(5-10-2004)

Data Evaluation Report on the adsorption-desorption of penoxsulam in soil

PMRA Submission Number {.....}

EPA MRID Number 45830801

Data Requirement: PMRA Data Code:
EPA DP Barcode: D288160
OECD Data Point:
EPA Guideline: 163-1

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

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

CITATION: Yoder, R.N. 2000. Batch equilibrium adsorption/desorption of XDE-638 on seventeen soils and one sediment. Unpublished study performed, sponsored and submitted by Global Environmental Chemistry Laboratory- Indianapolis Lab, Dow AgroSciences LLC, Indianapolis, Indiana. Laboratory Study ID: 990058. Experiment initiation August 25, 1999, and completion November 10, 1999 (p.3R1). Final report issued June 1, 2000.

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EXECUTIVE SUMMARY:

The adsorption/desorption characteristics of [triazolopyrimidine-2-^{14}C]-labeled 3-(2,2-difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-triflurortoluene-2-sulfonamide (penoxsulam, XDE-638) were studied in four soils and one sediment from the U.S.: a sand soil from North Carolina [M538; pH 5.6, organic carbon 0.40%], a silt loam soil from Arkansas [M557; pH 5.8, organic carbon 0.97%], a clay loam soil from California [M562; pH 6.5, organic carbon 2.46%], a loam soil from North Dakota [M563; pH 6.9, organic carbon 2.74%], a silty clay sediment from Arkansas [pH 5.1, organic carbon 0.12%], and in thirteen foreign soils: a loam soil [M558; pH 6.9, organic carbon 3.71%], a sandy clay loam soil [M559; pH 6.3, organic carbon 2.16%], and two loam soils [M560; pH 5.5, organic carbon 3.41% and M561; pH 5.3, organic carbon 1.28%] each from Japan, a sandy loam soil [M564; pH 6.0, organic carbon 1.45%], a clay loam soil [M565; pH 6.7, organic carbon 4.37%], and a sandy clay loam soil [pH 7.3, organic carbon 1.0%], each from Brazil, two clay loam soils from Canada [M567; pH 6.0, organic carbon 2.0% and M568; pH 8.1, organic carbon 3.59%], a silty clay loam [M570; pH 6.2, organic carbon 0.99%] and a sandy loam soil [M573; pH 6.3, organic carbon 0.85%], each from Italy, a silty clay loam soil from France [M571; pH 6.2, organic carbon 0.97%], and a sandy clay loam soil from the UK [M572; pH 8.0, organic carbon 1.64%] in a batch equilibrium experiment. The experiment was conducted in accordance with the U.S. EPA Pesticide Assessment Guidelines, Subdivision N, Section 163-1, and in compliance with U.S. EPA, Title 40, Part 160. The adsorption phase of the study was carried out in 12 of the 18 soils by equilibrating moist soil with [triazolopyrimidine-2-^{14}C]penoxsulam at nominal concentrations of 0.08, 0.4, 2.0, and 10.0 mg a.i/kg soil at 20°C for 24 hours (lighting conditions not reported). The adsorption phase of the study was carried out for the remaining 5 foreign soils and one domestic sediment by equilibrating moist soil with [triazolopyrimidine-2-^{14}C]penoxsulam at a nominal concentration of 2.0 mg a.i/kg soil at 20°C for 24 hours (lighting conditions not reported). The equilibrating solution used was 0.01M $CaCl_2$, with soil/solution ratios of 1:2 (w:v) for all soils. The desorption phase of the study was carried out by replacing the adsorption solution with an equivalent volume of pesticide-free 0.01M $CaCl_2$ solution and equilibrating for 24 hours at 20°C (lighting conditions not reported). The desorption step was conducted twice for all soils at all test concentrations.

The supernatant solution after adsorption and desorption was separated by centrifugation, and aliquots were analyzed for total radioactivity using LSC. Following desorption, samples were extracted two or three times with acetonitrile:0.1N HCl (90:10, v:v). The extracts were centrifuged, combined, and analyzed for total radioactivity using LSC. [^{14}C]Residues remaining in the extracted soil were quantified by LSC following combustion.

[^{14}C]Penoxsulam was stable in the adsorption supernatants and first desorption solutions, based on HPLC analyses. Greater than 90% was unchanged parent compound. Several second desorption and extraction samples showed 85-90% unchanged penoxsulam. Mass balances were calculated by summing the radiocarbon recovered in the adsorption supernatants

supernatants, soil extracts, and combusted soils. Material balances at the end of the desorption phase were 98.8-101.7%, 99.1-102.2%, 95.6-100.6%, 97.5-99.9%, 86.6-98.4%, 86.4-104.8%, 97.0-104.5%, 96.8-102.9%, 91.3-103.7%, 97.5-101.6%, 98.7-110.5%, and 93.3-103.3% of the applied for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively.

After 24 hours of equilibration, 11.0-13.2%, 11.0-19.4%, 17.3-36.2%, 16.8-33.8%, 47.3-86.2%, 37.3-65.0%, 15.3-23.8%, 14.8-29.1%, 44.0-64.4%, 15.9-31.2%, 5.4-11.2%, and 11.0-20.6% of the applied [^{14}C]penoxsulam was adsorbed to the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Simple adsorption K_d values were 0.33, 0.34, 0.95, 0.80, 9.4, 2.4, 0.63, 0.60, 2.5, 0.60, 0.19, 0.37, 1.4, 0.51, 0.636, 0.13, 1.4, and 0.67 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), sandy loam from Italy (M573) soils, silty clay sediment from Arkansas, sandy loam from Brazil (M564), clay loam from Brazil (M565), sandy clay loam from Brazil (M566), clay loam from Canada (M567), and clay loam from Canada (M568), respectively. Freundlich K_{ads} values were 0.27, 3.71, 0.59, 0.56, 4.69, 1.55, 0.49, 0.45, 1.96, 0.48, 0.16, and 0.32 for the same 12 soils, for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Freundlich K_{oc} values were 76, 40, 22, 40, 305, 194, 20, 21, 253, 66, 13, and 46 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Simple K_{oc} values were 130, 35, 14, 13, 73, and 19 for the silty clay sediment from Arkansas, sandy loam from Brazil (M564), clay loam from Brazil (M565), sandy clay loam from Brazil (M566), clay loam from Canada (M567), and clay loam from Canada (M568), respectively.

At the end of the desorption phase, 75.5-82.1%, 65.1-71.2%, 23.7-31.5%, 42.8-53.7%, 4.7-10.5%, 26.4-40.6%, 48.4-61.2%, 46.2-55.0%, 35.5-43.8%, 64.8-72.5%, 56.2-77.4%, and 74.7-82.8% of the applied ^{14}C was desorbed from the North Carolina sand (M538), Arkansas silt

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(M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Freundlich K_{des} values for these 12 soils were 1.56, 0.55, 4.16, 2.97, 20.77, 5.44, 2.88, 2.28, 5.09, 2.05, 0.87, and 0.86 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Freundlich K_{oc} values were 296, 197, 279, 193, 2156, 713, 156, 150, 720, 264, 192, and 169 for the same 12 soils, the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively.

The calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.1898, for Kd vs. pH is 0.1869, and for Kd vs. % clay is 0.0049.

Results Synopsis:

Soil type: North Carolina Sand (M538)
Amount adsorbed: 11.0-13.2% of the applied
Simple adsorption K_d: 0.33
Freundlich K_{ads}: 0.27
Freundlich adsorption K_{oc}: 76
Amount desorbed: 75.5-82.1% of the adsorbed
Freundlich K_{des}: 1.56
Freundlich desorption K_{oc}: 296

Soil type: Arkansas Silt loam (M557)
Amount adsorbed: 11.0-19.4% of the applied
Simple adsorption K_d: 0.34
Freundlich K_{ads}: 3.71
Freundlich adsorption K_{oc}: 40
Amount desorbed: 65.1-71.2% of the adsorbed
Freundlich K_{des}: 0.55
Freundlich desorption K_{oc}: 197

Soil type: Loam from Japan (M558)
Amount adsorbed: 17.3-36.2% of the applied
Simple adsorption K_d: 0.95
Freundlich K_{ads}: 0.59

Freundlich adsorption K_{oc}: 22
Amount desorbed: 23.7-31.5% of the adsorbed
Freundlich K_{des}: 4.16
Freundlich desorption K_{oc}: 279

Soil type: Sandy clay loam from Japan (M559)
Amount adsorbed: 16.8-33.8% of the applied
Simple adsorption K_d: 0.80
Freundlich K_{ads}: 0.56
Freundlich adsorption K_{oc}: 40
Amount desorbed: 42.8-53.7% of the adsorbed
Freundlich K_{des}: 2.97
Freundlich desorption K_{oc}: 193

Soil type: Loam from Japan (M560)
Amount adsorbed: 47.3-86.2% of the applied
Simple adsorption K_d: 9.4
Freundlich K_{ads}: 4.69
Freundlich adsorption K_{oc}: 305
Amount desorbed: 4.7-10.5% of the adsorbed
Freundlich K_{des}: 20.77
Freundlich desorption K_{oc}: 2156

Soil type: Loam from Japan (M561)
Amount adsorbed: 37.3-65.0% of the applied
Simple adsorption K_d: 2.4
Freundlich K_{ads}: 1.55
Freundlich adsorption K_{oc}: 194
Amount desorbed: 26.4-40.6% of the adsorbed
Freundlich K_{des}: 5.44
Freundlich desorption K_{oc}: 713

Soil type: California Clay loam (M562)
Amount adsorbed: 15.3-23.8% of the applied
Simple adsorption K_d: 0.62
Freundlich K_{ads}: 0.49
Freundlich adsorption K_{oc}: 20
Amount desorbed: 48.4-61.2% of the adsorbed
Freundlich K_{des}: 2.88
Freundlich desorption K_{oc}: 156

Soil type: North Dakota Loam (M563)

Amount adsorbed: 14.8-29.1 of the applied
Simple adsorption K_d: 0.60
Freundlich K_{ads}: 0.45
Freundlich adsorption K_{oc}: 21
Amount desorbed: 46.2-55.0% of the adsorbed
Freundlich K_{des}: 2.28
Freundlich desorption K_{oc}: 150

Soil type: Silty clay loam from Italy (M570)
Amount adsorbed: 44.0-64.4% of the applied
Simple adsorption K_d: 2.5
Freundlich K_{ads}: 1.96
Freundlich adsorption K_{oc}: 253
Amount desorbed: 35.5-43.8% of the adsorbed
Freundlich K_{des}: 5.09
Freundlich desorption K_{oc}: 720

Soil type: Silty clay loam from France (M571)
Amount adsorbed: 15.9-31.2% of the applied
Simple adsorption K_d: 0.60
Freundlich K_{ads}: 0.48
Freundlich adsorption K_{oc}: 66
Amount desorbed: 64.8-72.5% of the adsorbed
Freundlich K_{des}: 2.05
Freundlich desorption K_{oc}: 264

Soil type: Sandy clay loam from the UK (M572)
Amount adsorbed: 5.4-11.2% of the applied
Simple adsorption K_d: 0.19
Freundlich K_{ads}: 0.16
Freundlich adsorption K_{oc}: 13
Amount desorbed: 56.2-77.4% of the adsorbed
Freundlich K_{des}: 0.87
Freundlich desorption K_{oc}: 192

Soil type: Sandy loam from Italy (M573)
Amount adsorbed: 11.0-20.6% of the applied
Simple adsorption K_d: 0.37
Freundlich K_{ads}: 0.32
Freundlich adsorption K_{oc}: 46
Amount desorbed: 74.7-82.8% of the adsorbed
Freundlich K_{des}: 0.86

Freundlich desorption K_{oc}: 169

Soil type: silty clay sediment from Arkansas
Amount adsorbed: Not reported
Simple adsorption K_d: 1.4
Adsorption K_{oc}: 1130
Amount desorbed: Not reported
Simple desorption K_{des}: 13
Desorption K_{oc}: 10336

Soil type: sandy loam soil from Brazil (M564)
Amount adsorbed: Not reported
Simple adsorption K_d: 0.51
Adsorption K_{oc}: 35
Amount desorbed: Not reported
Simple desorption K_{des}: 3.2
Desorption K_{oc}: 217

Soil type: clay loam soil from Brazil (M565)
Amount adsorbed: Not reported
Simple adsorption K_d: 0.636
Adsorption K_{oc}: 14
Amount desorbed: Not reported
Simple desorption K_{des}: 3.8
Desorption K_{oc}: 87

Soil type: sandy clay loam soil from Brazil (M566)
Amount adsorbed: 3.7 % of the applied
Simple adsorption K_d: 0.13
Adsorption K_{oc}: 13
Amount desorbed: 55.6 % of the adsorbed
Simple desorption K_{des}: 2.1
Desorption K_{oc}: 210

Soil type: clay loam soil from Canada (M567)
Amount adsorbed: Not reported
Simple adsorption K_d: 1.4
Adsorption K_{oc}: 73
Amount desorbed: Not reported
Simple desorption K_{des}: 4.7
Desorption K_{oc}: 237

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Soil type: clay loam soil from Canada (M568)
Amount adsorbed: Not reported
Simple adsorption K_d: 0.67
Adsorption K_{oc}: 19
Amount desorbed: Not reported
Simple desorption K_{des}: 3.6
Desorption K_{oc}: 98

Study Acceptability: This study is classified as acceptable, and can be used to fulfill the Subdivision N Guideline §163-1 data requirements for a mobility study using unaged soil.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study was conducted according to the U.S. EPA Pesticide Assessment Guidelines, Subdivision N, Section 163-1; the Society of Environmental Toxicology and Chemistry (SETAC) Part 1, Section 4; the Organization for Economic Cooperation and Development (OECD) Method 106; and the U.S. EPA Fate, Transport, and Transformation Guidelines, OPPTS 835.1220 (p.10). Deviations from Subdivision N guidelines are:

It was not stated that the study was conducted in the dark. This does not affect the validity of the study since the test substance was stable in the test solutions during the study.

