total system
Half-life Determination

	Penoxsulam (XDE-638)		
Day	Label	%App	Ln(%App
0	TP-2	97.1	4.575741
0	Ph-U	98.9	4.594109
3	TP-2	60.7	4.105944
3	Ph-U	59.3	4.082609
7	TP-2	33.7	3.517498
7	Ph-U	34.3	3.535145
14	TP-2	12.2	2.501436
14	Ph-U	13.0	2.564949
30	TP-2	1.9	0.641854
30	Ph-U	1.9	0.641854
59	TP-2	0.2	-1.60944
59	Ph-U	0.2	-1.60944
120	TP-2	ND	ERR
120	Ph-U	ND	ERR

LOQ = 0.00016% of applied (p. 36).



0- to 59-day data

Regression Output:

Constant	4.27
Std Err of Y Est	0.322231
R Squared	0.981
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	-0.1048
Std Err of Coef.	0.004551

half-life **6.6 days**

*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 109 of study report and Attachment 1.

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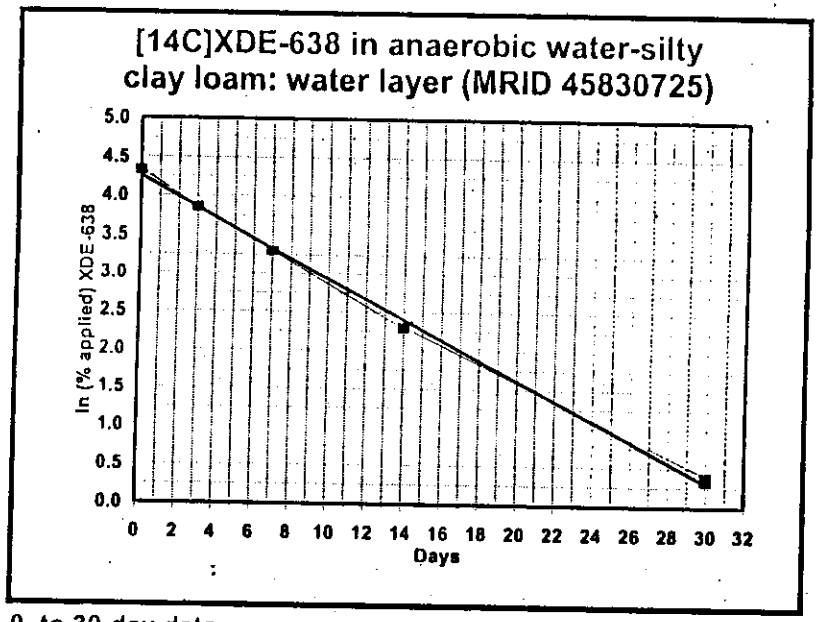
Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.
[^{14}C]Penoxsulam (both labels).
Water layer
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App
0	TP-2	75.5	4.324133
0	Ph-U	77.0	4.343805
3	TP-2	47.2	3.854394
3	Ph-U	47.8	3.867026
7	TP-2	27.4	3.310543
7	Ph-U	27.1	3.299534
14	TP-2	9.9	2.292535
14	Ph-U	10.1	2.312535
30	TP-2	1.5	0.405465
30	Ph-U	1.4	0.336472
59	TP-2	ND	ERR
59	Ph-U	ND	ERR
120	TP-2	ND	ERR
120	Ph-U	ND	ERR

LOQ = 0.00016% of applied (p. 36).



0- to 30-day data

Regression Output:

Constant	4.25
Std Err of Y Est	0.078571
R Squared	0.997
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.1314
Std Err of Coef.	0.002325

half-life **5.3 days**

*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 109 of study report.

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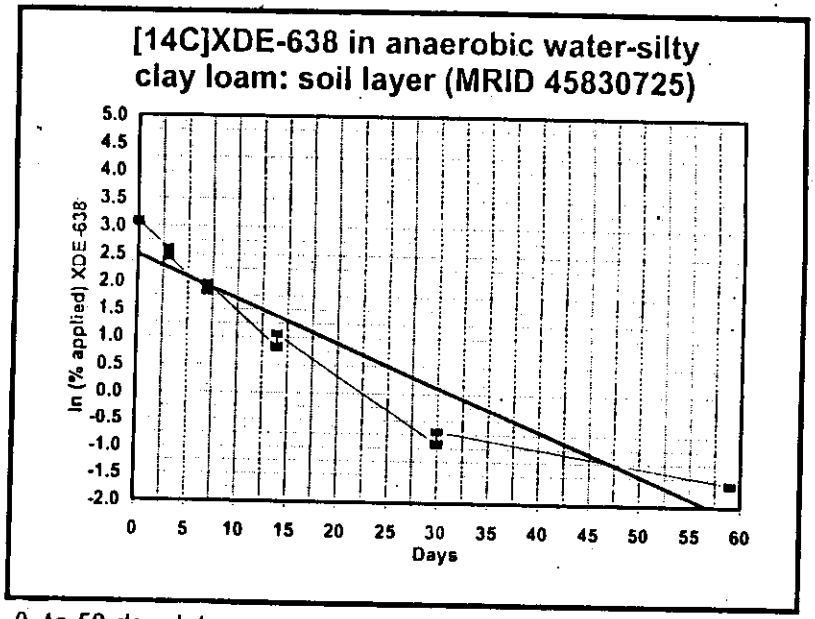
Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.
[^{14}C]Penoxsulam (both labels).
Soil layer
Half-life Determination

Penoxsulam (XDE-638)			
Day	Label	%App	Ln(%App)
0	TP-2	21.6	3.072693
0	Ph-U	21.9	3.086487
3	TP-2	13.5	2.60269
3	Ph-U	11.5	2.442347
7	TP-2	6.3	1.84055
7	Ph-U	7.2	1.974081
14	TP-2	2.3	0.832909
14	Ph-U	2.9	1.064711
30	TP-2	0.4	-0.91629
30	Ph-U	0.5	-0.69315
59	TP-2	0.2	-1.60944
59	Ph-U	0.2	-1.60944
120	TP-2	ND	ERR
120	Ph-U	ND	ERR

LOQ = 0.00016% of applied (p. 36).



0- to 59-day data

Regression Output:

Constant	2.50
Std Err of Y Est	0.602901
R Squared	0.897
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	-0.0793
Std Err of Coef.	0.008515

half-life **8.7 days**

*AR = Applied Radioactivity
Linear regression analysis performed using Corel Quattro Pro 8.
Results from Appendix C, p. 109 of study report.

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Determination of mean/standard deviation of system parameters (pH, O_2 and redox potentials).

Arkansas water-silty clay sediment.

		Water			Sediment
			O_2	Red Pot	Red Pot
Day	Label	pH	(mg/L)	(mV)	(mV)
0	TP-2	7.2	0.0	-140.5	-208.8
0	Ph-U	7.2	0.1	-166.1	-199.5
3	TP-2	7.2	1.0	-148.7	-188.4
3	Ph-U	7.2	0.5	-161.8	-182.4
7	TP-2	7.3	1.2	-117.5	-162.2
7	Ph-U	7.4	0.4	-125.0	-145.9
14	TP-2	7.6	1.2	-118.7	-173.0
14	Ph-U	7.6	2.0	-121.5	-173.0
30	TP-2	7.3	0.4	-182.9	-167.7
30	Ph-U	7.4	0.7	-151.3	-174.2
90	TP-2	7.7	1.6	-101.5	-161.5
90	Ph-U	7.5	0.9	-152.7	-162.5
181	TP-2	4.9	1.3	-75.1	-142.3
181	Ph-U	4.9	1.8	-42.9	-155.6
271	TP-2	7.4	0.3	-25.3	-121.8
271	Ph-U	7.2	0.4	-40.3	-138.7
365	TP-2	6.8	2.1	-53.8	-123.2
365	Ph-U	7.0	1.7	-38.4	-151.8
	Mean	7.0	1.0	-109.1	-162.9
	std. dev.	0.8	0.6	49.3	23.1
	n =	18	18	18	18

Results from Table 7, p. 54 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2)

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Determination of mean/standard deviation of system parameters (pH, O_2 and redox potentials).

Arkansas water-silt loam soil.

Day	Label	Water			Soil
		pH	O_2 (mg/L)	Red Pot (mV)	Red Pot (mV)
0	TP-2	7.9	0.0	-20.3	-260.4
0	Ph-U	7.8	0.0	-100.5	-263.9
3	TP-2	8.0	0.3	-73.5	-253.8
3	Ph-U	7.9	0.9	-188.2	-270.6
7	TP-2	7.8	1.0	-131.4	-226.0
7	Ph-U	7.8	1.0	82.9	26.6
14	TP-2	8.1	2.6	-125.5	-225.5
14	Ph-U	8.3	1.8	-138.2	-242.2
30	TP-2	8.1	2.2	-158.6	-237.6
30	Ph-U	8.1	2.0	-161.8	-199.6
59	TP-2	8.3	0.7	-229.6	-230.8
59	Ph-U	8.4	0.5	-197.6	-208.8
120	TP-2	8.2	2.9	-122.8	-209.5
120	Ph-U	8.3	3.8	-124.0	-205.7
	Mean	8.1	1.4	-120.7	-214.8
	std. dev.	0.2	1.1	75.6	70.5
	n =	14	14	14	14

Italy distilled water-silty clay loam soil.

