

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Data Requirement: PMRA Data Code:
EPA DP Barcode: D304186
OECD Data Point:
EPA Guideline: 162-4

Test material:

Common name: Orthosulfamuron.

Chemical name

IUPAC: 1-(4,6-Dimethoxypyrimidin-2-yl)-3-[2-(dimethylcarbamoyl)-phenylsulfamoyl]urea.

CAS name: 2-[[[(4,6-Dimethoxy-2-pyrimidinyl)-amino]carbonyl]amino]sulfonyl]amino]-N,N-dimethylbenzamide.

CAS No: 213464-77-8.

Synonyms: IR5878.

SMILES string: CN(C(=O)c1cccc1NS(=O)(=O)NC(=O)Nc1nc(cc(n1)OC)OC)C.

Primary Reviewer: Lynne Binari
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Secondary Reviewer: Greg Orrick
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Date: August 3, 2006

Company Code:

Active Code:

Use Site Category:

EPA PC Code: 108209.

CITATION: Scacchi, A. *et al.* 2003. Aerobic Aquatic Metabolism of ¹⁴C-IR5878 in Two American Soils. Unpublished study performed by ISAGRO RICERCA Srl, Novara, Italy; sponsored and submitted by ISAGRO SpA, Milano, Italy. Study and Report No.: MEF.02.14. Experiment initiation May 29, 2002 and completion November 11, 2002. Final report issued February 21, 2003. 298 pp.



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Primary Reviewer: Lynne Binari
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EXECUTIVE SUMMARY:

The biotransformation of [pyrimidinyl-5-¹⁴C]-and [phenyl-U-¹⁴C]-labeled 2-[[[(4,6-dimethoxy-2-pyrimidinyl)-amino]carbonyl]amino]sulfonyl]amino]-N,N-dimethylbenzamide (orthosulfamuron, IR5878) was studied in water-loam sediment (water pH 7.8, organic carbon not reported; sediment pH 6.2-6.9, organic carbon 0.87%) systems from Arkansas for 90 days and in water-clay sediment (water pH 7.7, organic carbon not reported; sediment pH 5.6-6.0, organic carbon 1.8%) systems from California for 61 days under aerobic conditions in darkness at 20 ± 2°C. Based on the water volume, [¹⁴C]orthosulfamuron was applied at a rate of *ca.* 0.11 mg a.i./L. The sediment:water ratios used were 1:2.2-2.5 (*ca.* 44-49 g dry wt. sediment:*ca.* 110 mL water). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-4 and in compliance with OECD principles of GLP as defined by the Republic of Italy Decreto Legislativo No. 120 (1992). The test system consisted of glass cylinders (4.5-cm i.d., volume/height not reported) containing water-sediment attached to a continuous flow-through (flow rate not reported) system. Sediment and water were pre-incubated for 22 days, then following treatment, duplicate systems per label were collected after 0, 7, 15, 22 (CAL only), 30, 44, 61 and 90 (ARK only) days of incubation. A flow-through trapping system was utilized for the continuous collection of CO₂ (2N potassium hydroxide); no attempt was made to collect volatile organic compounds. Upon collection, the water layer was separated from the sediment via pipette. Water layers were treated with saturated sodium bicarbonate (NaHCO₃) solution, brought to volume (100 mL) with acetonitrile and concentrated via rotary evaporation. Sediment samples were extracted with acetonitrile:33mM NaHCO₃; once at a solvent:solvent ratio of 7:3 (v:v) followed by 1-2 times at a ratio of 1:1 (v:v). A second solvent system was not utilized to further extract bound residues. Sediment extracts were combined and concentrated via rotary evaporation prior to TLC analysis. Water layers, sediment extracts, extracted sediment and trapping solutions were analyzed for total radioactivity using LSC. Water layers and sediment extracts were analyzed for [¹⁴C]orthosulfamuron and its transformation products by normal- and reverse-phase TLC; parent orthosulfamuron and degradates were identified by co-chromatography with and comparison to the retention factor (R_f) of reference standards. Parent [¹⁴C]orthosulfamuron and its transformation products were isolated and identifications also assigned via LC/MS-ESI; however, LC/MS analyses of reference standards were not provided for comparison.

The test conditions outlined in the study appear to have been maintained throughout the 2- and 3-month incubations. Conditions were moderately reducing in the water layers and sediments of both systems. In the water layers of both systems, redox potentials, dissolved oxygen and pH were *ca.* +110 to +116 mV, 5.9-6.7 mg/L and 7.1-7.8, respectively. In the sediments, redox potentials and pH were *ca.* +62 to +65 mV and 6.8-7.1, respectively, in the loam sediment and *ca.* -22 to -16 mV and 6.2-6.4, respectively, in the clay sediment.

Dissipation and transformation of [¹⁴C]orthosulfamuron occurred moderately in both systems, but was more rapid in the water-clay systems as compared to the water-loam systems. Accounting non-extracted residues as parent compound, linear/natural log half-life values of

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

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[¹⁴C]orthosulfamuron (both labels) were 12-13, 102->365, and 30-65 days in the water, sediment, and total system, respectively, in the California water-clay sediment systems and 28-29, >365, and 59-71 days, respectively, in the Arkansas water-loam sediment systems. Two major transformation products,

- N-(4,6-dimethoxypyrimidin-2-yl)urea (DOP urea, pyrimidine label) and
- 2-sulfamino-N,N-dimethylbenzamide (DBS acid, phenyl label),

and two minor products,

- 1-(4-methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl IR5878, both labels) and
- 2-sulfamoylamino-N,N-dimethylbenzamide (DBS amide, phenyl label),

were detected in both systems. For both systems, DOP urea was detected primarily in sediment extracts, whereas, DBS acid, O-desmethyl IR5878 and DBS amide were detected primarily in the water layers. Formation of volatilized ¹⁴CO₂ (identification not confirmed) was not significant for either system or label totaling 0.18-1.19% of the applied at study termination.

In water-loam sediment systems, recoveries of radiolabeled material averaged $103.31 \pm 2.03\%$ (range 98.24-105.89%) and $103.73 \pm 2.26\%$ (range 97.79-106.21%) for the [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-label treated systems, respectively, with no consistent declines in recoveries for either label. Following application of [¹⁴C]orthosulfamuron to the water layer, [pyrimidinyl-5-¹⁴C]residues partitioned from the water layer to the sediment with mean (n = 2) distribution ratios (water:sediment) of 2:1 at 7 days, 1:1 at 15-30 days, 1:2 at 44-61 days and were 1:3 at study termination (90 days), while distribution ratios for the [phenyl-U-¹⁴C]residues were 3:1 at 7-15 days and 2:1 thereafter. Extractable [pyrimidinyl-5-¹⁴C]residues increased from $\leq 0.44\%$ of the applied at day 0 to 60.67-60.97% at 44 days, then decreased to 57.63-57.93% at 90 days, while [phenyl-U-¹⁴C]residues increased from 0.30-0.43% at day 0 to 30.89-32.41% at 30 days, then decreased to 20.92-22.09% at study termination. Nonextractable [¹⁴C]residues (both labels) increased from <LOD (0.15-0.22% of applied) at day 0 to 17.39-23.74% at study termination. Organic matter fractionation of 90-day extracted [pyrimidinyl-5-¹⁴C]sediment found 8.48-9.33%, 2.31-2.41% and 7.36-8.12% of the applied was associated with the humin, fulvic acids and humic acids, respectively. Extracted **Orthosulfamuron** (both labels) in the total system decreased from 101.40-103.76% of the applied at day 0 (water layer only, sediment not analyzed at day 0) to 45.33-52.73% at 44 days and was 16.92-21.31% at study termination. In the water layer, orthosulfamuron decreased from 101.40-103.76% at day 0 to 46.38-50.52% at 15 days, 27.25-28.74% at 44 days and was 9.06-10.88% at 90 days. In the sediment, orthosulfamuron was detected at 18.41-21.81% at 7-15 days, 17.31-25.48% at 30-44 days and was 7.86-10.96% at study termination. **DOP urea** was detected at maximums of 42.50% and 47.78% at study termination in the sediment and total system, respectively, while detected in the water layer at 3.85-6.09% after day 0. At study termination, **DBS acid** was detected at maximums of 46.53%, 9.24% and 55.77% in the water layer, sediment and total system, respectively. For minor

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

products, **DBS amide** was detected at maximums of 3.25%, 0.87% and 4.07% in the water layer, sediment and total system, respectively, and **O-desmethyl IR5878** (both labels) was detected at 5.97-6.68%, 2.06-2.69% and 8.03-9.37%, respectively. Unidentified TLC [¹⁴C]residues (both labels) were detected at total maximums of 2.11-3.05%, 1.81-4.65% and 4.86-6.22% in the water layer, sediment and total system, respectively.

In water-clay sediment systems, recoveries of radiolabeled material averaged $103.57 \pm 1.89\%$ (range 101.03-107.42%) and $101.61 \pm 2.57\%$ (range 97.91-105.43%) for the [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-label treated systems, respectively, with no consistent declines in recoveries for either label. Following application of [¹⁴C]orthosulfamuron to the water layer, mean (n = 2) distribution ratios (water:sediment) for the [pyrimidinyl-5-¹⁴C]residues were 1:1 at 7 days, 1:2 at 15 days, 1:4 at 30 days and 1:7 at study termination (61 days), while distribution ratios for the [phenyl-U-¹⁴C]residues were primarily 2:1 for the entire incubation. Extractable [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-residues increased from $\leq 0.62\%$ of the applied (both labels) at day 0 to 65.47-66.35% and 36.01-36.41%, respectively, at 30 days, then decreased to 53.64-53.81% and 26.15-26.34%, respectively, at study termination. Nonextractable [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-residues increased from <LOD (0.09-0.14% of applied) at day 0 to 33.42-33.50% and 10.79-11.39%, respectively, at study termination. Organic matter fractionation of 44- and 61-day extracted [pyrimidinyl-5-¹⁴C]sediment found 17.31-21.11%, 6.54-9.43% and 1.14-1.74% of the applied was associated with the humin, fulvic acids and humic acids, respectively. Extracted **Orthosulfamuron** (both labels) in the total system decreased from 102.82-103.57% of the applied at day 0 (water layer only) to 50.51-56.31% at 15 days, 22.47-27.23% at 44 days and was 12.58-15.99% at study termination. In the water layer, orthosulfamuron decreased from 102.82-103.57% at day 0 to 46.80-51.50% at 7 days, 25.52-32.32% at 15 days, 12.79-13.80% at 30 days and was 2.42-3.37% at 61 days. In the sediment, orthosulfamuron increased from 16.75-23.22% at 7 days to 23.30-26.79% at 15-22 days, then gradually decreased to 10.16-12.62% at 61 days. **DOP urea** was detected at maximums of 37.70% and 40.52% at 30 days in the sediment and total system, respectively, and was 33.63-33.66% and 35.77-35.86%, respectively, at study termination, while in the water layer decreased from a maximum 6.66% at 7 days to 2.11-2.23% at 61 days. At study termination, **DBS acid** was detected at maximums of 49.88%, 11.11% and 60.86% in the water layer, sediment and total system, respectively. For minor products, **DBS amide** was detected at maximums of 2.81%, 1.28% and 4.09% in the water layer, sediment and total system, respectively, and **O-desmethyl IR5878** (both labels) was detected at 4.60-4.98%, 1.84-2.32% and 6.13-7.30%, respectively. Unidentified TLC [¹⁴C]residues (both labels) were detected at total maximums of 3.19-3.26%, 2.69-6.44% and 5.95-9.52% in the water layer, sediment and total system, respectively.

Transformation pathways were proposed by the study authors that were consistent with the transformation products detected. In the primary pathway, hydrolytic cleavage at the sulfamoylurea linkage yields the two major transformation products DBS acid (maximums of 46.53-49.88%, 9.24-11.11% and 55.77-60.86% in water layer, sediment and total system, respectively) and DOP urea (maximums of 6.09-6.66%, 37.70-42.50% and 40.52-47.78% in water layer, sediment and total system, respectively). A minor pathway involves demethylation

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

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of a methoxy group on the pyrimidine ring to yield O-desmethyl IR5878 (maximums of 4.60-6.68%, 1.84-2.69% and 6.13-9.37% in water layer, sediment and total system, respectively). Minor levels of DBS amide (maximums of 2.81-3.25%, 0.87-1.28% and 4.07-4.09% in water layer, sediment and total system, respectively) were also detected. Ultimate production of CO₂ was not significant for either label (0.18-1.19% at study termination).

Results Synopsis:

Test system used: Water-loam sediment from Arkansas.

[Pyrimidinyl-5-¹⁴C]-label:

Linear half-life (0- to 90-day data) in water:	29.1 days ($r^2 = 0.9652$).
Linear half-life (44- to 90-day data) in sediment:	39.6 days ($r^2 = 0.9171$).
Accounting non-extracted residues as parent:	Stable.
Linear half-life (0- to 90-day data) in total system:	40.6 days ($r^2 = 0.9827$).
Accounting non-extracted residues as parent:	70.5 days ($r^2 = 0.9167$).

Major transformation products: N-(4,6-dimethoxypyrimidin-2-yl)urea (DOP urea; maximums of 6.09%, 42.50% and 47.78% of the applied in water layer, sediment and total system, respectively).

Minor transformation products: 1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl IR5878; maximums of 6.68%, 2.69% and 9.37% in water layer, sediment and total system, respectively).

Unknowns (origin, plus two zones) via TLC (each $\leq 3.33\%$ in total system).

CO₂ (maximum 1.19% of applied).

[Phenyl-U-¹⁴C]-label:

Linear half-life (0- to 90-day data) in water:	27.6 days ($r^2 = 0.9822$).
Linear half-life (30- to 90-day data) in sediment:	41.5 days ($r^2 = 0.9912$).
Accounting non-extracted residues as parent:	Stable.
Linear half-life (0- to 90-day data) in total system:	36.3 days ($r^2 = 0.9934$).
Accounting non-extracted residues as parent:	59.2 days ($r^2 = 0.9721$).

Major transformation products: 2-Sulfamino-N,N-dimethylbenzamide (DBS acid; maximums of 46.53%, 9.24% and 55.77% in water layer, sediment and total system, respectively).

Minor transformation products: 1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

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IR5878; maximums of 5.97%, 2.06% and 8.03% in water layer, sediment and total system, respectively).

2-Sulfamoylamino-N,N-dimethylbenzamide (DBS amide maximums of 3.25%, 0.87% and 4.07% in water layer, sediment and total system, respectively).

Unknowns (origin, plus three zones) via TLC (each $\leq 3.73\%$ in total system).

CO₂ (maximum 0.50% of applied).

Test system used: Water-clay sediment from California.

[Pyrimidinyl-5-¹⁴C]-label:

Linear half-life (0- to 61-day data) in water: 13.1 days ($r^2 = 0.9669$).

Linear half-life (22- to 61-day data) in sediment: 38.4 days ($r^2 = 0.9588$).

Accounting unextracted residues as parent: Stable.

Linear half-life (0- to 61-day data) in total system: 24.1 days ($r^2 = 0.9773$).

Accounting unextracted residues as parent: 65.4 days ($r^2 = 0.6873$).

Major transformation products: N-(4,6-dimethoxypyrimidin-2-yl)urea (DOP urea; maximums of 6.66%, 37.70% and 40.52% of the applied in water layer, sediment and total system, respectively).

Minor transformation products: 1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl IR5878; maximums of 4.98%, 2.32% and 7.30% in water layer, sediment and total system, respectively).

Unknowns (origin, plus two zones) via TLC (each $\leq 5.58\%$ in total system).

CO₂ (maximum 1.16% of applied).

[Phenyl-U-¹⁴C]-label:

Linear half-life (0- to 61-day data) in water: 12.1 days ($r^2 = 0.9852$).

Linear half-life (15- to 61-day data) in sediment: 35.4 days ($r^2 = 0.9530$).

Accounting unextracted residues as parent: 101.9 days ($r^2 = 0.9598$).

Linear half-life (0- to 61-day data) in total system: 21.3 days ($r^2 = 0.9896$).

Accounting unextracted residues as parent: 30.3 days ($r^2 = 0.9592$).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

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Major transformation products: 2-Sulfamino-N,N-dimethylbenzamide (DBS acid; maximums of 49.88%, 11.11% and 60.86% in water layer, sediment and total system, respectively).

Minor transformation products: 1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl IR5878; maximums of 4.60%, 1.84% and 6.13% in water layer, sediment and total system, respectively).

2-Sulfamoylamino-N,N-dimethylbenzamide (DBS amide maximums of 2.81%, 1.28% and 4.09% in water layer, sediment and total system, respectively).

Unknowns (origin, plus two zones) via TLC (each $\leq 4.03\%$ in total system).

CO₂ (maximum 0.18% of applied).

Study Acceptability: This study is classified as **supplemental**. Multiple solvent systems were not employed in a reasonable extraction attempt, leaving 11-33% of the applied unextracted. Subdivision N guidelines require that a reasonable attempt be made to identify the parent and all major degradates, including rates of their formation and decline.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: This study was conducted in accordance with USEPA Subdivision N Guideline §162-4 (1982) and OECD Guideline 307: "Aerobic and Anaerobic Transformation in Soil" (2000; p. 15; Appendix 1, p. 182). One significant deviation from USEPA Subdivision N Guideline §162-4 was noted:

A reasonable attempt was not made to identify the parent and all degradates, as multiple solvent systems were not employed in the extraction attempt and 11-33% of the applied remained unextracted.

COMPLIANCE: This study was conducted in compliance with OECD principles of GLP as defined by the Republic of Italy Decreto Legislativo No. 120 (1992, p. 3). Signed and dated Data Confidentiality, GLP, Compliance and Quality Assurance statements were provided (pp. 2-5; Appendix 11, pp. 295-298).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

A. MATERIALS:

1. Test Material: [Pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]orthosulfamuron (IR5878; pp. 14, 17).

Chemical Structure: See DER Attachment 1.

Description: Technical grade, solid (pp. 14, 17).

Purity:
 [Pyrimidinyl-5-¹⁴C]-label Radiochemical purity: >98% (p. 17; Appendix 2, pp. 193-194).
 Lot No.: 180 (p. 17).
 Analytical purity: Not reported.
 Specific activity: 249,121 dpm/μg (112.217 μCi/mg, 4.152 MBq/mg; p. 17).
 Location of radiolabel: 5-C of pyrimidine ring (p. 17).

[Phenyl-U-¹⁴C]-label Radiochemical purity: >99% (p. 17; Appendix 2, pp. 195-196).
 Lot No.: 183 (p. 17).
 Analytical purity: Not reported.
 Specific activity: 342,008 dpm/μg (154.058 μCi/mg, 5.7 MBq/mg; p. 17).
 Location of radiolabel: Uniformly in phenyl ring (p. 17).

Storage conditions of test chemicals: Test substances were stored at 4°C prior to use (p. 18).

Table 1: Physico-chemical properties of orthosulfamuron.

Parameter	Values	Comments
Molecular weight:	424.44 (p. 14).	
Molecular formula:	C ₁₆ H ₂₀ N ₆ O ₆ S	
Water solubility:	Not reported.	
Vapor pressure:	Not reported.	
UV absorption:	Not reported.	
pK _a :	Not reported.	
K _{ow} /log K _{ow} :	Not reported.	
Stability of compound at room temperature:	Not reported.	

Data obtained from p. 14 of the study report.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

2. Water-sediment collection, storage and properties:

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

Description		Arkansas system	California system
Geographic location:		Shoffner farm, Arkansas; N 35° 28' W 91° 13'.	Maria Renner, Offenbach farm, California; N 39° 33' W 121° 43'.
Pesticide use history at the collection site:		Roundup Ultra Max, Karate Z, Pix Plus.	None.
Collection date:		March 2002 (Appendix 4, pp. 200-202).	April 2002 (Appendix 4, pp. 203-205).
Collection procedures:	Water:	Sediment and associated water were collected from each site; additional details were not provided (p. 18).	
	Sediment:		
Sampling depth:	Water:	Not reported.	
	Sediment:	Upper 20-cm layer (p. 18).	
Storage conditions:	Water:	Stored at 4°C prior to use (p. 18).	
	Sediment:		
Storage length:		Not reported; however, <90 days based on experimental start date on May 29, 2002 (p. 15).	
Preparation:	Water:	Paper filtered (Superfiltro, perfecte2 extra rapida; pp. 18-19).	
	Soil:	2-mm sieved (p. 18).	

Data obtained from pp. 15, 18-19; Appendix 4, pp. 199-205 of the study report.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Table 3: Properties of the waters.

