

Data Evaluation Report on the terrestrial field dissipation of pyrasulfotole (AE 0317309)

PMRA Submission Number 2006-2445

EPA MRID Number 46801719

Data Requirement: PMRA Data Code: 8.3.2.1
 EPA DP Barcode: D328639
 OECD Data Point: IIA 7.3
 EPA Guideline: 164-1

Test material: AE 0317309

End Use Product name: To be determined
Formulation type: Oil dispersion

Concentration of a.i.: 10.9%

Test material:

Common name: Pyrasulfotole.

Chemical name:

IUPAC name: (5-Hydroxy-1,3-dimethylpyrazol-4-yl)(α,α,α -trifluoro-2-mesyl-*p*-tolyl)methanone.

(5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)(2-mesyl-4-trifluoromethylphenyl)methanone.

CAS name: (5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-methylsulfonyl]-4(trifluoromethyl)phenyl]methanone.

Methanone, (5-hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-(methylsulfonyl)-4-(trifluoromethyl)phenyl].

CAS No: 365400-11-9.

Synonyms: AE 0317309; K-1196; K-1267.

SMILES string: FC(c1cc(c(cc1)C(=O)c1c(n(nc1C)C)O)S(=O)(=O)C(F)F (ISIS v2.3/Universal SMILES).

No EPI Suite, v3.12 SMILES String found as of 6/7/06.

Cc1nn(C)c(O)c1C(=O)c2ccc(C(F)(F)F)cc2S(C)(=O)=O.

CS(=O)(=O)c1c(ccc(c1)C(F)(F)F)C(=O)c1c(n(nc1C)C)O.

Primary Reviewer: Dan Hunt
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Date: 5/16/07



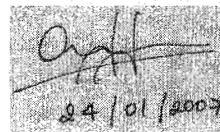
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**Final Reviewer: Olga Braga
DEH Reviewer**

**Signature:
Date:**

A rectangular stamp containing a handwritten signature and a date. The signature is written in dark ink and appears to be 'O. Braga'. Below the signature, the date '24 / 01 / 2003' is printed in a smaller font.

**Company Code: BCZ
Active Code: PSA
Use Site Category: 13, 14
EPA PC Code: 000692**

CITATION: Belyk, M. 2006. Terrestrial field dissipation of AE 0317309 in Canada, 2003-2004. Unpublished study performed by Bayer CropScience, Stilwell, KS; Bayer CropScience, Regina, Saskatchewan, Canada; Vaughn Agricultural Research Services, Branchton, Ontario, Canada; Ag-Quest, Minto, Manitoba, Canada; and EnviroTest Laboratories, Saskatoon, Saskatchewan, Canada; and sponsored and submitted by Bayer CropScience, Regina, Saskatchewan, Canada. Study Plan No: 03BCS01. Study Document No: MEAIM004. Experiment initiation June 24, 2003 and completion February 20, 2006 (p. 13). Final report issued February 20, 2006.

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EXECUTIVE SUMMARY

Soil dissipation/accumulation of pyrasulfotole (5-hydroxy-1,3-dimethylpyrazol-4-yl)(α,α,α -trifluoro-2-mesyl-*p*-tolyl)methanone) under Canadian field conditions was conducted in four replicate bare plots in Saskatchewan (Site 1), Manitoba (Site 2), and Ontario (Site 3) on clay loam soils. Site 1 was located in Ecoregion 9.3, Site 2 was located in Ecoregion 9.2, and Site 3 was located in Ecoregion 8.1. The experiment was carried out in accordance with the USEPA Pesticide Assessment Guidelines Subdivision N, 164-1 and the Canadian PMRA data code 8.3.2.1, and in compliance with OECD GLP standards. Pyrasulfotole was broadcast once with the formulated product AE 0317309 02 OD14 A102 (115 g a.i./L pyrasulfotole + 29 g a.i./L mefenpyr-diethyl), at a target rate of 0.100 kg a.i./ha (0.089 lb a.i./A) as pyrasulfotole to 4 x 34 m, 4 x 30 m, and 6 x 26.5 m replicate plots at Site 1, Site 2, and Site 3, respectively. The application rate corresponded to twice the proposed maximum label rate of 0.050 kg a.i./ha (0.045 lb a.i./A). Total water input during the 15-month study period was 741.7 mm or 185% of the 30-year average precipitation at Site 1, 723.8 mm or 130% of the historical average at Site 2, and 1197.6 mm or 116% of the historical average at Site 3. A control plot was located >10 m from the nearest treated plot at each test site.

The application rate was verified for each test site using both cellulose pads (15 pads for each replicate plot) and pans containing control soil (1 pan for each replicate plot) that were placed in the treated plots prior to the test application. Mean recovery of pyrasulfotole plus the transformation product AE B197555 (converted to parent equivalents) from the pads was equivalent to an application rate of 121 ± 38.4 g a.i./ha for Site 1, 103.8 ± 35.7 g a.i./ha for Site 2, and 97.1 ± 20.8 g a.i./ha for Site 3 (corresponding to a reviewer-calculated 121%, 104%, and 97% of the 100 g a.i./ha target application rate). Mean recoveries of pyrasulfotole and AE B197555 from the pans were 791 ng/g and 61.0 ng/g, respectively, at Site 1, 879.4 ng/g and 89.7 ng/g, respectively, at Site 2, and 523.3 ng/g and 29.6 ng/g, respectively, at Site 3. Total recoveries (pyrasulfotole plus AE B197555) were equivalent to 95%, 110%, and 85% of the theoretical concentration of parent. Field spikes were prepared for pyrasulfotole and the transformation product AE B197555 at approximately 0.1 ppb for parent and 0.05 ppb for AE B197555 using control soil to determine stability during sampling and transport. However, the stability of the parent and AE B 197555 could not be verified because of the high variability between duplicate samples and among sampling dates. Mean recoveries of pyrasulfotole and AE B197555 from Site 1 soil were $152 \pm 87.0\%$ and $147 \pm 137\%$, respectively, and corresponding recoveries from Site 2 soil were $61.5 \pm 26.4\%$ and $54.6 \pm 21.5\%$. Mean recovery of pyrasulfotole from Site 3 soil was $65.9 \pm 23.4\%$.

Soil samples were collected from each test site at approximately 0, 7, 14, and 21 days and 1, 2, 4, 11, 13, and 15 months posttreatment to a depth of 0-90 cm (excluding day-0 samples). Samples were extracted using an Accelerated Solvent Extractor with acetonitrile:water (65:35, v:v) at 100°C and 1500 psi pressure. An aliquot of the extraction solvent was cleaned up using a RP-102 SPE cartridge, and analyzed for pyrasulfotole and the transformation product AE B197555 (2-(methylsulfonyl)-4-(trifluoromethyl) benzoic acid) by LC/MS/MS. The LOD and LOQ were 0.1

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ppb and 0.5 ppb, respectively, for all analytes. Soil samples were stored frozen for up to 770 days prior to analysis.

At Site 1 (Saskatchewan), the measured zero-time recovery of pyrasulfotole in the 0-7.5 cm soil layer was 65.5 ppb or 58.0% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 113 µg/kg). Pyrasulfotole decreased to 32.8-37.0 ppb by 7-14 days, 20.2-20.8 ppb by 21-30 days, 6.42 ppb by 120 days, and was 1.52-2.13 ppb from 402 to 449 days posttreatment. Pyrasulfotole was detected at ≤2.83 ppb in the 7.5-15 cm soil depth, ≤1.46 ppb in the 15-30 cm depth, and ≤0.65 ppb in the 30-45 cm depth, and was detected only below the LOQ in the 45-60 cm and 60-75 cm depths. The major transformation product **AE B197555** was detected in the 0-7.5 cm soil depth at a maximum of 36.9 ppb at 14 days (which is equivalent to 49.8 ppb parent equivalents, or 67.3% of the total parent equivalents in the soil column at Day 0 after application), ranged from 32.1 to 34.9 ppb from 21 to 56 days, then decreased to 8.63 ppb by 120 days, and was 0.90 ppb at 449 days posttreatment. **AE B197555** was detected in the 7.5-15 cm soil depth at a maximum of 4.63 ppb at 120 days and in the 15-30 cm depth at a maximum of 2.60 ppb at 343 days. **AE B197555** was not detected above the LOQ in soil below the 15-30 cm depth.

At Site 2 (Manitoba), the measured zero-time recovery of pyrasulfotole in the 0-15 cm soil layer was 112.99 ppb or 90.4% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 125 µg/kg). Pyrasulfotole decreased to 44.8-56.2 ppb from 7 to 61 days, 16.9 ppb by 121 days, 8.34 ppb by 349 days, and was 4.60 ppb at 462 days posttreatment. Pyrasulfotole was detected at ≤7.53 ppb in the 7.5-15 cm soil depth, ≤3.51 ppb in the 15-30 cm depth, and ≤1.14 ppb in the 30-45 cm depth, and was only detected below the LOQ in the 45-60 cm depth. The major transformation product **AE B197555** was detected in the 0-7.5 cm soil depth at a maximum of 26.7 ppb at 29 days (which is equivalent to 36.1 ppb parent equivalents, or 29.0% of the total parent equivalents in the soil column at Day 0 after application), decreased to 16.1 ppb by 61 days, and ranged from 1.17 to 1.80 ppb from 121 to 462 days posttreatment. **AE B197555** was detected in the 7.5-15 cm soil depth at a maximum of 3.40 ppb at 7 days and was not detected above the LOQ in soil below the 7.5-15 cm depth, but was detected at levels below the LOQ in all soil depths analyzed (0-75 cm) at 462 days posttreatment.

At Site 3 (Ontario), the measured zero-time recovery of pyrasulfotole in the 0-15 cm soil layer was 58.1 ppb or 63.1% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 92 µg/kg). Pyrasulfotole decreased to 32.4 ppb by 14 days, 20.4 ppb by 30 days, 4.91 ppb by 139 days, and was 0.75 ppb at 458 days posttreatment. Pyrasulfotole was detected at ≤4.10 ppb in the 7.5-15 cm soil depth and was detected below the LOQ in the 15-30, 30-45, 45-60, and 60-75 cm depths. The major transformation product **AE B197555** was detected in the 0-7.5 cm soil depth at a maximum of 27.8 ppb at 14 days (which is equivalent to 37.6 ppb parent equivalents, or 56.7% of the total parent equivalents in the soil column at Day 0 after application), then decreased to 15.7 ppb by 30 days, 5.20 ppb by 56 days, and was last detected above the LOQ at 0.85 ppb at 350 days posttreatment. **AE B197555** was detected in the 7.5-15 cm soil depth at a maximum of 2.40 ppb at 7 days and in the 15-30 cm

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depth at a maximum of 1.01 ppb at 30 days, and was detected at levels below the LOQ in the 30-45, 45-60, and 60-75 cm depths.