Day	Label	Water			Soil
		pH	O_2 (mg/L)	Red Pot (mV)	Red Pot (mV)
0	TP-2	7.1	0.1	-163.8	-222.6
0	Ph-U	7.0	0.8	-122.2	-190.7
3	TP-2	7.3	0.9	-119.3	-192.5
3	Ph-U	7.4	1.1	-106.6	-197.6
7	TP-2	7.1	1.8	-123.3	-172.3
7	Ph-U	7.3	1.4	-130.8	-183.9
14	TP-2	7.4	2.5	-60.5	-167.8
14	Ph-U	7.6	2.7	-51.5	-170.4
30	TP-2	7.3	0.2	-120.2	-181.7
30	Ph-U	7.5	1.9	-125.4	-187.8
59	TP-2	7.7	0.2	-123.7	-141.9
59	Ph-U	7.8	0.7	-154.6	-190.3
120	TP-2	7.7	2.2	-28.1	-161.8
120	Ph-U	7.8	2.4	-97.8	-180.1
	Mean	7.4	1.4	-109.1	-181.5
	std. dev.	0.3	0.9	36.8	18.2
	n =	14	14	14	14

Results from Tables 8-9, pp. 55-56 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Determination of overall mean/standard deviation of applied radioactivity.

Arkansas pond water-silty clay sediment.

					Sediment														
		Water layer			Extracts			Nonextractable			CO_2			Material Balance			Material Balance[1]		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	79.9			21.2			1.4			0.0			102.5			102.5		
0	Ph-U	85.7	82.8	2.9	18.6	19.9	1.3	5.1	3.3	1.8	0.0	0.0	0.0	109.4	106.0	3.4	109.4	106.0	3.5
3	TP-2	75.2			23.1			4.6			0.0			102.9			102.8		
3	Ph-U	65.5	70.4	4.9	25.4	24.3	1.1	0.8	2.7	1.9	0.0	0.0	0.0	91.7	97.3	5.6	91.7	97.3	5.6
7	TP-2	62.1			28.3			12.0			0.0			102.4			102.4		
7	Ph-U	60.2	61.2	0.9	27.2	27.8	0.5	10.3	11.2	0.9	0.1	0.1	0.1	97.8	100.1	2.3	97.8	100.1	2.3
14	TP-2	53.2			21.7			28.5			0.0			103.4			103.4		
14	Ph-U	54.9	54.1	0.9	20.8	21.3	0.5	21.3	24.9	3.6	0.2	0.1	0.1	97.2	100.3	3.1	97.3	100.4	3.1
30	TP-2	45.2			12.1			46.3			0.2			103.8			103.7		
30	Ph-U	43.4	44.3	0.9	12.3	12.2	0.1	44.0	45.2	1.1	0.8	0.5	0.3	100.5	102.2	1.6	100.5	102.1	1.6
90	TP-2	42.7			8.3			57.0			0.3			108.3			108.2		
90	Ph-U	40.0	41.4	1.3	8.9	8.6	0.3	53.3	55.2	1.8	1.2	0.8	0.5	103.4	105.9	2.5	103.3	105.8	2.4
181	TP-2	36.6			6.4			62.5			0.4			105.9			105.8		
181	Ph-U	34.5	35.6	1.1	7.4	6.9	0.5	58.4	60.5	2.0	1.4	0.9	0.5	101.7	103.8	2.1	101.7	103.8	2.1
271	TP-2	29.1			5.5			59.7			0.6			94.9			94.9		
271	Ph-U	25.5	27.3	1.8	6.4	6.0	0.5	68.6	64.2	4.4	1.3	1.0	0.4	101.8	98.4	3.5	101.8	98.4	3.5
365	TP-2	35.8			5.0			58.3			0.6			99.7			99.8		
365	Ph-U	37.2	36.5	0.7	6.3	5.7	0.6	50.2	54.3	4.1	1.7	1.2	0.6	95.4	97.6	2.2	95.4	97.6	2.2
													Overall		101.3	4.5		101.2	4.4

[1]Study authors reported results (Table 10, p. 57).
Results (% of applied radioactivity) from Table 10, p. 57 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Determination of overall mean/standard deviation of applied radioactivity.

Arkansas pond water-silt loam soil.

					Soil														
		Water layer			Extracts			Nonextractable			CO_2			Material Balance			Material Balance[1]		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	84.5			16.1			0.7			0.0			101.3			101.4		
0	Ph-U	86.5	85.5	1.0	16.6	16.4	0.3	0.5	0.6	0.1	0.0	0.0	0.0	103.6	102.5	1.2	103.5	102.5	1.0
3	TP-2	73.6			27.8			3.9			0.0			105.3			105.3		
3	Ph-U	75.5	74.6	1.0	21.8	24.8	3.0	1.9	2.9	1.0	0.0	0.0	0.0	99.2	102.3	3.1	99.2	102.3	3.1
7	TP-2	66.3			23.1			6.8			0.0			96.2			96.3		
7	Ph-U	64.5	65.4	0.9	24.3	23.7	0.6	6.5	6.7	0.1	0.1	0.1	0.1	95.4	95.8	0.4	95.4	95.9	0.5
14	TP-2	58.4			18.7			16.7			0.0			93.8			93.8		
14	Ph-U	59.6	59.0	0.6	21.1	19.9	1.2	11.6	14.2	2.6	0.1	0.1	0.1	92.4	93.1	0.7	92.4	93.1	0.7
30	TP-2	57.5			16.3			29.1			0.0			102.9			102.8		
30	Ph-U	66.7	62.1	4.6	19.9	18.1	1.8	30.7	29.9	0.8	0.4	0.2	0.2	117.7	110.3	7.4	117.7	110.3	7.5
59	TP-2	47.1			12.9			36.9			0.0			96.9			96.9		
59	Ph-U	54.9	51.0	3.9	15.9	14.4	1.5	42.4	39.7	2.8	0.2	0.1	0.1	113.4	105.2	8.3	113.4	105.2	8.3
120	TP-2	39.1			9.5			44.6			0.0			93.2			93.1		
120	Ph-U	36.9	38.0	1.1	9.3	9.4	0.1	51.6	48.1	3.5	0.3	0.2	0.2	98.1	95.7	2.4	98.1	95.6	2.5
													Overall		100.7	7.2		100.7	7.2

[1]Study authors reported results (Table 11, p. 58).
Results (% of applied radioactivity) from Table 11, p. 58 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Determination of overall mean/standard deviation of applied radioactivity.

Italy distilled water-silty clay loam soil.

					Soil														
		Water layer			Extracts			Nonextractable			CO_2			Material Balance			Material Balance[1]		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	78.0			22.8			1.4			0.0			102.2			102.2		
0	Ph-U	80.3	79.2	1.1	23.2	23.0	0.2	0.8	1.1	0.3	0.0	0.0	0.0	104.3	103.3	1.0	104.2	103.2	1.0
3	TP-2	70.4			21.1			5.3			0.0			96.8			96.8		
3	Ph-U	69.0	69.7	0.7	18.7	19.9	1.2	6.3	5.8	0.5	0.0	0.0	0.0	94.0	95.4	1.4	94.1	95.5	1.4
7	TP-2	63.1			20.9			12.1			0.0			96.1			96.2		
7	Ph-U	59.8	61.5	1.6	21.6	21.3	0.4	9.9	11.0	1.1	0.1	0.1	0.1	91.4	93.8	2.4	91.4	93.8	2.4
14	TP-2	51.3			17.0			27.1			0.0			95.4			95.5		
14	Ph-U	49.8	50.6	0.7	19.4	18.2	1.2	22.5	24.8	2.3	0.2	0.1	0.1	91.9	93.7	1.8	91.9	93.7	1.8
30	TP-2	38.5			13.7			50.3			0.1			102.6			102.6		
30	Ph-U	37.6	38.1	0.5	14.3	14.0	0.3	55.3	52.8	2.5	0.4	0.3	0.2	107.6	105.1	2.5	107.7	105.2	2.5
59	TP-2	27.7			10.9			62.1			0.1			100.8			100.8		
59	Ph-U	26.5	27.1	0.6	11.8	11.4	0.4	51.1	56.6	5.5	0.4	0.3	0.2	89.8	95.3	5.5	89.8	95.3	5.5
120	TP-2	21.8			7.6			65.3			0.3			95.0			95.0		
120	Ph-U	22.6	22.2	0.4	8.4	8.0	0.4	62.9	64.1	1.2	1.0	0.7	0.3	94.9	95.0	0.0	94.8	94.9	0.1
													Overall		97.3	5.1		97.4	5.1

[1]Study authors reported results (Table 12, p. 59).
Results (% of applied radioactivity) from Table 12, p. 59 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of total radioactivity associated with sediment.