Property	Arkansas system		California system	
	Initial ¹ :	Final:	Initial:	Final:
Temperature (°C):	Not reported.			
pH:	Initial ¹ :	Final:	Initial:	Final:
	7.8	6.81	7.7	7.03
Redox potential (mV):	Initial ² :	Final:	Initial:	Final:
	ca. +110	ca. +115	ca. +112	ca. 115
Oxygen concentration (mg/L):	Initial ² :	Final:	Initial:	Final:
	ca. 6.5	ca. 6.7	ca. 6.1	ca. 6.3
Dissolved organic carbon (mg/L):	Not reported.			
Hardness (mg equivalent CaCO ₃ /L):	Initial ¹ :	Final:	Initial:	Final:
	224	100	39	64
Electrical conductivity (mmhos/cm):	0.52		Not reported.	
Biomass (mg microbial C/100 g, CFU or other):	Not reported.			

Data obtained from p. 18; Tables 1-2, pp. 49-50; Appendix 5, pp. 213-215 of the study report.

¹ Measured prior to study initiation and at end of study; however, specific intervals/dates were not reported (p. 18).

² Initial and final values measured in water layer of the treated system at 0 and at 61 (CA) or 90 (AR) days posttreatment, respectively (Appendix 5, pp. 213-215).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Table 4: Properties of the sediments.

Property		Arkansas system		California system	
Textural classification:		Loam		Clay	
%sand (2000-50 µm):		51		18	
%silt (50-2 µm):		38		22	
%clay (<2 µm):		11		60	
pH:		Initial ¹ :	Final:	Initial:	Final:
	In water:	6.9	7.25	6.0	6.97
	In 0.01M CaCl ₂ :	6.2	6.64	5.6	6.57
Organic carbon (%):		Initial ¹ :	Final:	Initial:	Final:
		0.87 ²	0.71	1.8	1.59
CEC (meq/100 g):		7.5		47.5	
Redox potential (mV):		Initial ³ :	Final:	Initial:	Final:
		ca. +64	ca. +62	ca. -22	ca. -20
Moisture (%):	At 1/3 bar:	21.1		44.7	
	At MWHC ⁴ :	30.5		57.4	
Dry mass (%):		91.20		86.95	
Bulk density (disturbed, g/cm ³):		1.24		1.10	
Biomass (µg microbial C/ g sediment) ⁵ :		Initial:	Final:	Initial:	Final:
		2,420	Not reported.	2,470	Not reported.

Data obtained from pp. 18-19, 40; Tables 1-2, pp. 49-50; Appendix 4, p. 200; Appendix 5, pp. 213-214 of the study report.

¹ Measured prior to study initiation and at end of study; however, specific intervals/dates were not reported (p. 18).

² Organic carbon calculated as = (organic matter %) ÷ 1.724 (Appendix 4, p. 200).

³ Initial and final values measured in sediment layer of the treated system at 0 and at 61 (CA) or 90 (AR) days posttreatment, respectively (Appendix 5, pp. 213-214).

⁴ Maximum water holding capacity.

⁵ Microbial biomass determined via extraction method according to Vance *et al* (pp. 18-19, 40).

B. EXPERIMENTAL CONDITIONS:

1. Preliminary experiments: None reported.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

2. Experimental conditions:

Table 5: Study design.

Parameter		Arkansas system	California system
Duration of the test :		90 days	61 days
Water: Filtered/unfiltered water: Type and size of filter used, if any:		Filtered (p. 18). Superfiltro, perfecte2 extra rapida paper filter (p. 19).	
Amount of sediment and water per treatment:	Water:	6 cm; volume <i>ca.</i> 110 mL (pp. 21, 23)	
	Sediment:	2.5 cm; 49.29 g dry wt. (p. 21).	2.5 cm; 43.73 g dry wt.
Water/sediment ratio:		2.4:1 (6 cm:2.5 cm); <i>ca.</i> 2.2-2.5:1 (mL: g dry wt.).	
Application rate (mg a.i./L):		<i>ca.</i> 0.11 mg a.i./L (11.85-11.99 µg a.i./ <i>ca.</i> 110 mL water, pp. 23, 30; Appendix 7, p. 225); 74.53-75.41 g a.i./ha based on 15.90 cm ² surface area of water (pp. 21-22, 30).	
Control conditions, if used:		No sterile controls were used.	
No. of Replications:	Controls, if used:	No sterile controls were used.	
	Treatments:	For each label, eighteen nonsterile systems were treated with [¹⁴ C]orthosulfamuron (p. 21).	For each label, twenty-three nonsterile systems were treated with [¹⁴ C]orothosulfamuron.
Test apparatus (Type/material/volume):		Water and sediment were combined in sealed glass cylinders (4.5-cm i.d., volume/height not reported) and maintained on an orbital shaker with slight agitation at 20 ± 2°C in darkness for 22 days prior to treatment (p. 21; Appendix 1, p. 185). Humidified, CO ₂ -free air was continuously flushed (flow rate not reported) through the cylinder headspace.	
Details of traps for CO ₂ and organic volatiles, if any:		Air was flushed continuously through the cylinder containing the treated water-sediment, then sequentially through a single bottle containing 2N KOH solution (100 mL; p. 21; Appendix 10, p. 293).	
If no traps were used, is the system closed/open?		Volatiles traps were used with a continuous air-flow atmosphere.	
Identity and concentration of co-solvent:		1% aqueous acetonitrile; final acetonitrile concentration <0.01% based on water layer (0.84-0.88 mL test solution in <i>ca.</i> 110 mL water, pp. 22-23).	
Test material application:	Volume of test solution used/treatment:	0.84-0.88 mL of <i>ca.</i> 14 µg/mL test solution (pp. 22-23).	
	Application method:	Test solution was applied drop-wise to surface of the water layer (p. 23; Appendix 1, p. 186).	
Any indication of the test material adsorbing to the walls of the test apparatus?		Not indicated.	

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Parameter		Arkansas system		California system	
Biomass (mg microbial C/100 g, CFU or other) of controls:		Initial:	Final:	Initial:	Final:
		No sterile controls were used.			
Biomass of treated (mg microbial C/100 g sediment, CFU or other):		Initial:	Final:	Initial:	Final:
		2,420	1,880	2,470	2,250
Experimental conditions:	Temperature (°C):	20 ± 2°C (p. 21; Appendix 1, p. 187); means of temperature maintenance was not reported.			
	Continuous darkness (Yes/No):	Yes (p. 21).			
Other details, if any:		Fifteen additional nonsterile untreated water-sediment systems of each type were prepared and incubated to be used for measurement of physicochemical parameters (two systems), a blank control (one system) and biomass determinations (twelve systems, p. 21). Vessels containing water-sediment systems for biomass determinations were stoppered with a cotton wool plug and not attached to the continuous air-flow system (Appendix 1, p. 186).			

Data obtained from pp. 18-19, 21-23; Appendix 1, pp. 185-187; Appendix 7, p. 225; Appendix 10, p. 293 of the study report.

3. Aerobic conditions: Water-sediment systems were incubated under a continuous-flow (flow rate not reported) air atmosphere for 22 days prior to application and following treatment (p. 21). In Arkansas water-loam sediment systems at day 0 posttreatment, redox potentials and dissolved oxygen levels in the water layers were *ca.* +110 mV and *ca.* 6.5 mg/L, respectively, in the water layers, with redox potentials of *ca.* +64 mV in the sediment (Appendix 5, pp. 213, 215). In California water-clay sediment systems at day 0, redox potentials and dissolved oxygen levels in the water layers were *ca.* +112 mV and *ca.* 6.1 mg/L, respectively, in the water layers, with redox potentials of *ca.* -22 mV in the sediment (Appendix 5, pp. 214-215).

4. Supplementary experiment: High dose (60x) rate experiment - "additional samples". To facilitate identification of possible nonvolatile degradates of orthosulfamuron, ten additional California water-clay sediment systems were prepared as described above, but treated with [¹⁴C]orthosulfamuron (five systems per label) at *ca.* sixty times the nominal application rate (p. 23); additional details concerning application were not reported. The high dose systems were collected at 31 days posttreatment and processed as described below (p. 29).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

5. Sampling:

Table 6: Sampling details.

Criteria	Arkansas system	California system
Sampling intervals:	0, 7, 15, 30, 44, 61 and 90.	0, 7, 15, 22, 30, 44 and 61.
Sampling method:	Duplicate systems for each label and type were collected at each interval (p. 23).	
Method of collection of CO ₂ and volatile organic compounds:	The KOH solutions were collected and/or replaced at each sampling interval starting at 7 days posttreatment (p. 25).	
Sampling intervals/times for: Sterility check, if sterile controls are used: Redox potential and pH in water layer and sediment, plus dissolved oxygen in water layer:	No sterile controls were used. Measured at each sampling interval (p. 21; Appendix 5, pp. 211-215).	
Sample storage before analysis:	Water layers and sediment were separated the day of collection (p. 23). Storage of sediment prior to extraction was not specified. Water layers, sediment extracts and concentrated samples were stored at 4-6°C until analysis (pp. 23-24, 26). TLC analyses were reportedly performed within one week of sample collection (p. 27); however, actual sampling, extraction and analysis dates were not provided.	
Other observations, if any:	None.	

Data obtained from pp. 21, 23-26; Appendix 5, pp. 211-215 of the study report.

C. ANALYTICAL METHODS:

Separation of the sediment and water: The water layer was removed from the sediment via pipette (p. 23).

Extraction/clean up/concentration methods: The water layer was basified (volume not specified) with saturated sodium bicarbonate (NaHCO₃) solution, brought to volume (100 mL) with acetonitrile, then aliquots (0.5 mL x 2) were analyzed for total radioactivity via LSC (pp. 23, 25). An aliquot (25 mL) of the processed water layer was concentrated via rotary evaporation (temperature not specified) to 1 mL prior to TLC analysis (pp. 20, 26).

The sediment was extracted once with acetonitrile:33mM NaHCO₃ at 7:3 (v:v, extract A) followed by once with the same solvent at 1:1 (v:v, extract B); extraction solvent volumes were 250 mL (p. 24; Scheme 1, p. 45). Each extraction was done via shaking (300 strokes/minute) for 1 hour, then sediment and extract were separated by centrifugation (15,200 RCF, 20 minutes). The supernatant was brought to volume (250 mL) with acetonitrile, then aliquots (1 mL x 2) of each extract were analyzed via LSC (pp. 24-25).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Extracted 44- to 90-day Arkansas loam sediment (both labels) and 15- to 61-day California clay sediment ([Pyr-¹⁴C]-label only) samples were further extracted with acetonitrile:33mM NaHCO₃ (1:1, v:v, extract C) via sonication for 50 minutes at 40°C followed by shaking (300 strokes/minute) for 1 hour. After which, extract was separated from the sediment, adjusted with acetonitrile and analyzed via LSC as described above.

For TLC analysis, an aliquot (50 mL) of each of the three extracts (A, B and, if present, C) were combined and concentrated via rotary evaporation to 1 mL (pp. 20, 26).

Nonextractable residue determination: Extracted sediment was air-dried, then aliquots (0.6-1.7 g x 3) were analyzed for total radioactivity by LSC following combustion (p. 24).

To separate nonextractable [¹⁴C]residues into humins, humic acids and fulvic acids, [Pyr-¹⁴C]-label treated extracted 90-day Arkansas loam sediment and 44- and 61-day California clay sediment were further processed as follows: the sediments were extracted once with 0.1N HCl followed by once with 0.5N NaOH; extraction solvent volumes were 100 mL (p. 24; Scheme 2, p. 46). Each extraction was done via shaking (300 strokes/minute) for 48 hours, then sediment and extract were separated by centrifugation as described above. The extracted sediment (humins, residue E) was air-dried, then [¹⁴C]residues were quantified (0.62-0.94 g x 3) by LSC following combustion (p. 25; Appendix 7, p. 254). Aliquots (1 mL x 2) of the HCl extract were analyzed for total radioactivity by LSC (extract D, p. 25). The NaOH extract (extract F) was acidified to pH 1 with 6N HCl, with the resulting precipitate removed by centrifugation as described above. [¹⁴C]Residues in the precipitate (precipitate G) were redissolved in 0.5M NaOH (100 mL), again acidified to pH 1 with 6N HCl, and the resulting precipitate removed by centrifugation. [¹⁴C]Residues in the second precipitate (humic acids, precipitate I) were redissolved in 0.5M NaOH (25 mL) and aliquots (0.25 mL x 2) were analyzed by LSC (p. 25). The two supernatants (fulvic acids, supernatants H and L) were combined, brought to volume (200 mL) and aliquots (1 mL x 2) were analyzed by LSC (p. 25).

Volatile residue determination: Aliquots (1 mL x 2) of the trapping solutions were analyzed for total radioactivity using LSC (p. 25).

Total ¹⁴C measurement: Total ¹⁴C residues were determined by summing the concentrations of residues measured in the water layers, sediment extracts, extracted sediment and volatile trapping solutions (p. 25).

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

Identification and quantification of parent compound: Concentrated water and pooled sediment extract samples were analyzed using one-dimensional TLC on normal-phase plates (Merck silica gel 60 F-254) developed with chloroform:methanol:32% ammonium hydroxide (75:22:3, v:v, s.s.2) and on reverse-phase plates (Merck RP-18, F-254S) developed with

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

acetonitrile:water (92:8, v:v, s.s.1; pp. 19, 26). Following development, areas of radioactivity were detected and quantified using a Fuji BAS 1500 Bio-Imaging Analyzer, with two-dimensional images generated using a Fuji BAS 1500 Autoradiographic Imaging System (pp. 26-27). [¹⁴C]Orthosulfamuron was identified by co-chromatography with (Figures 73-74, pp. 141-142; Figures 88-89, pp. 156-157) and/or comparison to the retention factor (R_f) of labeled reference standard (Figures 11-66, pp. 79-134; Figures 78-83, pp. 146-151; Appendix 8, p. 255). The normal-phase TLC method (s.s.2) was used for quantitation as it provided better separation of the compounds; compare Figure 14 (p. 82), Figure 20 (p. 88), Figure 28 (p. 96), Figure 34 (p. 102), Figure 40 (p. 108), Figure 46 (p. 114), Figure 54 (p. 122), and Figure 60 (p. 128) with Figures 63-66 (pp. 131-134).

In addition, selected Arkansas and California water and sediment extract samples were co-chromatographed (Figures 67-72, pp. 135-140).

High dose (60x) rate experiment - "additional samples". Water layers were removed via pipette, and then the water layers and sediments were processed and analyzed via TLC as described above (Figures 91-94, pp. 159-162).

Water layers were pooled according to respective label and concentrated to either *ca.* 12 mL ([Pyr-¹⁴C]-label) or 7.5 mL ([Phe-¹⁴C]-label, p. 29). The concentrated sample was partitioned three times (4 mL x 3) with ethyl acetate. Organic phases were combined, concentrated to dryness, and the resulting residues was reconstituted in 1 mL acetonitrile:water (1:1, v:v). Aliquots of the pooled, concentrated organic phase and remaining aqueous phase were chromatographed to isolate [¹⁴C]compounds (Figures 95-96, pp. 163-164). Isolated parent [¹⁴C]orthosulfamuron (compound S3) was analyzed via LC/MS under the following conditions: Supelcosil LC-18 column (4.6 x 250 mm, 5 μ m), gradient mobile phase combining (A) 1mM ammonium acetate, pH 4.5 and (B) acetonitrile [percent A:B at 0 min. 80:20 (v:v) to 10:90 at 20 min.], flow rate 0.8 mL/minute, Photodiode Array UV detector, Ramona 2000 Radiodetector, Thermoquest/Finnigan LCQ MS, electrospray ionization (ESI), ionization mode positive (pp. 28-29). Identification was based on molecular fragmentation analysis; comparison MS analysis of a reference standard was not provided (p. 36; Figures 101-102, pp. 169-170).

Identification and quantification of transformation products: Transformation products were separated, quantified and identified by TLC as described above for the parent (pp. 26-29; Figures 11-72, pp. 79-140; Figures 75-96, pp. 143-164; Appendix 8, p. 255). LC/MS-ESI analyses were performed as described above for compounds S2 and S12 (pp. 28-29; Figure 100, p. 168; Figures 105-106, pp. 173-174), but with the following exceptions for compounds S1 and S9: For compound S1, Synergi 4 μ Polar-RP 80A column (4.6 x 250 mm, 4 μ m), isocratic mobile phase of 5mM ammonium acetate, pH 4.5:acetonitrile (88:12, v:v), flow rate 0.6 mL/minute, ESI positive and negative (pp. 28-29; Figures 97-99, pp. 165-167).

For compound S9, isocratic mobile phase of 1mM ammonium acetate, pH 4.5:acetotnitrile (85:15, v:v; pp. 28-29; Figures 103-104, pp. 171-172).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Table 7: Reference compounds available for identifying transformation products of orthosulfamuron (IR5878).

Applicant's code, name	Chemical Name (IUPAC)	Purity	Lot No.
DOP urea	[pyrimidinyl-5- ¹⁴ C]N-(4,6-dimethoxypyrimidin-2-yl)urea	>99%	205
DBS acid	[phenyl-U- ¹⁴ C]2-sulfoamino-N,N-dimethylbenzamide	>98%	187
DBS amide	[phenyl-U- ¹⁴ C]2-sulfamoylamino-N,N-dimethylbenzamide	>99%	186

Data obtained from Appendix 9, pp. 289-291 of the study report.

Detection limits (LOD, LOQ) for the parent compound and transformation products:

Limits of detection (LODs) for LSC analyses of sediment extracts, nonextractable sediment residues and KOH solutions were reported as 0.25-0.37%, 0.09-0.22% and 0.17-0.23% of the applied, respectively (Appendix 7, pp. 227-228, 230-232, 234-235, 237-238, 240-247, 248-251). LODs for TLC analyses of water and sediment extract samples were reported as 0.16-0.22% and 0.20-0.27% of the applied, respectively (Appendix 8, pp. 257, 260, 265, 268, 273, 276, 281, 284). Limits of quantitation were not reported.

II. RESULTS AND DISCUSSION:

A. TEST CONDITIONS: During the 61- to 90-day incubations following treatment, conditions were moderately reducing (-50 to +200 mV) in the water layers and sediments of both systems. In the Arkansas water-loam sediment systems, redox potentials, dissolved oxygen and pH were *ca.* +110 to +115 mV, 6.5-6.7 mg/L and 7.4-7.8, respectively, in the water layers, while redox potentials and pH were *ca.* +62 to +65 mV and 6.8-7.1, respectively, in the sediment (Appendix 5, pp. 211, 213, 215).

In the California water-clay sediment systems, redox potentials, dissolved oxygen and pH were *ca.* +110 to +116 mV, 5.9-6.2 mg/L and 7.1-7.3, respectively, in the water layers, while redox potentials and pH were *ca.* -22 to -16 mV and 6.2-6.4, respectively, in the sediment (Appendix 5, pp. 212, 214-215).

The temperature was reportedly maintained at 20 ± 2°C throughout the incubations; however, temperature records were not provided (pp. 11, 21).

B. MATERIAL BALANCE: For Arkansas water-loam sediment systems, overall recovery of radiolabeled material (both labels) averaged 103.52 ± 2.16% (range 97.79-106.21%, n = 28) of the applied, with no consistent declines in recoveries for either label throughout the incubations. Recoveries of radiolabeled material averaged 103.31 ± 2.03% (range 98.24-105.89%, n = 14) for the [pyrimidinyl-5-¹⁴C]-label and 103.73 ± 2.26% (range 97.79-106.21%, n = 14) for the [phenyl-U-¹⁴C]-label. Following application of [¹⁴C]orthosulfamuron to the water layer, [pyrimidinyl-5-¹⁴C]residues partitioned from the water layer to the sediment with mean (n = 2)

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

distribution ratios (water:sediment) of 2:1 at 7 days, 1:1 at 15-30 days, 1:2 at 44-61 days and were 1:3 at 90 days, while distribution ratios for the [phenyl-U-¹⁴C]residues were 3:1 at 7-15 days and 2:1 at 30-90 days (DER Attachment 2).

For California water-clay sediment systems, overall recovery of radiolabeled material (both labels) averaged $102.59 \pm 2.46\%$ (range 97.91-107.42%, n = 28) of the applied, with no consistent declines in recoveries for either label throughout the incubations. Recoveries of radiolabeled material averaged $103.57 \pm 1.89\%$ (range 101.03-107.42%, n = 14) for the [pyrimidinyl-5-¹⁴C]-label and $101.61 \pm 2.57\%$ (range 97.91-105.43%, n = 14) for the [phenyl-U-¹⁴C]-label. Following application of [¹⁴C]orthosulfamuron to the water layer, mean (n = 2) distribution ratios (water:sediment) for the [pyrimidinyl-5-¹⁴C]residues were 1:1 at 7 days, 1:2 at 15 days, 1:4 at 30 days and 1:7 at 61 days, while distribution ratios for the [phenyl-U-¹⁴C]residues were primarily 2:1 for the entire 61-day incubation (DER Attachment 2).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Table 8: Biotransformation of [pyrimidinyl-5-¹⁴C]orthosulfamuron (IR5878), expressed as percentage of applied radioactivity (mean ± s.d., n = 2), in Arkansas water-loam sediment under aerobic conditions.