Under field conditions at Site 1 (Saskatchewan), pyrasulfotole had a reviewer-calculated half-life value of 106.6 days in soil ($r^2 = 0.8609$; based on all available replicate data, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with a more rapid decline phase occurring through the 21-day sampling interval. The reviewer-calculated half-life based on 0-21 day data from the top 7.5 cm soil layer was 14.4 days ($r^2 = 0.6241$). The registrant-calculated DT50 and DT90 values were 7 and 313 days, respectively for pyrasulfotole (DFOP model). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 10 and 260 days, respectively (2 compartment non-linear model, $r^2 = 0.86$). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm of the soil column was 82.5 days following the maximum detection at 14 days. The reviewer calculated half-life value for AE B197555 residues in the whole soil column was 121.6 days ($r^2 = 0.86$).

Under field conditions at Site 2 (Manitoba), pyrasulfotole had a reviewer-calculated half-life value of 115.5 days in soil ($r^2 = 0.8344$; based on all available replicate data from the top 7.5 cm soil layer, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with >50% of the test material dissipating by the second sampling interval at 7 days posttreatment, after which concentrations were level through 2 months posttreatment before decreasing again. The registrant-calculated DT50 and DT90 values were 31 and 568 days, respectively for pyrasulfotole (DFOP model). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 9.2 and 531 days, respectively (2 compartment non-linear model, $r^2 = 0.89$). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm of the soil column was 21.8 days following the maximum detection at 29 days posttreatment. The reviewer calculated half-life value for AE B197555 residues in the whole soil column was 35.0 days ($r^2 = 0.82$).

Under field conditions at Site 3 (Ontario), pyrasulfotole had a reviewer-calculated half-life value of 84.5 days in soil ($r^2 = 0.8946$; based on all available replicate data, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with a more rapid decline phase occurring through the 56-day sampling interval. The reviewer-calculated half-life based on 0-56 day data from the top 7.5 cm soil layer was 22.7 days ($r^2 = 0.9146$). The registrant-calculated DT50 and DT90 values were 15 and 160 days, respectively for pyrasulfotole (DFOP model). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 18 and 178 days, respectively (2 compartment non-linear model, $r^2 = 0.96$). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm of the soil column was 27.6 days following the maximum detection at 14 days posttreatment. The reviewer calculated half-life value for AE B197555 residues in the whole soil column was 26.8 days ($r^2 = 0.94$).

Carryover of residues at the start of the following growing season (i.e., at 343-350 days post treatment), was 10.9%, 19.2% and 7.2% of the applied pyrasulfotole for sites in Saskatchewan,

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Manitoba and Ontario respectively (total pyrasulfotole residues in the soil column were compared to observed levels at Day 0). By the end of the study period (i.e., 449-462 days post treatment), 12.5, 13.4 and 1.5% of the applied pyrasulfotole was present in the Saskatchewan, Manitoba and Ontario sites, respectively.

The major route of dissipation of pyrasulfotole under terrestrial field conditions at all three test sites was transformation.

RESULTS SYNOPSIS

Site 1

Location/soil type: Mortlach, Saskatchewan, Canada/Clay loam (0-30 cm) over clay/clay loam (30-90 cm).

Half-life: 106.6 days ($r^2 = 0.8609$; based on all replicate detections in the top 7.5 cm soil layer; reviewer-calculated).

14.4 days ($r^2 = 0.6241$; based on 0-21 day data in the top 7.5 cm soil layer; reviewer-calculated).

DT₅₀: 10 days (reviewer calculated for whole soil column; $r^2 = 0.86$).

DT₉₀: 260 days (reviewer calculated for whole soil column; $r^2 = 0.86$).

Major transformation products detected: AE B197555:

Half-life: 121.6 days (reviewer calculated for whole soil column; $r^2 = 0.78$)

Dissipation routes: Transformation.

Carryover to following growing season : 10.9%

Site 2

Location/soil type: Minto, Manitoba, Canada/Clay loam (0-90 cm).

Half-life: 115.5 days ($r^2 = 0.8344$; based on all replicate detections in the top 7.5 cm soil layer; reviewer-calculated).

55.9 days ($r^2 = 0.6078$; based on 0-121 day data in the top 7.5 cm soil layer; reviewer-calculated).

DT₅₀: 9.2 days (reviewer calculated for whole soil column; $r^2 = 0.89$).

DT₉₀: 531 days (reviewer calculated for whole soil column; $r^2 = 0.89$).

Major transformation products detected: AE B197555:

Half-life: 35.0 days (reviewer calculated for whole soil column; $r^2 = 0.82$)

Dissipation routes: Transformation.

Carryover to following growing season : 19.2%

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Site 3

Location/soil type: St. George, Ontario, Canada/Clay loam (0-60 cm) over clay (60-90 cm).
Half-life: 84.5 days ($r^2 = 0.8946$; based on all replicate detections in the top 7.5 cm soil layer; reviewer-calculated).

22.7 days ($r^2 = 0.9146$; based on 0-56 day data in the top 7.5 cm soil layer; reviewer-calculated).

DT₅₀: 18 days (reviewer calculated for whole soil column; $r^2 = 0.96$).

DT₉₀: 178 days (reviewer calculated for whole soil column; $r^2 = 0.96$).

Major transformation products detected: AE B197555:

Half-life: 26.8 days (reviewer calculated for whole soil column; $r^2 = 0.94$)

Dissipation routes: Transformation.

Carryover to following growing season : 7.2%

Study Acceptability: This study is classified **acceptable** to the PMRA and **supplemental** to the US EPA and DEH. No significant deviations from good scientific practices were noted. The application was applied at twice the proposed maximum label rate, and the stability of pyrasulfotole and AE B 197555 could not be determined in test soil.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED:

The study was conducted according to USEPA Pesticide Assessment Guidelines Subdivision N, 164-1 and Canadian PMRA data code No. 8.3.2.1 (p. 10). There were two deviations from guideline 164-1:

The application was applied at twice the proposed maximum label rate.

Storage stability data were not available for review to determine the stability of the parent and transformation product in the test soil during the storage interval.

COMPLIANCE:

The study was conducted in compliance with OECD Good Laboratory Practice standards with exceptions (p. 3). Signed and dated Data Confidentiality, GLP compliance, Quality Assurance and Certification of Authenticity statements were provided (pp. 2-5).

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A. MATERIALS:

1. Test Material

Pyrasulfotole.

Chemical Structure of the active ingredient(s):

See DER Attachment 1.

Description:

Formulation: Oil dispersion (p. 15).

Storage conditions of test chemicals:

The test substance was stored in the dark under ambient conditions at Sites 1 and 3 and at refrigerated temperatures at Site 2 (p. 16).

Physico-chemical properties of the active ingredient(s):

Parameter	Value	Comment
Chemical formula	C ₁₄ H ₁₃ F ₃ N ₂ O ₄ S	
Molecular mass	362.327	
Water Solubility	Bi-distilled water: 2.3 g/L pH 4: 4.2 g/L pH 7: 69.1 g/L pH 9: 49.0 g/L	At 20°C.
Vapor Pressure/Volatility	2.7x10 ⁻⁷ Pa	At 20°C.
UV Absorption	264 nm: 1.11 x 10 ⁴ L/mol*cm 306 nm: 5.93 x 10 ³ L/mol*cm	In water.
Pka	4.2	
K _{ow} /log K _{ow}	pH 4: 1.89/0.276 pH 7: 0.043/-1.362 pH 9: 0.026/-1.580	At 23°C.
Stability of compound at room temperature, if provided	Stable in solid state (ambient temperature); stable in aqueous solution at pH 5, 7 and 9 (25°C).	

Data were obtained from p. 15 and Table 2, p. 16 of the study report.

2. Test site: The test sites were located in Mortlach, Saskatchewan (Site 1), Minto, Manitoba (Site 2), and St. George, Ontario (Site 3) on clay loam soils (Tables 3 and 5, pp. 17-18 and 20). All three sites were located in growing regions where cereal crops are commonly grown. A three-year crop and pesticide use history for the three test sites is reported below in Table 2.

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Table 1: Geographic location, site description and climatic data at the study site.

Details		Site 1	Site 2	Site 3
Geographic coordinates	Latitude	50° 24.007'N	49° 24' 39"N	43° 16.270'N
	Longitude	106° 08.536'W	99° 59' 52"W	80° 15.390'W
	Province/State	Saskatchewan	Manitoba	Ontario
	Country	Canada	Canada	Canada
	Ecoregion	9.3	9.2	8.1
Slope Gradient		<1%	<1%	<1%
Depth to ground water (m)		>3 m	>3 m	>3 m
Distance from weather station used for climatic measurements		Not reported	On-site	On-site
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		Total precipitation during the 449-day study period was 741.7 mm or 185% of the 30-yr average precipitation. ¹	Total water input (rainfall plus irrigation) during the 462-day study period was 723.8 mm or 130% of the 30-yr average precipitation. ¹	Total precipitation during the 458-day study period was 1197.6 mm or 116% of the 30-yr average precipitation. ¹

Data were obtained from pp. 19-21 and 24; Table 3, pp. 17-18; and Appendix F, pp. 242-296 of the study report.

¹ Reviewer-calculated based on historical rainfall and actual rainfall and irrigation data reported in Appendix F, pp. 242-296. Totals are based on the actual study dates of June 30, 2003-September 21, 2004 (Site 1), June 25, 2003-September 29, 2004 (Site 2), and June 24, 2003-September 24, 2004 (Site 3). Percentages were calculated by the reviewer by pro-rating historical monthly data based on the study dates.

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Table 2: Site usage and management history for the previous three years.