		Sediment				
		Ext	Nonext	Total		
Day	Label	% AR	% AR	% AR	Mean	s.d.
0	TP-2	21.2	1.4	22.6		
0	Ph-U	18.6	5.1	23.7	23.2	0.6
3	TP-2	23.1	4.6	27.7		
3	Ph-U	25.4	0.8	26.2	27.0	0.7
7	TP-2	28.3	12.0	40.3		
7	Ph-U	27.2	10.3	37.5	38.9	1.4
14	TP-2	21.7	28.5	50.2		
14	Ph-U	20.8	21.3	42.1	46.2	4.0
30	TP-2	12.1	46.3	58.4		
30	Ph-U	12.3	44.0	56.3	57.4	1.1
90	TP-2	8.3	57.0	65.3		
90	Ph-U	8.9	53.3	62.2	63.8	1.5
181	TP-2	6.4	62.5	68.9		
181	Ph-U	7.4	58.4	65.8	67.4	1.6
271	TP-2	5.5	59.7	65.2		
271	Ph-U	6.4	68.6	75.0	70.1	4.9
365	TP-2	5.0	58.3	63.3		
365	Ph-U	6.3	50.2	56.5	59.9	3.4

Results (% of applied radioactivity) from Table 10, p. 57 of the study report and Attachment 1.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

[14C]Residue water phase:sediment ratios.

Day	Label	Water % AR	Sed % AR	Ratio W:S	Ratio S:W	Mean W:S ratio	s.d. W:S ratio	Mean S:W ratio	s.d. S:W ratio
0	TP-2	79.9	22.6	4	0				
0	Ph-U	85.7	23.7	4	0	4	0	0	0
3	TP-2	75.2	27.7	3	0				
3	Ph-U	65.5	26.2	3	0	3	0	0	0
7	TP-2	62.1	40.3	2	1				
7	Ph-U	60.2	37.5	2	1	2	0	1	0
14	TP-2	53.2	50.2	1	1				
14	Ph-U	54.9	42.1	1	1	1	0	1	0
30	TP-2	45.2	58.4	1	1				
30	Ph-U	43.4	56.3	1	1	1	0	1	0
90	TP-2	42.7	65.3	1	2				
90	Ph-U	40.0	62.2	1	2	1	0	2	0
181	TP-2	36.6	68.9	1	2				
181	Ph-U	34.5	65.8	1	2	1	0	2	0
271	TP-2	29.1	65.2	0	2				
271	Ph-U	25.5	75.0	0	3	0	0	3	0
365	TP-2	35.8	63.3	1	2				
365	Ph-U	37.2	56.5	1	2	1	0	2	0

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.

Determination of total radioactivity associated with soil.

		Soil				
		Ext	Nonext	Total		
Day	Label	% AR	% AR	% AR	Mean	s.d.
0	TP-2	16.1	0.7	16.8		
0	Ph-U	16.6	0.5	17.1	17.0	0.1
3	TP-2	27.8	3.9	31.7		
3	Ph-U	21.8	1.9	23.7	27.7	4.0
7	TP-2	23.1	6.8	29.9		
7	Ph-U	24.3	6.5	30.8	30.4	0.5
14	TP-2	18.7	16.7	35.4		
14	Ph-U	21.1	11.6	32.7	34.1	1.4
30	TP-2	16.3	29.1	45.4		
30	Ph-U	19.9	30.7	50.6	48.0	2.6
59	TP-2	12.9	36.9	49.8		
59	Ph-U	15.9	42.4	58.3	54.1	4.3
120	TP-2	9.5	44.6	54.1		
120	Ph-U	9.3	51.6	60.9	57.5	3.4

Results (% of applied radioactivity) from Table 11, p. 58 of the study report and Attachment 1.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

[14C]Residue water phase:soil ratios.

Day	Label	Water % AR	Soil % AR	Ratio W:S	Ratio S:W	Mean W:S ratio	s.d.	Mean S:W ratio	s.d.
0	TP-2	84.5	16.8	5	0				
0	Ph-U	86.5	17.1	5	0	5	0	0	0
3	TP-2	73.6	31.7	2	0				
3	Ph-U	75.5	23.7	3	0	3	0	0	0
7	TP-2	66.3	29.9	2	0				
7	Ph-U	64.5	30.8	2	0	2	0	0	0
14	TP-2	58.4	35.4	2	1				
14	Ph-U	59.6	32.7	2	1	2	0	1	0
30	TP-2	57.5	45.4	1	1				
30	Ph-U	66.7	50.6	1	1	1	0	1	0
59	TP-2	47.1	49.8	1	1				
59	Ph-U	54.9	58.3	1	1	1	0	1	0
120	TP-2	39.1	54.1	1	1				
120	Ph-U	36.9	60.9	1	2	1	0	2	0

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of total radioactivity associated with soil.

		Soil				
		Ext	Nonext	Total		
Day	Label	% AR	% AR	% AR	Mean	s.d.
0	TP-2	22.8	1.4	24.2		
0	Ph-U	23.2	0.8	24.0	24.1	0.1
3	TP-2	21.1	5.3	26.4		
3	Ph-U	18.7	6.3	25.0	25.7	0.7
7	TP-2	20.9	12.1	33.0		
7	Ph-U	21.6	9.9	31.5	32.3	0.8
14	TP-2	17.0	27.1	44.1		
14	Ph-U	19.4	22.5	41.9	43.0	1.1
30	TP-2	13.7	50.3	64.0		
30	Ph-U	14.3	55.3	69.6	66.8	2.8
59	TP-2	10.9	62.1	73.0		
59	Ph-U	11.8	51.1	62.9	68.0	5.1
120	TP-2	7.6	65.3	72.9		
120	Ph-U	8.4	62.9	71.3	72.1	0.8

[14C]Residue water phase:soil ratios.

Day	Label	Water % AR	Soil % AR	Ratio W:S	Ratio S:W	Mean W:S ratio	s.d.	Mean S:W ratio	s.d.
0	TP-2	78.0	24.2	3	0				
0	Ph-U	80.3	24.0	3	0	3	0	0	0
3	TP-2	70.4	26.4	3	0				
3	Ph-U	69.0	25.0	3	0	3	0	0	0
7	TP-2	63.1	33.0	2	1				
7	Ph-U	59.8	31.5	2	1	2	0	1	0
14	TP-2	51.3	44.1	1	1				
14	Ph-U	49.8	41.9	1	1	1	0	1	0
30	TP-2	38.5	64.0	1	2				
30	Ph-U	37.6	69.6	1	2	1	0	2	0
59	TP-2	27.7	73.0	0	3				
59	Ph-U	26.5	62.9	0	2	0	0	3	0
120	TP-2	21.8	72.9	0	3				
120	Ph-U	22.6	71.3	0	3	0	0	3	0

Both water-soil systems.

Mean W:S ratio	s.d.	Mean S:W ratio	s.d.
4	1	0	0
3	0	0	0
2	0	0	0
1	0	1	0
1	0	1	0
1	0	2	1
0	0	2	1

Results (% of applied radioactivity) from Table 12, p. 59 of the study report and Attachment 1.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).
To calculate means for both water-soil systems, values imported from **Ratios Silt loam** spreadsheet.

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of penoxsulam and degradates in total system.

		Penoxsulam									5-OH-XDE-638								
		Water layer			Sediment			Total System			Water layer			Sediment			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	77.2			20.1			97.3			2.2			0.8			3.0		
0	Ph-U	83.2	80.2	3.0	17.3	18.7	1.4	100.5	98.9	1.6	2.4	2.3	0.1	1.1	1.0	0.2	3.5	3.3	0.3
3	TP-2	54.6			15.1			69.7			14.8			5.0			19.8		
3	Ph-U	42.7	48.7	5.9	15.3	15.2	0.1	58.0	63.9	5.8	17.0	15.9	1.1	6.9	6.0	1.0	23.9	21.9	2.0
7	TP-2	21.9			9.5			31.4			25.7			11.9			37.6		
7	Ph-U	22.7	22.3	0.4	9.6	9.6	0.0	32.3	31.9	0.4	24.7	25.2	0.5	11.9	11.9	0.0	36.6	37.1	0.5
14	TP-2	5.1			2.0			7.1			27.2			11.3			38.5		
14	Ph-U	7.7	6.4	1.3	3.1	2.6	0.6	10.8	9.0	1.9	27.5	27.4	0.1	11.2	11.3	0.0	38.7	38.6	0.1
30	TP-2	1.1			ND			1.1			21.7			4.6			26.3		
30	Ph-U	1.3	1.2	0.1	0.4	0.2	0.2	1.7	1.4	0.3	19.5	20.6	1.1	4.8	4.7	0.1	24.3	25.3	1.0
90	TP-2	ND			ND			0.0			1.2			ND			1.2		
90	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.6	0.6	ND	0.0	0.0	0.0	0.6	0.6
181	TP-2	ND			ND			0.0			ND			ND			0.0		
181	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
271	TP-2	ND			ND			0.0			6.1			ND			6.1		
271	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	3.1	3.1	ND	0.0	0.0	0.0	3.1	3.1
365	TP-2	ND			ND			0.0			ND			ND			0.0		
365	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0

Results (% of applied radioactivity) from Appendix C, p. 105 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of penoxsulam and degradates in total system (continued).