Compound	Sampling times (days)							
	0	7	15	30	44	61	90	
Orthosulfamuron (S3)	water	103.69 ± 0.07	65.69 ± 0.32	47.09 ± 0.70	35.04 ± 0.20	27.33 ± 0.07	18.25 ± 0.96	10.34 ± 0.54
	sediment	nd ²	21.02 ± 0.10	21.44 ± 0.38	22.19 ± 0.30	24.79 ± 0.69	14.75 ± 0.21	10.70 ± 0.26
	system	103.69 ± 0.07	86.71 ± 0.41	68.52 ± 1.08	57.23 ± 0.10	52.11 ± 0.62	32.99 ± 0.75	21.04 ± 0.27
O-desmethyl IR5878 (S9)	water	1.02 ± 0.27	1.01 ± 0.03	1.45 ± 0.01	2.74 ± 0.01	3.10 ± 0.06	5.28 ± 0.07	6.67 ± 0.01
	sediment	nd	0.79 ± 0.09	1.02 ± 0.06	1.78 ± 0.02	2.15 ± 0.02	2.17 ± 0.07	2.48 ± 0.22
	system	1.02 ± 0.27	1.79 ± 0.06	2.46 ± 0.08	4.52 ± 0.00	5.25 ± 0.08	7.45 ± 0.00	9.15 ± 0.22
DOP urea (S12)	water	0.44 ± 0.04	4.89 ± 0.20	5.96 ± 0.13	5.02 ± 0.09	4.17 ± 0.32	5.43 ± 0.21	4.69 ± 0.59
	sediment	nd	7.94 ± 0.13	13.99 ± 0.04	29.62 ± 0.27	31.76 ± 0.13	38.62 ± 0.21	42.09 ± 0.41
	system	0.44 ± 0.04	12.82 ± 0.07	19.94 ± 0.10	34.64 ± 0.18	35.93 ± 0.45	44.05 ± 0.00	46.78 ± 1.01
Unidentified HPLC [¹⁴ C]residues ¹	water	nd ²	0.51 ± 0.07	1.12 ± 0.04	0.57 ± 0.00	0.87 ± 0.10	1.84 ± 0.27	1.68 ± 0.30
	sediment	nd	nd	0.93 ± 0.06	1.33 ± 0.27	2.14 ± 0.40	4.08 ± 0.58	2.53 ± 0.21
	system	nd	0.51 ± 0.07	2.04 ± 0.03	1.90 ± 0.27	3.01 ± 0.50	5.92 ± 0.30	4.21 ± 0.08
Extractable sediment residues	0.31 ¹ ± 0.13	29.86 ± 0.19	37.50 ± 0.28	54.91 ± 0.29	60.82 ± 0.15	59.61 ± 0.07	57.78 ± 0.15	
Total CO ₂	nd	<dl ²	<dl	<dl	0.40 ± 0.02	0.67 ± 0.05	0.95 ± 0.25	
Total volatile organics	nd	nd	nd	nd	nd	nd	nd	
Nonextractable sediment residues	<dl	2.62 ± 0.10	5.80 ± 0.25	5.46 ± 0.19	6.58 ± 0.07	12.57 ± 1.15	21.65 ± 2.09	
Total % recovery	water	105.16 ± 0.30	72.09 ± 0.16	55.60 ± 0.61	43.37 ± 0.10	35.45 ± 0.55	30.79 ± 0.99	23.37 ± 0.82
	sediment	0.31 ¹ ± 0.13	32.48 ± 0.08	43.30 ± 0.03	60.37 ± 0.10	67.40 ± 0.07	72.18 ± 1.07	79.43 ± 1.94
	system	105.38 ± 0.51	104.57 ± 0.25	98.90 ± 0.65	103.74 ± 0.00	103.25 ± 0.49	103.64 ± 0.13	103.75 ± 1.36

Data obtained from Table 3/A, p. 51; Table 7/A, p. 55; Table 8/A, p. 56; Table 9/A, p. 57 of the study report.

¹ Unidentified TLC [¹⁴C]residues consisting of three regions [R_f = 0.00 (S11), R_f = 0.08 (S15), R_f = 0.79 (S13)], with no single region detected at >3.33% of applied in the total system (DER Attachment 2).

² nd = not determined; nd = not detected; <dl = less than LOD.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....} EPA MRID Number 46219017

Table 9: Biotransformation of [phenyl-U-¹⁴C]orthosulfamuron (IR5878), expressed as percentage of applied radioactivity (mean ± s.d., n = 2), in Arkansas water-loam sediment under aerobic conditions.

Compound	Sampling times (days)									
	0	7	15	30	44	61	90			
Orthosulfamuron (S3)	water	102.37 ± 0.96	68.06 ± 0.06	49.99 ± 0.53	36.20 ± 0.06	28.38 ± 0.36	18.35 ± 0.06	9.14 ± 0.07		
	sediment	nd ²	20.12 ± 0.18	19.51 ± 1.10	22.76 ± 0.74	17.63 ± 0.32	13.64 ± 0.27	8.30 ± 0.44		
	system	102.37 ± 0.96	88.17 ± 0.12	69.50 ± 0.57	58.96 ± 0.68	46.01 ± 0.68	31.99 ± 0.20	17.43 ± 0.51		
O-desmethyl IR5878 (S9)	water	nd ²	0.44 ± 0.02	0.86 ± 0.03	2.23 ± 0.13	3.10 ± 0.10	4.70 ± 0.13	5.53 ± 0.44		
	sediment	nd	0.43 ± 0.05	0.74 ± 0.13	1.66 ± 0.03	1.92 ± 0.04	2.01 ± 0.04	1.92 ± 0.14		
	system	nd	0.87 ± 0.07	1.60 ± 0.10	3.89 ± 0.17	5.01 ± 0.05	6.70 ± 0.17	7.45 ± 0.58		
DBS acid (S1)	water	0.39 ± 0.08	9.99 ± 0.17	17.30 ± 0.23	26.41 ± 1.58	32.89 ± 0.80	40.34 ± 0.37	45.67 ± 0.86		
	sediment	nd	1.60 ± 0.07	2.61 ± 0.08	5.77 ± 0.07	6.13 ± 0.24	6.89 ± 0.27	8.80 ± 0.44		
	system	0.39 ± 0.08	11.59 ± 0.10	19.91 ± 0.15	32.18 ± 1.66	39.02 ± 0.56	47.23 ± 0.11	54.47 ± 1.30		
DBS amide (S2)	water	1.03 ± 0.02	1.43 ± 0.02	2.11 ± 0.08	2.47 ± 0.06	2.26 ± 0.06	3.18 ± 0.07	2.87 ± 0.07		
	sediment	nd	0.27 ± 0.02	0.47 ± 0.02	0.76 ± 0.02	0.64 ± 0.05	0.82 ± 0.00	0.85 ± 0.02		
	system	1.03 ± 0.02	1.70 ± 0.04	2.57 ± 0.09	3.22 ± 0.08	2.90 ± 0.01	4.00 ± 0.07	3.72 ± 0.05		
Unidentified HPLC [¹⁴ C]residues ¹	water	nd	1.20 ± 0.00	1.03 ± 0.09	1.01 ± 0.15	0.98 ± 0.01	2.11 ± 0.14	2.85 ± 0.20		
	sediment	nd	≤ 0.53	0.33 ± 0.01	0.71 ± 0.03	0.85 ± 0.27	1.16 ± 0.09	1.64 ± 0.17		
	system	nd	1.47 ± 0.27	1.36 ± 0.10	1.72 ± 0.19	1.83 ± 0.28	3.26 ± 0.06	4.49 ± 0.37		
Extractable sediment residues	0.36 ± 0.07	22.68 ± 0.12	23.82 ± 1.16	31.65 ± 0.76	27.16 ± 0.39	24.50 ± 0.58	21.51 ± 0.58			
Total CO ₂	nd	<dl ²	<dl	<dl	<dl	0.25 ± 0.00	0.48 ± 0.02			
Total volatile organics	nd	nd	nd	nd	nd	nd	nd			
Nonextractable sediment residues	<dl	1.20 ± 0.00	3.59 ± 0.13	3.67 ± 0.20	8.89 ± 0.34	12.04 ± 0.19	17.48 ± 0.09			
Total % recovery	water	103.77 ± 0.90	81.12 ± 0.11	71.27 ± 0.15	68.31 ± 1.31	67.61 ± 0.61	66.05 ± 0.22			
	sediment	0.36 ± 0.07	23.89 ± 0.13	27.41 ± 1.04	35.32 ± 0.96	36.05 ± 0.73	38.99 ± 0.49			
	system	104.13 ± 0.97	105.00 ± 0.02	98.68 ± 0.89	103.63 ± 0.35	103.66 ± 0.12	105.45 ± 0.00			

Data obtained from Table 5, p. 53, Table 13/A, p. 61; Table 14/A, p. 62; Table 15/A, p. 63 of the study report.

¹ Unidentified TLC [¹⁴C]residues consisting of four regions [R_f = 0.00 (S5), R_f = 0.06 (S8), R_f = 0.17 (S6), R_f = 0.79 (S4)], with no single region detected at >3.73% of applied in the total system (DER Attachment 2).

² nd = not determined; nd = not detected; <dl = less than LOD.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....} EPA MRID Number 46219017

Table 10: Biotransformation of [pyrimidinyl-5-¹⁴C]orthosulfamuron (IR5878), expressed as percentage of applied radioactivity (mean ± s.d., n = 2), in California water-clay sediment under aerobic conditions.

Compound	Sampling times (days)							
	0	7	15	22	30	44	61	
Orthosulfamuron (S3)	water	103.17 ± 0.35	51.12 ± 0.37	25.85 ± 0.33	18.79 ± 0.64	12.95 ± 0.15	7.62 ± 0.23	3.33 ± 0.04
	sediment	nd ²	20.82 ± 2.41	25.44 ± 1.10	26.33 ± 0.46	21.96 ± 0.43	19.42 ± 0.44	12.57 ± 0.06
	system ³	103.17 ± 0.35	71.94 ± 2.78	51.29 ± 0.78	45.12 ± 0.18	34.91 ± 0.59	27.03 ± 0.20	15.89 ± 0.10
O-desmethyl IR5878 (S9)	water	0.91 ± 0.02	1.57 ± 0.12	3.03 ± 0.05	3.99 ± 0.08	4.75 ± 0.23	4.47 ± 0.19	4.75 ± 0.11
	sediment	nd	0.76 ± 0.11	1.72 ± 0.05	2.02 ± 0.02	2.20 ± 0.12	2.11 ± 0.13	1.18 ± 0.01
	system	0.91 ± 0.02	2.33 ± 0.23	4.75 ± 0.01	6.01 ± 0.07	6.95 ± 0.35	6.58 ± 0.32	5.93 ± 0.10
DOP urea (S12)	water	0.63 ± 0.16	6.62 ± 0.04	3.93 ± 0.04	3.22 ± 0.10	2.77 ± 0.06	2.35 ± 0.09	2.17 ± 0.06
	sediment	nd	16.54 ± 2.28	28.10 ± 0.27	29.65 ± 0.24	37.36 ± 0.34	29.16 ± 1.20	33.65 ± 0.02
	system	0.63 ± 0.16	23.16 ± 2.24	32.03 ± 0.23	32.87 ± 0.15	40.13 ± 0.40	31.51 ± 1.28	35.82 ± 0.05
Unidentified HPLC [¹⁴ C]residues ¹	water	nd ²	1.00 ± 0.04	1.29 ± 0.39	1.57 ± 0.19	1.83 ± 0.02	2.30 ± 0.15	3.11 ± 0.08
	sediment	nd	0.86 ± 0.22	2.19 ± 0.10	3.05 ± 0.04	4.39 ± 0.21	5.98 ± 0.47	6.33 ± 0.01
	system	nd	1.86 ± 0.18	3.48 ± 0.49	4.61 ± 0.23	6.22 ± 0.24	8.28 ± 0.62	9.44 ± 0.09
Extractable sediment residues	0.40 ¹ ± 0.22	38.97 ± 0.24	57.44 ± 1.32	61.04 ± 0.68	65.91 ± 0.44	56.66 ± 0.16	53.72 ± 0.09	
Total CO ₂	nd	<dl ²	<dl	<dl	<dl	0.50 ± 0.05	1.15 ± 0.01	
Total volatile organics	nd	nd	nd	nd	nd	nd	nd	
Nonextractable sediment residues	<dl	7.49 ± 0.17	12.55 ± 0.07	14.86 ± 1.23	13.39 ± 0.15	28.51 ± 0.01	33.46 ± 0.04	
Total % recovery	water	104.71 ± 0.17	60.31 ± 0.25	34.10 ± 0.81	27.56 ± 1.02	22.28 ± 0.04	16.74 ± 0.02	13.36 ± 0.04
	sediment ⁷	0.40 ¹ ± 0.22	46.46 ± 0.40	69.99 ± 1.24	75.91 ± 0.56	79.30 ± 0.58	85.17 ± 0.17	87.19 ± 0.04
	system	105.02 ± 0.49	106.77 ± 0.65	104.09 ± 0.43	103.46 ± 1.57	101.58 ± 0.55	102.41 ± 0.11	101.69 ± 0.01

Data obtained from Table 4/A, p. 52; Table 10/A, p. 58; Table 11/A, p. 59; Table 12/A, p. 60 of the study report.

¹ Unidentified TLC [¹⁴C]residues consisting of three regions [R_f = 0.00 (S11), R_f = 0.08 (S15), R_f = 0.79 (S13)], with no single region detected at >5.58% of applied in the total system (DER Attachment 2).

² nd = not determined; nd = not detected; <dl = less than LOD.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IRS878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Table 11: Biotransformation of [phenyl-U-¹⁴C]orthosulfamuron (IRS878), expressed as percentage of applied radioactivity (mean ± s.d., n = 2), in California water-clay sediment under aerobic conditions.

Compound	Sampling times (days)							
	0	7	15	22	30	44	61	
Orthosulfamuron (S3)	water	103.50 ± 0.07	49.15 ± 2.35	31.12 ± 1.20	19.69 ± 0.86	13.67 ± 0.13	7.39 ± 0.27	2.56 ± 0.14
	sediment	nd ²	19.82 ± 3.07	24.26 ± 0.27	23.46 ± 0.16	21.97 ± 0.27	15.75 ± 0.40	10.18 ± 0.01
	system ³	103.50 ± 0.07	68.97 ± 5.41	55.38 ± 0.94	43.14 ± 1.02	35.64 ± 0.14	23.14 ± 0.67	12.73 ± 0.15
O-desmethyl IRS878 (S9)	water	nd ²	0.74 ± 0.10	2.19 ± 0.00	3.19 ± 0.29	3.58 ± 0.44	4.41 ± 0.16	4.32 ± 0.28
	sediment	nd	0.60 ± 0.04	1.23 ± 0.02	1.31 ± 0.03	1.60 ± 0.24	1.53 ± 0.04	1.30 ± 0.01
	system	nd	1.34 ± 0.14	3.41 ± 0.02	4.49 ± 0.26	5.17 ± 0.69	5.94 ± 0.19	5.62 ± 0.29
DBS acid (S1)	water	0.46 ± 0.03	20.92 ± 2.22	25.80 ± 0.26	36.17 ± 0.33	39.95 ± 1.82	45.24 ± 0.72	49.70 ± 0.18
	sediment	nd	5.63 ± 1.83	5.32 ± 0.43	7.24 ± 0.08	10.01 ± 0.03	8.96 ± 0.24	11.05 ± 0.07
	system	0.46 ± 0.03	26.55 ± 4.04	31.12 ± 0.69	43.40 ± 0.25	49.95 ± 1.85	54.20 ± 0.49	60.75 ± 0.11
DBS amide (S2)	water	1.06 ± 0.02	1.76 ± 0.14	2.16 ± 0.03	2.47 ± 0.10	2.61 ± 0.14	2.05 ± 0.05	2.66 ± 0.15
	sediment	nd	0.64 ± 0.07	0.70 ± 0.01	1.08 ± 0.07	1.19 ± 0.09	0.95 ± 0.09	1.25 ± 0.03
	system	1.06 ± 0.02	2.40 ± 0.21	2.86 ± 0.02	3.55 ± 0.16	3.80 ± 0.05	3.00 ± 0.14	3.90 ± 0.19
Unidentified HPLC [¹⁴ C]residues ¹	water	nd	0.52 ± 0.05	0.94 ± 0.15	1.03 ± 0.01	1.67 ± 0.27	1.64 ± 0.07	3.16 ± 0.10
	sediment	nd	0.99 ± 0.71	0.60 ± 0.03	0.89 ± 0.06	1.46 ± 0.17	1.28 ± 0.07	2.48 ± 0.22
	system	nd	1.51 ± 0.66	1.54 ± 0.11	1.91 ± 0.06	3.13 ± 0.44	2.91 ± 0.15	5.64 ± 0.32
Extractable sediment residues	0.39 ± 0.06	27.67 ± 0.50	32.11 ± 0.70	33.96 ± 0.40	36.21 ± 0.20	28.46 ± 0.51	26.25 ± 0.10	
Total CO ₂	nd	<dl ²	<dl	<dl	<dl	<dl	0.19 ± 0.01	
Total volatile organics	nd	nd	nd	nd	nd	nd	nd	
Nonextractable sediment residues	<dl	3.79 ± 0.25	4.67 ± 0.22	5.19 ± 0.78	4.82 ± 0.40	9.11 ± 0.45	11.09 ± 0.30	
Total % recovery	water	105.01 ± 0.08	73.08 ± 0.14	62.18 ± 0.83	62.53 ± 0.32	61.47 ± 1.13	60.71 ± 0.43	62.38 ± 0.28
	sediment ⁷	0.39 ± 0.06	31.46 ± 0.75	36.78 ± 0.92	39.16 ± 0.39	41.03 ± 0.60	37.57 ± 0.06	37.34 ± 0.21
	system	105.40 ± 0.02	104.54 ± 0.89	98.96 ± 0.10	101.68 ± 0.07	102.50 ± 0.53	98.28 ± 0.37	99.91 ± 0.47

Data obtained from Table 6, p. 54, Table 16/A, p. 64; Table 17/A, p. 65; Table 18/A, p. 66 of the study report.

¹ Unidentified TLC [¹⁴C]residues consisting of three regions [R_f = 0.00 (S5), R_f = 0.06 (S8), R_f = 0.79 (S4)], with no single region detected at >4.03% of applied in the total system (DER Attachment 2).

² nd = not determined; nd = not detected; <dl = less than LOD.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

C. TRANSFORMATION OF PARENT COMPOUND: In Arkansas water-loam systems, [¹⁴C]orthosulfamuron (both labels) in the total systems decreased from 101.40-103.76% of the applied at day 0 (water layer only, sediment not analyzed at day 0) to 45.33-52.73% at 44 days and was 16.92-21.31% at 90 days (study termination; Appendix 8, pp. 262, 278). In the water layer, [¹⁴C]orthosulfamuron decreased from 101.40-103.76% at day 0 to 46.38-50.52% at 15 days, 27.25-28.74% at 44 days and was 9.06-10.88% at 90 days (Appendix 8, pp. 257, 273). In the sediment, [pyrimidinyl-5-¹⁴C]orthosulfamuron increased from 20.92-21.81% at 7-15 days to 24.09-25.48% at 44 days, then decreased to 10.43-10.96% at 90 days, while [phenyl-U-¹⁴C]orthosulfamuron increased from 18.41-20.61% at 7-15 days to 22.02-23.50% at 30 days, then decreased to 13.37-13.90% at 61 days and was 7.86-8.73% at 90 days (Appendix 8, pp. 260, 276).

In California water-clay systems, [¹⁴C]orthosulfamuron (both labels) in the total systems decreased from 102.82-103.57% of the applied at day 0 (water layer only) to 50.51-56.31% at 15 days, 22.47-27.23% at 44 days and was 12.58-15.99% at 61 days (study termination; Appendix 8, pp. 270, 286). In the water layer, [¹⁴C]orthosulfamuron decreased from 102.82-103.57% at day 0 to 46.80-51.50% at 7 days, 25.52-32.32% at 15 days, 12.79-13.80% at 30 days and was 2.42-3.37% at 61 days (Appendix 8, pp. 265, 281). In the sediment, [¹⁴C]orthosulfamuron increased from 16.75-23.22% at 7 days to 23.30-26.79% at 15-22 days, then gradually decreased to 10.16-12.62% at 61 days (Appendix 8, pp. 268, 284).

HALF-LIFE/DT₅₀: Half-life values for the dissipation of [¹⁴C]orthosulfamuron from the water layer, sediment and total system of the treated systems were determined using linear/natural log regression analysis as calculated by Microsoft Excel 2000 (9.0.2720) and nonlinear/normal (single, 2 parameter, unweighted) regression analysis as calculated by SigmaPlot version 8 (DER Attachment 2).