Use	Year	Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
Crops grown	Previous year	Durum	Spring wheat	Fallow
	2 years previous	Chick Pea	Canola	Corn
	3 years previous	Durum	Spring wheat	Soybeans
Pesticides used	Previous year	-Glyphosate -Bromoxynil/MCPA	-MCPA/ Bromoxynil -Tralkoxydim -Thifensulfuron-methyl/ Tribenuron-methyl -Triticonazole -Propiconazole -Tebuconazole	None
	2 years previous	-Ethalfuralin -Azoxystrobin/ chlorothalonil -Azoxystrobin	-Thiram/Lindane -Glyphosate -Iprodione	-Metolachlor/ Atrazine
	3 years previous	-Bromoxynil/MCPA	-Tralkoxydim -MCPA/ Bromoxynil -Thifensulfuron-methyl/ Tribenuron methyl	-Glyphosate
Fertilizers used	Previous year	Not reported	Not reported	Not reported
	2 years previous	Not reported	Not reported	Not reported
	3 years previous	Not reported	Not reported	Not reported
Cultivation methods, if provided (eg., Tillage)	Previous year	Not reported	Not reported	Not reported
	2 years previous	Not reported	Not reported	Not reported
	3 years previous	Not reported	Not reported	Not reported

Data were obtained from Table 4, pp. 18-19 of the study report.

* The test plots were cultivated prior to the test application (p. 21 of the study report).

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3. Soils:

Table 3a: Properties of the soil at Site 1 (Saskatchewan).

Property	Depth (cm)						
	0-7.5	7.5-15	15-30	30-45	45-60	60-75	75-90
Textural classification	Clay loam	Clay loam	Clay loam	Clay	Clay	Clay loam	Clay
% sand	39	39	32	20	26	39	32
% silt	27	27	27	23	23	28	25
% clay	34	34	41	57	51	33	43
pH (1:2 soil:water)	7.8	7.5	8.1	8.0	8.5	8.6	8.5
Organic matter (%)	3.5	2.4	1.3	1.2	0.8	0.5	0.6
Total organic carbon (%)	2.0	1.4	0.8	0.7	0.5	0.3	0.3
CEC (meq/100 g)	17.3	16.8	14.7	22.9	18.3	9.4	15.3
Bulk density (g/cm ³)	1.18	1.13	1.10	1.11	1.13	1.18	1.15
Moisture at 1/3 atm (%)	23.6	23.6	27.9	30.4	27.2	19.6	24.0
Taxonomic classification (e.g., ferro-humic podzol)	Dark Brown Chernozem						
Soil mapping unit							

Data were obtained from Table 5, p. 20 of the study report.

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Table 3b: Properties of the soil at Site 2 (Manitoba).

Property	Depth (cm)						
	0-7.5	7.5-15	15-30	30-45	45-60	60-75	75-90
Textural classification	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam
% sand	29	33	28	32	34	35	32
% silt	42	38	39	36	33	28	35
% clay	29	29	33	31	33	37	33
pH (1:2 soil:water)	7.4	7.6	8.1	8.4	8.5	8.6	8.9
Organic matter (%)	5.5	5.9	3.4	1.4	1.4	0.7	0.7
Total organic carbon (%)	3.2	3.4	2.0	0.8	0.8	0.4	0.4
CEC (meq/100 g)	24.4	23.0	19.4	13.8	14.1	12.0	12.5
Bulk density (g/cm ³)	1.06	1.11	1.01	1.02	1.11	1.09	1.05
Moisture at 1/3 atm (%)	19.8	20.4	18.1	17.3	14.8	17.3	16.9
Taxonomic classification (e.g., ferro-humic podzol)	Black Chernozem						
Soil mapping unit							

Data obtained from Table 5, p. 21 of the study report.

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Table 3c: Properties of the soil at Site 3 (Ontario).

Property	Depth (cm)						
	0-7.5	7.5-15	15-30	30-45	45-60	60-75	75-90
Textural classification	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay	Clay
% sand	24	24	24	32	30	6	12
% silt	45	45	44	31	30	32	29
% clay	32	31	32	38	40	63	59
pH (1:2 soil:water)	7.1	7.2	7.7	8.1	7.9	8.1	8.3
Organic matter (%)	3.8	3.8	2.0	0.9	1.1	0.6	0.4
Total organic carbon (%)	2.2	2.2	1.2	0.5	0.6	0.3	0.2
CEC (meq/100 g)	15.2	14.8	11.7	7.2	8.9	8.8	8.2
Bulk density (g/cm ³)	1.45	1.38	1.23	1.43	1.49	1.63	1.42
Moisture at 1/3 atm (%)	17.2	17.1	16.4	15.0	16.5	19.8	18.9
Taxonomic classification (e.g., ferro-humic podzol)	Brunisolic Gray Brown Luvisol						
Soil mapping unit							

Data were obtained from Table 5, p. 20 of the study report.

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B. EXPERIMENTAL DESIGN:

1. Experimental design:

Table 4: Experimental design.

Details		Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
Duration of study		449 days	462 days	458 days
Uncropped (bare) or cropped		Bare	Bare	Bare
Control used (Yes/No)		Yes	Yes	Yes
No. of replications	Controls	One	One	One
	Treatments	Four	Four	Four
Plot size (L x W m)	Controls	4 x 14 m	4 x 10 m	6 x 14 m
	Treatments	4 x 34 m	4 x 30 m	6 x 26.5 m
Distance between control plot and treated plot		10 m	14 m	24.2 m
Distance between treated plots		4 m	5 m	4 m
Application rate(s) used (g a.i./ha)		100 g a.i./ha	100 g a.i./ha	100 g a.i./ha
Was the maximum label rate per ha used in study? (Yes/No)		No (200% of the maximum proposed label rate)	No (200% of the maximum proposed label rate)	No (200% of the maximum proposed label rate)
Number of applications		One	One	One
Application Date(s) (dd mm yyyy)		30/06/2003	25/06/2003	24/06/2003
For multiple applications, application rate at Day 0 and at each application time (mg a.i./kg soil)		0.113 mg a.i./kg soil ¹	0.125 mg a.i./kg soil ¹	0.092 mg a.i./kg soil ¹
Application method (eg., spraying, broadcast etc.)		Broadcast spray	Broadcast spray	Broadcast spray
Type of spray equipment, if used		Boom sprayer with eight flat fan 80° nozzles spaced 50 cm apart and approximately 50 cm above the ground	Boom sprayer with eight flat fan 80° nozzles spaced 50 cm apart and approximately 45 cm above the ground	Boom sprayer with twelve flat fan 80° nozzles spaced 50 cm apart and approximately 45 cm above the ground
Total volume of spray solution applied/plot OR total amount broadcasted/plot		Approximately 200 L/ha	Approximately 210 L/ha	221-229 L/ha
Identification and volume of carrier (e.g., water), if used		Water	Water	Water
Name and concentration of co-solvents, adjuvants and/or surfactants, if used		None	None	None
Indicate whether the following monthly reports were submitted:				
Precipitation:		Yes	Yes	Yes
Average minimum and maximum air temperature:		Yes	Yes	Yes

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Details		Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
Average minimum and maximum soil temperature:		No	No	No
Average annual frost-free periods:		No	No	No
Indicate whether the Pan evaporation data were submitted		No	No	No
Meteorological conditions during application	Cloud cover	20%	100%	0%
	Temperature (EC)	25	12.8	17
	Humidity	44%	78%	87%
	Windspeed (m/s) and direction	0.8-2.3, SE	3.5-5, N	0.8, E
	Sunlight (hr)	Not reported	Not reported	Not reported
Pesticides used during study:				
Name of product/a.i concentration: Amount applied: Application method:		Liberty 0.64 L/ha Not reported	Roundup Transorb 3 x 1263-1334 g ai/ha Not reported	Roundup Transorb 2 x 7 L/ha Not reported
Name of product/a.i concentration: Amount applied: Application method:			Roundup 3 x 889-1263 g ai/ha Not reported	
Supplemental irrigation used (Yes/No)		No	Yes	No
If yes, provide the following details:				
No. of irrigation: Interval between irrigation: Amount of water added each time: Method of irrigation:			7-8 per replicate plot 1-15 days 4.3-19 mm Overhead sprinkler	
Indicate whether water received through rainfall + irrigation equals the 30-year average rainfall (Yes/No)		Yes	Yes	Yes
Were the application concentrations verified?		Yes	Yes	Yes
Were field spikes used?		Yes	Yes	Yes
Good agricultural practices followed (Yes or No)		Yes	Yes	Yes
Indicate if any abnormal climatic events occurred during the study (eg., drought, heavy rainfall, flooding, storm etc.)		None	None	None
If cropped plots are used, provide the following details:		N/A	N/A	N/A
Plant - Common name/variety: Details of planting: Crop maintenance:				
Volatilization included in the study		No	No	No

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Details	Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
(Yes/No)			
Leaching included in the study (Yes/No)	Yes	Yes	Yes
Run off included in the study (Yes/No)	No	No	No

Data were obtained from pp. 21-24; Appendix F, pp. 242-296; and Appendix D, Table D1, pp. 100-103 of the study report.

1 Reviewer-calculated for the 0-7.5 cm soil depth based on one application at 0.089 lb a.i./A and a site-specific bulk density of 1.18 g/cm³ at Site 1, 1.06 g/cm³ at Site 2, and 1.45 g/cm³ at Site 3.

2. Application Verification: To verify the application rate, five stacked sets of two cellulose pads (150-mm diameter) were placed at three locations in each of the four treated plots at each site prior to the test application (resulting in 15 samples per replicate plot and a total of 60 samples for each test site; p. 22). The pads were placed in sets of five on a board positioned randomly in the replicate plots. Following application, the pads were collected, grouped by stacked pairs, and stored frozen prior to analysis. The pads were extracted with acetonitrile:water (65:35, v:v) by shaking for 55-65 minutes (p. 25). The extract was diluted to volume with acetonitrile:0.1% acetic acid in water (10:90, v:v), and analyzed for pyrasulfotole by LC/MS/MS.

In addition, a metal pan (approximately 900 cm²) containing a 1-cm layer of sieved (2-mm), air-dried control soil was placed into each of the four replicate plots at each test site prior to the test application (pp. 22-23). Following application, the soil from the pans was transferred to a plastic bag and stored frozen until analysis. The soil was extracted using an Accelerated Solvent Extractor with acetonitrile:water (65:35, v:v) at 100°C and 1500 psi pressure (pp. 25-26). Following dilution with acetonitrile, the extract was concentrated by evaporation, cleaned up using a RP-102 SPE cartridge, diluted to 5 mL with 0.1% acetic acid in water:acetonitrile (90:10, v:v), and analyzed for pyrasulfotole and AE B197555 by LC/MS/MS.