		5,8-diOH									BSTCA-methyl								
		Water layer			Sediment			Total System			Water layer			Sediment			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0			ND			ND			0.0		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
7	TP-2	ND			ND			0.0			2.5			2.8			5.3		
7	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	2.0	2.3	0.3	1.5	2.2	0.7	3.5	4.4	0.9
14	TP-2	ND			ND			0.0			10.5			4.1			14.6		
14	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	8.5	9.5	1.0	2.6	3.4	0.8	11.1	12.9	1.7
30	TP-2	ND			ND			0.0			11.8			0.9			12.7		
30	Ph-U	ND	0.0	0.0	0.5	0.3	0.3	0.5	0.3	0.3	12.1	12.0	0.2	ND	0.5	0.5	12.1	12.4	0.3
90	TP-2	ND			ND			0.0			ND			ND			0.0		
90	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
181	TP-2	8.3			1.3			9.6			ND			ND			0.0		
181	Ph-U	3.7	6.0	2.3	1.0	1.2	0.2	4.7	7.2	2.5	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
271	TP-2	ND			0.6			0.6			ND			ND			0.0		
271	Ph-U	4.9	2.5	2.5	2.6	1.6	1.0	7.5	4.1	3.5	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
365	TP-2	9.4			1.3			10.7			ND			ND			0.0		
365	Ph-U	9.7	9.6	0.1	1.6	1.5	0.1	11.3	11.0	0.3	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0

Results (% of applied radioactivity) from Appendix C, p. 105 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of penoxsulam and degradates in total system (continued).

		BSTCA									BST								
		Water layer			Sediment			Total System			Water layer			Sediment			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0			ND			ND			0.0		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
7	TP-2	2.3			ND			2.3			ND			ND			0.0		
7	Ph-U	2.6	2.5	0.1	0.5	0.3	0.3	3.1	2.7	0.4	1.2	0.6	0.6	0.5	0.3	0.3	1.7	0.9	0.9
14	TP-2	2.7			0.7			3.4			1.6			ND			1.6		
14	Ph-U	2.9	2.8	0.1	0.8	0.8	0.1	3.7	3.6	0.1	1.8	1.7	0.1	0.7	0.4	0.4	2.5	2.1	0.5
30	TP-2	3.8			2.9			6.7			2.9			0.7			3.6		
30	Ph-U	4.8	4.3	0.5	1.5	2.2	0.7	6.3	6.5	0.2	3.2	3.1	0.2	2.8	1.8	1.0	6.0	4.8	1.2
90	TP-2	25.4			5.1			30.5			ND			ND			0.0		
90	Ph-U	16.5	21.0	4.5	3.8	4.5	0.7	20.3	25.4	5.1	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
181	TP-2	15.6			1.6			17.2			ND			1.2			1.2		
181	Ph-U	17.0	16.3	0.7	1.8	1.7	0.1	18.8	18.0	0.8	1.8	0.9	0.9	0.4	0.8	0.4	2.2	1.7	0.5
271	TP-2	18.6			2.7			21.3			ND			0.8			0.8		
271	Ph-U	16.8	17.7	0.9	1.8	2.3	0.5	18.6	20.0	1.3	1.8	0.9	0.9	1.0	0.9	0.1	2.8	1.8	1.0
365	TP-2	19.9			1.4			21.3			ND			0.7			0.7		
365	Ph-U	19.6	19.8	0.2	1.5	1.5	0.0	21.1	21.2	0.1	ND	0.0	0.0	0.8	0.8	0.1	0.8	0.8	0.1

Results (% of applied radioactivity) from Appendix C, p. 105 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of penoxsulam and degradates in total system (continued).

		Unknown[1]									Unknowns[2]								
		Water layer			Sediment			Total System			Water layer			Sediment			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0			3.2			1.3			4.5		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	2.6	2.9	0.3	1.6	1.5	0.1	4.2	4.4	0.2
7	TP-2	ND			ND			0.0			6.1			2.9			9.0		
7	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	6.1	6.1	0.0	2.8	2.9	0.1	8.9	9.0	0.0
14	TP-2	ND			ND			0.0			4.8			2.2			7.0		
14	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	5.3	5.1	0.3	1.8	2.0	0.2	7.1	7.1	0.0
30	TP-2	ND			ND			0.0			1.9			ND			1.9		
30	Ph-U	ND	0.0	0.0	0.3	0.2	0.2	0.3	0.2	0.2	1.7	1.8	0.1	ND	0.0	0.0	1.7	1.8	0.1
90	TP-2	8.3			0.6			8.9			5.1			0.7			5.8		
90	Ph-U	12.2	10.3	1.9	1.2	0.9	0.3	13.4	11.2	2.3	6.4	5.8	0.7	1.0	0.9	0.2	7.4	6.6	0.8
181	TP-2	5.6			1.4			7.0			ND			ND			0.0		
181	Ph-U	5.5	5.6	0.0	1.4	1.4	0.0	6.9	7.0	0.1	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
271	TP-2	2.4			ND			2.4			ND			1.4			1.4		
271	Ph-U	ND	1.2	1.2	ND	0.0	0.0	0.0	1.2	1.2	ND	0.0	0.0	ND	0.7	0.7	0.0	0.7	0.7
365	TP-2	ND			ND			0.0			ND			0.5			0.5		
365	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0

[1]LC/MS analysis determined this peak consisted of ≥4 compounds.
[2]Reported as sum of 5 different HPLC peaks.
Results (% of applied radioactivity) from Appendix C, p. 106 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silty clay sediment.

Determination of unaccounted for radioactivity following HPLC analysis.

		Total Identified + Unks									Total [^{14}C]Residues								
		Water layer			Sediment			Total System			Water layer			Sediment ext.			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	79.4			20.9			100.3			79.9			21.2			101.1		
0	Ph-U	85.6	82.5	3.1	18.4	19.7	1.3	104.0	102.2	1.9	85.7	82.8	2.9	18.6	19.9	1.3	104.3	102.7	1.6
3	TP-2	72.6			21.4			94.0			75.2			23.1			98.3		
3	Ph-U	62.3	67.5	5.2	23.8	22.6	1.2	86.1	90.1	3.9	65.5	70.4	4.9	25.4	24.3	1.1	90.9	94.6	3.7
7	TP-2	58.5			27.1			85.6			62.1			28.3			90.4		
7	Ph-U	59.3	58.9	0.4	26.8	27.0	0.1	86.1	85.9	0.3	60.2	61.2	0.9	27.2	27.8	0.5	87.4	88.9	1.5
14	TP-2	51.9			20.3			72.2			53.2			21.7			74.9		
14	Ph-U	53.7	52.8	0.9	20.2	20.3	0.0	73.9	73.0	0.9	54.9	54.1	0.9	20.8	21.3	0.5	75.7	75.3	0.4
30	TP-2	43.2			9.1			52.3			45.2			12.1			57.3		
30	Ph-U	42.6	42.9	0.3	10.3	9.7	0.6	52.9	52.6	0.3	43.4	44.3	0.9	12.3	12.2	0.1	55.7	56.5	0.8
90	TP-2	40.0			6.4			46.4			42.7			8.3			51.0		
90	Ph-U	35.1	37.6	2.5	6.0	6.2	0.2	41.1	43.8	2.7	40.0	41.4	1.3	8.9	8.6	0.3	48.9	50.0	1.0
181	TP-2	29.5			5.5			35.0			36.6			6.4			43.0		
181	Ph-U	28.0	28.8	0.8	4.6	5.1	0.5	32.6	33.8	1.2	34.5	35.6	1.1	7.4	6.9	0.5	41.9	42.5	0.5
271	TP-2	27.1			5.5			32.6			29.1			5.5			34.6		
271	Ph-U	23.5	25.3	1.8	5.4	5.5	0.1	28.9	30.8	1.8	25.5	27.3	1.8	6.4	6.0	0.5	31.9	33.3	1.3
365	TP-2	29.3			3.9			33.2			35.8			5.0			40.8		
365	Ph-U	29.3	29.3	0.0	4.4	4.2	0.2	33.7	33.5	0.2	37.2	36.5	0.7	6.3	5.7	0.6	43.5	42.2	1.3

Results (% of applied radioactivity) imported from Silty clay Metab 1-3 and Silty clay Unk spreadsheets.
Total [^{14}C]Residues results from Table 10, p. 57 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
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Arkansas pond water-silty clay sediment.