Table 12: Half-life (t_{1/2}) values, accounting non-extracted residues as parent compound.¹

Label		Half-life	First order linear regression equation	r ²
Arkansas water-loam sediment system				
[pyrimidinyl-5-¹⁴C]orthosulfamuron				
Water	Linear/natural log	29.1 d	y = - 0.0238x + 4.38	0.9652
Sediment	Linear/natural log	Stable	--	--
System	Linear/natural log	70.5 d	y = - 0.0098x + 4.52	0.9167
[phenyl-U-¹⁴C]orthosulfamuron				
Water	Linear/natural log	27.6 d	y = - 0.0251x + 4.43	0.9822
Sediment	Linear/natural log	Stable	--	--
System	Linear/natural log	59.2 d	y = - 0.0117x + 4.54	0.9721
California water-clay sediment system				
[pyrimidinyl-5-¹⁴C]orthosulfamuron				

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Label		Half-life	First order linear regression equation	r ²
Water	Linear/natural log	13.1 d	y = - 0.0530x + 4.29	0.9669
Sediment	Linear/natural log	Stable	--	--
System	Linear/natural log	65.4 d	y = - 0.0106x + 4.42	0.6873
[phenyl-U-¹⁴C]orthosulfamuron				
Water	Linear/natural log	12.1 d	y = - 0.0571x + 4.39	0.9852
Sediment	Linear/natural log	101.9 d ²	y = - 0.0068x + 3.49	0.9598
System	Linear/natural log	30.3 d	y = - 0.0229x + 4.48	0.9592

¹ Determined using data from Appendix 8, pp. 257, 260, 262, 265, 268, 270, 273, 276, 278, 281, 284, and 286 of the study report (DER Attachment 2). Water and sediment layer kinetics reflect dissipation as well as degradation.

² Calculated using 15- to 61-day data (DER Attachment 2).

Table 13: Half-life (t_{1/2}), DT₅₀ and DT₉₀ values, not accounting non-extracted residues as parent compound.¹

Label		Half-life	First order linear regression equation	r ²	DT ₅₀	DT ₉₀
Arkansas water-loam sediment system						
[pyrimidinyl-5-¹⁴C]orthosulfamuron						
Water	Linear/natural log	29.1 d	y = - 0.0238x + 4.38	0.9652	15 d	90 d
	Nonlinear/normal	20.9 d	---	0.9403	---	---
Sediment	Linear/natural log	39.6 d ²	y = - 0.0175x + 3.89	0.9171	17-46 d	ND
	Nonlinear/normal	33.8 d ²	---	0.9262	---	---
System	Linear/natural log	40.6 d	y = - 0.0171x + 4.58	0.9827	44 d	ND
	Nonlinear/normal	39.6 d	---	0.9749	---	---
[phenyl-U-¹⁴C]orthosulfamuron						
Water	Linear/natural log	27.6 d	y = - 0.0251x + 4.43	0.9822	15 d	ND
	Nonlinear/normal	21.9 d	---	0.9585	---	---
Sediment	Linear/natural log	41.5 d ³	y = - 0.0167x + 3.62	0.9912	31-60 d	ND
	Nonlinear/normal	41.5 d ³	---	0.9909	---	---
System	Linear/natural log	36.3 d	y = - 0.0191x + 4.61	0.9934	30-44 d	ND
	Nonlinear/normal	36.9 d	---	0.9901	---	---
California water-clay sediment system						
[pyrimidinyl-5-¹⁴C]orthosulfamuron						
Water	Linear/natural log	13.1 d	y = - 0.0530x + 4.29	0.9669	7 d	30-44 d
	Nonlinear/normal	8.2 d	---	0.9861	---	---
Sediment	Linear/natural log	38.4 d ⁴	y = - 0.0180x + 3.67	0.9588	39 d	ND
	Nonlinear/normal	40.3 d ⁴	---	0.9579	---	---

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Label		Half-life	First order linear regression equation	r ²	DT ₅₀	DT ₉₀
System	Linear/natural log	24.1 d	y = - 0.0287x + 4.49	0.9773	15 d	ND
	Nonlinear/normal	20.1 d	---	0.9701	---	---
[phenyl-U-¹⁴C]orthosulfamuron						
Water	Linear/natural log	12.1 d	y = - 0.0571x + 4.39	0.9852	7 d	30-44 d
	Nonlinear/normal	8.7 d	---	0.9817	---	---
Sediment	Linear/natural log	35.4 d ⁵	y = - 0.0196x + 3.58	0.9530	29-46 d	ND
	Nonlinear/normal	40.1 d ⁵	---	0.9347	---	---
System	Linear/natural log	21.3 d	y = - 0.0326x + 4.53	0.9896	15-22 d	ND
	Nonlinear/normal	19.2 d	---	0.9758	---	---

¹ Determined using data from Appendix 8, pp. 257, 260, 262, 265, 268, 270, 273, 276, 278, 281, 284, and 286 of the study report (DER Attachment 2). Water and sediment layer kinetics reflect dissipation as well as degradation.

² Calculated using 44- to 90-day data (DER Attachment 2).

³ Calculated using 30- to 90-day data (DER Attachment 2).

⁴ Calculated using 22- to 61-day data (DER Attachment 2).

⁵ Calculated using 15- to 61-day data (DER Attachment 2).

TRANSFORMATION PRODUCTS: Two major transformation products, N-(4,6-dimethoxypyrimidin-2-yl)urea (DOP urea, S12, [pyrimidinyl-5-¹⁴C]-label) and 2-sulfamino-N,N-dimethylbenzamide (DBS acid, S1, [phenyl-U-¹⁴C]-label), and two minor products, 1-(4-methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]urea (O-desmethyl IR5878, S9, both labels) and 2-sulfamoylamino-N,N-dimethylbenzamide (DBS amide, S2, [phenyl-U-¹⁴C]-label) were detected in both systems. All compounds were identified via TLC co-chromatography against reference standards and MS molecular fragmentation analyses; however, MS chromatograms of reference standards were not provided (pp. 36-38; Figures 75-77, pp. 143-145; Figures 84-87, pp. 152-155; Figure 90, p. 158; Figures 97-100, pp. 165-168; Figures 103-106, pp. 171-174). Higher concentrations of DBS acid, O-desmethyl IR5878 and DBS amide were detected in the water layers as compared to the sediment extracts; however, the reverse occurred for DOP urea.

In Arkansas water-loam systems, DOP urea (S12, pyrimidine label) was detected at maximums of 42.50% and 47.78% at 90 days in the sediment and total system, respectively, while detected at 3.85-6.09% at 7-90 days in the water layer (Appendix 8, pp. 257, 260, 262). DBS acid (S1, phenyl label) was detected at maximums of 46.53%, 9.24% and 55.77% in the water layer, sediment and total system, respectively, at 90 days (Appendix 8, pp. 273, 276, 278). O-desmethyl IR5878 (S9, both labels) was detected at maximums of 5.97-6.68%, 2.06-2.69% and 8.03-9.37% in the water layer, sediment and total system, respectively, at 90 days. DBS amide (S2, phenyl label) was detected at maximums of 3.25% and 4.07% at 61 days in the water layer and total system, respectively, and was 2.80-2.94% and 3.67-3.77%, respectively, at 90 days, but was only a maximum 0.87% in the sediment at study termination. Unidentified [pyrimidinyl-5-¹⁴C]residues [TLC origin (S11), plus two zones (S13, S15)] were detected at total maximums of 2.11%, 4.65% and 6.22% in the water layer, sediment and total system, respectively (DER

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

Attachment 2). Unidentified [phenyl-U-¹⁴C]residues [TLC origin (S5), plus three zones (S4, S6, S8)] were detected at total maximums of 3.05%, 1.81% and 4.86% in the water layer, sediment and total system, respectively (DER Attachment 2).

In California water-clay systems, DOP urea (S12, pyrimidine label) was detected at maximums of 37.70% and 40.52% at 30 days in the sediment and total system, respectively, and was 33.63-33.66% and 35.77-35.86%, respectively, at 61 days, while in the water layer decreased from a maximum 6.66% at 7 days to 2.11-2.23% at 61 days (Appendix 8, pp. 265, 268, 270). DBS acid (S1, phenyl label) was detected at maximums of 49.88%, 11.11% and 60.86% in the water layer, sediment and total system, respectively, at 61 days (Appendix 8, pp. 281, 284, 286). O-desmethyl IR5878 (S9, both labels) was detected at maximums of 4.60-4.98% (30-61 days), 1.84-2.32% (30 days) and 6.13-7.30% (30-44 days) in the water layer, sediment and total system, respectively, and was 4.04-4.86%, 1.17-1.31% and 5.33-6.03%, respectively, at 61 days. DBS amide (S2, phenyl label) was detected at maximums of 2.81% (61 days), 1.28% (30 and 61 days) and 4.09% (61 days) in the water layer and total system, respectively. Unidentified [pyrimidinyl-5-¹⁴C]residues [TLC origin (S11), plus two zones (S13, S15)] were detected at total maximums of 3.19%, 6.44% and 9.52% in the water layer, sediment and total system, respectively (DER Attachment 2). Unidentified [phenyl-U-¹⁴C]residues [TLC origin (S5), plus two zones (S4, S8)] were detected at total maximums of 3.26%, 2.69% and 5.95% in the water layer, sediment and total system, respectively (DER Attachment 2).

NONEXTRACTABLE AND EXTRACTABLE RESIDUES: For the Arkansas loam sediment, extractable [pyrimidinyl-5-¹⁴C]residues increased from ≤0.44% of the applied at day 0 to 60.67-60.97% at 44 days, then decreased to 57.63-57.93% at 90 days, while [phenyl-U-¹⁴C]residues increased from 0.30-0.43% at day 0 to 30.89-32.41% at 30 days, then decreased to 20.92-22.09% at 90 days (Appendix 7, pp. 227-228, 234-235). Nonextractable [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-residues increased from <LOD (0.15-0.22% of applied) at day 0 to 19.56-23.74% and 17.39-17.57%, respectively, at 90 days (Appendix 7, pp. 240-241, 244-245). Organic matter fractionation of 90-day extracted [pyrimidinyl-5-¹⁴C]sediment found 0.47-0.53% of the applied was acid (HCl) extractable and 8.48-9.33%, 2.31-2.41% and 7.36-8.12% of the applied was associated with the humin, fulvic acids and humic acids, respectively (Appendix 7, pp. 252, 254).

For the California clay sediment, extractable [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-residues increased from ≤0.62% of the applied (both labels) at day 0 to 65.47-66.35% and 36.01-36.41%, respectively, at 30 days, then decreased to 53.64-53.81% and 26.15-26.34%, respectively, at 61 days (Appendix 7, pp. 230-232, 237-238). Nonextractable [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-residues increased from <LOD (0.09-0.14% of applied) at day 0 to 33.42-33.50% and 10.79-11.39%, respectively, at 61 days (Appendix 7, pp. 242-243, 246-247). Organic matter fractionation of 44- and 61-day extracted [pyrimidinyl-5-¹⁴C]sediment found ≤0.39% of the applied was acid (HCl) extractable and 17.31-21.11%, 6.54-9.43% and 1.14-1.74% of the applied was associated with the humin, fulvic acids and humic acids, respectively (Appendix 7, pp. 252, 254).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

VOLATILIZATION: At study termination (61 or 90 days), volatilized ¹⁴CO₂ (identification not confirmed) totaled 0.70-1.19% and 0.18-0.50% of the applied radioactivity, for the [pyrimidinyl-5-¹⁴C]- and [phenyl-U-¹⁴C]-label treated systems, respectively; no attempt was made to trap volatile organics (Appendix 7, pp. 248-251).

TRANSFORMATION PATHWAY: Transformation pathways were proposed by the study authors that were consistent with the transformation products detected (pp. 38, 41). In the primary pathway, hydrolytic cleavage at the sulfamoylurea linkage yields the two major transformation products DBS acid and DOP urea. A minor pathway involves demethylation of a methoxy group on the pyrimidine ring to yield O-desmethyl IR5878. Minor levels of DBS amide were also detected.

Table 14: Chemical names for transformation products of orthosulfamuron in aerobic water-sediment systems.

Applicant's code	CAS Number	Chemical Name(s)	Chemical formula	MW	SMILES string
DOP urea (S12) ¹	NR ²	N-(4,6-Dimethoxypyrimidin-2-yl)urea	C ₇ H ₁₀ N ₄ O ₃	198.21	NR ²
DBS acid (S1)	NR ²	2-Sulfamino-N,N-dimethylbenzamide	C ₉ H ₁₂ N ₂ SO ₄	244.28	NR ²
DBS amide (S2)	NR ²	2-Sulfamoylamino-N,N-dimethylbenzamide	C ₉ H ₁₃ N ₃ SO ₃	243.28	NR ²
O-desmethyl IR5878 (S9)	NR ²	1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(2-dimethylcarbamoyl)phenylsulfamoyl]-urea	NR ²	NR ²	NR ²

Data obtained from pp. 41; Appendix 9, pp. 289-291 of the study report.

¹ All identifications via TLC co-chromatography and MS fragmentation analyses.

² NR = not reported.

D. SUPPLEMENTARY EXPERIMENT-RESULTS: High dose (60x) rate experiment - "additional samples". Additional California water-clay sediment systems treated with [¹⁴C]orthosulfamuron (five systems per label) at ca. sixty times the nominal application rate were taken after 31 days and used to isolate transformation products (pp. 23, 29). TLC analysis of the high dose rate water layers and sediment extracts found degradate profiles comparable to the nominal dose rate samples (Figures 91-94, pp. 159-162). In addition, TLC analyses determined that ethyl acetate partitioning of the concentrated high dose rate water layers provided separation of the organo- and aqueous-soluble products, but did not appear to alter the degradate profile (Figures 95-96, pp. 163-164).

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

III. STUDY DEFICIENCIES:

1. Multiple solvent systems were not employed in a reasonable extraction attempt, leaving 11-33% of the applied non-extracted. Subdivision N guidelines require that a reasonable attempt be made to identify the parent and all major degradates, including rates of their formation and decline.

IV. REVIEWER'S COMMENTS:

1. Although the study authors reported that test samples were analyzed via TLC co-chromatography with reference standard [¹⁴C]-O-desmethyl IR5878 (pp. 19, 37), data concerning the reference standard [¹⁴C]-O-desmethyl IR5878 were not provided (Appendix 9, pp. 289-291).
2. Removing the water layer from the sediment via pipette leaves a significant amount of water associated with the sediment, consequently, assessing the partitioning of [¹⁴C]residues between the water and sediment phases is not as accurate. For example in this study, DOP urea (S12) was primarily associated with the sediment layer, but there were low, but consistent, levels of the compound appearing to remain with the water layer (Table 7/A, p. 55; Table 8/A, p. 56; Table 10/A, p. 58; Table 11/A, p. 59).
3. No justification was provided for the 0.11 mg a.i./L treatment rate used in this study, which was reported as equivalent to treatment of a body of water at a field application rate of 75 g a.i./ha based on the water surface area (pp. 21-23).
4. The test substance was incompletely characterized; the analytical purity, aqueous solubility, vapor pressure, UV absorption, dissociation constant (pKa), octanol-water partition coefficient (K_{ow} /log K_{ow}) and stability at room temperature should have been reported.
5. Results from measurements of the physicochemical parameters, pH, redox potential and oxygen concentrations, in the water layers and sediment of the test systems were only presented in graph format (Appendix 5, pp. 211-215). Quantitative results should be presented in tabular format, with supplemental presentation of the results in graph format.
6. Levels of quantitation were not reported.
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.

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

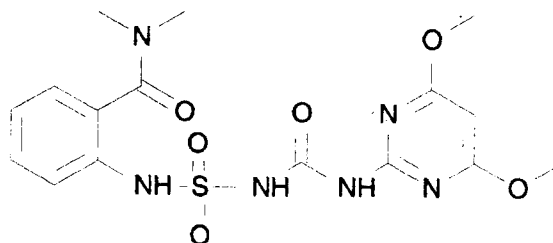
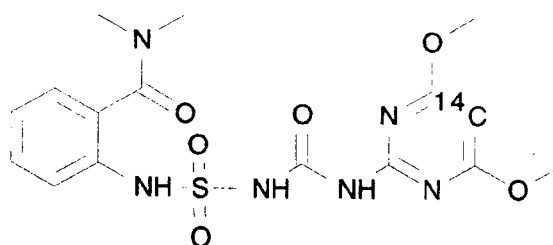
EPA MRID Number 46219017

8. The following typographical errors/discrepancies were noted:
- i. In Figures 92 (p. 160) and 94 (p. 162), the upper chromatogram labeled surface water I should actually be labeled soil I; refer to respective Figures 32 (p. 100) and 58 (p. 126).
 - ii. In Appendix 9 (p. 290), the IUPAC name for DBS acid of 2-sulfoamino-N,N-dimethylbenzamide should be 2-sulfamino-N,N-dimethylbenzamide (p. 41).

V. REFERENCES:

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 162-4, Aerobic 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. Vance, F., O. Brooks, and D. Jenkinson. 1987. An extraction method for measuring soil microbial biomass C. *Soil Biol. Biochem.* **19**, pp. 703-707.
5. 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.

Attachment 1: Structures of Parent and Transformation Products

Orthosulfamuron [IR5878; S3]**IUPAC name:** 1-(4,6-Dimethoxypyrimidin-2-yl)-3-[2-(dimethylcarbamoyl)phenylsulfamoyl]urea.**CAS name:** 2-[[[(4,6-Dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonylamino]-N,N-dimethylbenzamide.**CAS No:** 213464-77-8.**SMILES String:** CN(C(=O)c1cccc1NS(=O)(=O)NC(=O)Nc1nc(cc(n1)OC)OC)C.**Unlabeled****[Pyrimidinyl-5-¹⁴C]IR5878**¹⁴C = Location of the radiolabel.

	[Phenyl-U-¹⁴C]IR5878	
	¹⁴ C = Location of the radiolabel.	

Identified Compounds

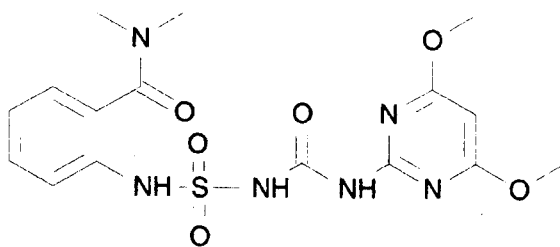
Orthosulfamuron [IR5878; S3]

IUPAC name: 1-(4,6-Dimethoxypyrimidin-2-yl)-3-[2-(dimethylcarbamoyl)phenylsulfamoyl]urea.

CAS name: 2-[[[[[(4,6-Dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]amino]-N,N-dimethylbenzamide.

CAS No: 213464-77-8.

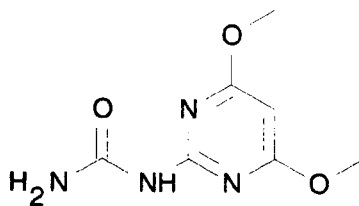
SMILES String: CN(C(=O)c1ccccc1NS(=O)(=O)NC(=O)Nc1nc(cc(n1)OC)OC)C.

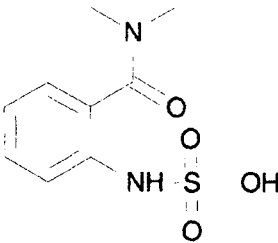
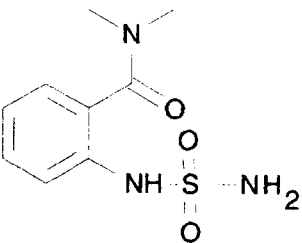
**S12 [DOP-urea]**

IUPAC name: N-(4,6-Dimethoxypyrimidin-2-yl)urea.

CAS name: Not reported.

CAS No: Not reported.

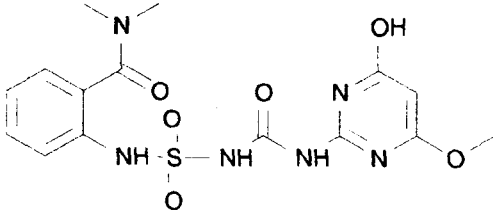


S1 [DBS-acid]		
IUPAC name: 2-Sulfoamino-N,N-dimethylbenzamide. CAS name: Not reported. CAS No: Not reported.		
		
S2 [DBS-amide]		
IUPAC name: 2-Sulfamoylamino-N,N-dimethylbenzamide. CAS name: Not reported. CAS No: Not reported.		
		

Data Evaluation Report on the Aerobic Biotransformation of Orthosulfamuron (IR5878) in a Water-Sediment System

PMRA Submission Number {.....}

EPA MRID Number 46219017

S9 [O-desmethyl IR 5878]		
IUPAC name:	1-(4-Methoxy-6-hydroxypyrimidin-2-yl)-3-[2-(dimethylcarbamoyl)phenylsulfamoyl]urea.	
CAS name:	Not reported.	
CAS No:	Not reported.	
		