3. Field Spiking: Field spikes were prepared for pyrasulfotole and the transformation product AE B197555 using control soil to determine the stability of the parent and transformation products during sampling and transport (p. 23). Duplicate field spikes were prepared at the 0-day and 1-, 4-, 11-, and 15-month sampling intervals at approximately 0.1 ppb for parent and 0.05 ppb for AE B197555 (reviewer-calculated). Due to a fortification error, the spikes were prepared at only 0.25% of the desired concentration (p. 29). As a result, the samples were analyzed as described below for the test samples, with some modifications to maximize the detection limits (larger sample size). The duration of sample storage was not reported.

4. Volatilization: Volatilization was not measured.

5. Leaching: Twenty cores were taken from each test site (five from each replicate plot) at approximately 0, 7, 14, and 21 days and 1, 2, 4, 11, 13, and 15 months posttreatment, to a depth of 90 cm (excluding day-0 samples, at which time 40 cores were collected to a depth of 15 cm),

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to determine the mobility of the test substance in the soil profile (pp. 23-24 and Appendix D, Table D2, pp. 104-105).

6. Run off: Run off was not studied.

7. Supplementary Study: An on-going storage stability study is currently being conducted using soil collected from the three test sites and fortified with pyrasulfotole and the transformation product AE B197555 (p. 25). Soil samples were fortified with pyrasulfotole and AE B197555 at 5 ppb.

8. Sampling:

Table 5: Soil sampling

Details	Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
Method of sampling (random or systematic)	Random	Random	Random
Sampling intervals	-5, 0, 7, 14, 21, 30, 56, 120, 343, 402, and 449 days	-1, 0, 7, 15, 22, 29, 61, 121, 349, 399, and 462 days	-1, 0, 7, 14, 21, 30, 56, 139, 350, 402, and 458 days
Method of soil collection (eg., cores)	Cores	Cores	Cores
Sampling depth	90 cm, except for day-0 samples which were collected to a depth of 15 cm.	90 cm, except for day-0 samples which were collected to a depth of 15 cm.	90 cm, except for day-0 samples which were collected to a depth of 15 cm.
Number of cores collected per plot	5 per replicate plot (20 total)	5 per replicate plot (20 total)	5 per replicate plot (20 total)
Number of segments per core	Seven	Seven	Seven
Length of soil segments (after sectioning)	0-7.5, 7.5-15, 15-30, 30-45, 45-60, 60-75, and 75-90 cm	0-7.5, 7.5-15, 15-30, 30-45, 45-60, 60-75, and 75-90 cm	0-7.5, 7.5-15, 15-30, 30-45, 45-60, 60-75, and 75-90 cm
Core diameter	0-15 cm cores - 5.7 cm. 15-90 cm cores - 3.4 cm.	0-15 cm cores - 5.7 cm. 15-90 cm cores - 3.8 cm.	0-15 cm cores - 5.7 cm. 15-90 cm cores - 3.8 cm.
Method of sample processing, if any	Samples were composited by replicate plot and depth by homogenizing with dry ice. Composited samples were milled using a hammer mill and mixed using a bucket mixer with inner paddle blades.	Samples were composited by replicate plot and depth by homogenizing with dry ice. Composited samples were milled using a hammer mill and mixed using a bucket mixer with inner paddle blades.	Samples were composited by replicate plot and depth by homogenizing with dry ice. Composited samples were milled using a hammer mill and mixed using a bucket mixer with inner paddle blades.
Storage conditions	Frozen	Frozen	Frozen
Storage length (days)	736 days	662 days	770 days

Data were obtained from pp. 23-24 and Appendix D, Table D2, pp. 104-105 of the study report.

9. Analytical Procedures:

Number of soil samples analysed per treatment or composite sample: Not reported.

Extraction, clean up and concentration of soil samples: Samples (5-20 g) were extracted using an Accelerated Solvent Extractor with acetonitrile:water (65:35, v:v) at 100°C and 1500 psi pressure (p. 26; Appendix E, pp. 199-201 and 238). An aliquot of the extract was concentrated, cleaned up using a RP-102 SPE cartridge, diluted to 5 mL with 0.1% acetic acid in water:acetonitrile (90:10, v:v), and filtered using an Acrodisc 0.45- Φ m syringe filter.

Identification and quantification of parent compound: Extracts were fortified with an isotopic internal standard containing pyrasulfotole-d₃, and analyzed for pyrasulfotole by LC/MS/MS (Phenomenex Prodigy 5 μ C8 50 x 2.00 mm column; p. 26; Appendix E, p. 202 and Table 2, p. 206). The mobile phase for the separation was A: 0.1% acetic acid in water; B: acetonitrile:water + 0.2% formic acid (85:15, v:v); A:B, 97:3 to 7:93 to 97:3 (Appendix E, p. 211). The retention time of pyrasulfotole was approximately 3.4 minutes.

Identification and quantification of transformation products: Extracts were fortified with an isotopic internal standard containing AE B197555-¹³C₆, and analyzed for AE B197555 by LC/MS/MS (Phenomenex Prodigy 5 μ C8 50 x 2.00 mm column; p. 26; Appendix E, p. 202 and Table 2, p. 206). The retention time of AE B197555 was approximately 3.8 minutes.

Detection limits (LOD, LOQ) for the parent compound in soil: The LOD and LOQ were 0.11 ppb and 0.5 ppb, respectively (p. 27).

Detection limits (LOD, LOQ) for the transformation products in soil: The LOD and LOQ were 0.10 ppb and 0.5 ppb, respectively (p. 27).

II. RESULTS AND DISCUSSION

APPLICATION MONITORS: Mean recovery of pyrasulfotole from the cellulose pads placed in the test plot prior to application was 209 \pm 65 μ g, 170.4 \pm 59.7 μ g, and 162.5 \pm 34.3 μ g for Site 1 (Saskatchewan), Site 2 (Manitoba), and Site 3 (Ontario), respectively (Table 7, p. 28 and Appendix C, Tables C-1 to C-3, pp. 73-81). Mean recovery of pyrasulfotole plus AE B197555 (converted to parent equivalents) was 215.2 \pm 67.8 μ g, 183.3 \pm 63 μ g, and 171.4 \pm 36.8 μ g for Sites 1, 2, and 3, respectively. Mean recoveries were equivalent to an application rate of 121 \pm 38.4 g a.i./ha for Site 1, 103.8 \pm 35.7 g a.i./ha for Site 2, and 97.1 \pm 20.8 g a.i./ha for Site 3 (corresponding to a reviewer-calculated 121%, 104%, and 97% of the 100 g a.i./ha target application rate). Mean recoveries of pyrasulfotole and AE B197555 from the soil pans were 791 ng/g and 61.0 ng/g, respectively, at Site 1, 879.4 ng/g and 89.7 ng/g, respectively, at Site 2, and 523.3 ng/g and 29.6 ng/g, respectively, at Site 3 (Table 8, p. 28 and Appendix C, Tables C-4 to C-6, p. 182). Total recoveries (pyrasulfotole plus AE B197555) were equivalent to 95%, 110%, and 85% of the theoretical concentration of parent (p. 29).

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2. RECOVERY FROM FIELD SPIKES: Stability of the parent and transformation product AE B 197555 during sampling and transport could not be verified because of the high variability between duplicate samples and among sampling dates (p. 29). Mean recoveries of pyrasulfotole and AE B197555 from Site 1 soil were $152 \pm 87.0\%$ and $147 \pm 137\%$, respectively; mean recoveries of pyrasulfotole and AE B197555 from Site 2 soil were $61.5 \pm 26.4\%$ and $54.6 \pm 21.5\%$, respectively; and mean recovery of pyrasulfotole from Site 3 soil was $65.9 \pm 23.4\%$ (Table 9, pp. 29-30; Appendix C, Tables 3-4, 4-4 and 5-4, pp. 142, 150, and 158).

3. MASS ACCOUNTING: A mass balance was not determined.

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Table 6a. Concentration of pyrasulfotole residues expressed as ppb in soil from Site 1 (Saskatchewan).

Compound	Soil depth (cm)	Sampling times (days)									
		0	7	14	21	30	56	120	343	402	449
Pyrasulfotole (AE 0317309)	0-7.5	65.53	32.76	36.96	20.75	20.18	16.80	6.42	5.12	2.13	1.52
	7.5-15	2.83	0.83	1.34	0.50	0.93	0.41	1.63	1.90	1.19	1.67
	15-30	NS	ND	0.52	ND	0.43	ND	0.16	0.2	0.80	1.46
	30-45	NS	ND	ND	ND	ND	ND	ND	ND	0.11	0.65
	45-60	NS		ND		ND			ND	ND	0.37
	60-75	NS							ND		0.17
	75-90	NS									ND
	Total ¹		68.4	33.6	39.3	21.3	22.0	17.2	8.4	7.4	5.1
AE B197555	0-7.5	3.98	35.11	36.89	34.90	32.05	34.02	8.63	4.48	1.17	0.90
	7.5-15	0.19	0.76	0.91	0.59	1.48	0.77	4.63	4.37	0.18	0.17
	15-30	NS	ND	0.26	ND	0.62	ND	0.15	2.60	ND	ND
	30-45	NS	ND	ND	ND	ND	ND	ND	0.32	ND	ND
	45-60	NS		ND		ND			ND	ND	ND
	60-75	NS							ND		ND
	75-90	NS									ND
	Total ¹		4.2	35.9	38.3	35.5	34.8	34.8	13.6	14.9	1.5

Residue data were obtained from Appendix C, Table C-7, pp. 83-87 of the study report; values are registrant-calculated means of four replicates including non-detects (mean values below the LOD were reported as not detected). Total extractable and non-extractable residues were not determined. NS = No sample. ND = Not detected. Blank cell indicates sample not analyzed. Values in bold are above the LOQ (0.5 ppb).

¹ Total residues were calculated by the study author and represent the residue remaining in the soil profile expressed as a residue in the upper 7.5 cm layer and assume a constant bulk density with depth and time (pp. 30-31). Total residues were determined by doubling the residue concentrations determined in the 15-cm sections to account for the doubled soil volume (compared to the 7.5-cm sections). This allowed for comparison of total residue with time while accounting for differences in the depth of residues.

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Table 6b. Concentration of pyrasulfotole residues expressed as ppb in soil from Site 2 (Manitoba).