Determination of unaccounted for radioactivity following HPLC analysis (continued).

		Unaccounted [^{14}C][1]								
		Water layer			Sediment			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	0.5			0.3			0.8		
0	Ph-U	0.1	0.3	0.2	0.2	0.2	0.0	0.3	0.5	0.3
3	TP-2	2.6			1.7			4.3		
3	Ph-U	3.2	2.9	0.3	1.6	1.6	0.1	4.8	4.5	0.2
7	TP-2	3.6			1.2			4.8		
7	Ph-U	0.9	2.3	1.4	0.4	0.8	0.4	1.3	3.1	1.8
14	TP-2	1.3			1.4			2.7		
14	Ph-U	1.2	1.3	0.1	0.6	1.0	0.4	1.8	2.3	0.5
30	TP-2	2.0			3.0			5.0		
30	Ph-U	0.8	1.4	0.6	2.0	2.5	0.5	2.8	3.9	1.1
90	TP-2	2.7			1.9			4.6		
90	Ph-U	4.9	3.8	1.1	2.9	2.4	0.5	7.8	6.2	1.6
181	TP-2	7.1			0.9			8.0		
181	Ph-U	6.5	6.8	0.3	2.8	1.9	1.0	9.3	8.7	0.6
271	TP-2	2.0			0.0			2.0		
271	Ph-U	2.0	2.0	0.0	1.0	0.5	0.5	3.0	2.5	0.5
365	TP-2	6.5			1.1			7.6		
365	Ph-U	7.9	7.2	0.7	1.9	1.5	0.4	9.8	8.7	1.1

[1]Total [^{14}C]residues - total identified + unknown [^{14}C]compounds (imported from Silty clay Unact 1 spreadsheet).
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2)

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.

Determination of penoxsulam and degradates in total system.

		Penoxsulam									5-OH-XDE-638								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	81.6			15.2			96.8			ND			ND			0.0		
0	Ph-U	84.2	82.9	1.3	15.8	15.5	0.3	100.0	98.4	1.6	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	58.7			20.1			78.8			11.0			4.8			15.8		
3	Ph-U	60.3	59.5	0.8	16.0	18.1	2.1	76.3	77.6	1.2	8.7	9.9	1.1	3.5	4.2	0.6	12.2	14.0	1.8
7	TP-2	34.9			10.4			45.3			20.2			8.2			28.4		
7	Ph-U	38.9	36.9	2.0	12.6	11.5	1.1	51.5	48.4	3.1	18.5	19.4	0.8	7.8	8.0	0.2	26.3	27.4	1.0
14	TP-2	19.3			5.4			24.7			28.5			9.6			38.1		
14	Ph-U	22.0	20.7	1.4	7.1	6.3	0.9	29.1	26.9	2.2	26.3	27.4	1.1	10.5	10.1	0.4	36.8	37.5	0.6
30	TP-2	8.4			1.7			10.1			32.1			8.7			40.8		
30	Ph-U	8.7	8.6	0.1	2.1	1.9	0.2	10.8	10.5	0.3	32.3	32.2	0.1	10.1	9.4	0.7	42.4	41.6	0.8
59	TP-2	1.1			0.4			1.5			22.2			6.7			28.9		
59	Ph-U	2.0	1.6	0.4	0.4	0.4	0.0	2.4	2.0	0.5	25.2	23.7	1.5	8.6	7.7	0.9	33.8	31.4	2.5
120	TP-2	ND			ND			0.0			15.8			4.4			20.2		
120	Ph-U	0.6	0.3	0.3	ND	0.0	0.0	0.6	0.3	0.3	11.2	13.5	2.3	3.1	3.8	0.7	14.3	17.3	3.0

Results (% of applied radioactivity) from Appendix C, p. 107 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.

Determination of penoxsulam and degradates in total system (continued).

		BSTCA									BST								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0			ND			ND			0.0		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
7	TP-2	2.5			1.0			3.5			1.9			0.4			2.3		
7	Ph-U	2.3	2.4	0.1	0.6	0.8	0.2	2.9	3.2	0.3	0.7	1.3	0.6	0.6	0.5	0.1	1.3	1.8	0.5
14	TP-2	3.0			1.1			4.1			1.9			0.5			2.4		
14	Ph-U	2.7	2.9	0.1	1.0	1.1	0.1	3.7	3.9	0.2	2.7	2.3	0.4	0.7	0.6	0.1	3.4	2.9	0.5
30	TP-2	4.5			3.0			7.5			1.8			ND			1.8		
30	Ph-U	11.4	8.0	3.5	3.8	3.4	0.4	15.2	11.4	3.9	ND	0.9	0.9	0.8	0.4	0.4	0.8	1.3	0.5
59	TP-2	10.9			2.6			13.5			ND			0.5			0.5		
59	Ph-U	15.3	13.1	2.2	2.9	2.8	0.2	18.2	15.9	2.3	ND	0.0	0.0	0.6	0.6	0.0	0.6	0.6	0.0
120	TP-2	14.2			3.5			17.7			ND			ND			0.0		
120	Ph-U	19.2	16.7	2.5	4.1	3.8	0.3	23.3	20.5	2.8	ND	0.0	0.0	0.9	0.5	0.5	0.9	0.5	0.5

Results (% of applied radioactivity) from Appendix C, p. 107 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.

Determination of penoxsulam and degradates in total system (continued).

		Unknown[1]									Unknown								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			1.8			0.7			2.5		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	2.2	2.0	0.2	0.7	0.7	0.0	2.9	2.7	0.2
3	TP-2	ND			ND			0.0			2.4			1.6			4.0		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	1.2	1.8	0.6	0.8	1.2	0.4	2.0	3.0	1.0
7	TP-2	ND			ND			0.0			4.4			1.9			6.3		
7	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	3.4	3.9	0.5	2.0	2.0	0.1	5.4	5.9	0.5
14	TP-2	ND			ND			0.0			4.4			1.3			5.7		
14	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	4.6	4.5	0.1	1.5	1.4	0.1	6.1	5.9	0.2
30	TP-2	ND			1.3			1.3			4.0			0.8			4.8		
30	Ph-U	ND	0.0	0.0	1.1	1.2	0.1	1.1	1.2	0.1	0.7	2.4	1.6	1.3	1.1	0.3	2.0	3.4	1.4
59	TP-2	6.1			1.4			7.5			1.6			0.4			2.0		
59	Ph-U	6.3	6.2	0.1	1.8	1.6	0.2	8.1	7.8	0.3	1.2	1.4	0.2	0.6	0.5	0.1	1.8	1.9	0.1
120	TP-2	ND			ND			0.0			1.4			0.2			1.6		
120	Ph-U	2.7	1.4	1.4	ND	0.0	0.0	2.7	1.4	1.4	ND	0.7	0.7	ND	0.1	0.1	0.0	0.8	0.8

[1]LC/MS analysis determined this peak consisted of ≥4 compounds.
Results (% of applied radioactivity) from Appendix C, p. 108 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
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Arkansas pond water-silt loam soil.

Determination of unaccounted for radioactivity following HPLC analysis.

		Total Identified + Unks									Total [^{14}C]Residues								
		Water layer			Soil			Total System			Water layer			Soil extract			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	83.4			15.9			99.3			84.5			16.1			100.6		
0	Ph-U	86.4	84.9	1.5	16.5	16.2	0.3	102.9	101.1	1.8	86.5	85.5	1.0	16.6	16.4	0.3	103.1	101.9	1.3
3	TP-2	72.1			26.5			98.6			73.6			27.8			101.4		
3	Ph-U	70.2	71.2	0.9	20.3	23.4	3.1	90.5	94.6	4.0	75.5	74.6	1.0	21.8	24.8	3.0	97.3	99.4	2.1
7	TP-2	63.9			21.9			85.8			66.3			23.1			89.4		
7	Ph-U	63.8	63.9	0.1	23.6	22.8	0.8	87.4	86.6	0.8	64.5	65.4	0.9	24.3	23.7	0.6	88.8	89.1	0.3
14	TP-2	57.1			17.9			75.0			58.4			18.7			77.1		
14	Ph-U	58.3	57.7	0.6	20.8	19.4	1.4	79.1	77.1	2.0	59.6	59.0	0.6	21.1	19.9	1.2	80.7	78.9	1.8
30	TP-2	50.8			15.5			66.3			57.5			16.3			73.8		
30	Ph-U	53.1	52.0	1.1	19.2	17.4	1.9	72.3	69.3	3.0	66.7	62.1	4.6	19.9	18.1	1.8	86.6	80.2	6.4
59	TP-2	41.9			12.0			53.9			47.1			12.9			60.0		
59	Ph-U	50.0	46.0	4.1	14.9	13.5	1.5	64.9	59.4	5.5	54.9	51.0	3.9	15.9	14.4	1.5	70.8	65.4	5.4
120	TP-2	31.4			8.1			39.5			39.1			9.5			48.6		
120	Ph-U	33.7	32.6	1.2	8.1	8.1	0.0	41.8	40.7	1.1	36.9	38.0	1.1	9.3	9.4	0.1	46.2	47.4	1.2

Results (% of applied radioactivity) imported from Silt loam Metab 1-2 and Silt loam Unk spreadsheets.
Total [^{14}C]Residues results from Table 11, p. 58 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Arkansas pond water-silt loam soil.