The test substance was incompletely characterized. This does not affect the validity of the study.

COMPLIANCE: The study was conducted in compliance with the U.S. EPA, Title 40, Part 160 GLP (1989) and the OECD ISBN 92-64-12367-9 GLP (1982; p.3R1). Signed and dated No Data Confidentiality, GLP, and Quality Assurance statements were provided (pp.2-4R1). A Certificate of Authenticity was not provided.

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A. MATERIALS:

1. Test Material [Triazolopyrimidine-2-^{14}C]-labeled 3-(2,2-difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-α,α,α-

trifluorortoluene-2-sulfonamide (penoxsulam, XDE-638; p.12).

Chemical Structure: See DER Attachment 1.

Description: Not reported.

Purity:

Radiolabelled:
Analytical purity: Not reported.
Radiochemical purity: 99.0% (p.12).
Inventory No. INV1456. Reference No. F-458-159.
Specific activity: 28.9 mCi/mmole (1069 MBq/mmole).
Locations of the label: 2-C in triazolopyrimidine ring.

Non-radiolabelled:
Analytical purity: 99.1% (p.13).
TSN No. TSN101649. Lot No. 597-C049-19A.

Storage conditions of test chemicals: The radiolabeled test material was stored frozen (p.12). The unlabeled test material was stored under ambient conditions (p.13).

hysico-chemical properties of penoxsulam:

Parameter	Values	Comments
Water solubility	>10 ppm	At pH 5.
Vapour pressure	Not reported	
JV absorption	Not reported	
Molecular Formula	$C_{16}H_{14}F_5N_5O_5S$	
Molecular Weight	483.38 g/mole	
Melting point	Not reported	
Bulk density	Not reported	
K_a	4.4	
K_{ow}	Not reported	
tability of Compound at room temperature	Not reported	

ta were obtained from p.12 of the study report.

2. Soil Characteristics

Table 1: Description of soil collection and storage.

Description	M538	M557	M562	M563	Sediment	M558	M559	M560	M561
Geographic location	NC	AR	CA	ND	AR	Japan	Japan	Japan	Japan
Pesticide use history at the collection site	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed
Collection procedures	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed
Sampling depth (cm)	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed
Storage conditions	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 25°C.	Stored at 4°C, then at room temperatur e 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then room temperature 2 weeks prior to treatment.
Storage length	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not report-ed	Not reported	Not report-ed	Not report-ed	Not reported
Soil preparation	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm

Description	M564	M565	M566	M567	M568	M570	M571	M572	M573
Geographic location	Brazil	Brazil	Brazil	Canada	Canada	Italy	France	UK	Italy
Pesticide use history at the collection site	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Collection procedures	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Sampling depth (cm)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Storage conditions	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then at room temperature 2 weeks prior to treatment.	Stored at 4°C, then room temperature 2 weeks prior to treatment.
Storage length	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Soil preparation	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm	Sieved, 2 mm

ata were obtained from pp.14-15 and Table 3, p.33 of the study report.

Table 2: Properties of the soils.

Property	M538	M557	M562	M563	Sediment	M558	M559	M560	M561
Soil Texture	Sand	Silt loam	Clay loam	Loam	Silty clay	Loam	Sandy clay loam	Loam	Loam
% sand	88.4	8.8	32.8	40.8	10.8	38.8	50.8	44.8	46.8
% silt	7.6	67.2	33.2	35.2	41.2	35.2	27.2	37.2	35.2
% clay	4.0	24.0	34.0	24.0	48.0	26.0	22.0	18.0	18.0
pH	5.6	5.8	6.5	6.9	5.1	6.9	6.3	5.5	5.3
Organic carbon (%)	0.40	0.97	2.46	2.74	0.12	3.71	2.16	3.41	1.28
Organic matter (%)[1]	0.69	1.67	4.23	4.71	0.21	6.38	3.72	5.86	2.20
CEC (meq/100 g)	1.16	16.54	21.67	21.99	4.90	25.78	20.72	22.84	12.55
Moisture at 1/3 atm (%)	3.58	24.82	29.84	28.53	37.44	50.87	23.73	48.76	22.74
Bulk density (g/cm^3)	1.68	1.11	1.18	1.02	1.23	0.82	0.98	0.76	1.04
Biomass (mg microbial C/100 g or CFU or other)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Soil taxonomic classification[2]	Loamy, Kaolinitic, thermic Arenic Kandiudults and Loamy, Kaolinitic, thermic Grossarenic Kandiudults.	Fine-silty, mixed, active, thermic Typic Endoaqualfs	Fine, smectitic, thermic, Aquic Haploxererts.	Fine-loamy, mixed, superative, frigid Calcic Haplu-dolls.	Not applicable	Volcanic/ Upland.	Non-volcanic/ Upland.	Volcanic / Rice	Non-volcanic/ Rice.
Soil mapping unit (for EPA)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported

Property	M564	M565	M566	M567	M568	M570	M571	M572	M573
Soil Texture	Sandy loam	Clay loam	Sandy clay loam	Clay loam	Clay loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
% sand	66.8	44.8	66.8	28.8	23.2	13.2	15.2	57.2	69.2
% silt	19.2	27.2	11.2	43.2	40.0	54.0	56.0	16.0	22.0
% clay	14.0	28.0	22.0	28.0	36.8	32.8	28.8	26.8	8.8
pH	6.0	6.7	7.3	6.0	8.1	6.2	6.2	8.0	6.3
Organic carbon (%)	1.45	4.37	1.00	2.00	3.59	0.99	0.97	1.64	0.85
Organic matter (%)[1]	2.49	7.52	1.72	3.44	6.17	1.70	1.67	2.82	1.46
CEC (meq/100 g)	8.35	25.13	5.74	23.17	24.60	10.73	13.08	16.45	3.80
Moisture at 1/3 atm (%)	18.73	36.00	12.35	27.95	37.54	27.25	24.59	19.44	11.48
Bulk density (g/cm^3)	1.33	0.93	1.35	1.05	1.25	1.23	1.20	1.21	1.29
Biomass (mg microbial C/100 g or CFU or other)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Soil taxonomic classification[2]	Purple Latisoil	Glu Humid	Red Latisoil	Dark Brown Chemozemic loam	Ryerson	Greggio	Charentilly	Marcham	Ottobiano
Soil mapping unit (for EPA)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported

Data were obtained from pp.14-15 and Tables 2-3, pp.32-33 of the study report.

[1] Percent organic matter was calculated as follows: % organic carbon × 1.72.

[2] Test soils M538, M557, M562, and M563 and the sediment were classified according to the USDA Soil Classification for US Soils. For the remaining test soils, the classification system used was not reported.

C. STUDY DESIGN:

1. Preliminary study:

Preliminary Test: Preliminary tests were conducted to determine the most suitable test containers and filters, and to validate the chromatographic method used for sample analysis (p.15). To validate the HPLC method, 5 g (oven-dry weight) of the Japanese volcanic upland loam soil (M558) was added to a 40-mL glass centrifuge tube containing 25 mL of a 0.01M $CaCl_2$ solution to establish a soil:solution ratio of 1:5 (w:v; pp.15-16). The soil control was shaken on a horizontal shaker overnight at 20°C, then centrifuged, and the supernatant was decanted. The soil control sample was treated with approximately 3 µg of [triazolopyrimidine-2-^{14}C]penoxsulam. A soilless control sample was prepared by adding approximately 3 µg of [triazolopyrimidine-2-^{14}C]penoxsulam to a glass centrifuge tube containing 25 mL of a 0.01M $CaCl_2$ solution. The soil control and soilless control samples were shaken on a horizontal shaker at low speed (not specified) for 2 hours. The soil control was extracted with 10 mL of acetonitrile:0.1N HCl (10;1, v:v) by shaking on a horizontal shaker for at least one hour, then was centrifuged and the extract was pipetted off into a 25-mL volumetric flask. The sample was extracted one or two more times, and the extracts were combined. The soil extracts and the supernatant from the soilless control were analyzed using LSC and HPLC to determine if the water-soluble components of a soil matrix interfere with HPLC analysis of the test substance, or if the test substance adsorbed to the glass centrifuge tubes. The results demonstrated that [triazolopyrimidine-2-^{14}C]penoxsulam was stable in 0.01M $CaCl_2$ solution, and did not adsorb to the glass centrifuge tubes, based on recoveries of 101% in the soil control and 99.2% for the soilless control (p.22; Table 4, p.34).

Screening Test: To determine the soil:solution ratio to be used in the definitive study, duplicate 5-g portions (oven-dry weight) of North Carolina sand (M538), loam from Japan (M558), loam from Japan (M561), and sandy clay loam from Brazil (M566) soils were added to 40-mL glass centrifuge tubes containing 25 mL a 0.01M $CaCl_2$ solution treated with [triazolopyrimidine-2-^{14}C]penoxsulam, at a nominal concentration of 0.2 ppm, to establish soil:solution ratios of 1:5 (w:v; pp.15-17; Table 5, p.35). Soil control samples were also prepared by adding untreated 0.01M $CaCl_2$ solution to 40-mL glass centrifuge tubes containing one of the four test soils. All samples were shaken on a horizontal shaker at 20°C for 20 hours, followed by two 20-hour desorption steps (p.17). Aliquots of the adsorption and desorption supernatants were analyzed for total radioactivity using LSC. Following the second desorption step, the samples were extracted by shaking on a horizontal shaker for at least one hour with 10 mL of acetonitrile:0.1N HCl (90:10, v:v; pp.16-17). The samples were centrifuged, the supernatants removed, and the samples were extracted one or two more times. The extracts were combined and analyzed for total radioactivity using LSC. Since >95% of the radioactivity was recovered from the samples following extraction (96.1-99.1%), the soil samples were not combusted to obtain material balances (p.23; Table 5, p.35). The results demonstrated that adsorption rates were less than the optimal range of 20-80% of the applied radioactivity for the North Carolina sand (M538), loam

from Japan (M561), and sandy clay loam from Brazil (M566) soils (p.23; Table 6, p.36). Based on these results, a soil:solution ratio of 1:5 (w:v) was selected for use in the definitive study. Some degradation of [^{14}C]penoxsulam in some of the second desorption and organic extracts was noted (p.23; Figures 2-3, pp.44-45). However, since >90% of the test substance was isolated from the supernatants from the adsorption and first desorption step, it was concluded that [^{14}C]penoxsulam was stable under the test conditions.

Kinetics Test: To determine the equilibration time to be used in the definitive study, duplicate 5-g (oven-dry weight) portions of Arkansas silt loam (M557), loam from Japan (M561), clay loam from Brazil (M567), and sandy clay loam from the UK (M572) soils were added to glass centrifuge tubes containing 10 mL of 0.01M $CaCl_2$ solution containing [triazolopyrimidine-2-^{14}C]penoxsulam, at a nominal concentration of 0.2 ppm, to establish soil:solution ratios of 1:2 (w:v; pp.15, 17-18; Figure 6, p.48). The samples were shaken on a horizontal shaker for 24 hours at 20°C (lighting conditions not reported). Aliquots of the supernatants were sampled after 2, 4, 8, 24, and 48 hours of shaking and analyzed for total radioactivity using LSC. The samples were then subjected to a 48-hour desorption phase by shaking on a horizontal shaker at 20°C. Aliquots of the supernatants were sampled after 2, 4, 8, 24, and 48 hours of shaking (p.24R1; Figures 6-7, p.48-49). Based on the results of these preliminary studies, an equilibration time of 24 hours and a soil:solution ratio of 1:2 (w:v) were selected for use in the definitive study (pp.23-24R1). [^{14}C]Penoxsulam was stable following 96 hours of shaking, based on a purity of >88% (Figures 2-5, pp.44-47).

2. Definitive study experimental conditions:

Table 3a: Study design for the adsorption phase.

Parameters		M538 Sand	M557 Silt loam	M558 Loam	M559 Sandy clay loam	M560 Loam	M561 Loam	M562 Clay loam	M563 Loam	M570 Silty clay loam	M571 Silty clay loam	M572 Sandy clay loam	M573 Sandy loam
Condition of soil (air dried/fresh)		Moist											
Have these soils been used for other laboratory studies ? (specify which)		Yes, MRID 4583-0802	Yes, MRID 4583-0802	No	No	No	No	Yes, MRID 4583-0802	Yes, MRID 4583-0802	Yes, MRID 4583-0802	Yes, MRID 4583-0802	Yes, MRID 4583-0802	Yes, MRID 4583-0802
Soil (g/replicate)		5											
Equilibrium solution used (name and concentration; eg: 0.01N $CaCl_2$)		0.01M $CaCl_2$											
Control used (with salt solution only) (Yes/No)		No											
Test material concentrations[1]	Nominal application rates (mg a.i./kg soil)	0.08, 0.4, 2.0, 10.0											
	Analytically measured concen-trations (mg a.i./kg soil)	0.1, 0.4, 1.86, 9.34											
Identity and concentration of co-solvent, if any)		Acetone or acetonitrile, concentration not reported.											