Compound	Soil depth (cm)	Sampling times (days)									
		0	7	15	22	29	61	121	349	399	462
Pyrasulfotole (AE 0317309)	0-7.5	112.99	44.78	50.95	49.46	56.22	46.18	16.86	8.34	5.72	4.60
	7.5-15	1.18	7.53	2.28	1.47	0.79	3.55	7.45	5.13	4.73	3.63
	15-30	NS	0.28	0.24	0.17	0.19	0.34	1.35	2.96	3.51	2.22
	30-45	NS	ND	ND	ND	ND	ND	0.66	1.14	ND	0.93
	45-60	NS		ND				0.3	0.12	0.11	0.34
	60-75	NS						ND	ND	ND	ND
	75-90	NS							ND		
	Total ¹		114.2	52.9	53.7	51.3	57.4	50.4	29.1	21.9	17.8
AE B197555	0-7.5	7.57	16.91	21.56	26.36	26.72	16.06	1.80	1.23	1.23	1.17
	7.5-15	ND	3.40	0.3	0.49	0.44	0.62	0.33	0.17	0.31	0.37
	15-30	NS	ND	ND	ND	ND	ND	ND	ND	0.15	0.37
	30-45	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.30
	45-60	NS		ND				ND	ND	ND	0.17
	60-75	NS						ND	ND	ND	0.19
	75-90	NS							ND		
	Total ¹		7.6	20.3	22.0	26.8	27.2	16.8	2.1	1.2	1.4

Residue data were obtained from Appendix C, Table C-9, pp. 94-98 in the study report; values are registrant-calculated means of four replicates including non-detects (mean values below the LOD were reported as not detected). Total extractable and non-extractable residues were not determined. NS = No sample. ND = Not detected. Blank cell indicates sample not analyzed. Values in bold are above the LOQ (0.5 ppb).

¹ Total residues were calculated by the study author and represent the residue remaining in the soil profile expressed as a residue in the upper 7.5 cm layer and assume a constant bulk density with depth and time (pp. 30-31). Total residues were determined by doubling the residue concentrations determined in the 15-cm sections to account for the doubled soil volume (compared to the 7.5-cm sections). This allowed for comparison of total residue with time while accounting for differences in the depth of residues.

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Table 6c. Concentration of pyrasulfotole residues expressed as ppb in soil from Site 3 (Ontario).

Compound	Soil depth (cm)	Sampling times (days)									
		0	7	14	21	30	56	139	350	402	458
Pyrasulfotole (AE 0317309)	0-7.5	58.06	40.83	32.44	25.89	20.38	9.83	4.91	2.37	1.31	0.75
	7.5-15	0.89	4.10	0.25	0.14	0.41	0.53	0.37	0.43	0.26	ND
	15-30	NS	ND	ND	ND	0.4	0.49	0.31	0.41	ND	ND
	30-45	NS	ND			ND	0.19	ND	ND		
	45-60	NS				ND	0.22	ND	ND		
	60-75	NS				ND	0.29	ND	ND		
	75-90	NS					ND	ND	ND		
	Total ¹		59.0	45.1	32.7	26.1	21.8	12.7	6.2	4.2	1.8
AE B197555	0-7.5	5.46	25.04	27.82	24.70	15.66	5.20	1.81	0.85	0.39	0.28
	7.5-15	ND	2.40	0.23	0.14	1.09	0.36	0.57	0.12	0.14	ND
	15-30	NS	ND	ND	ND	1.01	0.34	ND	ND	ND	ND
	30-45	NS	ND			0.22	0.4	ND	ND		
	45-60	NS				ND	0.32	ND	ND		
	60-75	NS					0.42	ND	ND		
	75-90	NS					ND	ND	ND		
	Total ¹		5.5	27.4	28.0	24.8	19.4	8.5	2.6	1.2	0.5

Residue data were obtained from Appendix C, Table C-8, pp. 88-93 in the study report; values are registrant-calculated means of four replicates including non-detects (mean values below the LOD were reported as not detected). Total extractable and non-extractable residues were not determined. NS = No sample. ND = Not detected. Blank cell indicates sample not analyzed. Values in bold are above the LOQ (0.5 ppb).

¹ Total residues were calculated by the study author and represent the residue remaining in the soil profile expressed as a residue in the upper 7.5 cm layer and assume a constant bulk density with depth and time (pp. 30-31). Total residues were determined by doubling the residue concentrations determined in the 15-cm sections to account for the doubled soil volume (compared to the 7.5-cm sections). This allowed for comparison of total residue with time while accounting for differences in the depth of residues.

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4. PARENT COMPOUND: At Site 1 (Saskatchewan), the measured zero-time recovery of pyrasulfotole in the 0-7.5 cm soil layer was 65.53 ppb or 58.0% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 113 µg/kg; Appendix C, Table C-7, pp. 83-85; see footnote to DER Table 4). Pyrasulfotole decreased to 32.76-36.96 ppb by 7-14 days, 20.18-20.75 ppb by 21-30 days, 6.42 ppb by 120 days, and was 1.52-2.13 ppb from 402 to 449 days posttreatment in the 0-7.5 cm depth. Pyrasulfotole was detected in the 7.5-15 cm soil depth at 2.83 ppb at day 0, and was detected at ≤1.90 ppb from 7 to 449 days. Pyrasulfotole was initially detected in the 15-30 cm depth at 0.52 ppb at 14 days, and was detected at a maximum of 1.46 ppb at 449 days. Pyrasulfotole was detected in the 30-45 cm depth at 0.65 ppb at 449 days, and was detected only below the LOQ in the 45-60 cm and 60-75 cm depths, at 449 days posttreatment.

At Site 2 (Manitoba), the measured zero-time recovery of pyrasulfotole in the 0-7.5 cm soil layer was 112.99 ppb or 90.4% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 125 µg/kg; Appendix C, Table C-9, pp. 94-96; see footnote to DER Table 4). Pyrasulfotole decreased to 44.78-56.22 ppb from 7 to 61 days, 16.86 ppb by 121 days, 8.34 ppb by 349 days, and was 4.60 ppb at 462 days posttreatment in the 0-7.5 cm depth. Pyrasulfotole was detected in the 7.5-15 cm soil depth at 1.18 ppb at day 0 and ranged from 0.79 to 7.53 ppb from 7 to 462 days. Pyrasulfotole was initially detected in the 15-30 cm depth at concentrations below the LOQ at 7 days, and was detected at a maximum of 3.51 ppb at 399 days. Pyrasulfotole was detected in the 30-45 cm depth at 0.66-1.14 ppb at 121, 349, and 462 days, and was detected only below the LOQ in the 45-60 cm depth.

At Site 3 (Ontario), the measured zero-time recovery of pyrasulfotole in the 0-7.5 cm soil layer was 58.06 ppb or 63.1% of the theoretical based on the target application rate (reviewer-calculated based on a theoretical day-0 recovery of 92 µg/kg; Appendix C, Table C-8, pp. 88-90; see footnote to DER Table 4). Pyrasulfotole decreased to 32.44 ppb by 14 days, 20.38 ppb by 30 days, 4.91 ppb by 139 days, and was 0.75 ppb at 458 days posttreatment in the 0-7.5 cm depth. Pyrasulfotole was detected in the 7.5-15 cm soil depth at 0.89 ppb at day 0, was a maximum of 4.10 ppb at 7 days, and was detected at ≤0.53 ppb from 14 to 402 days. Pyrasulfotole was not detected above the LOQ in soil below the 7.5-15 cm depth, but was detected below the LOQ to a depth of 60-75 cm at 56 days posttreatment.

HALF-LIFE: Under field conditions at Site 1 (Saskatchewan), pyrasulfotole had a reviewer-calculated half-life value of 106.6 days in soil ($r^2 = 0.8609$; based on all available replicate data, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with a more rapid decline phase occurring through the 21-day sampling interval. The reviewer-calculated half-life based on 0-21 day data from the top 7.5 cm soil layer was 14.4 days ($r^2 = 0.6241$). The registrant-calculated DT50 and DT90 values were 7 and 313 days, respectively for pyrasulfotole (DFOP model, p. 32). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 10 and 260 days, respectively (2 compartment non-linear model, using Sigma Stat equation solver for 0.5x and 0.1x mean Day 0 concentrations, $r^2 = 0.86$; see DER Table 7).

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Under field conditions at Site 2 (Manitoba), pyrasulfotole had a reviewer-calculated half-life value of 115.5 days in soil ($r^2 = 0.8344$; based on all available replicate data from the top 7.5 cm soil layer, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with >50% of the test material dissipating by the second sampling interval at 7 days posttreatment, after which concentrations were level through 2 months posttreatment before decreasing again. The registrant-calculated DT50 and DT90 values were 31 and 568 days, respectively for pyrasulfotole (DFOP model, p. 32). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 9.2 and 531 days, respectively (2 compartment non-linear model, using Sigma Stat equation solver for 0.5x and 0.1x mean Day 0 concentrations, $r^2 = 0.89$; see DER Table 7).

Under field conditions at Site 3 (Ontario), pyrasulfotole had a reviewer-calculated half-life value of 84.5 days in soil ($r^2 = 0.8946$; based on all available replicate data, using linear regression and the equation $t_{1/2} = \ln 2 / k$, where k is the rate constant); however, dissipation was bi-phasic, with a more rapid decline phase occurring through the 56-day sampling interval. The reviewer-calculated half-life based on 0-56 day data from the top 7.5 cm soil layer was 22.7 days ($r^2 = 0.9146$). The registrant-calculated DT50 and DT90 values were 15 and 160 days, respectively for pyrasulfotole (DFOP model, p. 32). The reviewer calculated DT50 and DT90 values for whole-soil column pyrasulfotole residues were 18 and 178 days, respectively (2 compartment non-linear model, using Sigma Stat equation solver for 0.5x and 0.1x mean Day 0 concentrations, $r^2 = 0.96$; see DER Table 7).

Table 7. Reviewer calculated DT50/DT90 for pyrasulfotole (AE 0317309) in Canadian terrestrial field dissipation trials.

Location	Half-life (days)	Regression equation	r^2	DT50 (days)	DT90 (days)
Mortlach, Saskatchewan					
Nonlinear/normal ¹	-	$y = 44.256 * \exp(-0.1211 * x) + 22.6375 * \exp(-0.0046 * x)$	0.86	10	260*
Minto, Manitoba					
Nonlinear/normal ¹	-	$y = 58.0884 * \exp(-4.4 * 10^{-7} * x) + 56.0616 * \exp(-0.003 * x)$	0.89	9.2	531
St. George, Ontario					
Nonlinear/normal ¹	-	$y = 45.6754 * \exp(-0.0544 * x) + 13.3813 * \exp(-0.0046 * x)$	0.96	18	178

¹ Determined by the peer reviewer using Sigmaplot v 8.0 (nonlinear, 2 parameter model) and individual sample data obtained from Tables C-7, C-8 and C-9 of the study report.