Attachment 2: Excel Spreadsheets

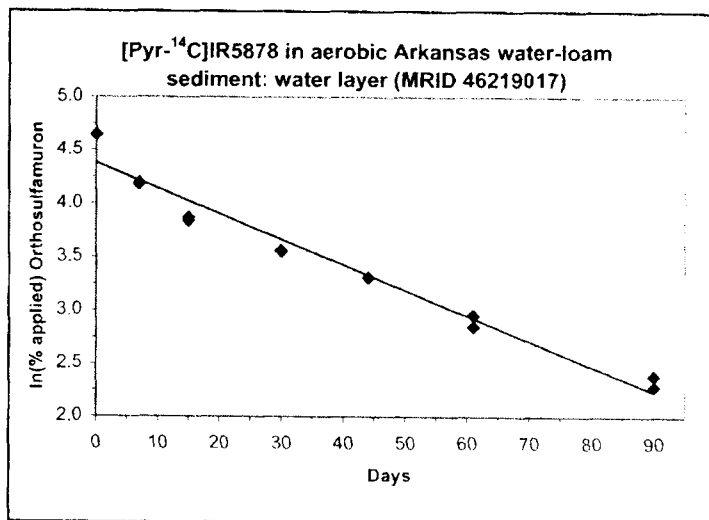
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination

Water layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.62	4.64073
0	103.76	4.642081
7	65.37	4.180063
7	66.01	4.189806
15	47.79	3.866816
15	46.38	3.836868
30	35.24	3.562182
30	34.84	3.550766
44	27.25	3.305054
44	27.40	3.310543
61	17.28	2.84955
61	19.21	2.955431
90	9.80	2.282382
90	10.88	2.386926



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9824
R Square	0.9652
Adj R Sq	0.9623
Std Error	0.1454
Observations	14

0- to 90-day data:

Linear half-life = 29.1 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 20.9 days R²: 0.9403

See SigmaPlot file 108209 46219017 162-4 ARK Pyr H2O Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	7.03737	7.0374	332.7756959	4.072E-10
Residual	12	0.25377	0.0211		
Total	13	7.29114			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.38	0.060239	72.703	3.05001E-17	4.2482579	4.5107548	4.24825788	4.51075479
X Variable 1	-0.0238	0.001304	-18.24	4.07155E-10	-0.026635	-0.0209515	-0.02663513	-0.02095146

Linear regression analysis performed using Microsoft Excel 2000.

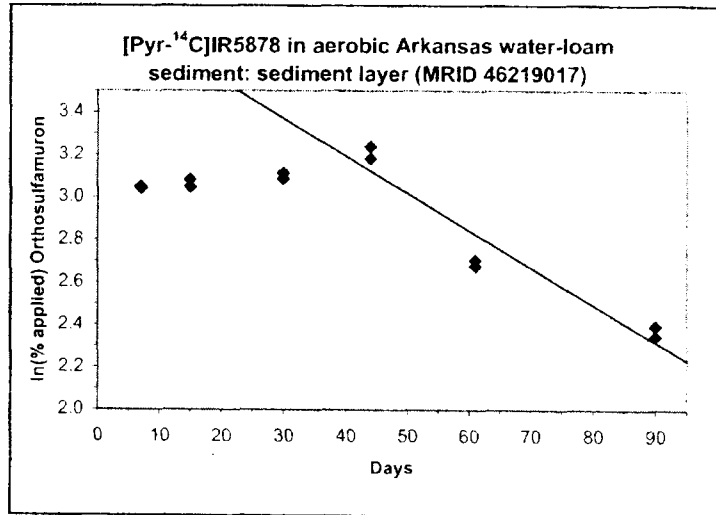
Results (% of applied radioactivity) imported from **Profile ARK Pyr** worksheet.

**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination
Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0		#NUM!
0		#NUM!
7	20.92	3.040706
7	21.11	3.049747
15	21.81	3.082369
15	21.06	3.047376
30	21.89	3.08603
30	22.49	3.113071
44	25.48	3.237894
44	24.09	3.181797
61	14.96	2.70538
61	14.53	2.676215
90	10.96	2.394252
90	10.43	2.344686



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9577
R Square	0.9171
Adj R Sq	0.8964
Std Error	0.1224
Observations	6

44- to 90-day data:

Linear half-life = 39.6 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 33.8 days R²: 0.9262

See SigmaPlot file 108209 46219017 162-4 ARK Pyr Sed Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	0.6626	0.6626	44.25429565	0.0026515
Residual	4	0.05989	0.015		
Total	5	0.72249			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.89	0.178123	21.862	2.59044E-05	3.3995463	4.388647	3.39954626	4.388646988
X Variable 1	-0.0175	0.00263	-6.652	0.002651507	-0.024801	-0.0101952	-0.02480148	-0.01019521

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile ARK Pyr worksheet.

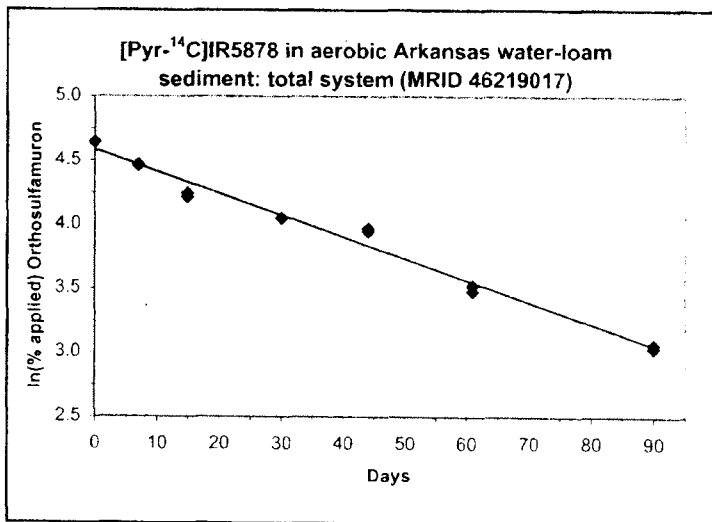
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.62	4.64073
0	103.76	4.642081
7	86.29	4.457714
7	87.12	4.467286
15	69.60	4.242765
15	67.44	4.211238
30	57.13	4.045329
30	57.33	4.048824
44	52.73	3.965185
44	51.49	3.941388
61	32.24	3.473208
61	33.74	3.518684
90	20.76	3.033028
90	21.31	3.059176



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9913
R Square	0.9827
Adj R Sq	0.9813
Std Error	0.0729
Observations	14

0- to 90-day data:

Linear half-life = 40.6 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 39.6 days R²: 0.9749

See SigmaPlot file 108209 46219017 162-4 ARK Pyr Tot sys Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	3.624298	3.6243	681.912361	6.079E-12
Residual	12	0.063779	0.0053		
Total	13	3.688077			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.58	0.030199	151.81	4.48387E-21	4.5186092	4.6502051	4.51860916	4.650205102
X Variable 1	-0.0171	0.000654	-26.11	6.07876E-12	-0.0185	-0.0156503	-0.01849971	-0.01565035

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile ARK Pyr worksheet.

41

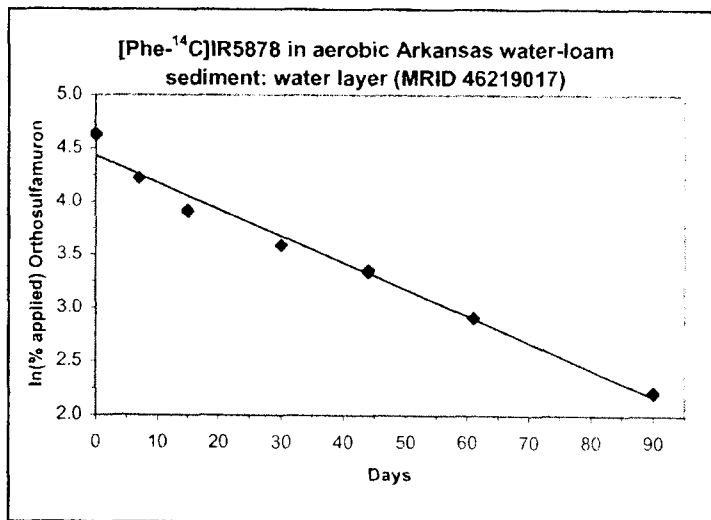
Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems. MRID 46219017

Arkansas water-loam sediment - [phenyl-U-¹⁴C]-label.

Half-life determination

Water layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.33	4.637928
0	101.40	4.619073
7	67.99	4.219361
7	68.12	4.221271
15	49.46	3.901164
15	50.52	3.922369
30	36.26	3.590715
30	36.14	3.5874
44	28.02	3.332919
44	28.74	3.35829
61	18.29	2.906354
61	18.41	2.912894
90	9.06	2.203869
90	9.21	2.22029



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9911
R Square	0.9822
Adj R Sq	0.9807
Std Error	0.1088
Observations	14

0- to 90-day data:

Linear half-life = 27.6 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 21.9 days R²: 0.9585

See SigmaPlot file 108209 46219017 162-4 ARK Phe H2O Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	7.83209	7.8321	661.681806	7.261E-12
Residual	12	0.14204	0.0118		
Total	13	7.97413			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.43	0.045067	98.32	8.19805E-19	4.3327869	4.5291722	4.33278688	4.529172217
X Variable 1	-0.0251	0.000976	-25.72	7.26127E-12	-0.027227	-0.0229747	-0.02722694	-0.02297474

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile ARK Phe worksheet.

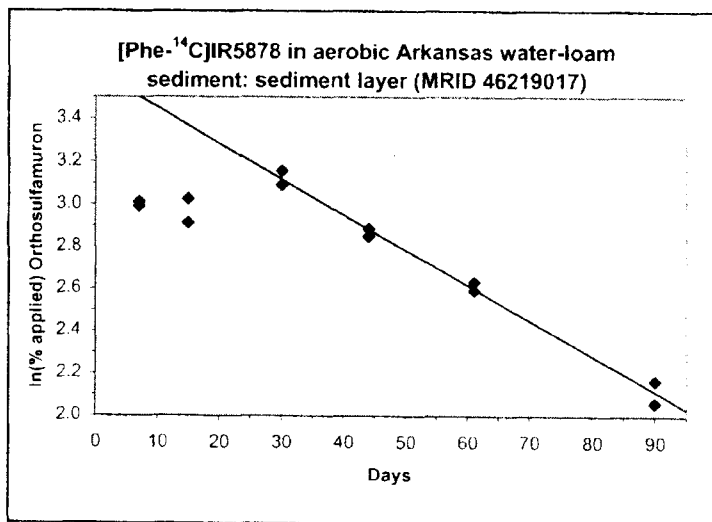
12

**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [phenyl-U-¹⁴C]-label.

Half-life determination
Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	20.30	3.010621
7	19.93	2.992226
15	20.61	3.025776
15	18.41	2.912894
30	22.02	3.091951
30	23.50	3.157
44	17.31	2.851284
44	17.95	2.88759
61	13.90	2.631889
61	13.37	2.593013
90	7.86	2.061787
90	8.73	2.166765



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9956
R Square	0.9912
Adj R Sq	0.9898
Std Error	0.0405
Observations	8

30- to 90-day data:

Linear half-life = 41.5 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 41.5 days R²: 0.9909

See SigmaPlot file 108209 46219017 162-4 ARK Phe Sed Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	1.115285	1.1153	678.7221075	2.11E-07
Residual	6	0.009859	0.0016		
Total	7	1.125144			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.62	0.038791	93.302	1.02136E-10	3.5243254	3.7141606	3.52432543	3.714160579
X Variable 1	-0.0167	0.000641	-26.05	2.10957E-07	-0.018263	-0.0151268	-0.01826284	-0.01512678

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile ARK Phe worksheet.

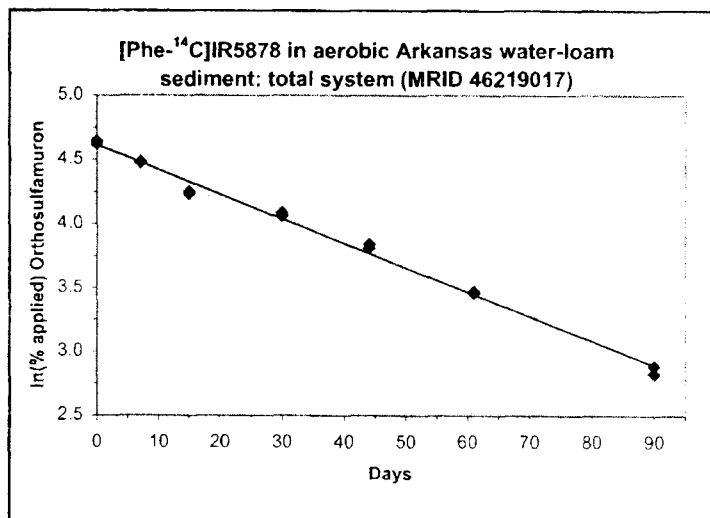
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [phenyl-U-¹⁴C]-label.

Half-life determination

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.33	4.637928
0	101.40	4.619073
7	88.29	4.480627
7	88.05	4.477905
15	70.07	4.249495
15	68.93	4.233091
30	58.28	4.065259
30	59.64	4.088326
44	45.33	3.813969
44	46.69	3.84353
61	32.19	3.471656
61	31.78	3.458837
90	16.92	2.828496
90	17.94	2.887033



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9967
R Square	0.9934
Adj R Sq	0.9929
Std Error	0.05
Observations	14

0- to 90-day data:

Linear half-life = 36.3 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 36.9 days R²: 0.9901

See SigmaPlot file 108209 46219017 162-4 ARK Phe Tot sys Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	4.539426	4.5394	1812.769527	1.83E-14
Residual	12	0.03005	0.0025		
Total	13	4.569475			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.61	0.020729	222.59	4.54805E-23	4.5687881	4.6591164	4.56878808	4.659116405
X Variable 1	-0.0191	0.000449	-42.58	1.8297E-14	-0.020087	-0.0181316	-0.02008744	-0.01813162

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from **Profile ARK Phe** worksheet.

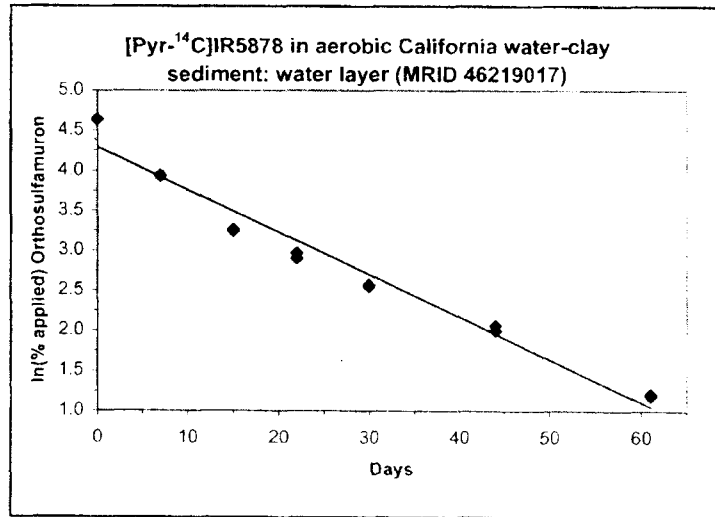
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination

Water layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	102.82	4.63298
0	103.52	4.639765
7	51.49	3.941388
7	50.75	3.926912
15	26.18	3.264996
15	25.52	3.239462
22	19.43	2.966818
22	18.15	2.898671
30	13.10	2.572612
30	12.79	2.548664
44	7.85	2.060514
44	7.38	1.998774
61	3.37	1.214913
61	3.28	1.187843



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9833
R Square	0.9669
Adj R Sq	0.9641
Std Error	0.2097
Observations	14

0- to 61-day data:

Linear half-life = 13.1 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 8.2 days R²: 0.9861

See SigmaPlot file 108209 46219017 162-4 CAL Pyr H2O Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	15.39551	15.396	350.1864202	3.027E-10
Residual	12	0.527565	0.044		
Total	13	15.92307			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.29	0.0916	46.848	5.84723E-15	4.0916759	4.4908353	4.09167586	4.490835254
X Variable 1	-0.0530	0.002834	-18.71	3.02737E-10	-0.0592	-0.046852	-0.05919977	-0.04685201

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile CAL Pyr worksheet.

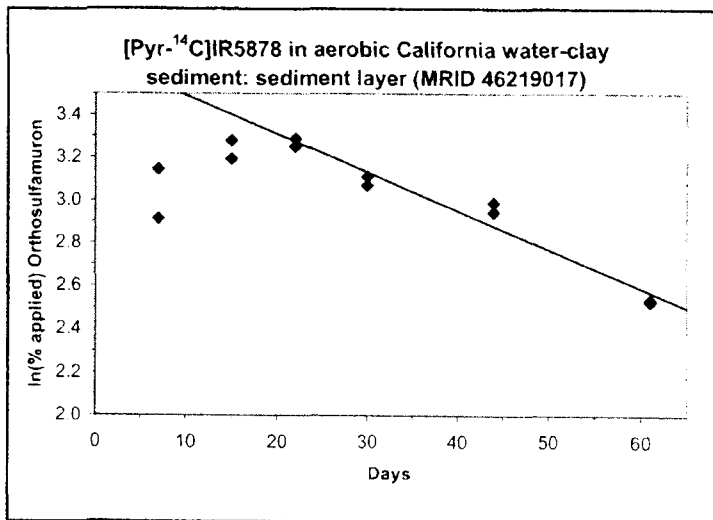
415

**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [pyrimidiny]-5-¹⁴C-label.

Half-life determination
Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	23.22	3.145014
7	18.41	2.912894
15	24.33	3.19171
15	26.54	3.278653
22	25.87	3.253084
22	26.79	3.288029
30	22.39	3.108614
30	21.53	3.069447
44	18.98	2.943386
44	19.85	2.988204
61	12.62	2.535283
61	12.51	2.526528



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9792
R Square	0.9588
Adj R Sq	0.9519
Std Error	0.064
Observations	8

22- to 61-day data:

Linear half-life = 38.4 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 40.3 days R²: 0.9579

See SigmaPlot file 108209 46219017 162-4 CAL Pyr Sed Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	0.572199	0.5722	139.6269615	2.22E-05
Residual	6	0.024588	0.0041		
Total	7	0.596787			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.67	0.064066	57.32	1.89397E-09	3.5155233	3.8290518	3.51552329	3.829051781
X Variable 1	-0.0180	0.001527	-11.82	2.22027E-05	-0.02178	-0.0143073	-0.02178017	-0.01430725

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile CAL Pyr worksheet.

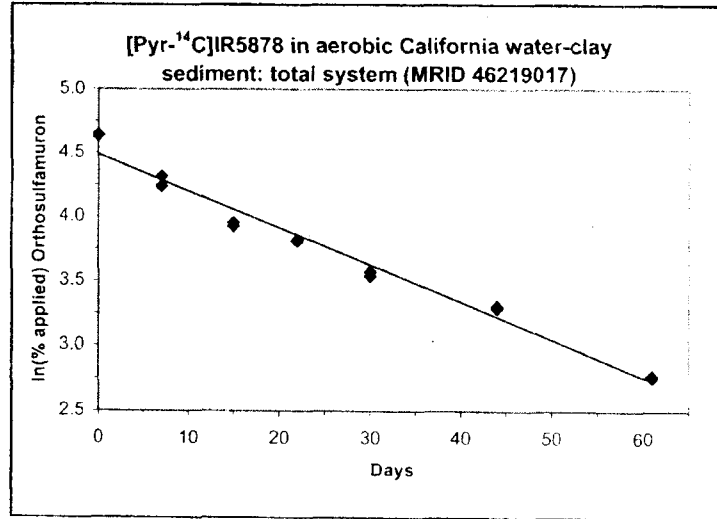
Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

California water-clay sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	102.82	4.63298
0	103.52	4.639765
7	74.71	4.313614
7	69.16	4.236423
15	50.51	3.922171
15	52.06	3.952397
22	45.30	3.813307
22	44.94	3.805328
30	35.49	3.569251
30	34.32	3.535728
44	26.83	3.289521
44	27.23	3.304319
61	15.99	2.771964
61	15.79	2.759377



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9886
R Square	0.9773
Adj R Sq	0.9755
Std Error	0.0935
Observations	14

0- to 61-day data:

Linear half-life = 24.1 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 20.1 days R²: 0.9701

See SigmaPlot file 108209 46219017 162-4 CAL Pyr Tot sys Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	4.525356	4.5254	517.5979459	3.083E-11
Residual	12	0.104916	0.0087		
Total	13	4.630272			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.49	0.040849	109.88	2.16272E-19	4.399438	4.5774417	4.39943796	4.577441688
X Variable 1	-0.0287	0.001264	-22.75	3.08306E-11	-0.031502	-0.0259954	-0.03150186	-0.02599542

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile CAL Pyr worksheet.