Parameters		M538 Sand	M557 Silt loam	M558 Loam	M559 Sandy clay loam	M560 Loam	M561 Loam	M562 Clay loam	M563 Loam	M570 Silty clay loam	M571 Silty clay loam	M572 Sandy clay loam	M573 Sandy loam
Soil:solution ratio		1:2											
Initial pH of the equilibration solution, if provided		Not reported											
No. of replications	Controls	0											
	Treatments	2											
Equilibration	Time (hours)	24											
	Temperature (°C)	20											
	Darkness	Not reported											
	Shaking method	Horizontal shaker											
	Shaking time (hours)	24											
Method of separation of supernatant (eg., centrifugation)		Centrifugation											
Centrifugation	Speed (rpm)	Not reported											
	Duration (min)	Not reported											
	Method of separation of soil and solution	Pipette											

Data were obtained from pp.15, 18 and Table 1, p.31 of the study report.
Test material concentrations were calculated as follows: [test concentration (ppm) x total volume of test material solution (mL)] ÷ amount of soil (g); eg. [0.04 ppm x 10.0 mL) ÷ 5.0 g = 0.08 mg a.i./kg soil.

Table 4: Study design for the desorption phase.[1]

Parameters		M538 Sand	M557 Silt loam	M558 Loam	M559 Sandy clay loam	M560 Loam	M561 Loam	M562 Clay loam	M563 Loam	M570 Silty clay loam	M571 Silty clay loam	M572 Sandy clay loam	M573 Sandy loam
Were the soil residues from the adsorption phase used? If not, describe the method for adsorption using a separate adsorption Table		Yes											
Amount of test material present in the adsorbed state/adsorbed amount (mg a.i./kg soil)	0.08	0.0090	0.0155	0.0290	0.0270	0.0690	0.0520	0.0190	0.0230	0.0515	0.0250	0.0090	0.0165
	0.4	0.0530	0.0580	0.0920	0.1045	0.2900	0.1920	0.0840	0.0850	0.2065	0.0915	0.0325	0.0665
	2.0	0.2260	0.2490	0.4225	0.4200	1.2980	0.8100	0.4225	0.3440	0.9330	0.3750	0.1080	0.2680
	10.0	1.0950	1.1010	1.7330	1.6775	5.356	3.7300	1.5255	1.4745	4.4040	1.5880	0.8715	1.0950
No. of desorption cycles		2											
Equilibration solution and quantity used per treatment for desorption (eg., 0.01M $CaCl_2$)		0.01M $CaCl_2$											
Soil:solution ratio		1:2											
Replications	Controls	0											
	Treatments	2											
Desorption equilibrium	Time (hours)	24											
	Temperature (°C)	20											
	Darkness	Not reported											
	Shaking method	Horizontal shaker											
	Shaking time	24											

(19)

Parameters		M538 Sand	M557 Silt loam	M558 Loam	M559 Sandy clay loam	M560 Loam	M561 Loam	M562 Clay loam	M563 Loam	M570 Silty clay loam	M571 Silty clay loam	M572 Sandy clay loam	M573 Sandy loam
Centrifugation	Speed (rpm)	Not reported											
	Duration (min)	Not reported											
	Method of separation of soil and solution	Pipette											
Second desorption	Indicate if the method is the same as the first desorption cycle	Same											

'ata were obtained from pp.15, 18 and Appendix C, Table C1, pp.82R1-84R1 of the study report.

upplemental experiment: An additional adsorption test was conducted with the soils from Canada and Brazil, as well as the U.S.

sediment, using a 0.01M $CaCl_2$ solution containing [triazolopyrimidine-2-^{14}C]-labeled penoxsulam at 0.2 mg a.i./kg soil at a soil:solution ratio of 1:2 (w:v) and an equilibration time of 24 hours. The samples were subjected to one adsorption and one desorption step (p.19; Table 3, p.33). Following desorption, the samples were extracted by shaking on a horizontal shaker for at least one hour with 10 mL of acetonitrile:0.1N HCl (90:10, v:v; pp.16-17). The samples were centrifuged, the supernatants removed, and the samples were extracted one or two more times. The extracts were combined and analyzed for total radioactivity using LSC. The soils were air-dried, combusted, and analyzed to determine a material balance.

3. Description of analytical procedures:

Extraction/clean up/concentration methods: Following the final desorption step, samples were extracted by shaking on a horizontal shaker for at least one hour with 10 mL of acetonitrile:0.1N HCl (90:10, v:v; pp.16, 18-19). The samples were then centrifuged, the supernatants were removed, and the samples were extracted one or two additional times. The extracts were combined and analyzed for total radioactivity using LSC. It was stated that all samples analyzed by LSC were analyzed on the day of sampling (p.21).

Total ^{14}C measurement: Aliquots of the adsorption and desorption supernatants were analyzed for total radioactivity using LSC (pp.13, 15, 18-19, 21). Following desorption and extraction, duplicate portions of the extracted, air-dried soil were combusted manually or by robot, and analyzed using LSC. Oxidizer efficiency was not reported. The data were corrected for combustion efficiency.

Non-extractable residues, if any: Not applicable.

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

Identification and quantification of penoxsulam: Selected aliquots of the supernatants were analyzed for [^{14}C]penoxsulam using HPLC using the following operating conditions: YMC ODS-AQ SN042529109 column (dimensions and particle size not reported), isocratic gradient of water + 1% acetic acid:acetonitrile + 1% acetic acid (50:50, v:v), flow rate 1 mL/min, and with radioactive flow detection (pp.13-14, 21; Appendix A, pp.61-62). It was not stated how [^{14}C]penoxsulam was identified in the supernatants. An unlabeled reference standard of penoxsulam was detected using a UV-VIS detector (254 nm). It was not stated whether the samples were chromatographed separately or cochromatographed with an unlabeled reference standard of penoxsulam.

Identification and quantification of transformation products, if appropriate: Samples were not analyzed for transformation products of penoxsulam

Detection limits (LOD, LOQ) for penoxsulam: The LOD and LOQ for LSC and HPLC analyses of penoxsulam were 10 and 40 dpm, respectively (pp.21-22).

Detection limits (LOD, LOQ) for the transformation products: Samples were not analyzed for transformation products of penoxsulam.

II. RESULTS AND DISCUSSION

A. TEST CONDITIONS: [Triazolopyrimidine-2-^{14}C]penoxsulam was stable in the adsorption supernatants and first desorption solutions, based on HPLC analyses. Greater than or equal to 90% was unchanged parent compound (p.25; Figures 11-16, pp.53-58). It was stated that a few of the second desorption and extraction samples showed 85-90% [^{14}C]penoxsulam remained undegraded. Quantitative data were not provided (p.25). The temperature during the study was reported to be 20°C. However, temperature records were not provided. The pH of the test solutions during the study was not reported.

B. MASS BALANCE: The mass balance was not reported at the end of the adsorption phase of the study. Mass balances at the end of the desorption phase of the study were calculated by summing the radiocarbon recovered in the adsorption supernatants, desorption supernatants, soil extracts, and combusted soils (p.19). Material balances at the end of the desorption phase were 98.8-101.7%, 99.1-102.2%, 95.6-100.6%, 97.5-99.9%, 86.6-98.4%, 86.4-104.8%, 97.0-104.5%, 96.8-102.9%, 91.3-103.7%, 97.5-101.6%, 98.7-110.5%, and 93.3-103.3% of the applied for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively (Table 8, pp.38-40).

'able 5: Recovery of [triazolopyrimidine-2-^{14}C]penoxsulam, expressed as percentage of applied radioactivity, in soil after dsorption/desorption (mean ± s.d.).

Matrices	M538 Sand	M557 Silt loam	M558 Loam	M559 Sandy clay loam	M560 Loam	M561 Loam	M562 Clay loam	M563 Loam	M570 Silty clay loam	M571 Silty clay loam	M572 Sandy clay loam	M573 Sandy loam
At the end of the adsorption phase												
Supernatant solution	87.7 ± 2.3	85.1 ± 3.0	69.3 ± 6.5	72.8 ± 5.4	18.4 ± 6.3	46.4 ± 10.5	77.7 ± 2.1	78.4 ± 5.2	44.4 ± 6.4	77.4 ± 4.9	92.3 ± 3.3	84.3 ± 5.1
Solid phase (total ^{14}C)	Not analyzed											
Non-extractable residues in soil, if measured	Not measured											
Total recovery	Not determined											
At the end of the desorption phase												
Supernatant solution (Desorption 1)	7.7 ± 0.9	7.0 ± 0.9	3.7 ± 0.9	7.0 ± 0.9	2.3 ± 0.5	9.5 ± 0.7	7.5 ± 3.0	6.4 ± 0.7	11.6 ± 0.7	9.8 ± 1.1	3.6 ± 2.8	8.4 ± 1.3
Supernatant solution (Desorption 2)	2.3 ± 0.5	3.2 ± 0.3	4.5 ± 0.4	5.1 ± 0.5	2.8 ± 0.8	6.8 ± 0.4	4.3 ± 0.6	4.6 ± 0.5	9.4 ± 0.6	5.3 ± 1.0	2.2 ± 0.5	3.8 ± 0.5
Solid phase (extracted)[1]	1.9 ± 0.4	3.8 ± 0.8	14.3 ± 3.7	11.2 ± 2.8	62.9 ± 8.5	30.1 ± 6.9	8.3 ± 1.5	7.9 ± 2.1	29.8 ± 3.5	6.4 ± 1.6	2.5 ± 0.9	2.9 ± 0.9
Non-extractable residues in soil, if measured	0.5 ± 0.4	1.0 ± 0.3	6.0 ± 0.9	3.1 ± 1.2	7.9 ± 1.0	3.6 ± 2.0	1.0 ± 0.3	1.9 ± 0.7	1.7 ± 0.6	0.6 ± 0.5	2.5 ± 0.9	2.9 ± 0.9
Total recovery	100.1 ± 1.1	100.0 ± 1.2	97.8 ± 2.3	99.0 ± 0.8	94.3 ± 4.5	96.4 ± 5.6	98.7 ± 2.6	99.2 ± 2.7	96.91 ± 3.8	99.5 ± 1.4	101.1 ± 4.1	99.7 ± 3.1

ata were obtained from Table 8, pp.38-40 of the study report. Means and standard deviations were calculated using Excel.
All soils were extracted prior to combustion.

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'able 6: Concentration of [triazolopyrimidine-2-^{14}C]penoxsulam in the solid and liquid phases at the end of adsorption equilibration 'eriod (mean ± s.d.).

Concentration (mg a.i./kg soil)	North Carolina Sand (M538)			Arkansas Silt Loam (M557)			Loam from Japan (M558)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]
0.08	0.009*	0.043*	11.2*	0.0155 ± 0.0	0.0395 ± 0.0	19.4 ± 0.9	0.029*	0.029*	36.2*
0.4	0.0530 ± 0.0	0.1690 ± 0.0	13.2 ± 1.1	0.0580 ± 0.0	0.1660 ± 0.0	14.5 ± 1.1	0.092*	0.128*	23.0*
2.0	0.2260 ± 0.0	0.8120 ± 0.0	11.3 ± 1.2	0.2490 ± 0.0	0.7955 ± 0.0	12.4 ± 0.6	0.4225 ± 0.0	0.6395 ± 0.0	21.1 ± 0.2
10.0	1.0950 ± 0.1	4.1835 ± 0.0	11.0 ± 1.3	1.1010 ± 0.0	4.1740 ± 0.0	11.0 ± 0.5	1.7330 ± 0.0	3.5825 ± 0.0	17.3 ± 0.1

Concentration (mg a.i./kg soil)	Sandy clay loam from Japan (M559)			Loam from Japan (M560)			Loam from Japan (M561)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]
0.08	0.027*	0.032*	33.8*	0.0690 ± 0.0	0.0060 ± 0.0	86.2 ± 7.1	0.0520 ± 0.0	0.0165 ± 0.0	65.0 ± 8.8
0.4	0.1045 ± 0.0	0.1365 ± 0.0	26.1 ± 0.2	0.2900 ± 0.0	0.0300 ± 0.0	72.5 ± 3.2	0.1920 ± 0.0	0.0805 ± 0.0	48.0 ± 0.7
2.0	0.4200 ± 0.0	0.6845 ± 0.0	21.0 ± 1.1	1.2980 ± 0.0	0.1795 ± 0.0	64.9 ± 1.8	0.8100 ± 0.0	0.4740 ± 0.0	40.5 ± 0.8
10.0	1.6775 ± 0.0	3.7150 ± 0.0	16.8 ± 0.1	5.356 ± 0.4	1.2850 ± 0.0	47.3 ± 5.4	3.7300 ± 0.4	2.8065 ± 0.0	37.3 ± 4.3