* One outlier removed from analysis by peer reviewer (i.e., Day 449, 26.1 ug/kg pyrasulfotole).

5. TRANSFORMATION PRODUCTS: At Site 1 (Saskatchewan), the major transformation product AE B197555 (2-(methylsulfonyl)-4-(trifluoromethyl) benzoic acid) was initially detected in the 0-7.5 cm soil depth at 3.98 ppb at day 0, increased to a maximum of 36.89 ppb by 14 days

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(which is equivalent to 49.84 ppb parent equivalents or 44.1% of the theoretical applied pyrasulfotole based on the target application rate; Appendix C, Table C-7, pp. 85-87; see footnote to DER Table 4), ranged from 32.05 to 34.90 ppb from 21 to 56 days, then decreased to 8.63 ppb by 120 days, and was 0.90 ppb at 449 days posttreatment. AE B197555 was detected in the 7.5-15 cm soil depth at all sampling intervals, with the maximum occurring at 120 days (4.63 ppb). AE B197555 was initially detected in the 15-30 cm depth at concentrations below the LOQ at 14 days, and was last detected at a maximum concentration of 2.60 ppb at 343 days. AE B197555 was not detected below the 15-30 cm depth excluding one detection below the LOQ. The registrant-calculated half-life for AE B197555 was 87 days (first order kinetics). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm soil layer was 82.5 days ($r^2 = 0.9107$), using linear regression analysis and based on all replicate data following the maximum detection at 14 days. The reviewer calculated half-life value for AE B197555 residues was 122 days based on whole-soil column residues from Day 14 to study termination (first order kinetics, $r^2 = 0.78$; see DER Table 8).

At Site 2 (Manitoba), the major transformation product AE B197555 (2-(methylsulfonyl)-4-(trifluoromethyl) benzoic acid) was initially detected in the 0-7.5 cm soil depth at 7.57 ppb at day-0, increased to a maximum of 26.72 ppb by 29 days (which is equivalent to 36.1 ppb parent equivalents or 28.9% of the theoretical applied pyrasulfotole based on the target application rate; Appendix C, Table C-9, pp. 96-98; see footnote to DER Table 4), decreased to 16.06 ppb by 61 days, and ranged from 1.17 to 1.80 ppb from 121 to 462 days posttreatment. AE B197555 was detected in the 7.5-15 cm soil depth at a maximum of 3.40 ppb at 7 days, and was generally detected below the LOQ from 15 to 462 days posttreatment. AE B197555 was not detected above the LOQ below the 7.5-15 cm soil depth, but was detected at levels below the LOQ in all soil depths analyzed (0-75 cm) at 462 days. The registrant-calculated half-life for AE B197555 was 32 days (first order kinetics). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm soil layer was 21.8 days ($r^2 = 0.8360$), using linear regression analysis and based on all replicate data following the maximum detection at 29 days through 121 days posttreatment. The reviewer calculated half-life value for AE B197555 residues was 35 days based on whole-soil column residues from Day 29 to study termination (first order kinetics model, $r^2 = 0.82$; see DER Table 8).

At Site 3 (Ontario), the major transformation product AE B197555 (2-(methylsulfonyl)-4-(trifluoromethyl) benzoic acid) was initially detected in the 0-7.5 cm soil depth at 5.46 ppb at day 0, increased to a maximum of 27.82 ppb by 14 days (which is equivalent to 37.58 ppb parent equivalents or 40.9% of the theoretical applied pyrasulfotole based on the target application rate; Appendix C, Table C-8, pp. 90-93; see footnote to DER Table 4), decreased to 15.66 ppb by 30 days, 5.20 ppb by 56 days, and was last detected above the LOQ at 0.85 ppb at 350 days posttreatment. AE B197555 was initially detected in the 7.5-15 cm soil depth at a maximum of 2.40 ppb, and was #1.09 ppb from 14 to 402 days. AE B197555 was detected once above the LOQ in the 15-30 cm depth, at 1.01 ppb at 30 days, and was detected below the LOQ in the 30-45, 45-60, and 60-75 cm depths. The registrant-calculated half-life for AE B197555 was 16 days (first order kinetics). The reviewer-calculated half-life value for AE B197555 in the top 7.5 cm soil layer was 27.6 days ($r^2 = 0.8290$), using linear regression analysis and based on all replicate

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data following the maximum detection at 14 days through 139 days posttreatment. The reviewer calculated half-life value for AE B197555 residues was 26.8 days based on whole-soil column residues from Day 14 to study termination (first order kinetics model, $r^2 = 0.94$; see DER Table 8).

Table 8. Reviewer calculated half-life/DT50 for AE B197555 in Canadian terrestrial field dissipation trials.

Location	Half-life ¹ (days)	Regression equation	r ²	DT50 ² (days)
Mortlach, Saskatchewan	121.6	$y = 41.1856 * \exp(-0.0057 * x)$	0.78	136
Minto, Manitoba	35.0	$y = 49.4612 * \exp(-0.0198 * x)$	0.82	64
St. George, Ontario	26.8	$y = 41.2277 * \exp(-0.0259 * x)$	0.94	41

1 Determined by the peer reviewer using Sigmaplot v 8.0 (linear first order regression model) and whole soil column totals for each subplot from the date of maximum detection; data obtained from Tables C-7, C-8 and C-9 of the study report.

2 DT50 estimated by adding number of days to reach maximum concentration in soil column to half-life estimate.

Table 9: Chemical names and CAS numbers for the transformation products of pyrasulfotole.

Applicants Code Name	CAS Number	Chemical Name (CAS)	Chemical Formula	Molecular Weight (g/mol)	Smiles String
AE B197555	142994-06-7	2-(Methylsulfonyl)-4-(trifluoromethyl) benzoic acid	C ₉ H ₇ F ₃ O ₄ S	268.21	

Data were obtained from p. 15 of the study report.

6. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES: Non-extractable residues were not measured.

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Table 10: Dissipation routes of pyrasulfotole under field conditions.

Route of dissipation		% of applied amount		
		Site 1 (Saskatchewan)	Site 2 (Manitoba)	Site 3 (Ontario)
Pyrasulfotole residues in whole soil column at beginning of following growing season (i.e., Day 343 for SK, 349 for MB and 350 for ON).		10.9%	19.2%	7.2%
Accumulation (pyrasulfotole residues) in soil at study termination (i.e., Day 449 for SK, 462 for MB and 458 for ON)		12.5%	13.4%	1.5%
Transformation (% of transformation products) ¹		45.8% (day 14)	29.4% (day 29)	41.1% (day 14)
Leaching, if measured (maximum depth detected)	Pyrasulfotole	60-75 cm	45-60 cm	60-75 cm
	AE B197555	30-45 cm	60-75 cm	60-75 cm
Volatilization, if measured		Not measured	Not measured	Not measured
Plant uptake, if measured		N/A	N/A	N/A
Run off, if measured		Not measured	Not measured	Not measured
Total				

Data were obtained from Appendix C, Tables C-7 to C-9, pp. 83-98 of the study report. Determined by reviewer as proportion of total amount of parent material present at beginning of following growing season (i.e., Day 269 posttreatment), to the amount present in the soil at Day 0 (sum of concentrations in whole soil column).

¹ Maximum concentration of AE B197555 in the soil after converting to parent equivalents (sum of all soil depths).

7. VOLATILIZATION: The concentration of applied pyrasulfotole lost through volatilization was not determined.

8. PLANT UPTAKE: N/A.

9. LEACHING: At Site 1 (Saskatchewan), pyrasulfotole and AE B197555 were generally confined to the upper 0-30 cm soil layer, but pyrasulfotole was detected once above the LOQ in the 30-45 cm depth (at 449 days), and was detected below the LOQ in the 45-60 and 60-75 cm depths (at 409 days; Appendix C, Table C-7, pp. 83-87). At Site 2 (Manitoba), pyrasulfotole was detected at levels above the LOQ to a depth of 30-45 cm and at levels below the LOQ in the 45-60 cm depth, and AE B197555 was detected at levels above the LOQ to a depth of 0-15 cm and at levels below the LOQ from 15 to 75 cm (Appendix C, Table C-9, pp. 94-98). At Site 3 (Ontario), pyrasulfotole was not detected above the LOQ in soil below the 0-15 cm depth, and AE B197555 was not detected above the LOQ in soil below the 15-30 cm depth; however, residues of pyrasulfotole and AE B197555 were detected to a maximum depth of 60-75 cm (Appendix C, Table C-8, pp. 88-93).

At Site 1, total precipitation was much greater than historic rainfall for the study site for the duration of the study (185% of the 30-year average), and was 108% of the historical average over the first month of the study (reviewer-calculated based on climatic data reported in Appendix F of the study report; pp. 243 and 246-262). At Site 2, total water input (precipitation plus irrigation) was 130% of the historic rainfall for the study site for the duration of the study,

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but was only 57% of the historical average over the first 30 days of the study (reviewer-calculated based on climatic data reported in Appendix F of the study report; pp. 245 and 280-296). At Site 3, total precipitation was 116% of the historic rainfall for the study site for the duration of the study, and was 74.2% of the historical average over the first 30 days of the study (reviewer-calculated based on climatic data reported in Appendix F of the study report; pp. 244 and 263-279). Site 1 and Site 3 plots were not irrigated.

10. RUN OFF: Run off was not studied.

11. RESIDUE CARRYOVER: Residues as a percentage of applied amount were calculated by the reviewer as the total amount of parent equivalent material present in the whole soil column relative to observed concentrations at Day 0. At the start of the following growing season (i.e., at 343-350 days post treatment), carryover of pyrasulfotole residues was 10.9%, 19.2% and 7.2% of the applied pyrasulfotole for Sites in Saskatchewan, Manitoba and Ontario respectively (Appendix C, Tables C-7 to C-9, pp. 83-98). By the end of the study period (i.e., 449-462 days post treatment), 12.5, 13.4 and 1.5% of the applied pyrasulfotole was present in the Saskatchewan, Manitoba and Ontario sites, respectively.