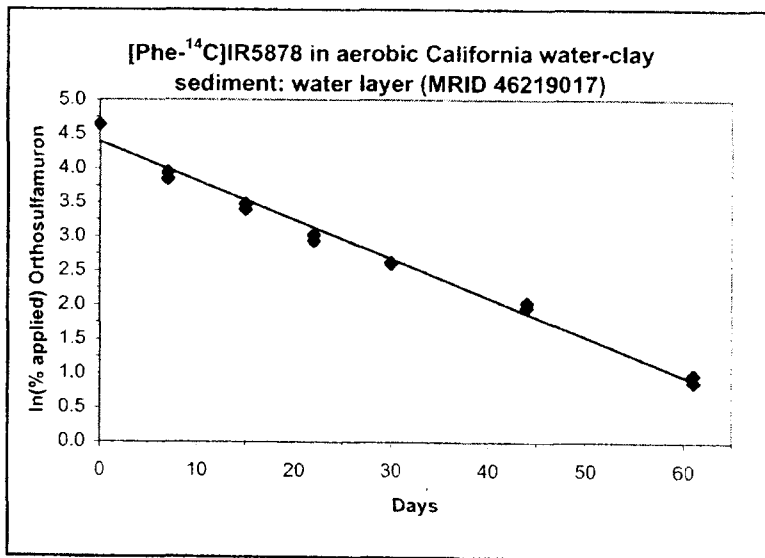
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [phenyl-U-¹⁴C]-label.

Half-life determination

Water layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.42	4.638798
0	103.57	4.640248
7	46.80	3.845883
7	51.50	3.941582
15	29.91	3.398193
15	32.32	3.475686
22	20.55	3.022861
22	18.82	2.93492
30	13.54	2.605648
30	13.80	2.624669
44	7.12	1.962908
44	7.66	2.036012
61	2.42	0.883768
61	2.69	0.989541



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9926
R Square	0.9852
Adj R Sq	0.9839
Std Error	0.1497
Observations	14

0- to 61-day data:

Linear half-life = 12.1 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 8.7 days R²: 0.9817

See SigmaPlot file 108209 46219017 162-4 CAL Phe H2O Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	17.84923	17.849	796.8124885	2.422E-12
Residual	12	0.268809	0.0224		
Total	13	18.11804			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.39	0.065385	67.119	7.93929E-17	4.2461695	4.5310946	4.24616952	4.531094595
X Variable 1	-0.0571	0.002023	-28.23	2.42154E-12	-0.061502	-0.0526883	-0.06150234	-0.05268835

Linear regression analysis performed using Microsoft Excel 2000.

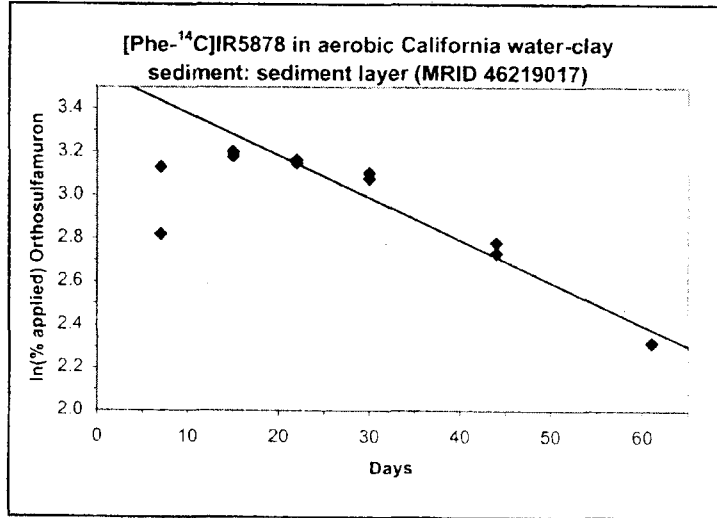
Results (% of applied radioactivity) imported from **Profile CAL Phe** worksheet.

**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [phenyl-U-¹⁴C]-label.

**Half-life determination
Sediment layer**

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	16.75	2.818398
7	22.88	3.130263
15	24.53	3.199897
15	23.99	3.177637
22	23.61	3.16167
22	23.30	3.148453
30	22.24	3.101892
30	21.69	3.076851
44	15.35	2.731115
44	16.14	2.781301
61	10.16	2.318458
61	10.19	2.321407



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9762
R Square	0.953
Adj R Sq	0.9471
Std Error	0.0798
Observations	10

15- to 61-day data:

Linear half-life = 35.4 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 40.1 days R²: 0.9347

See SigmaPlot file 108209 46219017 162-4 CAL Phe Sed Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	1.033793	1.0338	162.1584964	1.362E-06
Residual	8	0.051002	0.0064		
Total	9	1.084795			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.58	0.058594	61.016	5.78525E-12	3.4400701	3.7103085	3.44007015	3.710308465
X Variable 1	-0.0196	0.001537	-12.73	1.36188E-06	-0.023118	-0.0160288	-0.02311778	-0.01602879

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile CAL Phe worksheet.

4

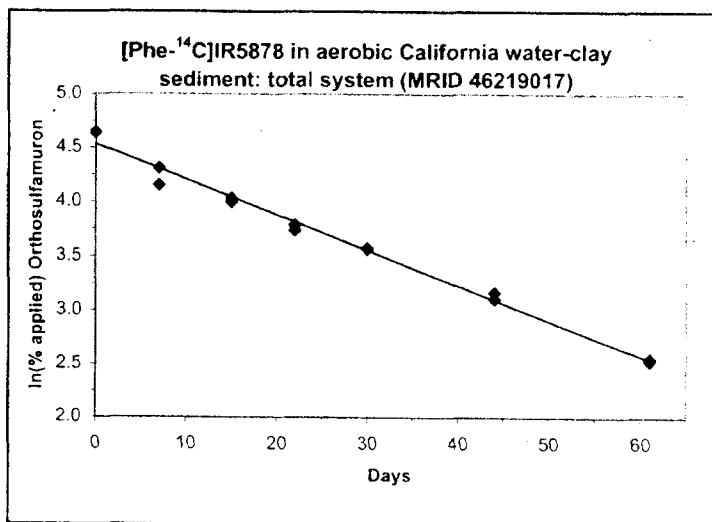
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [phenyl-U-¹⁴C]-label.

Half-life determination

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.42	4.638798
0	103.57	4.640248
7	63.55	4.151827
7	74.38	4.309187
15	54.44	3.997099
15	56.31	4.030872
22	44.16	3.787819
22	42.12	3.740523
30	35.78	3.577389
30	35.49	3.569251
44	22.47	3.112181
44	23.80	3.169686
61	12.58	2.532108
61	12.88	2.555676



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9948
R Square	0.9896
Adj R Sq	0.9887
Std Error	0.0714
Observations	14

0- to 61-day data:

Linear half-life = 21.3 days

Nonlinear (exponential decay/single, 2 parameter)

half-life = 19.2 days R²: 0.9758

See SigmaPlot file 108209 46219017 162-4 CAL Phe Tot sys Ver6.JNB

ANOVA

	df	SS	MS	F	Sig F
Regression	1	5.81897	5.819	1142.388406	2.859E-13
Residual	12	0.061124	0.0051		
Total	13	5.880094			

	Coeffs	Std Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.53	0.031179	145.43	7.49941E-21	4.4665926	4.6024599	4.46659257	4.602459935
X Variable 1	-0.0326	0.000965	-33.8	2.85911E-13	-0.034701	-0.0304982	-0.03470122	-0.03049824

Linear regression analysis performed using Microsoft Excel 2000.

Results (% of applied radioactivity) imported from Profile CAL Phe worksheet.

52

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

Arkansas water-loom sediment.
[Pyrimidinyl-5-¹⁴C]-label.

Confirmation of summations and means for applied radioactivity and determination of standard deviations.

Day	Water						Sediment						CO ₂ ³			Material Balance			
	% AR		Mean	s.d.	% AR		Mean	s.d.	% AR		Mean	s.d.	% AR	Mean	s.d.	% AR	Mean	s.d.	
	Nonextractable ²		Extract ¹		Nonextractable ²		CO ₂ ³		Material Balance		CO ₂ ³		Material Balance		Material Balance		Material Balance		
0	104.86	105.45	105.16	0.30	0.19	0.44	0.31	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
7	71.92	72.25	72.09	0.16	29.67	30.05	29.86	0.19	2.72	2.51	2.62	0.10	#DIV/0!	#DIV/0!	#DIV/0!	104.31	104.81	104.56	0.25
15	56.21	54.98	55.60	0.61	37.78	37.21	37.50	0.28	5.55	6.05	5.80	0.25	#DIV/0!	#DIV/0!	#DIV/0!	99.54	98.24	98.89	0.65
30	43.47	43.27	43.37	0.10	54.62	55.20	54.91	0.29	5.65	5.27	5.46	0.19	#DIV/0!	#DIV/0!	#DIV/0!	103.74	103.74	103.74	0.00
44	34.90	36.00	35.45	0.55	60.97	60.67	60.82	0.15	6.50	6.65	6.58	0.08	0.38	0.42	0.40	102.75	103.74	103.25	0.49
61	29.80	31.78	30.79	0.99	59.53	59.68	59.61	0.07	13.72	11.43	12.58	1.15	0.72	0.62	0.67	103.77	103.51	103.64	0.13
90	22.54	24.19	23.37	0.82	57.63	57.93	57.78	0.15	23.74	19.56	21.65	2.09	1.19	0.70	0.95	105.10	102.38	103.74	1.36
Overall:															103.31	2.03			

¹LOD reported as 0.37% of applied (Appendix 7, pp. 227-228); 0.185% (shaded cell) was used for a nondetect with a detect at the same interval for determining a mean and std. dev.

²LOD reported as 0.22% of applied (Appendix 7, pp. 240-241).

³LOD reported at 0.23% of applied (Appendix 7, p. 248).

Results from Appendix 7, pp. 226-228, 240-241, 248 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

Arkansas water-foam sediment.
[Pyrimidinyl-5-¹⁴C]-label.

Total [¹⁴C]residues in sediment.

Day	Sediment					
	Ext.	Nonext.	Total in Sediment			s.d.
	% AR	% AR	% AR	Mean		
0	0.19		0.19	0.31	0.13	
7	0.44		0.44	0.31	0.13	
	29.67	2.72	32.39	32.48	0.09	
	30.05	2.51	32.56	32.48	0.09	
15	37.78	5.55	43.33	43.30	0.04	
	37.21	6.05	43.26	43.30	0.04	
30	54.62	5.65	60.27	60.37	0.10	
	55.20	5.27	60.47	60.37	0.10	
44	60.97	6.50	67.47	67.40	0.08	
	60.67	6.65	67.32	67.40	0.08	
61	59.53	13.72	73.25	72.18	1.07	
	59.68	11.43	71.11	72.18	1.07	
90	57.63	23.74	81.37	79.43	1.94	
	57.93	19.56	77.49	79.43	1.94	

Results imported from **Mat bal ARK Pyr** worksheet.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

[¹⁴C]Residue water phase:sediment ratios.

Day	Water		Sed.		Ratio		W:S ratio		S:W ratio	
	% AR	% AR	% AR	% AR	W:S	S:W	Mean	s.d.	Mean	s.d.
0	104.86	0.19	567	0						
	105.45	0.44	240	0			403	164	0	0
7	71.92	32.39	2	0						
	72.25	32.56	2	0			2	0	0	0
15	56.21	43.33	1	1						
	54.98	43.26	1	1			1	0	1	0
30	43.47	60.27	1	1						
	43.27	60.47	1	1			1	0	1	0
44	34.90	67.47	1	2						
	36.00	67.32	1	2			1	0	2	0
61	29.80	73.25	0	2						
	31.78	71.11	0	2			0	0	2	0
90	22.54	81.37	0	4						
	24.19	77.49	0	3			0	0	3	0

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

Arkansas water-loam sediment.
[Phenyl-U-¹⁴C]-label.

Confirmation of summations and means for applied radioactivity and determination of standard deviations.

Day	Water						Sediment						CO ₂ ³			Material Balance					
	% AR		Mean	s.d.	% AR		Mean	s.d.	% AR		Mean	s.d.	% AR		Mean	s.d.	% AR		Mean	s.d.	
0	104.67	102.87	103.77	0.90	0.43	0.30	0.37	0.07										105.10	103.17	104.14	0.97
7	81.23	81.01	81.12	0.11	22.56	22.80	22.68	0.12	1.20	1.21	1.21	0.01	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	104.99	105.02	105.01	0.01
15	71.13	71.42	71.28	0.15	24.98	22.66	23.82	1.16	3.46	3.71	3.59	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	99.57	97.79	98.68	0.89
30	69.62	67.00	68.31	1.31	30.89	32.41	31.65	0.76	3.47	3.87	3.67	0.20	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	103.98	103.28	103.63	0.35
44	68.22	67.00	67.61	0.61	26.77	27.55	27.16	0.39	8.55	9.23	8.89	0.34	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	103.54	103.78	103.66	0.12
61	67.89	69.44	68.67	0.78	25.08	23.93	24.51	0.58	12.23	11.85	12.04	0.19	0.26	0.25	0.26	0.01	0.26	105.46	105.47	105.47	0.00
90	65.83	66.27	66.05	0.22	20.92	22.09	21.51	0.58	17.57	17.39	17.48	0.09	0.50	0.46	0.48	0.02	0.46	104.82	106.21	105.52	0.70
Overall:																103.73	2.26				

¹LOD reported as 0.27% of applied (Appendix 7, pp. 234-235).

²LOD reported as 0.15% of applied (Appendix 7, pp. 244-245).

³LOD reported as 0.17% of applied (Appendix 7, p. 250).

Results from Appendix 7, pp. 233-235, 244-245, 250 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

(6)

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

Arkansas water-loam sediment.
[Phenyl-U-¹⁴C]-label.

Total [¹⁴C]residues in sediment.

Day	Sediment			
	Ext. % AR	Nonext. % AR	Total in Sediment % AR	Total in Sediment Mean s.d.
0	0.43		0.43	0.37 0.07
7	22.56	1.20	23.76	23.89 0.13
15	24.98	3.46	28.44	27.41 1.04
30	30.89	3.47	34.36	35.32 0.96
44	26.77	8.55	35.32	36.05 0.73
61	25.08	12.23	37.31	36.55 0.77
90	23.93	11.85	35.78	38.99 0.49
	20.92	17.57	38.49	
	22.09	17.39	39.48	

[¹⁴C]Residue water phase:sediment ratios.

Day	Water % AR	Sed. % AR	Ratio		W:S ratio		S:W ratio	
			W:S	S:W	Mean	s.d.	Mean	s.d.
0	104.67	0.43	243	0				
	102.87	0.30	343	0	293	50	0	0
7	81.23	23.76	3	0				
	81.01	24.01	3	0	3	0	0	0
15	71.13	28.44	3	0				
	71.42	26.37	3	0	3	0	0	0
30	69.62	34.36	2	0				
	67.00	36.28	2	1	2	0	1	0
44	68.22	35.32	2	1				
	67.00	36.78	2	1	2	0	1	0
61	67.89	37.31	2	1				
	69.44	35.78	2	1	2	0	1	0
90	65.83	38.49	2	1				
	66.27	39.48	2	1	2	0	1	0

Results imported from **Mat bal ARK Phe** worksheet.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (R5878) in Two Water-Sediment Systems.
MRID 46219017

California water-clay sediment.
[Pyrimidinyl-5-¹⁴C]-label.

Total [¹⁴C]residues in sediment.

Day	Sediment			
	Ext. % AR	Nonext. % AR	Total in Sediment % AR	Total in Sediment Mean s.d.
0	0.18		0.18	0.40 0.22
7	39.21	7.65	46.86	46.46 0.40
15	56.12	12.62	68.74	69.99 1.24
22	60.37	16.09	76.46	75.91 0.56
30	66.35	13.53	79.88	79.30 0.58
44	56.82	28.52	85.34	85.17 0.17
61	53.81	33.42	87.23	87.19 0.04

[¹⁴C]Residue water phase:sediment ratios.

Day	Water		Sed.		Ratio		Ratio		W:S ratio		S:W ratio	
	% AR	% AR	% AR	% AR	W:S	S:W	W:S	S:W	Mean	s.d.	Mean	s.d.
0	104.53	0.18	0.62	169	597	0	0	383	214	0	0	
7	60.56	46.86	46.05	1	1	1	1	1	0	1	0	
15	34.91	68.74	71.23	0	0	2	2	0	0	2	0	
22	28.57	76.46	75.35	0	0	3	3	0	0	3	0	
30	22.24	79.88	78.71	0	0	4	4	0	0	4	0	
44	16.72	85.34	84.99	0	0	5	5	0	0	5	0	
61	13.32	87.23	87.14	0	0	7	7	0	0	7	0	

Results imported from **Mat bal CAL Pyr** worksheet.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).



Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

California water-clay sediment.
[Phenyl-U-¹⁴C]-label.

Confirmation of summations and means for applied radioactivity and determination of standard deviations.

Day	Water						Sediment						CO ₂ ³			Material Balance		
	Mean		s.d.		Extract ¹		Nonextractable ²		CO ₂ ³		Material Balance		% AR	Mean	s.d.			
	% AR		% AR		% AR	Mean	s.d.	% AR	Mean	s.d.	% AR	Mean				s.d.		
0	104.93		0.08		0.45		0.06						105.38			105.43	0.02	
7	72.94		0.14		27.17		0.50	3.54	#DIV/0!	#DIV/0!			103.65			105.43	0.89	
15	61.35		0.83		32.81		0.70	4.89					99.05			98.86	0.09	
22	63.01		0.32		31.41		0.40	4.44	4.41	5.20	0.78		101.62			101.75	0.07	
30	62.85		1.13		34.36		0.20	4.42	5.98	4.82	0.40		103.03			101.97	0.53	
44	62.21		0.43		33.56		0.51	9.56	4.42	9.11	0.45		98.65			97.91	0.37	
61	62.10		0.28		26.34		0.10	10.79	11.39	11.09	0.30	0.21	99.44			100.39	0.47	
	62.67				26.15			11.39				0.18						
Overall:													101.61		2.57			

¹L₀D reported as 0.25% of applied (Appendix 7, pp. 237-238).

²L₀D reported as 0.09% of applied (Appendix 7, pp. 246-247).

³L₀D reported as 0.17% of applied (Appendix 7, p. 251).

Results from Appendix 7, pp. 236-238, 246-247, 251 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017

California water-clay sediment.
[Phenyl-U-¹⁴C]-label.

Total [¹⁴C]residues in sediment.

Day	Sediment			
	Ext.	Nonext.	Total in Sediment	
	% AR	% AR	% AR	s.d.
0	0.45		0.45	0.39
	0.33		0.33	0.06
7	27.17	3.54	30.71	
	28.17	4.04	32.21	31.46
15	32.81	4.89	37.70	
	31.41	4.44	35.85	36.78
22	34.36	4.41	38.77	
	33.56	5.98	39.54	39.16
30	36.01	4.42	40.43	
	36.41	5.22	41.63	41.03
44	27.95	9.56	37.51	
	28.97	8.66	37.63	37.57
61	26.34	10.79	37.13	
	26.15	11.39	37.54	37.34

Results imported from **Mat bal CAL Phe** worksheet.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

[¹⁴C]Residue water phase:sediment ratios.

Day	Water		Sed.		Ratio		Ratio		W:S ratio		S:W ratio	
	% AR		% AR		W:S		S:W		Mean		s.d.	
0	104.93	0.45	233	0	276	43	0	0	0	0	0	0
	105.10	0.33	318	0	2	0	2	0	2	0	0	0
7	72.94	30.71	2	0	2	0	2	0	2	0	0	0
	73.22	32.21	2	0	2	0	2	0	2	0	0	0
15	61.35	37.70	2	1	2	0	2	0	2	0	1	0
	63.01	35.85	2	1	2	0	2	0	2	0	1	0
22	62.85	38.77	2	1	2	0	2	0	2	0	1	0
	62.21	39.54	2	1	2	0	2	0	2	0	1	0
30	62.60	40.43	2	1	2	0	2	0	2	0	1	0
	60.34	41.63	1	1	1	0	1	0	1	0	1	0
44	61.14	37.51	2	1	2	0	2	0	2	0	1	0
	60.28	37.63	2	1	2	0	2	0	2	0	1	0
61	62.10	37.13	2	1	2	0	2	0	2	0	1	0
	62.67	37.54	2	1	2	0	2	0	2	0	1	0

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (R5878) in Two Water-Sediment Systems.
 MRID 46219017

Determination of overall means and standard deviations for applied radioactivity for both labels.