Concentration (mg a.i./kg soil)	California Clay loam (M562)			North Dakota Loam (M563)			Silty clay loam from Italy (M570)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]
0.08	0.019*	0.037*	23.8*	0.023*	0.035*	29.1*	0.0515 ± 0.0	0.0180 ± 0.0	64.4 ± 2.6
0.4	0.0840 ± 0.0	0.1495 ± 0.0	21.0 ± 0.4	0.085*	0.146*	21.2*	0.2065 ± 0.0	0.0820 ± 0.0	51.6 ± 0.2
2.0	0.4225 ± 0.1	0.7195 ± 0.0	21.1 ± 5.3	0.3440 ± 0.0	0.7240 ± 0.0	17.2 ± 0.7	0.9330 ± 0.1	0.4300 ± 0.0	46.6 ± 2.6
10.0	1.5255 ± 0.0	3.7605 ± 0.0	15.3 ± 0.2	1.4745 ± 0.0	3.9475 ± 0.0	14.8 ± 0.4	4.4040 ± 0.3	2.4815 ± 0.0	44.0 ± 3.1

Concentration (mg a.i./kg soil)	Silty clay loam from France (M571)			Sandy clay loam from the UK (M572)			Sandy loam from Italy (M573)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% adsorbed[1]
0.08	0.0250 ± 0.0	0.0350 ± 0.0	31.2 ± 0.0	0.0090 ± 0.0	0.0430 ± 0.0	11.2 ± 0.0	0.0165 ± 0.0	0.0390 ± 0.0	20.6 ± 0.9
0.4	0.0915 ± 0.0	0.1485 ± 0.0	22.9 ± 0.2	0.0325 ± 0.0	0.1795 ± 0.0	8.1 ± 0.5	0.0665 ± 0.0	0.1570 ± 0.0	16.6 ± 0.5
2.0	0.3750 ± 0.0	0.7315 ± 0.0	18.8 ± 0.2	0.1080 ± 0.0	0.8630 ± 0.0	5.4 ± 0.4	0.2680 ± 0.0	0.7970 ± 0.0	13.4 ± 0.1
10.0	1.5880 ± 0.0	3.9330 ± 0.0	15.9 ± 0.3	0.8715 ± 0.6	4.5300 ± 0.0	8.7 ± 5.7	1.0950 ± 0.0	4.2580 ± 0.0	11.0 ± 0.2

Data were obtained from Appendix C, Table C1, pp.82R1-84R1 of the study report. Means and standard deviations were calculated using Excel.
% Adsorbed as the % of the applied was calculated by dividing the amount in soil after adsorption by the applied; e.g. [(0.009 µg/g ÷ 0.08 mg a.i./kg] × 100 = 11.2%.
Only single replicate values were reported.

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Table 7: Concentration of [triazolopyrimidine-2-^{14}C]penoxsulam in the solid and liquid phases at the end of desorption (n=2).

Concentration (mg a.i./kg soil)	North Carolina Sand (M538)			Arkansas Silt loam (M557)			Loam from Japan (M558)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed
0.08	0.0012*	0.0007*	75.5*	0.0047 ± 0.0	0.0017 ± 0.0	65.1 ± 1.4	0.0202*	0.0021*	25.3*
0.4	0.0089 ± 0.0	0.0052 ± 0.0	80.9 ± 1.6	0.0156 ± 0.0	0.0067 ± 0.0	68.3 ± 1.1	0.0630*	0.0099*	23.7*
2.0	0.0341 ± 0.0	0.0210 ± 0.0	81.0 ± 1.4	0.0671 ± 0.0	0.0277 ± 0.0	68.9 ± 1.8	0.2516 ± 0.0	0.0442 ± 0.0	31.5 ± 0.6
10.0	0.1855 ± 0.0	0.1118 ± 0.0	82.1 ± 2.2	0.2681 ± 0.0	0.1383 ± 0.0	71.2 ± 1.8	1.0420 ± 0.0	0.1935 ± 0.0	31.4 ± 1.0

Concentration (mg a.i./kg soil)	Sandy clay loam from Japan (M559)			Loam from Japan (M560)			Loam from Japan (M561)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]
0.08	0.0143*	0.0027*	42.8*	0.0655 ± 0.0	0.0010 ± 0.0	4.7 ± 1.0	0.0369 ± 0.0	0.0031 ± 0.0	26.4 ± 1.2
0.4	0.0520 ± 0.0	0.0109 ± 0.0	43.4 ± 0.8	0.2710 ± 0.0	0.0053 ± 0.0	5.9 ± 0.0	0.1302 ± 0.0	0.0128 ± 0.0	29.4 ± 0.1
2.0	0.2050 ± 0.0	0.0463 ± 0.0	44.8 ± 0.2	1.2016 ± 0.0	0.0242 ± 0.0	6.6 ± 0.0	0.4820 ± 0.0	0.0664 ± 0.0	37.4 ± 2.4
10.0	0.7042 ± 0.0	0.2104 ± 0.0	53.7 ± 0.6	4.7284 ± 0.5	0.1870 ± 0.0	10.5 ± 2.4	2.1788 ± 0.4	0.3294 ± 0.0	40.6 ± 4.6

Concentration (mg a.i./kg soil)	California Clay loam (M562)			North Dakota Loam (M563)			Silty clay loam from Italy (M570)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed
0.08	0.0094*	0.0020*	48.4*	0.0111*	0.0024*	46.2*	0.0326 ± 0.0	0.0045 ± 0.0	35.5 ± 3.7
0.4	0.0378 ± 0.0	0.0098 ± 0.0	52.7 ± 0.9	0.0348*	0.0108*	53.6*	0.1236 ± 0.0	0.0181 ± 0.0	39.2 ± 0.1
2.0	0.1493 ± 0.0	0.0351 ± 0.0	61.2 ± 3.3	0.1448 ± 0.0	0.0402 ± 0.0	54.1 ± 1.7	0.5270 ± 0.0	0.0881 ± 0.0	42.1 ± 0.3
10.0	0.6250 ± 0.0	0.1997 ± 0.0	56.6 ± 1.7	0.5401 ± 0.0	0.2050 ± 0.0	55.0 ± 2.9	2.4334 ± 0.3	0.4512 ± 0.0	43.8 ± 2.1

Concentration (mg a.i./kg soil)	Silty clay loam from France (M571)			Sandy clay loam from the UK (M572)			Sandy loam from Italy (M573)		
	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]	on soil (mg a.i./kg)	in solution (µg a.i./mL)	% desorbed as % of the adsorbed[1]
0.08	0.0082 ± 0.0	0.0031 ± 0.0	64.8 ± 2.8	0.0036 ± 0.0	0.0012 ± 0.0	56.6 ± 1.6	0.0039 ± 0.0	0.0020 ± 0.0	74.7 ± 1.0
0.4	0.0271 ± 0.0	0.0120 ± 0.0	68.9 ± 2.8	0.0106 ± 0.0	0.0053 ± 0.0	62.3 ± 3.9	0.0127 ± 0.0	0.0085 ± 0.0	78.4 ± 1.9
2.0	0.1096 ± 0.0	0.0413 ± 0.0	69.3 ± 1.9	0.0389 ± 0.0	0.0145 ± 0.0	56.2 ± 0.7	0.0461 ± 0.0	0.0314 ± 0.0	80.1 ± 0.4
10.0	0.4191 ± 0.0	0.2000 ± 0.0	72.5 ± 2.3	0.1232 ± 0.0	0.1003 ± 0.0	77.4 ± 17.8	0.1694 ± 0.0	0.1574 ± 0.0	82.8 ± 0.2

Data were obtained from Table 8, pp.38-40 and Appendix C, Table C3, pp.88R1-90R1 of the study report. Means and standard deviations were calculated using Excel.

[1] Percent desorbed as % of the adsorbed was calculated as follows: [% desorbed (desorption 1 + desorption 2) ÷ (% total recovery - % adsorbed) x 100]; e.g. [(6.2% + 1.5%) ÷ (100.2% - 90.0%) x 100] = 75.5%.

* Only single replicate values were reported.

Table 8a: Adsorption and desorption constants of [triazolopyrimidine-2-^{14}C]penoxsulam in the soils.[1]

Soil	Adsorption				Desorption			
	K	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
North Carolina Sand (M538)	0.27	1.02	0.99	76	1.56	0.98	1.00	296
Arkansas Silt loam (M557)	3.71	1.09	1.00	40	0.55	1.08	1.00	196
Loam from Japan (M558)	0.59	0.86	1.00	22	4.16	0.88	1.00	275
Sandy clay loam from Japan (M559)	0.56	0.86	1.00	40	2.97	0.89	1.00	195
Loam from Japan (M560)	4.69	0.80	1.00	305	20.77	0.82	0.99	2165
Loam from Japan (M561)	1.55	0.83	1.00	195	5.44	0.87	1.00	710
California Clay loam (M562)	0.49	0.94	0.99	20	2.88	0.92	0.99	151
North Dakota Loam (M563)	0.45	0.88	1.00	21	2.28	0.89	1.00	155
Silty clay loam from Italy (M570)	1.96	0.90	1.00	253	5.09	0.93	1.00	720
Silty clay loam from France (M571)	0.48	0.88	1.00	66	2.05	0.96	1.00	264
Sandy clay loam from the UK (M572)	0.16	0.93	0.97	13	0.87	0.81	0.97	192
Sandy loam from Italy (M573)	0.32	0.89	1.00	46	0.86	0.87	1.00	169

Data were obtained from Table 7, p.37R1 of the study report.

K_d -Adsorption and desorption coefficients; K - Freundlich adsorption and desorption coefficients; 1/N -Slope of Freundlich adsorption/desorption isotherms.

K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).

R^2 - Regression coefficient of Freundlich equation.

[1] Freundlich K values were calculated by the study author using the following equation (p.21):

$$\ln [C_s] = \ln K_f + 1/n(\ln[C_{aq}])$$

where

Kf = partitioning coefficient;

1/n = slope of the adsorption isotherm;

Cs = concentration of test substance adsorbed to the soil; and

Caq = concentration of test substance in solution at equilibrium.

Table 8b: Adsorption constants of [triazolopyrimidine-2-^{14}C]penoxsulam in the soils.

Soil	Adsorption K_d
North Carolina Sand (M538)[1]	0.329
Arkansas Silt loam (M557)	0.3364
Loam from Japan (M558)[1]	0.9536
Sandy clay loam from Japan (M559)[1]	0.7984
Loam from Japan (M560)[1]	9.3997
Loam from Japan (M561)[1]	2.4023
California Clay loam (M562)[1]	0.6274
North Dakota Loam (M563)[1]	0.6028
Silty clay loam from Italy (M570)[1]	2.5011
Silty clay loam from France (M571)[1]	0.6038
Sandy clay loam from the UK (M572)[1]	0.193
Sandy loam from Italy (M573)[1]	0.3652
Silty clay sediment from Arkansas[2]	1.4
Sandy loam soil from Brazil (M564)[2]	0.51
Clay loam soil from Brazil (M565)[2]	0.636
Sandy clay loam soil from Brazil (M566)[2]	0.13
Clay loam soil from Canada (M567)[2]	1.4
Clay loam soil from Canada (M568)[2]	0.67

[1] Adsorption K_d values were calculated using data obtained from Appendix C, Table C1, pp.82R1-84R1 of the study report and the following equation:

$$Kd = \frac{\left[\frac{(C_0 V_0 - C_{eq} V_0)}{m}\right]}{C_{eq}}$$

where
C_0 = the concentration in the water before sorption;
V_0 = the total water volume in the batch system;
C_{eq} = the aqueous-phase equilibrium concentration; and
m = the dry mass of sorbent.

[2] Adsorption K_d values were obtained from Table 9, p.41R1

C. ADSORPTION: Adsorption decreased with increasing concentration. After 24 hours of

equilibration, 11.0-13.2%, 11.0-19.4%, 17.3-36.2%, 16.8-33.8%, 47.3-86.2%, 37.3-65.0%, 15.3-23.8%, 14.8-29.1%, 44.0-64.4%, 15.9-31.2%, 5.4-11.2%, and 11.0-20.6% of the applied [^{14}C]penoxsulam was adsorbed to the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively (Appendix C, Table C1, pp.82R1-84R1). Adsorption K_d values were 0.3290, 0.3364, 0.9536, 0.7984, 9.3997, 2.4023, 0.6274, 0.6028, 2.5011, 0.6038, 0.1930, and 0.3652 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively (Appendix C, Table C1, pp.82R1-84R1). Freundlich K_{ads} values were 0.27, 3.71, 0.59, 0.56, 4.69, 1.55, 0.49, 0.45, 1.96, 0.48, 0.16, and 0.32 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Freundlich K_{oc} values were not reported (Table 7, p.37R1).

D. DESORPTION: At the end of the desorption phase, 75.5-82.1%, 65.1-71.2%, 23.7-31.5%, 42.8-53.7%, 4.7-10.5%, 26.4-40.6%, 48.4-61.2%, 46.2-55.0%, 35.5-43.8%, 64.8-72.5%, 56.2-77.4%, and 74.7-82.8% of the applied ^{14}C was desorbed from the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively (Table 8, pp.38-40). Freundlich K_{des} values were 1.56, 0.55, 4.16, 2.97, 20.77, 5.44, 2.88, 2.28, 5.09, 2.05, 0.87, and 0.86 for the North Carolina sand (M538), Arkansas silt loam (M557), loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), California clay loam (M562), North Dakota loam (M563), silty clay loam from Italy (M570), silty clay loam from France (M571), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils, respectively. Freundlich K_{oc} values were not reported (Table 7, p.37R1).