Determination of unaccounted for radioactivity following HPLC analysis (continued).

		Unaccounted [^{14}C]^1								
		Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	1.1			0.2			1.3		
0	Ph-U	0.1	0.6	0.5	0.1	0.2	0.1	0.2	0.8	0.6
3	TP-2	1.5			1.3			2.8		
3	Ph-U	5.3	3.4	1.9	1.5	1.4	0.1	6.8	4.8	2.0
7	TP-2	2.4			1.2			3.6		
7	Ph-U	0.7	1.6	0.9	0.7	1.0	0.3	1.4	2.5	1.1
14	TP-2	1.3			0.8			2.1		
14	Ph-U	1.3	1.3	0.0	0.3	0.5	0.2	1.6	1.8	0.3
30	TP-2	6.7			0.8			7.5		
30	Ph-U	13.6	10.2	3.5	0.7	0.7	0.1	14.3	10.9	3.4
59	TP-2	5.2			0.9			6.1		
59	Ph-U	4.9	5.0	0.1	1.0	0.9	0.1	5.9	6.0	0.1
120	TP-2	7.7			1.4			9.1		
120	Ph-U	3.2	5.5	2.3	1.2	1.3	0.1	4.4	6.8	2.4

^{1}Total [^{14}C]residues - total identified + unknown [^{14}C]compounds (imported from Silt loam Unact 1 spreadsheet).
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2)

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of penoxsulam and degradates in total system.

		Penoxsulam									5-OH-XDE-638								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	75.5			21.6			97.1			ND			ND			0.0		
0	Ph-U	77.0	76.3	0.8	21.9	21.8	0.2	98.9	98.0	0.9	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	47.2			13.5			60.7			13.4			4.5			17.9		
3	Ph-U	47.8	47.5	0.3	11.5	12.5	1.0	59.3	60.0	0.7	13.4	13.4	0.0	3.8	4.2	0.3	17.2	17.6	0.4
7	TP-2	27.4			6.3			33.7			23.2			7.5			30.7		
7	Ph-U	27.1	27.3	0.1	7.2	6.8	0.5	34.3	34.0	0.3	22.8	23.0	0.2	8.1	7.8	0.3	30.9	30.8	0.1
14	TP-2	9.9			2.3			12.2			24.8			6.9			31.7		
14	Ph-U	10.1	10.0	0.1	2.9	2.6	0.3	13.0	12.6	0.4	24.0	24.4	0.4	9.4	8.2	1.3	33.4	32.6	0.9
30	TP-2	1.5			0.4			1.9			12.1			3.5			15.6		
30	Ph-U	1.4	1.5	0.0	0.5	0.5	0.1	1.9	1.9	0.0	11.8	12.0	0.2	3.9	3.7	0.2	15.7	15.7	0.0
59	TP-2	ND			0.2			0.2			4.1			1.2			5.3		
59	Ph-U	ND	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	4.8	4.5	0.4	1.4	1.3	0.1	6.2	5.8	0.4
120	TP-2	ND			ND			0.0			ND			ND			0.0		
120	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0

Results (% of applied radioactivity) from Appendix C, p. 109 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of penoxsulam and degradates in total system (continued).

		BSTCA-methyl									BSTCA								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0			1.8			0.7			2.5		
3	Ph-U	ND	0.0	0.0	0.4	0.2	0.2	0.4	0.2	0.2	1.7	1.8	0.0	0.4	0.6	0.1	2.1	2.3	0.2
7	TP-2	ND			0.9			0.9			4.0			1.6			5.6		
7	Ph-U	ND	0.0	0.0	0.9	0.9	0.0	0.9	0.9	0.0	3.2	3.6	0.4	1.5	1.6	0.0	4.7	5.2	0.4
14	TP-2	4.4			1.9			6.3			3.9			2.5			6.4		
14	Ph-U	2.3	3.4	1.1	0.5	1.2	0.7	2.8	4.6	1.7	3.6	3.8	0.1	3.5	3.0	0.5	7.1	6.8	0.4
30	TP-2	ND			ND			0.0			13.9			4.0			17.9		
30	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	14.3	14.1	0.2	4.5	4.3	0.3	18.8	18.4	0.4
59	TP-2	ND			ND			0.0			12.5			3.5			16.0		
59	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	11.4	12.0	0.6	3.7	3.6	0.1	15.1	15.6	0.5
120	TP-2	ND			ND			0.0			13.9			4.4			18.3		
120	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	14.0	14.0	0.1	5.1	4.8	0.4	19.1	18.7	0.4

Results (% of applied radioactivity) from Appendix C, p. 109 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of penoxsulam and degradates in total system (continued).

		BST								
		Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0
3	TP-2	ND			ND			0.0		
3	Ph-U	ND	0.0	0.0	0.2	0.1	0.1	0.2	0.1	0.1
7	TP-2	1.3			0.6			1.9		
7	Ph-U	ND	0.7	0.7	0.6	0.6	0.0	0.6	1.3	0.7
14	TP-2	1.7			0.8			2.5		
14	Ph-U	2.5	2.1	0.4	0.9	0.9	0.0	3.4	3.0	0.4
30	TP-2	ND			0.7			0.7		
30	Ph-U	ND	0.0	0.0	ND	0.4	0.4	0.0	0.4	0.4
59	TP-2	ND			0.7			0.7		
59	Ph-U	ND	0.0	0.0	0.6	0.7	0.1	0.6	0.7	0.1
120	TP-2	ND			ND			0.0		
120	Ph-U	3.1	1.6	1.6	0.9	0.5	0.5	4.0	2.0	2.0

Results (% of applied radioactivity) from Appendix C, p. 109 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2)

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of penoxsulam and degradates in total system (continued).

		Unknown[1]									Unknown								
		Water layer			Soil			Total System			Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	ND			ND			0.0			2.1			1.1			3.2		
0	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	2.3	2.2	0.1	1.1	1.1	0.0	3.4	3.3	0.1
3	TP-2	ND			ND			0.0			3.7			2.0			5.7		
3	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	3.3	3.5	0.2	1.9	2.0	0.1	5.2	5.5	0.3
7	TP-2	ND			ND			0.0			6.6			2.7			9.3		
7	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	5.9	6.3	0.3	2.8	2.8	0.0	8.7	9.0	0.3
14	TP-2	ND			ND			0.0			5.2			1.7			6.9		
14	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	4.5	4.9	0.4	1.9	1.8	0.1	6.4	6.7	0.3
30	TP-2	ND			ND			0.0			ND			0.5			0.5		
30	Ph-U	ND	0.0	0.0	3.7	1.9	1.9	3.7	1.9	1.9	ND	0.0	0.0	0.6	0.6	0.0	0.6	0.6	0.0
59	TP-2	ND			3.3			3.3			ND			0.2			0.2		
59	Ph-U	ND	0.0	0.0	3.9	3.6	0.3	3.9	3.6	0.3	ND	0.0	0.0	ND	0.1	0.1	0.0	0.1	0.1
120	TP-2	ND			ND			0.0			ND			ND			0.0		
120	Ph-U	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0

[1]LC/MS analysis determined this peak consisted of ≥4 compounds.
Results (% of applied radioactivity) from Appendix C, p. 110 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of unaccounted for radioactivity following HPLC analysis.

		Total Identified + Unks									Total [^{14}C]Residues								
		Water layer			Soil			Total System			Water layer			Soil extract			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	77.6			22.7			100.3			78.0			22.8			100.8		
0	Ph-U	79.3	78.5	0.9	23.0	22.9	0.1	102.3	101.3	1.0	80.3	79.2	1.1	23.2	23.0	0.2	103.5	102.2	1.3
3	TP-2	66.1			20.7			86.8			70.4			21.1			91.5		
3	Ph-U	66.2	66.2	0.0	18.2	19.5	1.3	84.4	85.6	1.2	69.0	69.7	0.7	18.7	19.9	1.2	87.7	89.6	1.9
7	TP-2	62.5			19.6			82.1			63.1			20.9			84.0		
7	Ph-U	59.0	60.8	1.8	21.1	20.4	0.8	80.1	81.1	1.0	59.8	61.5	1.6	21.6	21.3	0.4	81.4	82.7	1.3
14	TP-2	49.9			16.1			66.0			51.3			17.0			68.3		
14	Ph-U	47.0	48.5	1.5	19.1	17.6	1.5	66.1	66.1	0.0	49.8	50.6	0.7	19.4	18.2	1.2	69.2	68.8	0.4
30	TP-2	27.5			9.1			36.6			38.5			13.7			52.2		
30	Ph-U	27.5	27.5	0.0	13.2	11.2	2.1	40.7	38.7	2.1	37.6	38.1	0.5	14.3	14.0	0.3	51.9	52.1	0.2
59	TP-2	16.6			9.1			25.7			27.7			10.9			38.6		
59	Ph-U	16.2	16.4	0.2	9.8	9.5	0.4	26.0	25.9	0.1	26.5	27.1	0.6	11.8	11.4	0.4	38.3	38.5	0.1
120	TP-2	13.9			4.4			18.3			21.8			7.6			29.4		
120	Ph-U	17.1	15.5	1.6	6.0	5.2	0.8	23.1	20.7	2.4	22.6	22.2	0.4	8.4	8.0	0.4	31.0	30.2	0.8

Results (% of applied radioactivity) imported from Silty cl lo Metab 1-3 and Silty cl lo Unk spreadsheets.
Total [^{14}C]Residues results from Table 12, p. 59 of the study report.
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2).