Day	Ark water-loam sed.		
	[Pyr- ¹⁴ C] % AR	[Phe- ¹⁴ C] % AR	
0	104.86	105.10	
	105.89	103.17	
7	104.31	104.99	
	104.81	105.02	
15	99.54	99.57	
	98.24	97.79	
30	103.74	103.98	
	103.74	103.28	
44	102.75	103.54	
	103.74	103.78	
61	103.77	105.46	
	103.51	105.47	
90	105.10	104.82	
	102.38	106.21	
Mean	103.31	103.73	
std dev	2.03	2.26	
n =	14	14	
Both labels	Mean	103.52	
	std dev	2.16	
	n =	28	

Day	Cal water-clay sed.		
	[Pyr- ¹⁴ C] % AR	[Phe- ¹⁴ C] % AR	
0	104.53	105.38	
	105.50	105.43	
7	107.42	103.65	
	106.11	105.43	
15	103.65	99.05	
	104.52	98.86	
22	105.03	101.62	
	101.89	101.75	
30	102.12	103.03	
	101.03	101.97	
44	102.52	98.65	
	102.30	97.91	
61	101.71	99.44	
	101.69	100.39	
Mean	103.57	101.61	
std dev	1.89	2.57	
n =	14	14	
Both labels	Mean	102.59	
	std dev	2.46	
	n =	28	

Results imported from Mat bal ARK Pyr, Mat bal ARK Phe, Mat bal CAL Pyr, Mat bal CAL Phe worksheets.
 Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

29

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 Arkansas water-foam sediment.
 Confirmation/determination of means/std.dev. for [pyrimidinyl-5-¹⁴C]orthosulfamuron and its degradates.

Day	Water			Sediment			Total system			Water			Sediment			Total system		
	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.
Orthosulfamuron (IR5878, S3)																		
0	103.62						103.62			103.62			0.48			0.48		
	103.76	103.69	0.07				103.76	103.69	0.07				0.40	0.44	0.04	0.40	0.44	0.04
7	65.37			20.92			86.29			7.80			5.09	7.80		12.89		
	66.01	65.69	0.32	21.11	21.02	0.09	87.12	86.71	0.41	8.07	7.94	0.13	4.68	8.07	0.13	12.75	12.82	0.07
15	47.79			21.81			69.60			14.02			5.82	14.02		19.84		
	46.38	47.09	0.70	21.06	21.44	0.38	67.44	68.52	1.08	13.95	13.99	0.04	6.09	13.95	0.04	20.04	19.94	0.10
30	35.24			21.89			57.13			4.93			4.93	29.89		34.82		
	34.84	35.04	0.20	22.49	22.19	0.30	57.33	57.23	0.10	5.11	5.02	0.09	5.11	29.35	0.27	34.46	34.64	0.18
44	27.25			25.48			52.73			3.85			3.85	31.63		35.48		
	27.40	27.33	0.07	24.09	24.79	0.69	51.49	52.11	0.62	4.48	4.17	0.32	4.48	31.89	0.13	36.37	35.93	0.45
61	17.28			14.96			32.24			5.22			5.22	38.83		44.05		
	19.21	18.25	0.96	14.53	14.75	0.21	33.74	32.99	0.75	5.64	5.43	0.21	5.64	38.41	0.21	44.05	44.05	0.00
90	9.80			10.96			20.76			4.09			4.09	41.68		45.77		
	10.88	10.34	0.54	10.43	10.70	0.26	21.31	21.04	0.27	5.28	4.69	0.59	5.28	42.50	0.41	47.78	46.78	1.01
O-desmethyl IR5878 (S9)																		
0	0.75						0.75			0.75			0.75			0.75		
	1.29	1.02	0.27				1.29	1.02	0.27				1.29	1.02	0.27	1.29	1.02	0.27
7	1.03			0.70			1.73			1.73			1.73			1.73		
	0.98	1.01	0.03	0.87	0.79	0.09	1.85	1.79	0.06	1.85	1.79	0.06	1.85	1.79	0.06	1.85	1.79	0.06
15	1.46			1.08			2.54			2.54			2.54			2.54		
	1.43	1.45	0.02	0.95	1.02	0.06	2.38	2.46	0.08	2.38	2.46	0.08	2.38	2.46	0.08	2.38	2.46	0.08
30	2.72			1.80			4.52			4.52			4.52			4.52		
	2.75	2.74	0.01	1.76	1.78	0.02	4.51	4.52	0.01	4.51	4.52	0.01	4.51	4.52	0.01	4.51	4.52	0.01
44	3.04			2.13			5.17			5.17			5.17			5.17		
	3.16	3.10	0.06	2.17	2.15	0.02	5.33	5.25	0.08	5.33	5.25	0.08	5.33	5.25	0.08	5.33	5.25	0.08
61	5.20			2.24			7.44			7.44			7.44			7.44		
	5.35	5.28	0.07	2.10	2.17	0.07	7.45	7.45	0.00	7.45	7.45	0.00	7.45	7.45	0.00	7.45	7.45	0.00
90	6.68			2.69			9.37			9.37			9.37			9.37		
	6.66	6.67	0.01	2.26	2.48	0.22	8.92	9.15	0.22	8.92	9.15	0.22	8.92	9.15	0.22	8.92	9.15	0.22

LODs reported as 0.22% and 0.27% of applied for water and sediment extracts, respectively (Appendix 8, pp. 257, 260).
 Results from Appendix 8, pp. 257, 260, 262 of the study report.
 Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.

Arkansas water-loam sediment.

Confirmation/determination of means/std.dev. for [pyrimidinyl-5-¹⁴C]orthosulfamuron and its degradates (continued).

Day	Origin S11						Unknown S13						Unknown S15						Total Unknowns						
	H2O		Sed		Tot sys		H2O		Sed		Tot sys		H2O		Sed		Tot sys		Water		Sediment		Total system		
	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	mean	s.d.	% AR	mean	s.d.	
0			0.00			0.00					0.00								0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.43		0.43			0.00					0.00								0.43	0.00	0.00	0.00	0.43	0.00	0.00
15	0.37	0.42	0.79			0.00	0.78	0.44	1.22		0.00	0.58	0.99	1.68					0.58	0.51	0.07	0.00	0.58	0.51	0.07
30	0.57	0.48	1.05			0.58	0.69	0.99	1.68		0.58	1.09	1.09	1.09					1.08	1.12	0.04	0.99	0.93	0.06	2.04
44	0.77	1.26	2.03			0.48	0.22	1.19	1.41		0.48	1.09	1.09	1.09					0.57	0.57	0.00	1.06	1.33	0.27	1.90
61	1.07	1.04	2.11			2.07	0.78	2.07	2.85		2.07	3.10	3.33	3.33					2.11	1.84	0.27	3.50	4.08	0.58	5.92
90	1.08	1.82	2.90			1.11	0.61	0.50	1.11		0.50	1.23	1.23	1.23					1.97	1.68	0.30	2.32	2.53	0.21	4.21
	1.13	1.51	2.64			1.23	0.25	0.25	1.23		0.25	0.25	0.25	0.25					1.38	0.30	0.30	2.74	2.74	0.21	4.12

LODs reported as 0.22% and 0.27% of applied for water and sediment extracts, respectively (Appendix 8, pp. 257, 260).

Results from Appendix 8, pp. 257, 260, 262 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

6

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 Arkansas water-foam sediment.
 Confirmation/determination of means/std.dev. for [phenyl-U-¹⁴C]orthosulfamuron and its degradates.

Day	Water			Sediment			Total system			Water			Sediment			Total system		
	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.
Orthosulfamuron (IR5878, S3)																		
0	103.33						103.33			103.33			0.31			0.31		
	101.40	102.37	0.96				101.40	102.37	0.96				0.47	0.39	0.08	0.47	0.39	0.08
7	67.99			20.30			88.29			88.29			10.16			11.69		
	68.12	68.06	0.07	19.93	20.12	0.18	88.05	88.17	0.12				9.82	9.99	0.17	11.49	11.59	0.10
15	49.46			20.61			70.07			70.07			17.53			20.06		
	50.52	49.99	0.53	18.41	19.51	1.10	68.93	69.50	0.57				17.06	17.30	0.23	19.75	19.91	0.15
30	36.26			22.02			58.28			58.28			27.99			33.83		
	36.14	36.20	0.06	23.50	22.76	0.74	59.64	58.96	0.68				24.83	26.41	1.58	30.52	32.18	1.66
44	28.02			17.31			45.33			45.33			33.69			39.58		
	28.74	28.38	0.36	17.95	17.63	0.32	46.69	46.01	0.68				32.09	32.89	0.80	38.46	39.02	0.56
61	18.29			13.90			32.19			32.19			39.97			47.12		
	18.41	18.35	0.06	13.37	13.64	0.27	31.78	31.99	0.20				40.71	40.34	0.37	47.33	47.23	0.11
90	9.06			7.86			16.92			16.92			44.81			53.17		
	9.21	9.14	0.08	8.73	8.30	0.44	17.94	17.43	0.51				46.53	45.67	0.86	55.77	54.47	1.30
O-desmethyl IR5878 (S9)																		
0							0.00			0.00			1.04			1.04		
	0.46						0.00	0.00	0.00				1.01	1.03	0.02	1.01	1.03	0.02
7	0.41			0.48			0.94			0.94			1.41			1.66		
	0.41	0.44	0.02	0.38	0.43	0.05	0.79	0.87	0.07				1.45	1.43	0.02	1.74	1.70	0.04
15	0.83			0.87			1.70			1.70			2.18			2.66		
	0.89	0.86	0.03	0.61	0.74	0.13	1.50	1.60	0.10				2.03	2.11	0.08	2.48	2.57	0.09
30	2.10			1.62			3.72			3.72			2.41			3.14		
	2.36	2.23	0.13	1.69	1.66	0.03	4.05	3.89	0.17				2.52	2.47	0.06	3.30	3.22	0.08
44	3.19			1.87			5.06			5.06			2.32			2.91		
	3.00	3.10	0.10	1.96	1.92	0.04	4.96	5.01	0.05				2.20	2.26	0.06	2.89	2.90	0.01
61	4.56			1.97			6.53			6.53			3.11			3.93		
	4.83	4.70	0.13	2.04	2.01	0.04	6.87	6.70	0.17				3.25	3.18	0.07	4.07	4.00	0.07
90	5.97			2.06			8.03			8.03			2.94			3.77		
	5.08	5.53	0.44	1.78	1.92	0.14	6.86	7.45	0.58				2.80	2.87	0.07	3.67	3.72	0.05

LODs reported as 0.16% and 0.20% of applied for water and sediment extracts, respectively (Appendix 8, pp. 273, 276).
 Results from Appendix 8, pp. 273, 276, 278 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 Arkansas water-loam sediment.

Confirmation/determination of means/std.dev. for [phenyl-U-¹⁴C]orthosulfamuron and its degradates (continued).

Day	Unknown S4				Origin S5				Unknown S6				Unknown S8			
	H2O		Sed		H2O		Sed		H2O		Sed		H2O		Sed	
	% AR	mean	% AR	mean	% AR	mean	% AR	mean	% AR	mean	% AR	mean	% AR	mean	% AR	mean
0																
7																
15	0.24	0.34	0.32	0.32	0.46	0.40	0.40	0.40	0.46	0.41	0.41	0.41				
30	0.38	0.33	0.33	0.33	0.86	0.34	0.34	0.34	1.20	0.41	0.41	0.41				
44		0.63	0.63	0.63	0.99	0.48	0.48	0.48	1.47	0.00	0.00	0.00				
61	0.22	0.32	0.32	0.32	1.74	0.92	0.92	0.92	2.66	0.00	0.00	0.00				
90	0.21	0.56	0.77	0.77	2.84	0.89	0.89	0.89	3.73	0.00	0.00	0.00				
	0.17	0.32	0.49	0.49	2.48	0.85	0.85	0.85	3.33	0.00	0.00	0.00				
Total Unknowns																

Day	% AR		mean		s.d.		% AR		mean		s.d.	
	water	sediment	water	sediment	water	sediment	water	sediment	water	sediment	water	sediment
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.20	1.20	1.20	1.20	0.00	0.00	1.20	1.20	1.47	0.27	0.27	0.27
15	1.11	1.03	1.09	1.03	0.09	0.09	1.45	1.26	1.36	0.10	0.10	0.10
30	0.86	1.01	0.93	1.01	0.15	0.15	1.53	1.90	1.72	0.19	0.19	0.19
44	0.99	0.98	0.98	0.98	0.01	0.01	2.10	1.55	1.83	0.28	0.28	0.28
61	1.96	2.25	2.11	2.11	0.14	0.14	3.20	3.32	3.26	0.06	0.06	0.06
90	3.05	2.85	2.95	2.95	0.20	0.20	4.86	4.12	4.49	0.37	0.37	0.37

LODs reported as 0.16% and 0.20% of applied for water and sediment extracts, respectively (Appendix 8, pp. 273, 276).
 Results from Appendix 8, pp. 273, 276, 278 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 California water-clay sediment.
 Confirmation/determination of means/std.dev. for [pyrimidinyl-5-¹⁴C]orthosulfamuron and its degradates.

Day	Water			Sediment			Total system			Water			Sediment			Total system			
	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	
Orthosulfamuron (IR5878, S3)																			
0	102.82	103.17	0.35				102.82	103.52	103.17	0.35	0.78	0.63	0.16				0.78	0.63	0.16
7	51.49	51.12	0.37	23.22	20.82	2.41	74.71	69.16	71.94	2.78	6.66	6.62	0.04	14.26	#DIV/0!	#DIV/0!	20.92	23.16	2.24
15	26.18	25.85	0.33	24.33	25.44	1.10	50.51	52.06	51.29	0.78	6.57	3.93	0.04	27.83			31.80		
22	19.43	18.79	0.64	25.87	26.33	0.46	45.30	44.94	45.12	0.18	3.97	3.22	0.10	28.37	28.10	0.27	32.26	32.03	0.23
30	18.15	12.95	0.15	26.79	21.96	0.43	35.49	34.32	34.91	0.59	3.32	2.77	0.06	29.40	29.65	0.24	33.01	32.87	0.15
44	12.79	7.62	0.23	22.39	19.42	0.44	26.83	27.23	27.03	0.20	2.82	2.44	0.09	37.70	37.36	0.34	40.52	40.13	0.40
61	7.85	3.33	0.05	19.85	12.57	0.05	15.99	15.79	15.89	0.10	2.71	2.35	0.06	30.35	29.16	1.20	32.79	31.51	1.28
	3.28			12.62			15.99				2.11	2.17	0.06	33.66	33.65	0.01	35.77	35.82	0.05
				12.51			15.79				2.23			33.63			35.86		
O-desmethyl IR5878 (S9)																			
0	0.93	0.91	0.03				0.93	0.88	0.91	0.03									
7	1.45	1.57	0.12	0.65	0.76	0.11	2.10	2.56	2.33	0.23									
15	3.08	3.03	0.05	1.67	1.72	0.05	4.75	4.74	4.75	0.00									
22	4.07	3.99	0.08	2.00	2.02	0.02	6.07	5.94	6.01	0.07									
30	4.52	4.75	0.23	2.08	2.20	0.12	6.60	7.30	6.95	0.35									
44	4.28	4.47	0.19	2.32	2.11	0.13	6.26	6.90	6.58	0.32									
61	4.66	4.75	0.11	2.24	1.18	0.01	5.83	6.03	5.93	0.10									
	4.64			1.19			6.03												
	4.86			1.17			6.03												

LODs reported as 0.22% and 0.27% of applied for water and sediment extracts, respectively (Appendix 8, pp. 265, 268).
 Results from Appendix 8, pp. 265, 268, 270 of the study report.
 Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

53

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.

California water-clay sediment.

Confirmation/determination of means/std.dev. for [pyrimidinyl-5-¹⁴C]orthosulfamuron and its degradates (continued).

Day	Origin S11						Unknown S13						Unknown S15						Total Unknowns						
	H2O		Sed		Tot sys		H2O		Sed		Tot sys		H2O		Sed		Tot sys		Water		Sediment		Total system		
	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	% AR	mean	s.d.	mean	s.d.	mean	s.d.
0			0.00			0.00					0.00								0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.51	0.81	1.32	0.45		0.45	0.45				0.27	0.27							0.96	0.00	1.08	0.00	2.04	0.00	0.00
15	0.49	0.64	1.13	0.55		0.55	0.35	0.68	1.03	1.03	0.24	0.70	0.94	0.90	0.67	0.67	0.67	0.67	1.04	1.00	0.64	0.86	1.68	0.22	1.86
22	1.09	0.91	2.00	0.91	0.51	0.51	0.33	0.91	1.24	1.24	0.26	1.23	1.49	1.75	0.90	0.90	0.90	0.90	1.68	1.29	2.29	2.19	3.97	0.10	3.48
30	0.90	0.91	1.81				1.11	0.76	1.87	1.87	0.27	1.19	1.46	1.38	1.38	1.38	1.38	1.38	0.90	0.39	2.09	0.10	2.99	0.04	3.48
44	1.16	0.95	2.11	0.87	1.05	1.05	0.22	0.87	1.09	1.09	0.25	1.70	1.95	1.80	1.80	1.80	1.80	1.80	1.75	1.57	3.09	3.05	4.84	0.04	4.61
61	1.33	1.61	2.94	1.28	1.28	1.28	0.22	0.87	1.09	1.09	0.33	1.80	2.13	1.85	1.83	1.83	1.83	1.83	1.80	0.03	4.18	4.39	5.98	0.21	6.22
	1.52	1.52	3.04	0.77	0.77	0.77					0.44	2.89	3.33	2.15	2.15	2.15	2.15	2.15	0.15	5.51	5.98	7.66	0.47	8.28	
	1.71	1.85	3.56	0.57	0.57	0.57	0.34	0.68	1.02	1.02	0.44	3.61	4.05	2.45	2.30	2.30	2.30	2.45	0.15	6.44	6.33	8.89	0.00	9.52	
	2.01	2.26	4.27	0.51	0.51	0.51	0.25	0.51	0.76	0.76	0.67	2.39	3.06	3.03	3.03	3.03	3.03	3.03	0.08	6.32	6.32	9.35	0.00	9.44	
	2.18	3.26	5.44				0.60	0.60	2.41	2.41	0.60	2.41	3.01	3.03	3.03	3.03	3.03	3.03	0.08	6.32	6.32	9.35	0.00	9.44	
	2.18	3.40	5.58																						0.09

LODs reported as 0.22% and 0.27% of applied for water and sediment extracts, respectively (Appendix 8, pp. 265, 268).

Results from Appendix 8, pp. 265, 268, 270 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 California water-clay sediment.
 Confirmation/determination of means/std.dev. for [phenyl-U-¹⁴C]orthosulfamuron and its degradates.

Day	Water			Sediment			Total system			Water			Sediment			Total system		
	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.	% AR	mean	s.d.
Orthosulfamuron (IR5878, S3)																		
0	103.42						103.42			103.50	0.07	0.43				0.43		
	103.57	103.50	0.07				103.57			103.50	0.07	0.49	0.46	0.03		0.49	0.46	0.03
7	46.80	49.15	2.35	16.75			63.55			68.97	5.41	23.14			7.45	30.59		
	51.50	49.15	2.35	22.88	19.82	3.07	74.38			68.97	5.41	18.70	20.92	2.22	3.80	22.50	26.55	4.04
15	29.91	31.12	1.20	24.53			54.44			55.38	0.94	26.06			5.75	31.81		
	32.32	31.12	1.20	23.99	24.26	0.27	56.31			55.38	0.94	25.53	25.80	0.26	4.89	30.42	31.12	0.69
22	20.55	19.69	0.86	23.61			44.16			43.14	1.02	35.83	36.17	0.33	7.32	43.15		
	18.82	19.69	0.86	23.30	23.46	0.16	42.12			43.14	1.02	36.50	36.17	0.33	7.15	43.65	43.40	0.25
30	13.54	13.67	0.13	22.24			35.78			35.64	0.15	41.77	39.95	1.82	10.03	51.80		
	13.80	13.67	0.13	21.69	21.97	0.27	35.49			35.64	0.15	38.12	39.95	1.82	9.98	48.10	49.95	1.85
44	7.12	7.39	0.27	15.35			22.47			23.14	0.67	45.96	45.24	0.72	8.72	54.68		
	7.66	7.39	0.27	16.14	15.75	0.40	23.80			23.14	0.67	44.51	45.24	0.72	9.20	53.71	54.20	0.49
61	2.42	2.56	0.14	10.16			12.58			12.73	0.15	49.88	49.70	0.18	10.98	60.86		
	2.69	2.56	0.14	10.19	10.18	0.01	12.88			12.73	0.15	49.52	49.70	0.18	11.11	60.63	60.75	0.11
O-desmethyl IR5878 (S9)																		
0							0.00			0.00	0.00	1.08	1.06	0.02		1.08	1.06	0.02
							0.00			0.00	0.00	1.04	1.06	0.02		1.04	1.06	0.02
7	0.64	0.74	0.10	0.56	0.60	0.04	1.20			1.34	0.14	1.90	1.76	0.14	0.71	2.61		
	0.83	0.74	0.10	0.64	0.60	0.04	1.47			1.34	0.14	1.62	1.76	0.14	0.57	2.19	2.40	0.21
15	2.18	2.19	0.00	1.25	1.23	0.03	3.43			3.41	0.02	2.12	2.16	0.03	0.71	2.83		
	2.19	2.19	0.00	1.20	1.23	0.03	3.39			3.41	0.02	2.19	2.16	0.03	0.69	2.88	2.86	0.02
22	2.89	3.19	0.29	1.34	1.31	0.04	4.23			4.49	0.26	2.57	2.47	0.10	1.14	3.71		
	3.48	3.19	0.29	1.27	1.31	0.04	4.75			4.49	0.26	2.37	2.47	0.10	1.01	3.38	3.55	0.16
30	3.13	3.58	0.44	1.35			4.48			5.17	0.69	2.75	2.61	0.14	1.10	3.85		
	4.02	3.58	0.44	1.84	1.60	0.24	5.86			5.17	0.69	2.47	2.61	0.14	1.28	3.75	3.80	0.05
44	4.25	4.41	0.16	1.49	1.53	0.04	5.74			5.94	0.19	2.10	2.05	0.05	1.04	3.14		
	4.56	4.41	0.16	1.57	1.53	0.04	6.13			5.94	0.19	2.00	2.05	0.05	0.85	2.85	3.00	0.14
61	4.04	4.32	0.28	1.29	1.30	0.01	5.33			5.62	0.29	2.50	2.66	0.15	1.21	3.71		
	4.60	4.32	0.28	1.31	1.30	0.01	5.91			5.62	0.29	2.81	2.66	0.15	1.28	4.09	3.90	0.19

LODs reported as 0.16% and 0.20% of applied for water and sediment extracts, respectively (Appendix 8, pp. 281, 284).
 Results from Appendix 8, pp. 281, 284, 286 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems/MRID 46219017.
 California water-clay sediment.