Supplementary experiment: Adsorption K_d values in the soils ranged from 0.12 to 10.67. Corresponding adsorption K_{oc} values ranged from 12 to 1141 (Table 9, p.41R). No linear relationships were noted between adsorption K_d or K_{oc} values and other soil characteristics (Table 10, p.42). Desorption K_d values ranged from 1.17 to 77.44. Corresponding K_{oc} values ranged from 82 to 11436. The higher desorption K_d values compared to the adsorption K_d values indicates some degree of irreversible adsorption to soil (p.27R1).

III. STUDY DEFICIENCIES: This study is acceptable, and can be used to fulfill the Subdivision N Guideline §163-1 data requirements for a mobility study using unaged soil. However, it was not stated that the study was conducted in the dark, and the test substance was incompletely characterized.

IV. REVIEWER'S COMMENTS:

1. It was not stated whether the definitive study was conducted in the dark. Although the test substance did not degrade during the study, the lighting conditions used in the experiment should be reported.

2. The study author calculated desorption constants for [triazolopyrimidine-2-^{14}C]-labeled penoxsulam following each of the two desorption steps:

Desorption constants of [-2-^{14}C]-labeled penoxsulam in the soils.

Soil	Desorption 1				Desorption 2			
	K	1/N	R^2	K_{oc}	K	1/N	R^2	K_{oc}
North Carolina Sand (M538)	1.22	1.04	1.00	Not reported	1.56	0.98	1.00	Not reported
Arkansas Silt loam (M557)	0.52	1.01	1.00	Not reported	0.55	1.08	1.00	Not reported
Loam from Japan (M558)	7.03	0.89	0.98	Not reported	4.16	0.88	1.00	Not reported
Sandy clay loam from Japan (M559)	3.99	0.95	1.00	Not reported	2.97	0.89	1.00	Not reported
Loam from Japan (M560)	30.29	0.86	0.99	Not reported	20.77	0.82	0.99	Not reported
Loam from Japan (M561)	5.43	0.89	1.00	Not reported	5.44	0.87	1.00	Not reported
California Clay loam (M562)	2.70	0.91	0.96	Not reported	2.88	0.92	0.99	Not reported
North Dakota Loam (M563)	3.34	0.95	1.00	Not reported	2.28	0.89	1.00	Not reported
Silty clay loam from Italy (M570)	5.71	0.94	1.00	Not reported	5.09	0.93	1.00	Not reported
Silty clay loam from France (M571)	1.94	0.94	1.00	Not reported	2.05	0.96	1.00	Not reported
Sandy clay loam from the UK (M572)	1.18	0.78	0.92	Not reported	0.87	0.81	0.97	Not reported
Sandy loam from Italy (M573)	1.42	0.97	1.00	Not reported	0.86	0.87	1.00	Not reported

Data were obtained from Table 7, p.37R1 of the study report.

K_d -Adsorption and desorption coefficients; K - Freundlich adsorption and desorption coefficients; 1/N -Slope of

Freundlich adsorption/desorption isotherms.
K_{oc} - Coefficient adsorption per organic carbon (K_d or K x 100/% organic carbon).
R^2 - Regression coefficient of Freundlich equation.

3. The 1/n values associated with the adsorption K values were slightly below 0.9 for the loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), North Dakota loam (M563), silty clay loam from France (M571), and sandy loam from Italy (M573) soils (1/n = 0.80-0.89; Table 7, p.37R1). The 1/n values associated with the desorption K values were below 0.9 for the loam from Japan (M558), sandy clay loam from Japan (M559), loam from Japan (M560), loam from Japan (M561), North Dakota loam (M563), sandy clay loam from the UK (M572), and sandy loam from Italy (M573) soils. If the 1/n value is not within the range of 0.9 to 1.1, then the Freundlich isotherm may not adequately or accurately represent adsorption and desorption of the test compound across all concentrations.

4. Thirteen of the test soils were foreign in origin (Table 3, p.33). However, these soils were characterized using the USDA classification system and were comparable to soils in the US.

5. The physico-chemical properties of the test substance were incomplete. Vapour pressure, UV adsorption, melting point, bulk density, K_{ow}, and the stability of the test substance was not reported.

6. The soil biomass of the test soils was not reported.

7. A complete description of the test soil collection and storage was not provided. Pesticide use history at the collection site, collection procedures, sampling depth, and storage length were not reported.

8. The definitive study temperature was reported as 20°C. More detailed information was not provided. It is preferred that minimum, maximum, and average temperatures be reported. Any significant deviations from the average and their duration should be noted.

9. The study author stated that some of the second desorption samples and the organic extracts showed some degradation of [^{14}C]penoxsulam, with 85-90% remaining (p.25). The author added that some degradation of penoxsulam is expected, given its relatively short half-life (8-14 days in anaerobic soil systems), and the small amount of degradation in one screening test sample (88.6%; p.23; Figure 3, p.45).

10. The study author stated that for the preliminary kinetics test, there was some degradation in the second desorption samples (p.27R1). However, only one desorption step was conducted in the preliminary kinetics test.

11. Controls were not used in the definitive study.

12. Complete details of the analytical methods were not reported. Oxidizer efficiency was not reported. For the HDLC method, the dimensions and particle size of the HDLC column were not reported, and it was not stated how [^{14}C]penoxsulam was identified in the samples.

13. Stock solutions were prepared by dissolving the test material in acetonitrile or acetone (p.12). However, the concentration of the co-solvents were not reported. Insufficient information was provided in the study report for the reviewer to determine the concentration of acetonitrile or acetone in the test solutions.

14. The study author stated that only one radiolabeled test material was used in the definitive study, since the purpose of the study was to determine the sorptive behavior of penoxsulam, rather than to determine its transformation products (p.11).

15. Freundlich isotherms for [triazolopyrimidine-2-^{14}C]penoxsulam adsorption/desorption on the Arkansas silt loam (M557), sandy loam from Italy (M573), and loam from Japan (M560) soils are presented in Figures 8-10 of the study report (pp.50R1-52R1).

16. The radiochemical purity of [triazolopyrimidine-2-^{14}C]penoxsulam was confirmed using HDLC analysis to be 99.0% (p.12; Figure 1, p.43).

17. Limits of detection and quantification (LOD and LOQ) were not reported for LSC and HPLC analyses. LODs and LOQs should be reported to allow the reviewer to evaluate the adequacy of the test method.

18. The IUPAC, CAS names, and CAS numbers for penoxsulam were obtained from the Compendium of Pesticide Common Names at http://www.alanwood.net/pesticides/penoxsulam.html and the USEPA/OPP Chemical Ingrediants Database Query at http://www.cdpr.ca.gov/cgi-bin/epa/chemdetiris.pl?pccode=119031.

V. REFERENCES:

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 163-1. Mobility 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.

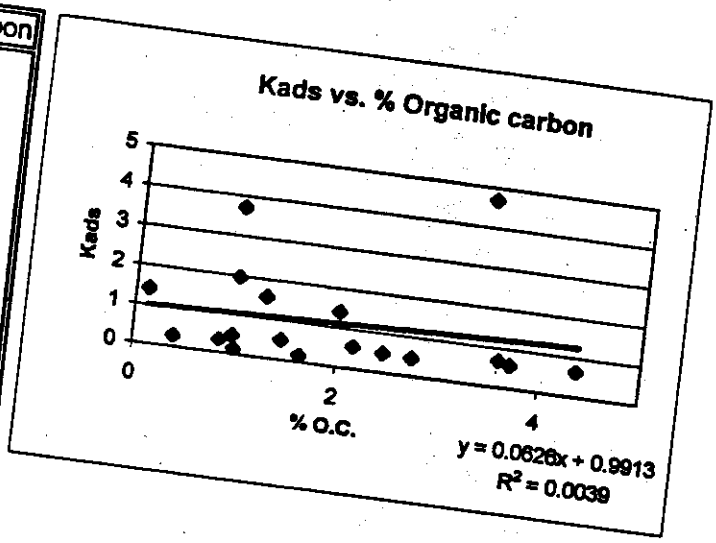
4. U.S. Environmental Protection Agency. 2003. Guidance for Calculating Sorption Coefficients in Batch Equilibrium Studies.

Attachment 1

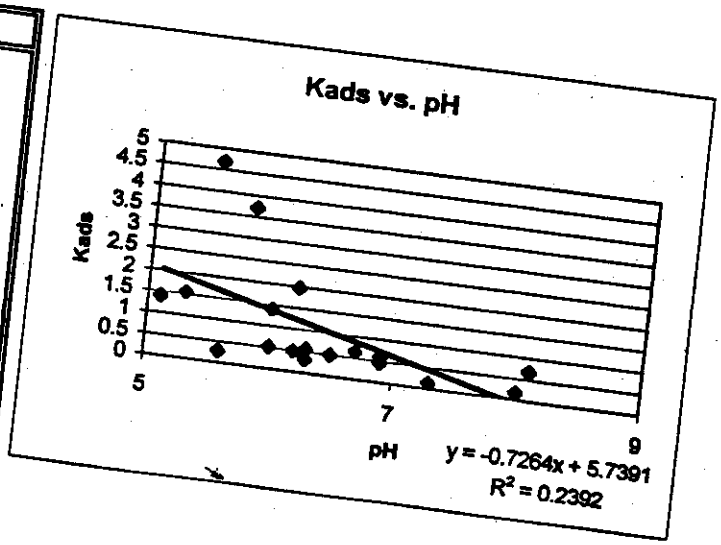
Excel Spreadsheets

Chemical:
PC Code: Penoxsulam
MRID: 118205
Guideline No: 45830801
163-1

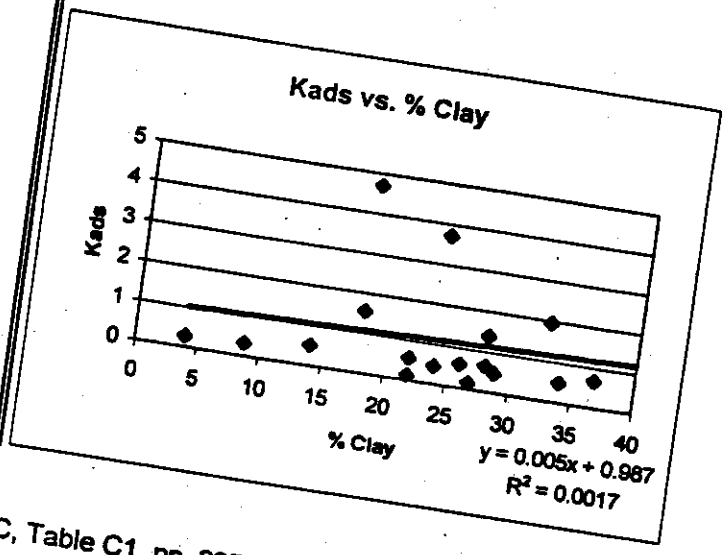
Soil	Kads	% organic carbon
Sand	0.27	0.4
Silt loam	3.71	0.97
Loam	0.59	3.71
Sandy clay loam	0.56	2.16
Loam	4.69	3.41
Loam	1.55	1.28
Clay loam	0.49	2.46
Loam	0.45	2.74
Silty clay loam	1.96	0.99
Silty clay loam	0.48	0.97
Sandy clay loam	0.16	1.64
Sandy loam	0.32	0.85
Silty clay sediment	1.4	0.12
Sandy loam	0.51	1.45
Clay loam	0.64	4.37
Sandy clay loam	0.13	1
Clay loam	1.4	2
Clay loam	0.67	3.59



Soil	Kads	pH
Sand	0.27	5.6
Silt loam	3.71	5.8
Loam	0.59	6.9
Sandy clay loam	0.56	6.3
Loam	4.69	5.5
Loam	1.55	5.3
Clay loam	0.49	6.5
Loam	0.45	6.9
Silty clay loam	1.96	6.2
Silty clay loam	0.48	6.2
Sandy clay loam	0.16	8
Sandy loam	0.32	6.3
Silty clay sediment	1.4	5.1
Sandy loam	0.51	6
Clay loam	0.64	6.7
Sandy clay loam	0.13	7.3
Clay loam	1.4	6
Clay loam	0.67	8.1



Soil	Kads	% clay
Sand	0.27	4
Silt loam	3.71	24
Loam	0.59	26
Sandy clay loam	0.56	22
Loam	4.69	18
Loam	1.55	18
Clay loam	0.49	34
Loam	0.45	24
Silty clay loam	1.96	32.8
Silty clay loam	0.48	28.8
Sandy clay loam	0.16	26.8
Sandy loam	0.32	8.8
Silty clay sediment	1.4	48
Sandy loam	0.51	14
Clay loam	0.64	28
Sandy clay loam	0.13	22
Clay loam	1.4	28
Clay loam	0.67	36.8



Data were obtained from Table 2, p. 32 and Appendix C, Table C1, pp. 82R1-84R1 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