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Anaerobic Aquatic Metabolism of [^{14}C]Penoxsulam (XDE-638) in Three Water-Sediment/Soil Systems.
MRID 45830725

Italy distilled water-silty clay loam soil.

Determination of unaccounted for radioactivity following HPLC analysis (continued).

		Unaccounted [^{14}C][1]								
		Water layer			Soil			Total System		
Day	Label	% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.
0	TP-2	0.4			0.1			0.5		
0	Ph-U	1.0	0.7	0.3	0.2	0.1	0.1	1.2	0.9	0.3
3	TP-2	4.3			0.4			4.7		
3	Ph-U	2.8	3.6	0.8	0.5	0.5	0.0	3.3	4.0	0.7
7	TP-2	0.6			1.3			1.9		
7	Ph-U	0.8	0.7	0.1	0.5	0.9	0.4	1.3	1.6	0.3
14	TP-2	1.4			0.9			2.3		
14	Ph-U	2.8	2.1	0.7	0.3	0.6	0.3	3.1	2.7	0.4
30	TP-2	11.0			4.6			15.6		
30	Ph-U	10.1	10.6	0.5	1.1	2.9	1.7	11.2	13.4	2.2
90	TP-2	11.1			1.8			12.9		
90	Ph-U	10.3	10.7	0.4	2.0	1.9	0.1	12.3	12.6	0.3
181	TP-2	7.9			3.2			11.1		
181	Ph-U	5.5	6.7	1.2	2.4	2.8	0.4	7.9	9.5	1.6

[1]Total [^{14}C]residues - total identified + unknown [^{14}C]compounds (imported from Silty cl lo Unact 1 spreadsheet).
Means and standard deviations calculated using Corel Quattro Pro 8 program functions @avg(A1..A2), @std(A1..A2)

Attachment 2

Structures of Parent and Transformation Products

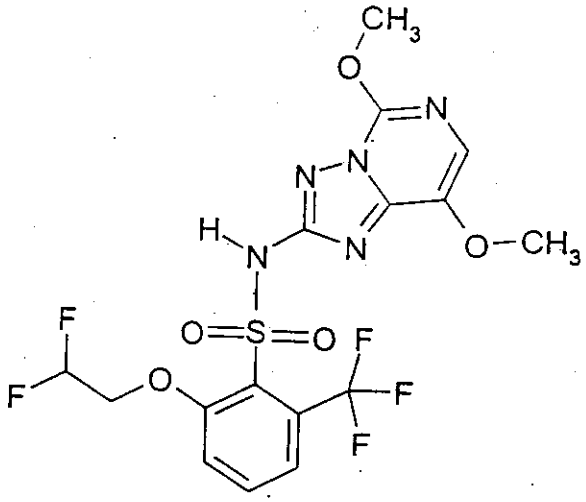
Penoxsulam

IUPAC name: 3-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluorotoluene-2-sulfonamide

CAS name: 2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide

CAS No: 219714-96-2

Unlabeled



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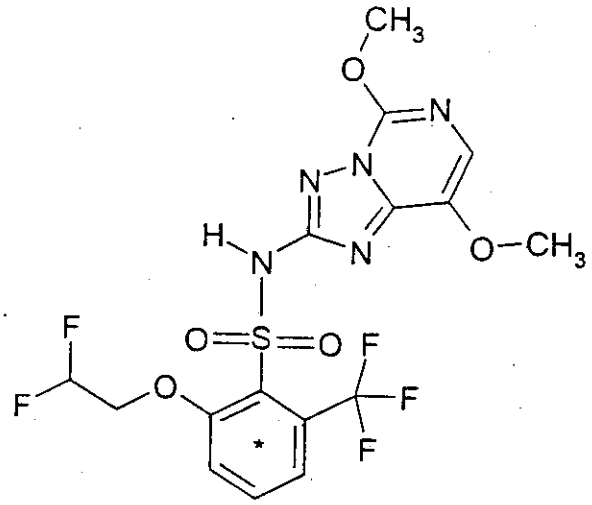
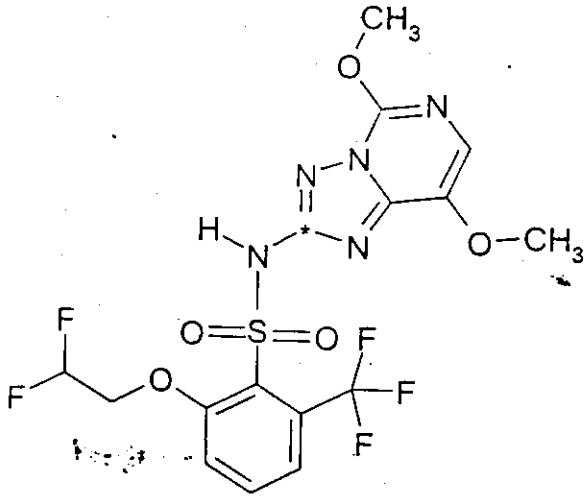
[Phenyl-U-^{14}C] label



[Triazolopyrimidine-2-^{14}C] label



*Position of the radiolabel.

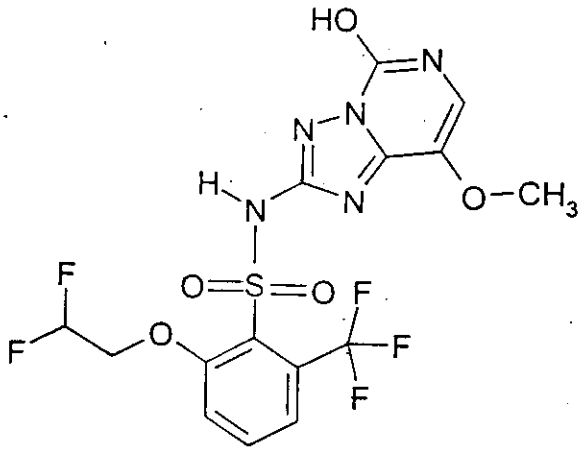
5-OH-XDE-638

IUPAC name: 6-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo-s-triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-trifluoro-o-toluenesulfonamide

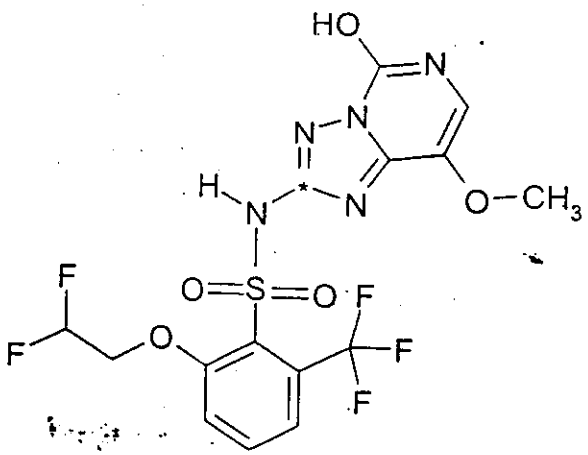
CAS name: 2-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide

CAS No: NA

Unlabeled



[Triazolopyrimidine-2-^{14}C] label



* Position of the radiolabel.