12. SUPPLEMENTARY STUDY RESULTS: The storage stability study was on-going; however, the study author stated that no evidence of degradation was apparent through 161, 152, and 151 days posttreatment for Site 1, 2, and 3 soils, respectively (p. 34).

III. STUDY DEFICIENCIES

1. The test substance was applied at an exaggerated target application rate of 100 g a.i./ha or 200% of the proposed maximum label rate. The reviewer notes that application at the maximum label rate is required for kinetic studies because dissipation rates can vary unpredictably at different application rates.
2. The stability of the parent and transformation product during the storage interval could not be confirmed because the storage stability study was on-going and preliminary data were not available for review. However, the study author did state that no evidence of degradation was apparent through 161, 152, and 151 days posttreatment for Site 1, 2, and 3 soils, respectively (p. 34). The reviewer notes that the longest storage interval for the test samples was 736 days for Site 1, 662 days for Site 2, and 770 days for Site 3. Additionally, the stability of pyrasulfotole and AE B 197555 during sampling and transport (field spikes) could not be verified because of the high variability between duplicate samples and among sampling dates (p. 29). Subdivision N Guidelines require that a storage stability study be conducted to determine the stability of the analytes under typical laboratory storage conditions.

IV. REVIEWER'S COMMENTS

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1. The study author calculated half-lives using ModelMaker Version 4.0 using both a single first order model and a bi-exponential kinetic model or double first order in parallel (DFOP) model (pp. 27-28). Simple first-order half-lives were 19 days, 116 days, and 21 days for Sites 1, 2, and 3, respectively (Table 11, p. 32). Using the DFOP model, the study author reported a DT50 value for pyrasulfotole of 7 days and a DT90 of 313 days for Site 1, a DT50 value of 31 days and a DT90 value of 568 days for Site 2, and a DT50 value of 15 days and a DT90 value of 160 days for Site 3. The study author-calculated half-life values for AE B197555 were 87 days, 32 days, and 16 days for Sites 1, 2, and 3, respectively.
3. The concentration of AE B197555 in soil was converted to parent equivalents by the reviewer by dividing by the molecular weight conversion factor 0.74. The molecular weight conversion factor was calculated by dividing the molecular weight of AE B197555 (268.2 g/mol) by the molecular weight of the parent (362.3 g/mol). AE B197555 concentrations were converted to parent equivalents by dividing the AE B197555 concentration by the molecular weight conversion factor.
4. The percent of AE B197555 in terms of percent of the applied pyrasulfotole was calculated by dividing the concentration of AE B197555 in parent equivalents (see above comment on how to convert to parent equivalents) by the theoretical day-0 concentration of pyrasulfotole in the 0-15 cm soil depth, based on the target application rate (see footnote to DER Table 4).
5. The aerobic soil metabolism pathway of pyrasulfotole is provided as Figure 1 (p. 12) of the study report, and shows that pyrasulfotole degrades to AE B197555, with subsequent degradation to non extractable residues and mineralization to CO₂. The study author added that in two aerobic soil metabolism studies, non-extractable ¹⁴C-residues increased from 0.4-2% at day 0 to 30-45% at study termination (the number of days in the study were not specified; p. 32).
6. Mean method validation recoveries from soil samples fortified with pyrasulfotole at 0.5 ng/g (LOQ) and 2.5 ng/g (5x LOQ) were 87 ± 6.7% and 98 ± 3.6%, respectively, and for soil samples fortified with AE B197555 were 93 ± 6.0% and 96 ± 3.0%, respectively (Appendix E, p. 214). The method validation was conducted using soil samples from Sites 2 and 3.
7. The study author stated that an oil dispersion formulation is similar to emulsifiable concentrate and suspo-emulsion formulations (p. 15).
8. Mean recoveries of pyrasulfotole and AE B197555 from fortified control soil samples prepared with each sample set were 83 ± 10% for pyrasulfotole and 83 ± 10% for AE B197555 at Site 1, 83 ± 9% for pyrasulfotole and 83 ± 13% for AE B197555 at Site 2, and 83 ± 15% for pyrasulfotole and 92 ± 14% for AE B197555 at Site 3 (Table 6, p. 26;

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Appendix E, Tables 3-5, 4-5 and 5-5, pp. 143, 151 and 159). The fortification level ranged from 0.5 ppb to 2000 ppb (p. 26).

9. The study authors used an oil dispersion (OD) formulation with a guarantee of 115 g a.i./L pyrasulfotole which they claim is similar to the emulsifiable concentrate (EC) and suspo-emulsion (SE) formulations. The SE formulated product (AE 0317309 SE 06 02; 50 g a.i./L), which is currently being reviewed for registration in Canada and the US, was used in the US studies. Pyrasulfotole was applied at 2x the proposed application rate in Canada (i.e., 50 g a.i./ha).

V. REFERENCES

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 164-1, Terrestrial Field Dissipation Studies. Office of Pesticide and Toxic Substances, Kansas, DC. EPA 540/9-82-021.
2. U.S. Environmental Protection Agency. 1993. Pesticide Registration Rejection Rate Analysis - Environmental Fate. Office of the Prevention, Pesticides, and Toxic Substances, Kansas, DC. EPA 738-R-93-010.
3. U.S. Environmental Protection Agency. 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Kansas, DC. EPA 540/09-90-078.

Attachment 1: Structures of Parent Compounds and Transformation Products

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Pyrasulfotole [AE 0317309; K-1196; K-1267]

IUPAC Name: (5-Hydroxy-1,3-dimethylpyrazol-4-yl)(α,α,α -trifluoro-2-mesyl-*p*-tolyl)methanone.

(5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)(2-mesyl-4-trifluoromethylphenyl)methanone.

CAS Name: (5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-methylsulfonyl]-4-(trifluoromethyl)phenyl]methanone.

Methanone, (5-hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-(methylsulfonyl)-4-(trifluoromethyl)phenyl].

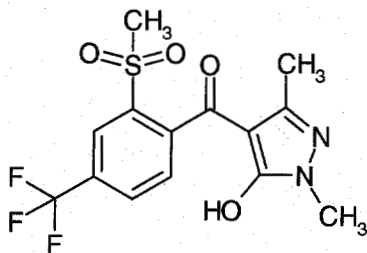
CAS Number: 365400-11-9.

SMILES String: FC(c1cc(c(cc1)C(=O)c1c(n(nc1C)C)O)S(=O)(=O)C(F)F (ISIS v2.3/Universal SMILES).

No EPI Suite, v3.12 SMILES String found as of 6/7/06.

Cc1nn(C)c(O)c1C(=O)c2ccc(C(F)(F)F)cc2S(C)(=O)=O.

CS(=O)(=O)c1c(ccc1)C(F)(F)F)C(=O)c1c(n(nc1C)C)O.



Identified Compounds

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Pyrasulfotole [AE 0317309; K-1196; K-1267]

IUPAC Name: (5-Hydroxy-1,3-dimethylpyrazol-4-yl)(α,α,α -trifluoro-2-mesyl-*p*-tolyl)methanone.

(5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)(2-mesyl-4-trifluoromethylphenyl)methanone.

CAS Name: (5-Hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-methylsulfonyl]-4-(trifluoromethyl)phenyl]methanone.

Methanone, (5-hydroxy-1,3-dimethyl-1H-pyrazol-4-yl)[2-(methylsulfonyl)-4-(trifluoromethyl)phenyl].

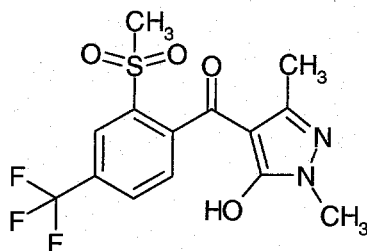
CAS Number: 365400-11-9.

SMILES String: FC(c1cc(c(cc1)C(=O)c1c(n(nc1C)C)O)S(=O)(=O)C(F)F (ISIS v2.3/Universal SMILES).

No EPI Suite, v3.12 SMILES String found as of 6/7/06.

Cc1nn(C)c(O)c1C(=O)c2ccc(C(F)(F)F)cc2S(C)(=O)=O.

CS(=O)(=O)c1c(ccc(c1)C(F)(F)F)C(=O)c1c(n(nc1C)C)O.



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RPA 203328 [AE B197555-benzoic acid; AE B197555; K-1198; K-1367]

IUPAC Name: 2-Mesyl-4-trifluoromethylbenzoic acid.

CAS Name: Benzoic acid, 2-(methylsulfonyl)-4-(trifluoromethyl)-.

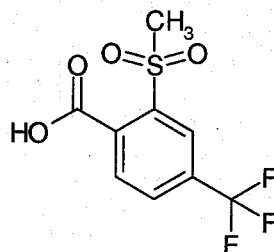
CAS Number: 142994-06-7.

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No EPI Suite, v3.12 SMILES String found as of 6/7/06.

CS(=O)(=O)c1cc(C(F)(F)F)ccc1C(=O)O.

CS(=O)(=O)c1cc(ccc1C(=O)O)C(F)(F)F.