M538 Sand- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.043	10	5	-0.0060	-0.1395
0.04	10		10	5		
0.2	10	0.172	10	5	0.0560	0.3256
0.2	10	0.166	10	5	0.0680	0.4096
1	10	0.804	10	5	0.3920	0.4876
1	10	0.82	10	5	0.3600	0.4390
5	10	4.217	10	5	1.5660	0.3714
5	10	4.15	10	5	1.7000	0.4096
						0.3290 AVG

M557 Silt loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.039	10	5	0.0020	0.0513
0.04	10	0.04	10	5	0.0000	0.0000
0.2	10	0.164	10	5	0.0720	0.4390
0.2	10	0.168	10	5	0.0640	0.3810
1	10	0.792	10	5	0.4160	0.5253
1	10	0.799	10	5	0.4020	0.5031
5	10	4.196	10	5	1.6080	0.3832
5	10	4.152	10	5	1.6960	0.4085
						0.3364 AVG

M558 Loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.029	10	5	0.0220	0.7586
0.04	10		10	5		
0.2	10	0.128	10	5	0.1440	1.1250
0.2	10		10	5		
1	10	0.642	10	5	0.7160	1.1153
1	10	0.637	10	5	0.7260	1.1397
5	10	3.568	10	5	2.8640	0.8027
5	10	3.597	10	5	2.8060	0.7801
						0.9536 AVG

Data were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

M559 Sandy clay loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.032	10	5	0.0160	0.5000
0.04	10		10	5		
0.2	10	0.137	10	5	0.1260	0.9197
0.2	10	0.136	10	5	0.1280	0.9412
1	10	0.69	10	5	0.6200	0.8986
1	10	0.679	10	5	0.6420	0.9455
5	10	3.701	10	5	2.5980	0.7020
5	10	3.729	10	5	2.5420	0.6817
						0.7984 AVG

M560 Loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.006	10	5	0.0680	11.3333
0.04	10	0.006	10	5	0.0680	11.3333
0.2	10	0.03	10	5	0.3400	11.3333
0.2	10	0.03	10	5	0.3400	11.3333
1	10	0.184	10	5	1.6320	8.8696
1	10	0.175	10	5	1.6500	9.4286
5	10	1.271	10	5	7.4580	5.8678
5	10	1.299	10	5	7.4020	5.6982
						9.3997 AVG

M561 Loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.017	10	5	0.0460	2.7059
0.04	10	0.016	10	5	0.0480	3.0000
0.2	10	0.078	10	5	0.2440	3.1282
0.2	10	0.083	10	5	0.2340	2.8193
1	10	0.475	10	5	1.0500	2.2105
1	10	0.473	10	5	1.0540	2.2283
5	10	2.806	10	5	4.3880	1.5638
5	10	2.807	10	5	4.3860	1.5625
						2.4023 AVG

ata were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

M562 Clay loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.037	10	5	0.0060	0.1622
0.04	10		10	5		
0.2	10	0.151	10	5	0.0980	0.6490
0.2	10	0.148	10	5	0.1040	0.7027
1	10	0.721	10	5	0.5580	0.7739
1	10	0.718	10	5	0.5640	0.7855
5	10	3.773	10	5	2.4540	0.6504
5	10	3.748	10	5	2.5040	0.6681
						0.6274 AVG

M563 Loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.035	10	5	0.0100	0.2857
0.04	10		10	5		
0.2	10	0.146	10	5	0.1080	0.7397
0.2	10		10	5		
1	10	0.723	10	5	0.5540	0.7663
1	10	0.725	10	5	0.5500	0.7586
5	10	3.941	10	5	2.1180	0.5374
5	10	3.954	10	5	2.0920	0.5291
						0.6028 AVG

M570 Silty clay loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.018	10	5	0.0440	2.4444
0.04	10	0.018	10	5	0.0440	2.4444
0.2	10	0.081	10	5	0.2380	2.9383
0.2	10	0.083	10	5	0.2340	2.8193
1	10	0.431	10	5	1.1380	2.6404
1	10	0.429	10	5	1.1420	2.6620
5	10	2.493	10	5	5.0140	2.0112
5	10	2.47	10	5	5.0600	2.0486
						2.5011 AVG

ata were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

M571 Silty clay loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.035	10	5	0.0100	0.2857
0.04	10	0.035	10	5		
0.2	10	0.148	10	5	0.1040	
0.2	10	0.149	10	5	0.1020	0.7027
1	10	0.726	10	5	0.5480	0.6846
1	10	0.737	10	5	0.5260	0.7548
5	10	3.942	10	5	2.1160	0.7137
5	10	3.924	10	5	2.1520	0.5368
						0.5484
						0.6038 AVG

M572 Sandy clay loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.043	10	5	-0.0060	-0.1395
0.04	10	0.043	10	5		
0.2	10	0.178	10	5	0.0440	
0.2	10	0.181	10	5		0.2472
1	10	0.867	10	5	0.2660	
1	10	0.859	10	5	0.2820	0.3068
5	10	4.508	10	5	0.9840	0.3283
5	10	4.552	10	5	0.8960	0.2183
						0.1968
						0.1930 AVG

M573 Sandy loam- Adsorption

Initial soln concen (C_o)	Volume of soln (V_o)	Concen in soln after equil (C_{eq})	Volume of soln (V_o)	Dry mass of sorbent (m)	$[(C_oV_o)-(C_{eq}V_o)]$/soil mass	Kd
0.04	10	0.039	10	5	0.0020	0.0513
0.04	10	0.039	10	5	0.0020	0.0513
0.2	10	0.163	10	5	0.0740	0.4540
0.2	10	0.151	10	5	0.0980	0.6490
1	10	0.798	10	5	0.4040	0.5063
1	10	0.796	10	5	0.4080	0.5126
5	10	4.275	10	5	1.4500	0.3392
5	10	4.241	10	5	1.5180	0.3579
						0.3652 AVG

Data were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

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Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

Table 4/6 Adsorption soil

0.04	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	0.009	0.016	0.029	0.027	0.073	0.057	0.019	0.023	0.053	0.025	0.009	0.017
AVG		0.015			0.065	0.047			0.05	0.025	0.009	0.016
STDEV		0.0155			0.0690	0.0520			0.0515	0.0250	0.0090	0.0165
		0.0007			0.0057	0.0071			0.0021	0.0000	0.0000	0.0007
0.2												
0.2	0.05	0.061	0.092									
AVG	0.056	0.055		0.104	0.299	0.19	0.083		0.206	0.092	0.034	0.068
STDEV	0.0530	0.0580		0.105	0.281	0.194	0.085	0.085	0.207	0.091	0.031	0.065
	0.0042	0.0042		0.1045	0.2900	0.1920	0.0840		0.2065	0.0915	0.0325	0.0665
				0.0007	0.0127	0.0028	0.0014		0.0007	0.0007	0.0021	0.0021
1												
1	0.243	0.258	0.425									
AVG	0.209	0.24	0.42	0.404	1.324	0.821	0.497		0.897	0.378	0.102	0.269
STDEV	0.2260	0.2490	0.4225	0.436	1.272	0.799	0.348	0.334	0.969	0.372	0.114	0.267
	0.0240	0.0127	0.0035	0.4200	1.2980	0.8100	0.4225	0.354	0.9330	0.3750	0.1080	0.2680
				0.0226	0.0368	0.0156	0.1054	0.3440	0.0509	0.0042	0.0085	0.0014
5												
5	1.006	1.067	1.74									
AVG	1.184	1.135	1.726	1.672	5.041	4.032	1.542		4.186	1.567	1.272	1.084
STDEV	1.0950	1.1010	1.7330	1.683	5.671	3.428	1.509	1.447	4.622	1.609	0.471	1.106
	0.1259	0.0481	0.0099	1.6775	5.3560	3.7300	1.5255	1.502	4.4040	1.5880	0.8715	1.0950
				0.0078	0.4455	0.4271	0.0233	1.4745	0.3083	0.0297	0.5664	0.0156
								0.0389				

Data were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

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Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

Table 5 Adsorption supernatant

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	90	81.4	60.5	65.7	11.6	36	77	72.3	36.9	72	88.6	81
0.04		82.3			11.6	32.8			37.2	71.6	88.8	81.1
0.2	87	83	64.8	69.1	15.1	39.3	76.6	73.9	40.9	75.1	90.2	82.6
0.2	84	85		68.8	15.4	41.8	75		41.8	75.7	91.7	76.5
1	86	84.7	68.7	73.8	19.6	50.9	77.1	77.3	46.1	77.7	92.7	85.4
1	87.7	85.4	68.1	72.7	18.7	50.6	76.8	77.6	45.9	78.8	91.9	85.1
5	90.3	89.9	76.4	79.3	27.2	60.1	80.8	84.4	53.4	84.4	96.6	91.6
5	88.9	88.9	77.1	79.9	27.8	60.1	80.3	84.7	52.9	84.1	97.5	90.8
AVG	87.70	85.08	69.27	72.76	18.38	46.45	77.66	78.37	44.39	77.43	92.25	84.26
STDEV	2.26	3.02	6.49	5.38	6.32	10.54	2.10	5.20	6.39	4.88	3.31	5.10

Table 5 Desorption 1 supernatant

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	6.2	7.8	4.6	8.1	1.5	9.3	6.2	7.1	10.2	11.2	3.6	9.4
0.04		8.1			2.1	8.5			11.3	11	3.3	9.2
0.2	8.3	8	2.3	7.8	2.3	8.8	6.1	7.2	11.8	10.6	2.7	9.9
0.2	8.8	6.7		7.8	2.1	9.5	7.4		12	9.9	3	8.7
1	8.4	7.1	4.7	6.4	2.5	10.7	14	6.1	12.5	9.6	1.7	8.4
1	7.6	6.4	4.1	6.7	2.6	10.2	7.8	6.6	12.2	10	2.5	8.6
5	7	5.4	3.5	6.2	3.1	9.7	5.8	5.5	11.5	7.9	10.2	6.3
5	7.7	6.5	3.1	5.7	2.3	9.5	5	5.7	11.5	8.6	1.5	6.7
AVG	7.71	7.00	3.72	6.96	2.31	9.53	7.47	6.37	11.63	9.85	3.56	8.40
STDEV	0.90	0.94	0.93	0.94	0.46	0.71	3.03	0.71	0.70	1.14	2.78	1.27

Data were obtained from Table 8, pp. 38-40 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

Table 5 Desorption 2 supernatant

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	1.5	3.6	4.3	5.5	1.9	6.8	4.2	4.9	9	6.4	2.4	4.1
0.04		3.2			2	6.1			9.3	6.3	2.3	3.9
0.2	2.2	3.4	5	5.6	2.6	6.3	5.3	5.4	9.1	6.2	2.9	3.9
0.2	3	3.3		5.5	2.7	6.7	4.6		9.2	5.9	2.4	4.7
1	2.4	3	4.7	4.7	2.7	7.2	3.4	4.2	8.4	4.4	1.7	3.5
1	2	3	4.7	5.2	2.4	7	4.1	4.4	10.4	4.4	1.4	3.3
5	2.2	3.2	4.2	4.2	4.3	7	4.2	4.3	9.4	4.3	2.3	3.4
5	2.6	2.7	4.1	4.8	3.7	7.1	4.3	4.4	10	4.3	2	3.3
AVG	2.27	3.18	4.50	5.07	2.79	6.78	4.30	4.60	9.35	5.28	2.18	3.76
STDEV	0.47	0.28	0.35	0.52	0.82	0.39	0.57	0.46	0.61	1.00	0.47	0.49

Table 5 Extracted

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	1.3	5	20.9	14.8	72.7	42.7	9.8	11.4	35.9	8.7	3.5	4
0.04		4.6			63	33.7			31.6	8.2	3.9	4
0.2	2.1	4.1	15.9	13	70.8	33	9.6	8.8	31.2	6.5	3	3.4
0.2	2.4	3.8		13.3	66.4	32.8	9.5		31.3	7.3	2.4	3
1	2.1	3.8	13.3	10.5	65.6	26.1	9.2	7.6	27.2	6.1	2	2.6
1	1.5	3.4	13.6	11.5	63.1	25.4	6.8	7.9	29.3	5.6	2.2	2.4
5	1.6	2.8	10.9	7.5	46.6	26.5	6.6	5.7	24.1	4.7	1.2	1.9
5	2.3	2.9	11.4	7.6	54.7	20.2	6.8	5.9	28.1	4.3	1.5	1.8
AVG	1.90	3.80	14.33	11.17	62.86	30.05	8.33	7.88	29.84	6.43	2.46	2.89
STDEV	0.43	0.77	3.68	2.82	8.54	6.93	1.50	2.10	3.53	1.58	0.94	0.86

ata were oblained from Table 8, pp. 38-40 of the study report.

Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

Table 5- Combusted

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	1.2	1.4	5.4	3.4	8.7	4.3	1.3	2.5	3.2	1.7	3.5	4
0.04		1.1			7.9	5.4			1.9	0.5	3.9	4
0.2	0.2	1	7.5	4.1	7.6	3.1	1	2	1.4	0.4	3	3.4
0.2	0.6	0.9		4.5	9.8	6.2	1		1.5	0.6	2.4	3
1	0.5	0.7	6.7	3.3	7.6	1.8	0.7	1.6	1.9	0.4	2	2.6
1	0.6	1.1	5.9	3.3	8	5.4	1.5	1	1.5	0.5	2.2	2.4
5	0.2	0.9	5.3	1.7	6.6	1.5	0.7	2.9	1.2	0.3	1.2	1.9
5	0.2	0.5	5.1	1.4	7	1.1	0.6	1.6	1.3	0.3	1.5	1.8
AVG	0.50	0.95	5.98	3.10	7.90	3.60	0.97	1.93	1.74	0.59	2.46	2.89
STDEV	0.36	0.27	0.94	1.15	1.00	2.00	0.34	0.69	0.64	0.46	0.94	0.86

able 5 Recovery

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	100.2	99.2	95.7	97.5	96.4	99.1	98.5	98.3	95.3	100	99	98.9
0.04		99.4			86.6	86.4			91.3	97.5	98.9	98.8
0.2	99.8	99.5	95.6	99.6	98.4	90.6	98.5	97.4	94.4	98.8	99.6	100.5
0.2	98.8	99.8		99.9	96.4	97.1	97.5		95.8	99.3	100	93.3
1	99.5	99.1	98.1	98.7	98.1	96.7	104.5	96.8	96	98.3	98.7	100.3
1	99.4	99.3	96.4	99.2	94.8	98.7	97	97.5	99.3	99.2	98.9	99.9
5	101.3	102.2	100.4	98.8	87.9	104.8	98.1	102.9	99.5	101.6	110.5	103.3
5	101.7	101.6	100.6	99.3	95.5	98	97.1	102.4	103.7	101.5	102.9	102.9
AVG	100.10	100.01	97.80	99.00	94.26	96.43	98.74	99.22	96.91	99.53	101.06	99.74
STDEV	1.05	1.19	2.28	0.78	4.50	5.61	2.61	2.71	3.80	1.45	4.05	3.09

ıta were obtained from Table 8, pp. 38-40 of the study report.

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Chemical: Penoxsulam
PC Code: 119031
MRID: 45830801
Guideline: 163-1

Table 6 Adsorption supernatant

0.04	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	0.043	0.039	0.029	0.032	0.006	0.017	0.037	0.035	0.018	0.035	0.043	0.039
AVG		0.04			0.006	0.016			0.018	0.035	0.043	0.039
STDEV		0.0395			0.0060	0.0165			0.0180	0.0350	0.0430	0.0390
		0.0007			0.0000	0.0007			0.0000	0.0000	0.0000	0.0000
0.2												
0.2	0.172	0.164	0.128	0.137	0.03	0.078	0.151	0.146	0.081	0.148	0.178	0.163
AVG	0.166	0.168		0.136	0.03	0.083	0.148		0.083	0.149	0.181	0.151
STDEV	0.1690	0.1660		0.1365	0.0300	0.0805	0.1495		0.0820	0.1485	0.1795	0.1570
	0.0042	0.0028		0.0007	0.0000	0.0035	0.0021		0.0014	0.0007	0.0021	0.0085
1												
1	0.804	0.792	0.642	0.69	0.184	0.475	0.721	0.723	0.431	0.726	0.867	0.798
AVG	0.82	0.799	0.637	0.679	0.175	0.473	0.718	0.725	0.429	0.737	0.859	0.796
STDEV	0.8120	0.7955	0.6395	0.6845	0.1795	0.4740	0.7195	0.7240	0.4300	0.7315	0.8630	0.7970
	0.0113	0.0049	0.0035	0.0078	0.0064	0.0014	0.0021	0.0014	0.0014	0.0078	0.0057	0.0014
5												
5	4.217	4.196	3.568	3.701	1.271	2.806	3.773	3.941	2.493	3.942	4.508	4.275
AVG	4.15	4.152	3.597	3.729	1.299	2.807	3.748	3.954	2.47	3.924	4.552	4.241
STDEV	4.1835	4.1740	3.5825	3.7150	1.2850	2.8065	3.7605	3.9475	2.4815	3.9330	4.5300	4.2580
	0.0474	0.0311	0.0205	0.0198	0.0198	0.0007	0.0177	0.0092	0.0163	0.0127	0.0311	0.0240

Data were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

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hemical: Penoxsulam
C Code: 119031
IRID: 45830801
uideline: 163-1

able 6 % Adsorption

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	11.25	20	36.25	33.75	91.25	71.25	23.75	29.13	66.25	31.25	11.25	21.25
0.04		18.75			81.25	58.75			62.5	31.25	11.25	20
AVG		19.38			86.25	65.00			64.38	31.25	11.25	20.63
STDEV		0.88			7.07	8.84			2.65	0.00	0.00	0.88
0.2	12.50	15.25	23.00	26.00	74.75	47.50	20.75	21.25	51.5	23	8.5	17
0.2	14.00	13.75		26.25	70.25	48.50	21.25		51.75	22.75	7.75	16.25
AVG	13.25	14.50		26.13	72.50	48.00	21.00		51.63	22.88	8.13	16.63
STDEV	1.06	1.06		0.18	3.18	0.71	0.35		0.18	0.18	0.53	0.53
1	12.15	12.9	21.25	20.2	66.2	41.05	24.85	16.7	44.85	18.9	5.1	13.45
1	10.45	12	21	21.8	63.6	39.95	17.4	17.7	48.45	18.6	5.7	13.35
AVG	11.30	12.45	21.13	21.00	64.90	40.50	21.13	17.20	46.65	18.75	5.40	13.40
STDEV.	1.20	0.64	0.18	1.13	1.84	0.78	5.27	0.71	2.55	0.21	0.42	0.07
5	10.06	10.67	17.4	16.72	43.46	40.32	15.42	14.47	41.86	15.67	12.72	10.84
5	11.84	11.35	17.26	16.83	51.11	34.28	15.09	15.02	46.22	16.09	4.71	11.06
AVG	10.95	11.01	17.33	16.78	47.29	37.30	15.26	14.75	44.04	15.88	8.72	10.95
STDEV	1.26	0.48	0.10	0.08	5.41	4.27	0.23	0.39	3.08	0.30	5.66	0.16

ta were obtained from Appendix C, Table C1, pp. 82R1-84R1 of the study report.

emical: Penoxsulam
Code: 119031
ID: 45830801
deline: 163-1

ble 7 Desorption soil

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	0.0012	0.0048	0.0202	0.0143	0.0702	0.0412	0.0094	0.0111	0.0346	0.0084	0.0034	0.0039
0.04		0.0045			0.0607	0.0325			0.0305	0.0079	0.0038	0.0039
AVG		0.0047			0.0655	0.0369			0.0326	0.0082	0.0036	0.0039
TDEV		0.0002			0.0067	0.0062			0.0029	0.0004	0.0003	0.0000
0.2	0.0084	0.0161	0.0630	0.0513	0.2796	0.1306	0.0379	0.0348	0.1234	0.0255	0.0118	0.0135
0.2	0.0094	0.0151		0.0526	0.2623	0.1297	0.0376		0.1237	0.0287	0.0094	0.0119
AVG	0.0089	0.0156		0.0520	0.2710	0.1302	0.0378		0.1236	0.0271	0.0106	0.0127
TDEV	0.0007	0.0007		0.0009	0.0122	0.0006	0.0002		0.0002	0.0023	0.0017	0.0011
1	0.0395	0.0701	0.2486	0.1959	1.2257	0.4879	0.1717	0.1421	0.5073	0.1152	0.0369	0.0477
1	0.0286	0.0640	0.2545	0.2140	1.1774	0.4761	0.1268	0.1475	0.5466	0.1039	0.0409	0.0444
AVG	0.0341	0.0671	0.2516	0.2050	1.2016	0.4820	0.1493	0.1448	0.5270	0.1096	0.0389	0.0461
TDEV	0.0077	0.0043	0.0042	0.0128	0.0342	0.0083	0.0317	0.0038	0.0278	0.0080	0.0028	0.0023
5	0.1525	0.2630	1.0217	0.7024	4.3462	2.4727	0.6130	0.5299	2.2465	0.4364	0.1089	0.1737
5	0.2185	0.2731	1.0622	0.7060	5.1106	1.8848	0.6370	0.5503	2.6203	0.4018	0.1375	0.1650
AVG	0.1855	0.2681	1.0420	0.7042	4.7284	2.1788	0.6250	0.5401	2.4334	0.4191	0.1232	0.1694
TDEV	0.0467	0.0071	0.0286	0.0025	0.5405	0.4157	0.0170	0.0144	0.2643	0.0245	0.0202	0.0062

a were obtained from Appendix C, Table C3, pp. 88R1-90R1 of the study report.

hemical: Penoxsulam
C Code: 119031
RID: 45830801
uideline: 163-1

able 7 Desorption supernatant

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	0.0007	0.0018	0.0021	0.0027	0.0009	0.0033	0.002	0.0024	0.0044	0.0031	0.0012	0.002
0.04		0.0015			0.001	0.0029			0.0045	0.003	0.0011	0.0019
AVG		0.0017			0.0010	0.0031			0.0045	0.0031	0.0012	0.0020
STDEV		0.0002			0.0001	0.0003			0.0001	0.0001	0.0001	0.0001
0.2	0.0044	0.0067	0.0099	0.0110	0.0051	0.0124	0.0105	0.0108	0.0180	0.0123	0.0058	0.0077
0.2	0.0059	0.0066		0.0108	0.0054	0.0132	0.0090		0.0182	0.0116	0.0048	0.0093
AVG	0.0052	0.0067		0.0109	0.0053	0.0128	0.0098		0.0181	0.0120	0.0053	0.0085
STDEV	0.0011	0.0001		0.0001	0.0002	0.0006	0.0011		0.0001	0.0005	0.0007	0.0011
1	0.0228	0.0276	0.0441	0.0442	0.0257	0.0670	0.0319	0.0389	0.0788	0.0413	0.0161	0.0323
1	0.0191	0.0277	0.0442	0.0484	0.0227	0.0657	0.0382	0.0414	0.0973	0.0412	0.0129	0.0304
AVG	0.0210	0.0277	0.0442	0.0463	0.0242	0.0664	0.0351	0.0402	0.0881	0.0413	0.0145	0.0314
STDEV	0.0026	0.0001	0.0001	0.0030	0.0021	0.0009	0.0045	0.0018	0.0131	0.0001	0.0023	0.0013
5	0.1019	0.1508	0.1977	0.1967	0.2017	0.3289	0.1973	0.2023	0.4368	0.1989	0.1062	0.1587
5	0.1216	0.1257	0.1892	0.2241	0.1722	0.3298	0.2020	0.2077	0.4655	0.2011	0.0944	0.1560
AVG	0.1118	0.1383	0.1935	0.2104	0.1870	0.3294	0.1997	0.2050	0.4512	0.2000	0.1003	0.1574
STDEV	0.0139	0.0177	0.0060	0.0194	0.0209	0.0006	0.0033	0.0038	0.0203	0.0016	0.0083	0.0019

ta were obtained from Appendix C, Table C3, pp. 88R1-90R1 of the study report.

iemical: Penoxsulam
: Code: 119031
RID: 45830801
iideline: 163-1

ble 7 % desorbed as % of the adsorbed

	Sand	Silt loam	Loam	Sandy clay loam	Loam	Loam	Clay loam	Loam	Silty clay loam	Silty clay loam	Sandy clay loam	Sandy loam
0.04	75.49	64.04	25.28	42.77	4.01	25.52	48.37	46.15	32.88	62.86	57.69	75.42
0.04		66.08			5.47	27.24			38.08	66.80	55.45	74.01
AVG		65.06			4.74	26.38			35.48	64.83	56.57	74.72
STDEV		1.44			1.03	1.22			3.68	2.79	1.58	1.00
0.2	82.03	69.09	23.70	43.93	5.88	29.43	52.05	53.62	39.07	70.89	59.57	77.09
0.2	79.73	67.57		42.77	5.93	29.29	53.33		39.26	66.95	65.06	79.76
AVG	80.88	68.33		43.35	5.91	29.36	52.69		39.17	68.92	62.32	78.43
STDEV	1.63	1.07		0.82	0.04	0.10	0.91		0.13	2.79	3.88	1.89
1	80.00	70.14	31.97	44.58	6.62	39.08	63.50	52.82	41.88	67.96	56.67	79.87
1	82.05	67.63	31.10	44.91	6.57	35.76	58.91	55.28	42.32	70.59	55.71	80.41
AVG	81.03	68.89	31.54	44.75	6.60	37.42	61.21	54.05	42.10	69.28	56.19	80.14
STDEV	1.45	1.77	0.62	0.23	0.04	2.35	3.25	1.74	0.31	1.86	0.68	0.38
5	83.64	69.92	32.08	53.33	12.19	37.36	57.80	52.97	45.34	70.93	89.93	82.91
5	80.47	72.44	30.64	54.12	8.86	43.80	55.36	57.06	42.32	74.14	64.81	82.64
AVG	82.06	71.18	31.36	53.73	10.53	40.58	56.58	55.02	43.83	72.54	77.37	82.78
STDEV	2.24	1.78	1.02	0.56	2.35	4.55	1.73	2.89	2.14	2.27	17.76	0.19

a were obtained from Table 8, pp. 38-40 of the study report.