Confirmation/determination of means/std.dev. for [phenyl-¹⁴C]orthosulfamuron and its degradates (continued).

Day	Unknown S4			Origin S5			Unknown S6			Unknown S8		
	H2O %AR	Sed %AR	Tot sys %AR	H2O %AR	Sed %AR	Tot sys %AR	H2O %AR	Sed %AR	Tot sys %AR	H2O %AR	Sed %AR	Tot sys %AR
0			0.00			0.00			0.00			0.00
7		1.23	0.00	0.47	0.47	0.94			0.00			0.00
15	0.37	0.24	0.61	0.71	0.33	1.04			0.00			0.00
22	0.25	0.28	0.53	0.54	0.35	0.89			0.00			0.00
30	0.23	0.46	0.69	0.79	0.49	1.28			0.00			0.00
44	0.23	0.41	0.64	0.80	0.41	1.21			0.00			0.00
61	0.29	0.62	0.91	1.11	0.67	1.78			0.00			0.00
	0.46	0.77	1.23	1.48	0.86	2.34			0.00			0.00
	0.19	0.58	0.77	1.52	0.77	2.29			0.00			0.00
	0.19	0.39	0.58	1.37	0.81	2.18			0.00			0.00
	0.39	0.92	1.31	2.87	1.16	4.03			0.00			0.00
	0.44	0.79	1.23	2.62	0.97	3.59			0.00			0.00
Total Unknowns												
Day	Water		Sediment			Total system						
	%AR	s.d.	%AR	mean	s.d.	%AR	mean	s.d.				
0	0.00		0.00	0.00	0.00	0.00	0.00	0.00				
7	0.47	0.52	1.70	0.99	0.71	2.17	1.51	0.66				
15	1.08	0.94	0.57	0.60	0.03	1.65	1.54	0.11				
22	1.02		0.95	0.89	0.06	1.97	1.91	0.06				
30	1.03	1.03	0.82	1.46	0.17	2.69	3.13	0.44				
44	1.40	1.67	1.63	1.35		3.57	2.91	0.15				
61	1.94	1.64	1.20	2.69	0.07	5.95	5.64	0.32				
	1.71	3.26	2.69	2.48	0.22	5.32	5.64	0.32				

LODs reported as 0.16% and 0.20% of applied for water and sediment extracts, respectively (Appendix 8, pp. 281, 284).
 Results from Appendix 8, pp. 281, 284, 286 of the study report.

Means and standard deviations calculated using Microsoft program functions @average(A1:A2) and stdevp(A1:A2).

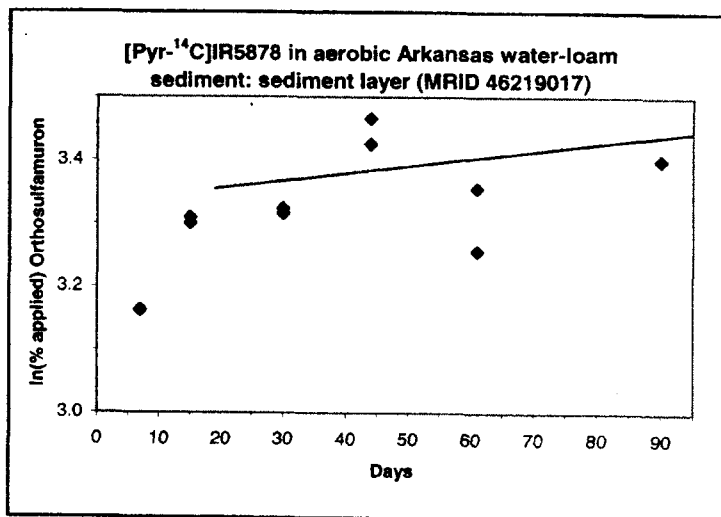
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0		#NUM!
0		#NUM!
7	23.64	3.16294
7	23.62	3.162094
15	27.36	3.309082
15	27.11	3.299903
30	27.54	3.315639
30	27.76	3.323596
44	31.98	3.465111
44	30.74	3.425565
61	28.68	3.3562
61	25.96	3.256557
90	34.70	3.54674
90	29.99	3.400864



0- to 90-day data:

Linear half-life = Stable

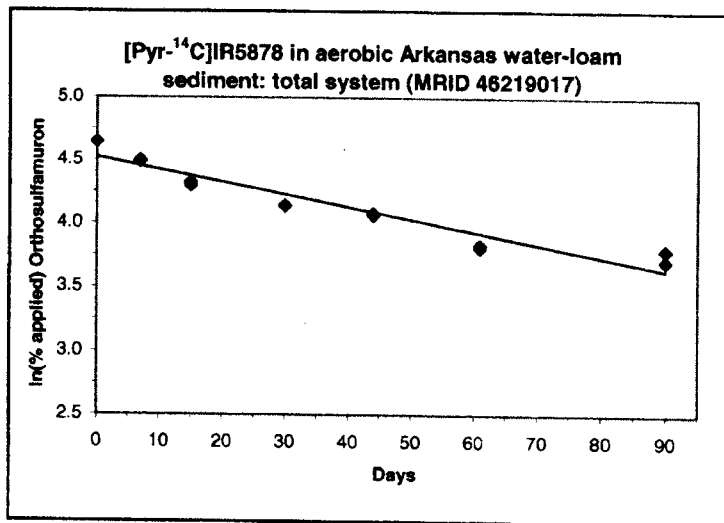
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.62	4.64073
0	103.76	4.642081
7	89.01	4.488749
7	89.63	4.49569
15	75.15	4.319486
15	73.49	4.297149
30	62.78	4.139637
30	62.60	4.136765
44	59.23	4.081428
44	58.14	4.062854
61	45.96	3.827771
61	45.17	3.810433
90	44.50	3.795489
90	40.87	3.710396



SUMMARY OUTPUT

0- to 90-day data:

Linear half-life = 70.5 days

Regression Statistics	
Multiple R	0.95746333
R Square	0.91673602
Adjusted R Square	0.90979736
Standard Error	0.09532338
Observations	14

ANOVA

	df	SS	MS	F	Significance F
Regression	1	1.200514	1.2005	132.1199444	7.801E-08
Residual	12	0.109039	0.0091		
Total	13	1.309553			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.52166662	0.039486	114.51	1.31806E-19	4.4356338	4.6076995	4.435633784	4.607699456
X Variable 1	-0.00982727	0.000855	-11.49	7.80105E-08	-0.01169	-0.0079645	-0.01169009	-0.00796446

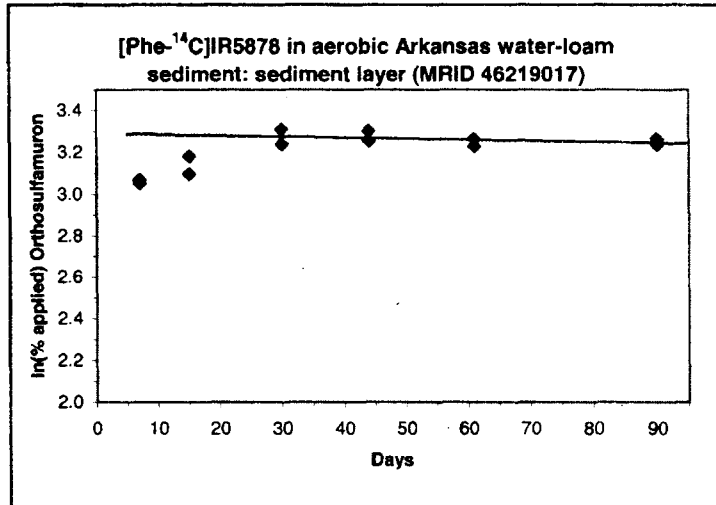
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [phenyl-U-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	21.50	3.068053
7	21.14	3.051167
15	24.07	3.180966
15	22.12	3.096482
30	25.49	3.238286
30	27.37	3.309448
44	25.86	3.252697
44	27.18	3.302481
61	26.13	3.263084
61	25.22	3.227637
90	25.43	3.23593
90	26.12	3.262701



0- to 90-day data:

Linear half-life = Stable

7

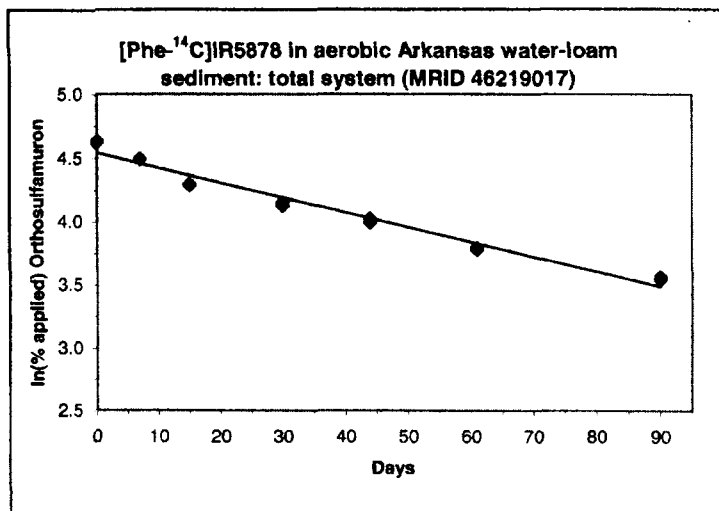
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

Arkansas water-loam sediment - [phenyl-U-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.33	4.637928
0	101.40	4.619073
7	89.49	4.494127
7	89.26	4.491553
15	73.53	4.297693
15	72.64	4.285516
30	61.75	4.123094
30	63.51	4.151197
44	53.88	3.986759
44	55.92	4.023922
61	44.42	3.79369
61	43.63	3.775745
90	34.49	3.540669
90	35.33	3.564732



SUMMARY OUTPUT

<u>Regression Statistics</u>	
Multiple R	0.986
R Square	0.9721
Adjusted R Square	0.9698
Standard Error	0.0637
Observations	14

0- to 90-day data:

Linear half-life = 59.2 days

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.701668	1.7017	418.8475388	1.066E-10
Residual	12	0.048753	0.0041		
Total	13	1.750421			

	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.5404	0.026403	171.96	1.00496E-21	4.4828665	4.5979212	4.482866506	4.597921181
X Variable 1	-0.012	0.000572	-20.47	1.06588E-10	-0.012946	-0.0104544	-0.01294563	-0.01045443

1

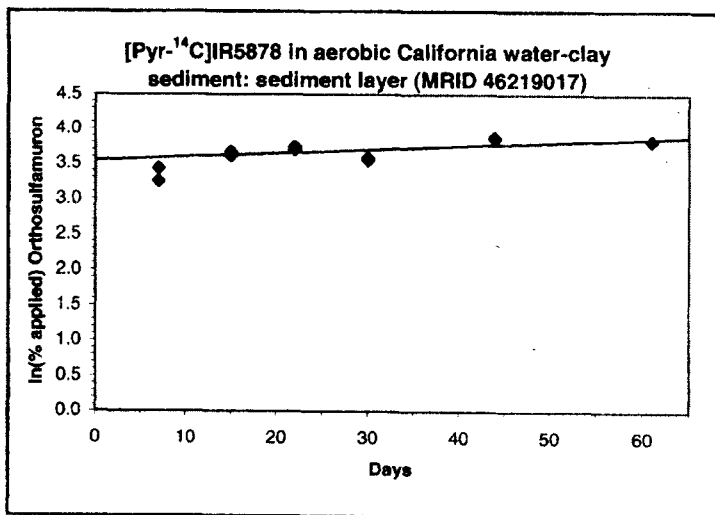
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	30.87	3.429785
7	25.73	3.247658
15	36.95	3.609566
15	39.02	3.664074
22	41.96	3.736717
22	40.42	3.699325
30	35.92	3.581294
30	34.77	3.548755
44	47.50	3.86073
44	48.35	3.878466
61	46.04	3.829511
61	46.01	3.828859



0- to 61-day data:

Linear half-life = Stable

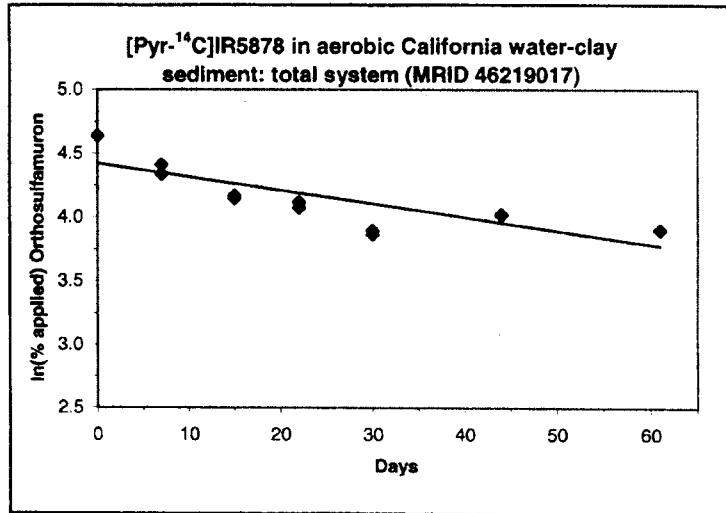
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [pyrimidinyl-5-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	102.82	4.63298
0	103.52	4.639765
7	82.36	4.41111
7	76.48	4.337029
15	63.13	4.145196
15	64.54	4.167285
22	61.39	4.117247
22	58.57	4.070223
30	49.02	3.892228
30	47.56	3.861992
44	55.35	4.013677
44	55.73	4.020519
61	49.41	3.900153
61	49.29	3.897721



SUMMARY OUTPUT

0- to 61-day data:

Linear half-life = 65.4 days

Regression Statistics

Multiple R	0.829
R Square	0.6873
Adjusted R Square	0.6613
Standard Error	0.1527
Observations	14

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.615058	0.6151	26.37829982	0.0002466
Residual	12	0.279802	0.0233		
Total	13	0.89486			

	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.4215	0.066709	66.281	9.22856E-17	4.2761837	4.5668761	4.276183652	4.566876082
X Variable 1	-0.011	0.002064	-5.136	0.000246641	-0.015095	-0.0061024	-0.01509481	-0.00610241

72

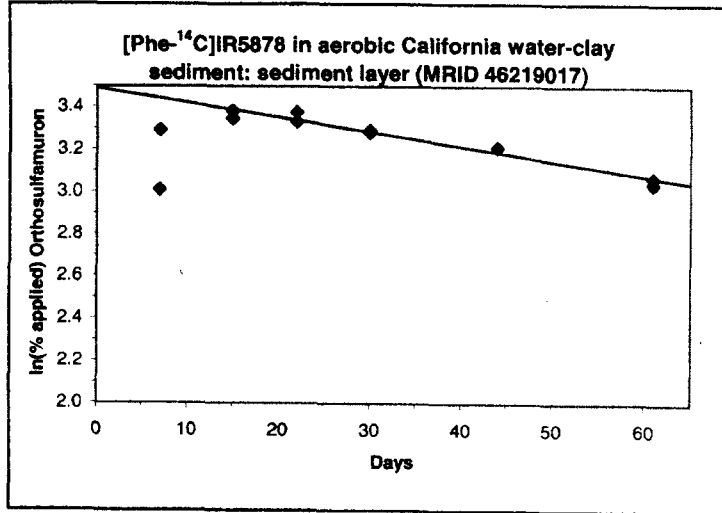
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [phenyl-U-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Sediment layer

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	0.00	#NUM!
0	0.00	#NUM!
7	20.29	3.010128
7	26.92	3.29287
15	29.42	3.381675
15	28.43	3.347445
22	28.02	3.332919
22	29.28	3.376905
30	26.66	3.283164
30	26.91	3.292498
44	24.91	3.215269
44	24.80	3.210844
61	20.95	3.042139
61	21.58	3.071767



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9797
R Square	0.9598
Adjusted R Square	0.9548
Standard Error	0.0256
Observations	10

15- to 61-day data:

Linear half-life = 101.9 days

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.124909	0.1249	191.2474631	7.223E-07
Residual	8	0.005225	0.0007		
Total	9	0.130134			

	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	3.4895	0.018755	186.06	7.7914E-16	3.4462609	3.5327575	3.446260889	3.532757534
X Variable 1	-0.007	0.000492	-13.83	7.22343E-07	-0.007938	-0.0056692	-0.00793819	-0.00566918

71

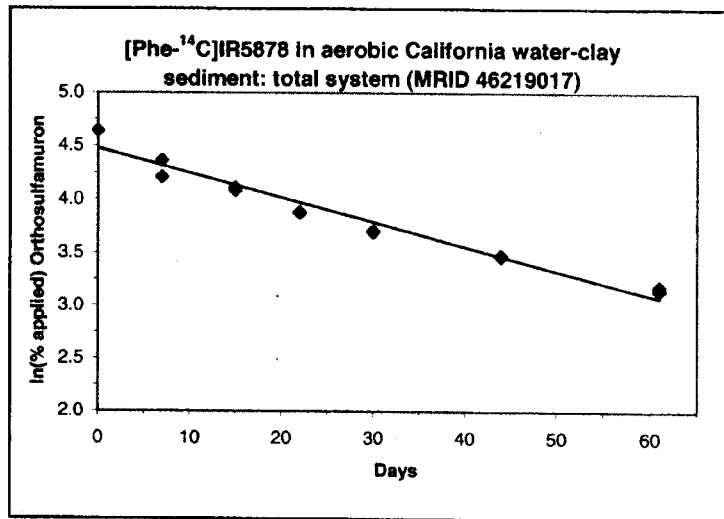
**Aerobic Aquatic Metabolism of [¹⁴C]-labeled Orthosulfamuron (IR5878) in Two Water-Sediment Systems.
MRID 46219017**

California water-clay sediment - [phenyl-U-¹⁴C]-label.

Half-life determination accounting bound residues as parent.

Total system

Days	Orthosulfamuron	
	%AR	Ln(%AR)
0	103.42	4.638798
0	103.57	4.640248
7	67.09	4.206035
7	78.42	4.362079
15	59.33	4.083115
15	60.75	4.106767
22	48.57	3.883006
22	48.10	3.873282
30	40.20	3.693867
30	40.71	3.706474
44	32.03	3.466673
44	32.46	3.480009
61	23.37	3.151453
61	24.27	3.189241



SUMMARY OUTPUT

0- to 61-day data:
Linear half-life = 30.3 days

Regression Statistics	
Multiple R	0.9794
R Square	0.9592
Adjusted R Sq	0.9558
Standard Error	0.1008
Observations	14

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	2.865005	2.865	282.1648306	1.058E-09
Residual	12	0.121844	0.0102		
Total	13	2.986849			

	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.4764	0.044021	101.69	5.47425E-19	4.3805261	4.5723533	4.380526104	4.572353334
X Variable 1	-0.023	0.001362	-16.8	1.05825E-09	-0.025842	-0.0199076	-0.02584164	-0.01990758

75

**Attachment 3: Transformation Pathway Presented by Registrant
Illustration of Test System**

DER for MRID #46219017

Page _____ is not included in this copy.

Pages 77 through 78 are not included in this copy.

The material not included contains the following type of information:

- Identity of product inert ingredients.
- Identity of product impurities.
- Description of the product manufacturing process.
- Description of quality control procedures.

- Identity of the source of product ingredients.
- Sales or other commercial/financial information.
- A draft product label.
- The product confidential statement of formula.
- Information about a pending registration action.
- FIFRA registration data.
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- The document is not responsive to the request.
- Internal deliberative information.
- Attorney-Client work product.
- Claimed Confidential by submitter upon submission to the Agency.

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