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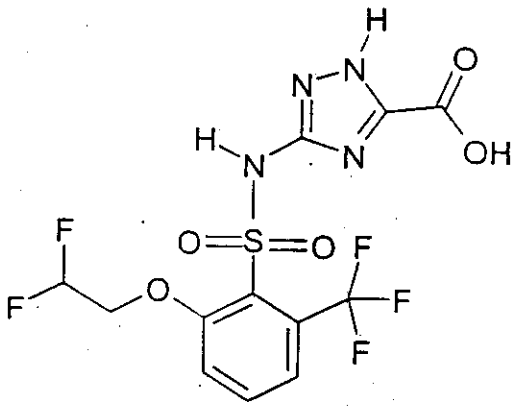
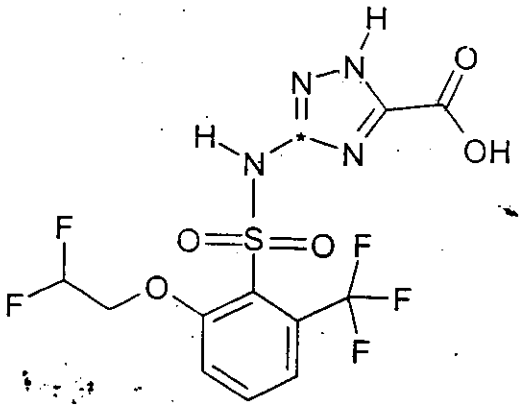
BSTCA

IUPAC name:	3-[6-(2,2-Difluoroethoxy)-α,α,α-(trifluoro-o-toluenesulfonamido]-s-triazole-5-carboxylic acid
CAS name:	3-[[[2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)phenyl]-sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylic acid
CAS No:	NA

Unlabeled



[Triazolopyrimidine-2-^{14}C] label



* Position of the radiolabel.

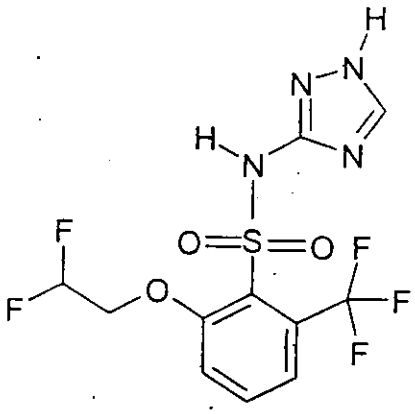
BST

IUPAC name: 6-(2,2-Difluoroethoxy)-α,α,α-trifluoro-N-s-triazol-3-yl-o-toluenesulfonamide

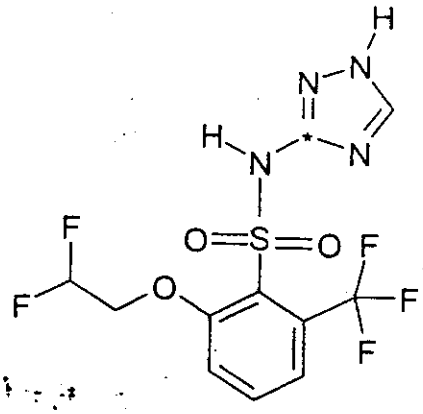
CAS name: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide

CAS No: NA

Unlabeled



[Triazolopyrimidine-2-^{14}C] label



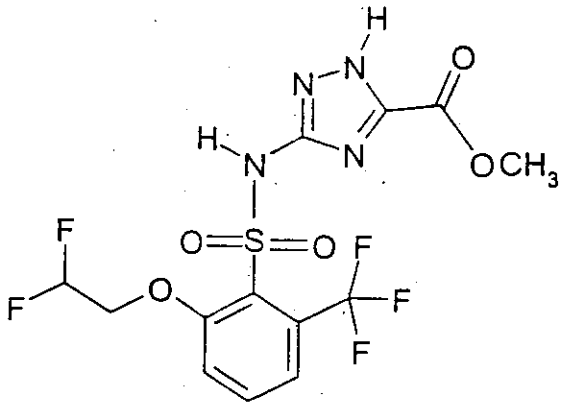
* Position of the radiolabel.

BSTCA-methyl

IUPAC name: Methyl 3-[6-(2,2-difluoroethoxy)-α,α,α-trifluoro-o-toluenesulfonamido]-s-triazole-5-carboxylate

CAS name: Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate

CAS No: NA

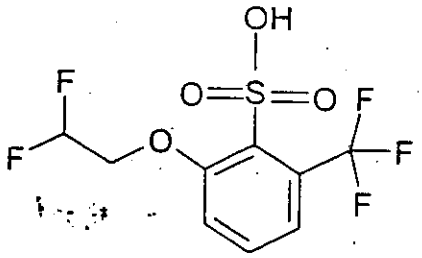


BSA

IUPAC name: 6-(2,2-Difluoroethoxy)-α,α,α-trifluoro-o-toluenesulfonic acid

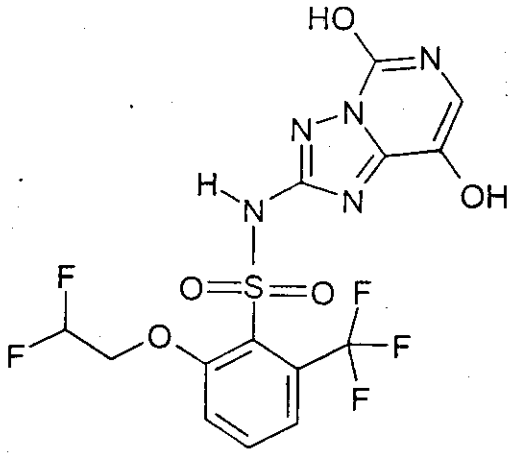
CAS name: 2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)benzenesulfonic acid

CAS No: NA



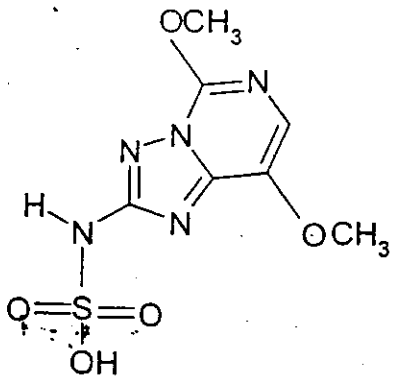
5,8-diOH

IUPAC name: NA
CAS name: 2-(2,2-Difluoroethoxy)-6-trifluoromethyl-N-(5,8-dihydroxy-[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)benzenesulfonamide
CAS No: NA



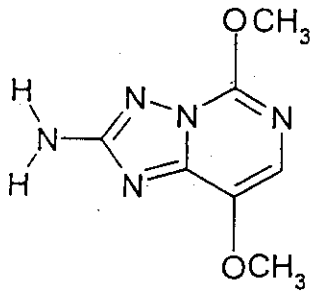
TPSA

IUPAC name: NA
CAS name: 5,8-Dimethoxy[1,2,4]triazolo-[1,5-c]pyrimidin-2-yl-sulfamic acid
CAS No: NA



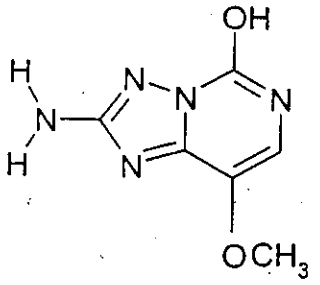
2-Amino TP

IUPAC name: 2-Amino-5,8-dimethoxy-s-triazolo[1,5-c]pyrimidine
CAS name: 5,8-Dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-amine
CAS No: NA



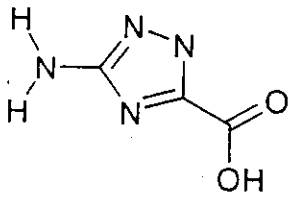
5-OH, 2-Amino TP

IUPAC name: NA
CAS name: 8-Methoxy[1,2,4]triazolo-[1,5-c]pyrimidin-5-ol-2-amine
CAS No: NA



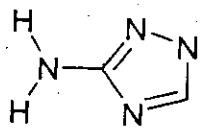
2-Amino TCA

IUPAC name: NA
CAS name: 2-Amino-1,3,4-triazole-5-carboxylic acid
CAS No: NA



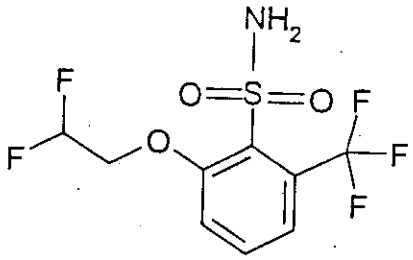
2-Amino-1,3,4-triazole

IUPAC name: NA
CAS name: 2-Amino-1,3,4-triazole
CAS No: NA



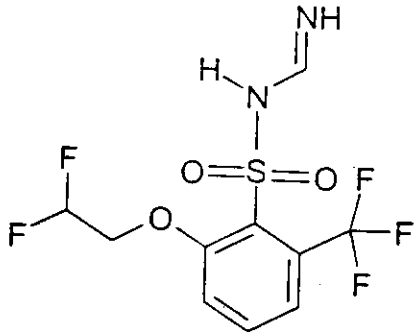
Sulfonamide

IUPAC name: 2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)-benzenesulfonamide
CAS name: 2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)-benzenesulfonamide
CAS No: NA



Sulfonylformamidine

IUPAC name: 2-(2,2-Difluoroethoxy)-N-[(E)iminomethyl-6-(trifluoromethyl)benzenesulfonamide
CAS name: 2-(2,2-Difluoroethoxy)-N-(iminomethyl-6-(trifluoromethyl)-benzenesulfonamide
CAS No: NA



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