Attachment 2

Structures of Parent and Transformation Products

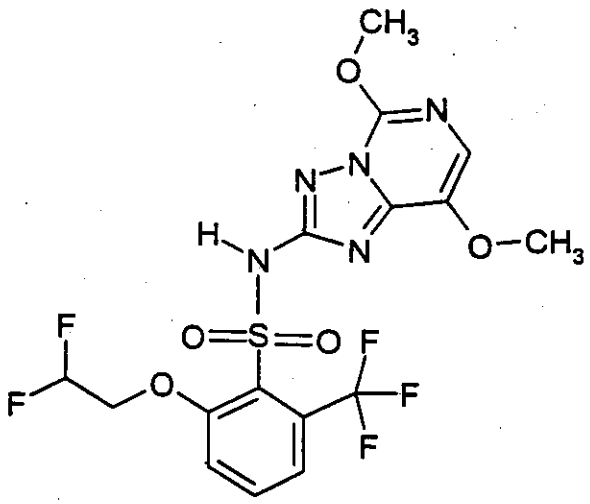
Penoxsulam

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

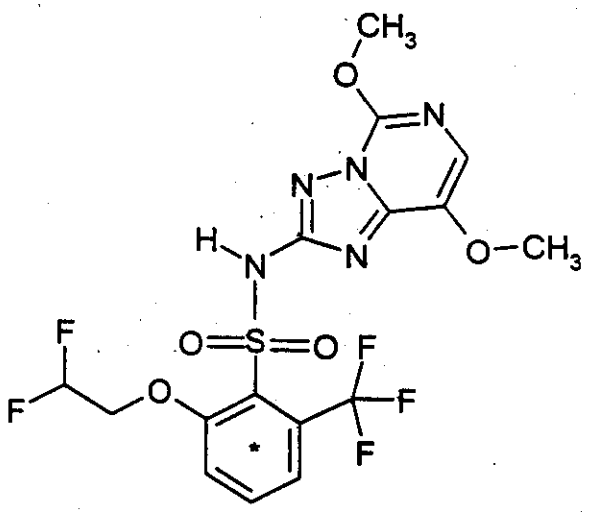
CAS name: 2-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide

CAS No: 219714-96-2

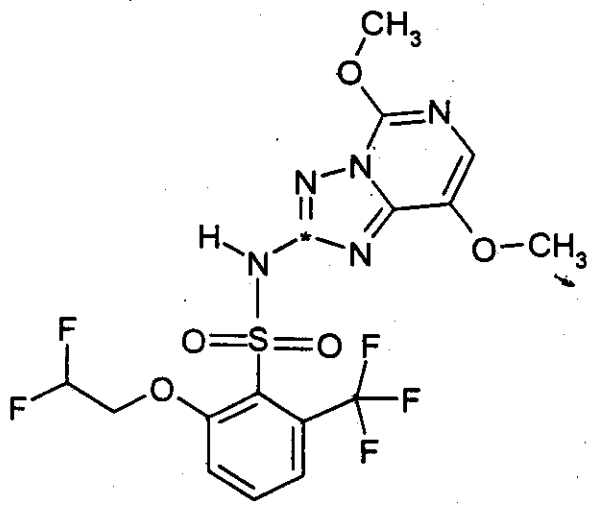
Unlabeled



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



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

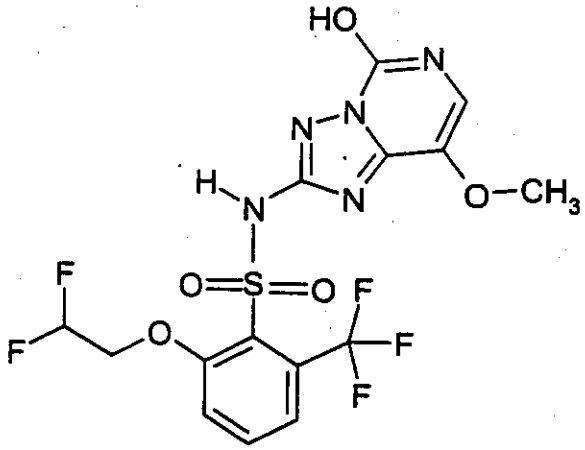


* Position of the radiolabel.

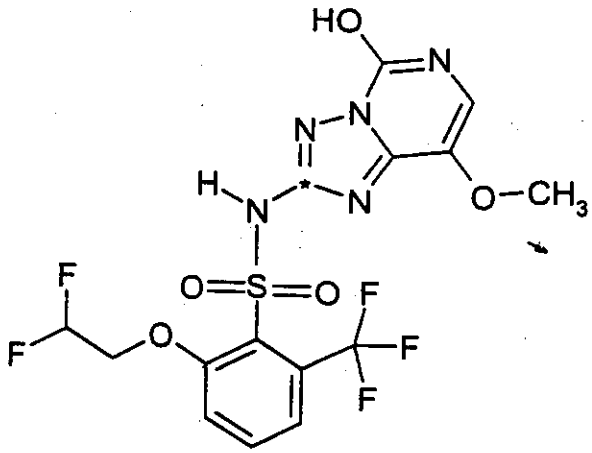
5-OH-XDE-638

IUPAC name: 6-(2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo-s-triazolo[1,5-c]pyrimidin-2-yl)-□,□,□-trifluoro-o-toluenesulfonamide
CAS name: (2,2-Difluoroethoxy)-N-(5,6-dihydro-8-methoxy-5-oxo[1,2,4]triazolo[1,5-c]pyrimidin-2-yl)-6-(trifluoromethyl)benzenesulfonamide
CAS No: NA

Unlabeled



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

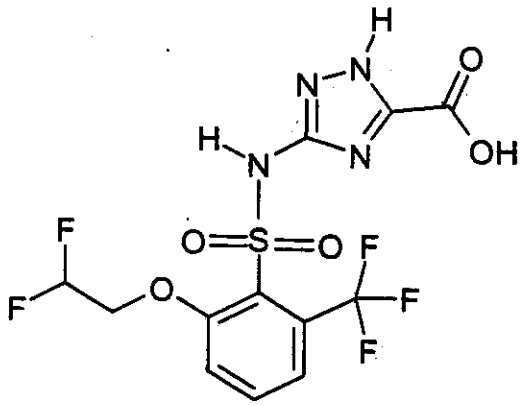


* Position of the radiolabel.

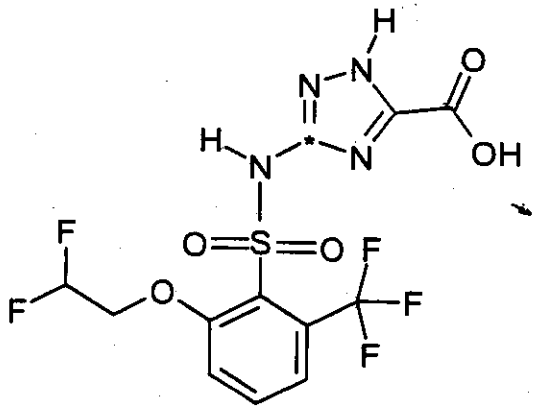
BSTCA

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

Unlabeled



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

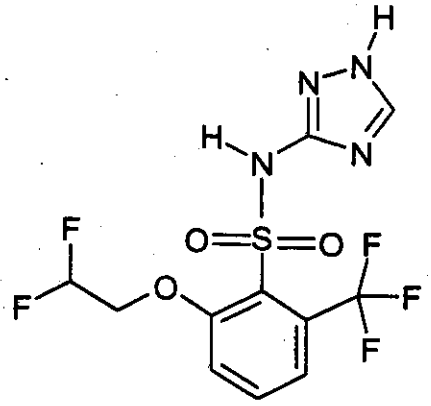


* Position of the radiolabel.

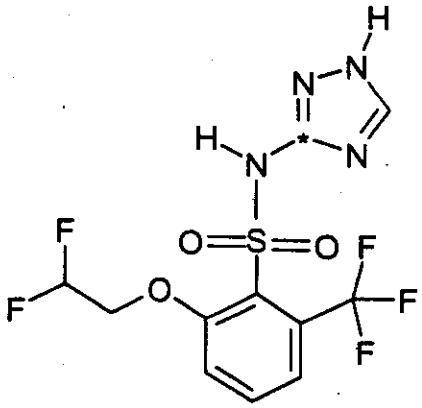
BST

IUPAC name: 6-(2,2-Difluoroethoxy)-□,□,□-trifluoro-N-s-triazol-3-yl-o-toluenesulfonamide
CAS name: 2-(2,2-Difluoroethoxy)-N-1H-1,2,4-triazole-3-yl-6-(trifluoromethyl)benzenesulfonamide
CAS No: NA

Unlabeled



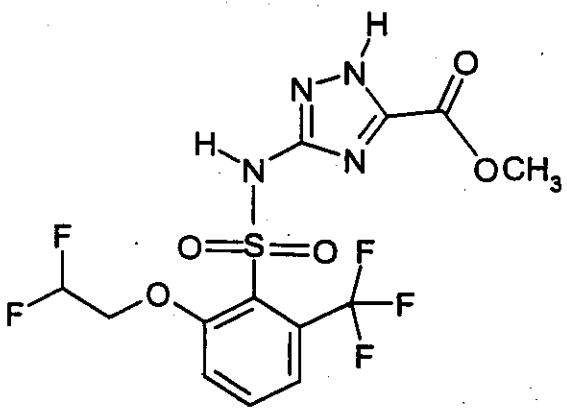
[Triazolopyrimidine-2-^{14}C] label



* Position of the radiolabel.

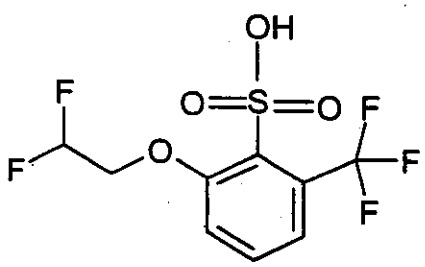
BSTCA-methyl

IUPAC name: Methyl 3-[6-(2,2-difluoroethoxy)-□,□,□-trifluoro-o-toluenesulfonamido]-s-triazole-5-carboxylate
CAS name: Methyl 3-[[[2-(2,2-difluoroethoxy)-6-(trifluoromethyl)phenyl]sulfonyl]amino]-1H-1,2,4-triazole-5-carboxylate
CAS No: NA



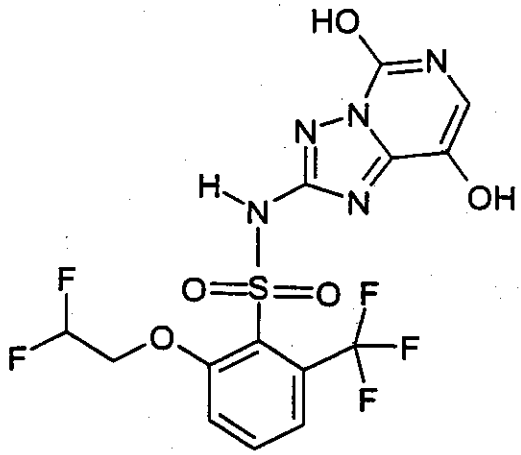
BSA

IUPAC name: 6-(2,2-Difluoroethoxy)-□,□,□-trifluoro-o-toluenesulfonic acid
CAS name: 2-(2,2-Difluoroethoxy)-6-(trifluoromethyl)benzenesulfonic acid
CAS No: NA



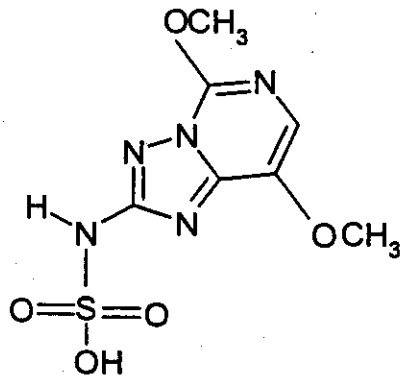
5,8-diOH

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



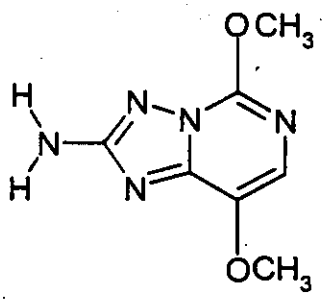
TPSA

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



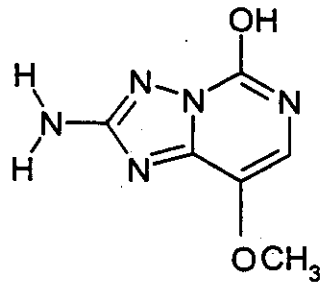
2-Amino TP

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



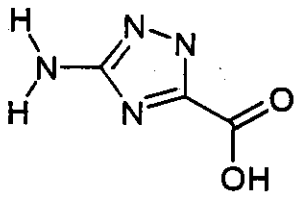
5-OH, 2-Amino TP

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



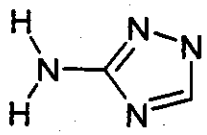
2-Amino TCA

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



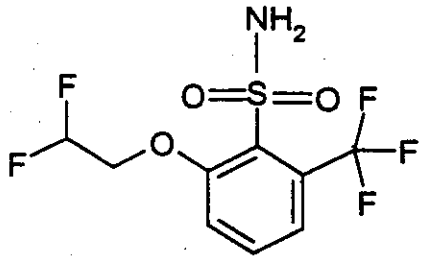
2-Amino-1,3,4-triazole

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



Sulfonamide

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



Sulfonylformamidine

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