Chemical name Pyrasulfotole
 PC code 000692
 MRID 46801719
 Guideline No. 164-1

Site 1 (Saskatchewan)
 0-7.5 cm depth

Half-life (days) = 106.6
 *Calculated using all available data
 Half-life (days) = 14.4
 *Calculated using 0-21 day data

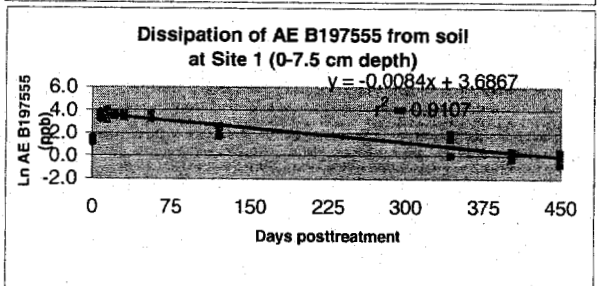
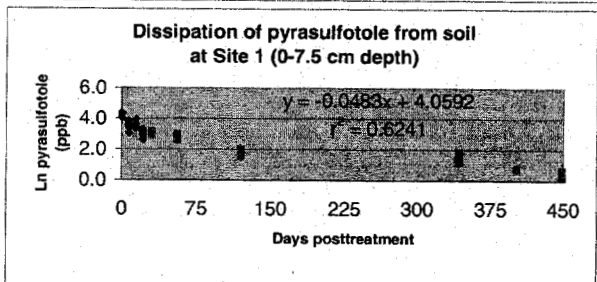
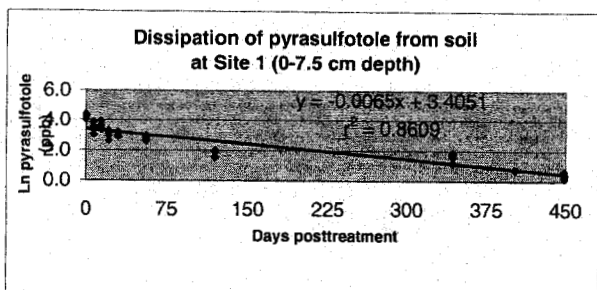
Half-life (days) = 82.5
 *Calculated using all available data
 following the maximum at 14 days

Days posttreatment	Replicate plot	Pyrasulfotole (ppb)	Ln (pyrasulfotole)	AE B197555 (ppb)	Ln (AE B197555)	Whole soil column		Day 0	Day 343	Day 449
						Pyrasulfotole (ppb)*	AE B197555 (ppb)**			
0	1	55.96	4.02	2.93	1.08	58.40	3.10			
				3.53		60.20				
0	2	57.71	4.06		1.26		3.70			
0	3	69.91	4.25	4.17	1.43	73.60	4.40		74.0	27.6
0	4	78.56	4.36	5.29	1.67	81.30	5.50			10.2
				44.94		35.80				
7	1	34.45	3.54		3.81		46.10			
7	2	29.38	3.38	24.84	3.21	29.90	25.30			
7	3	21.13	3.05	32.65	3.49	21.80	33.50			
7	4	46.09	3.83	38.01	3.64	46.90	38.60			
14	1	30.37	3.41	34.98	3.55	32.10	36.10			
14	2	28.89	3.36	23.19	3.14	29.90	23.50			
14	3	37.06	3.61	36.76	3.60	38.70	37.60			
14	4	51.52	3.94	52.63	3.96	56.60	56.10			
21	1	27.05	3.30	35.01	3.56	28.00	35.80			
21	2	13.62	2.61	37.61	3.63	13.90	38.10			
21	3	23.29	3.15	35.70	3.58	23.60	36.00			
21	4	19.04	2.95	31.28	3.44	19.60	32.00			
30	1	24.46	3.20	33.06	3.50	25.40	33.90			
30	2	18.00	2.89	38.24	3.64	19.00	40.70			
30	3	18.81	2.93	27.93	3.33	20.80	30.60			
30	4	19.46	2.97	28.97	3.37	22.80	33.90			
56	1	15.83	2.76	25.86	3.25	16.30	26.40			
56	2	19.82	2.99	37.13	3.61	20.40	38.30			
56	3	17.99	2.89	34.96	3.55	18.30	35.50			
56	4	13.54	2.61	38.14	3.64	13.80	39.00			
120	1	6.76	1.91	8.41	2.13	8.90	12.20			
120	2	7.02	1.95	5.51	1.71	8.20	7.50			
120	3	7.24	1.98	7.98	2.08	11.00	10.90			
120	4	4.65	1.54	12.61	2.53	5.40	23.60			
343	1	5.92	1.78	4.23	1.44	8.50	24.00			
343	2	3.31	1.20	1.00	0.00	7.50	3.00			
343	3	4.92	1.59	6.62	1.89	5.40	16.00			
343	4	6.34	1.85	6.09	1.81	8.30	14.60			
402	1	2.07	0.73	1.37	0.31	3.80	1.80			
402	2	2.17	0.77	1.09	0.09	5.00	1.30			
402	3	2.22	0.80	1.46	0.38	3.00	1.70			
402	4	2.06	0.72	0.76	-0.27	8.80	1.40			
449	1	1.43	0.36	0.88	-0.13	2.80	1.200			
449	2	1.54	0.43	1.41	0.34	2.30	2.200			
449	3	1.20	0.18	0.79	-0.24	3.10	0.800			
449	4	1.91	0.65	0.50	-0.69	26.10	0.500			

* Data obtained from Appendix C, Table C-7, pp. 83 and 85 of the study report.

* Data obtained from Appendix C, Table C-7, p. 83 of the study report.

** Data obtained from Appendix C, Table C-7, p. 85 of the study report.



Chemical name Pyrasulfotole
 PC code 000692
 MRID 46801719
 Guideline No. 164-1

Site 2 (Manitoba)
 0-7.5 cm depth

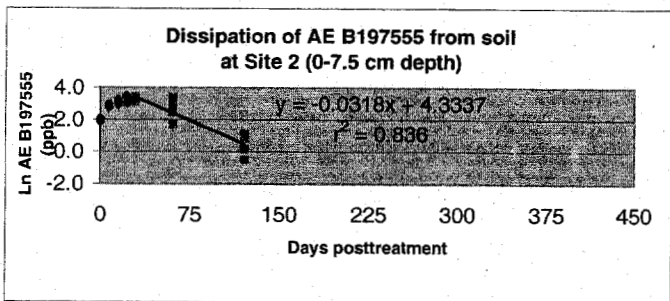
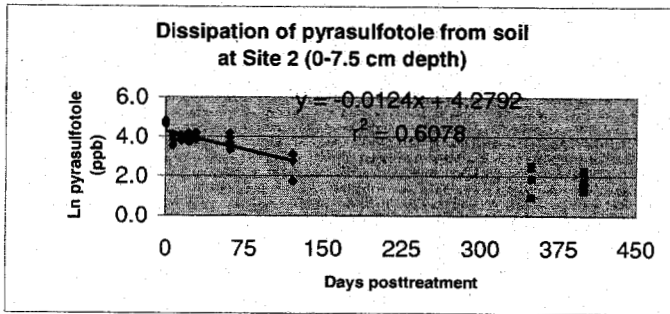
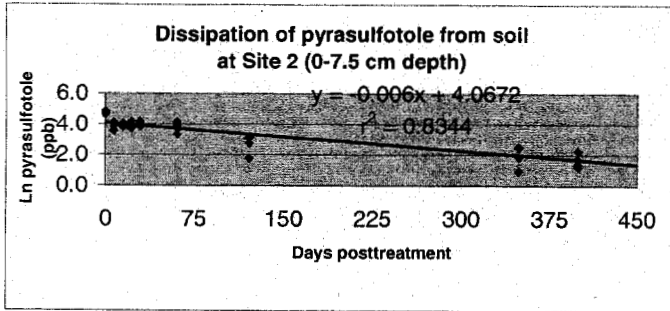
Half-life (days) = 115.5
 *Calculated using all available data
 Half-life (days) = 55.9
 *Calculated using 0-121 day data

Half-life (days) = 21.8
 *Calculated using 29-121 day data

Days posttreatment	Replicate plot	Pyrasulfotole (ppb)	Ln (pyrasulfotole)	AE B197555 (ppb)	Ln (AE B197555)	Whole soil column		Day 0	Day 349	Day 462
						Pyrasulfotole (ppb)*	AE B197555 (ppb)**			
0	1	124.06	4.82	8.16	2.10	124.90	8.20			
				6.44		119.60				
0	2	117.95	4.77		1.86		6.40			
0	3	102.13	4.63	7.45	2.01	103.20	7.50	124.4	23.5	20.1
0	4	107.82	4.68	8.22	2.11	106.90	8.20			
				16.72		37.40				
7	1	35.94	3.58		2.82		17.00			
7	2	47.21	3.85	15.77	2.76	48.60	16.00			
7	3	33.92	3.52	15.37	2.73	61.50	28.20			
7	4	62.04	4.13	19.78	2.98	64.00	20.00			
15	1	46.16	3.83	26.98	3.30	46.80	27.30			
15	2	57.94	4.06	22.62	3.12	63.60	23.10			
15	3	43.70	3.78	18.45	2.92	46.10	19.10			
15	4	56.02	4.03	18.20	2.90	58.10	18.40			
22	1	65.18	4.18	34.01	3.53	66.60	34.50			
22	2	46.55	3.84	29.05	3.37	47.90	29.50			
22	3	40.18	3.69	20.42	3.02	41.60	20.80			
22	4	45.91	3.83	21.95	3.09	48.90	22.70			
29	1	48.30	3.88	21.24	3.06	49.10	21.60			
29	2	45.72	3.82	26.05	3.26	46.50	26.50			
29	3	63.88	4.16	27.54	3.32	65.10	28.00			
29	4	66.98	4.20	32.06	3.47	68.80	32.50			
61	1	27.59	3.32	5.45	1.70	31.00	5.90			
61	2	40.16	3.69	11.72	2.46	44.90	12.00			
61	3	52.28	3.96	17.37	2.85	60.40	19.10			
61	4	64.69	4.17	29.70	3.39	65.20	30.10			
121	1	22.52	3.11	2.37	0.96	31.50	2.60			
121	2	23.15	3.14	3.05	1.12	30.30	3.50			
121	3	5.85	1.77	0.61	-0.49	26.70	0.80			
121	4	15.92	2.77	1.17	0.16	27.70	1.60			
349	1	2.55	0.94	0.18	-1.71	11.10	0.20			
349	2	6.39	1.85	0.86	-0.15	22.60	1.00			
349	3	12.01	2.49	1.33	0.29	26.10	1.70			
349	4	12.42	2.52	1.51	0.41	27.80	1.90			
399	1	5.53	1.71	1.05	0.05	12.40	1.40			
399	2	9.77	2.28	1.42	0.35	28.60	3.00			
399	3	3.49	1.25	ND		16.10	0.40			
399	4	4.09	1.41	0.47	-0.76	14.10	1.00			
462	1	5.46	1.70	1.56	0.44	11.50	5.10			
462	2	4.60	1.53	1.74	0.55	12.50	2.80			
462	3	3.93	1.37	0.70	-0.36	15.30	2.40			
462	4	4.41	1.48	0.70	-0.36	21.80	4.00			

* Data obtained from Appendix C, Table C-9, pp. 94 and 96 of the study report.
 ND = Not detected

* Data obtained from Appendix C, Table C-9, p. 94 of the study report.
 ** Data obtained from Appendix C, Table C-9, p. 96 of the study report.



Chemical name Pyrasulfotole
 PC code 000692
 MRID 46801719
 Guideline No. 164-1

Site 3 (Ontario)
 0-7.5 cm depth

Half-life (days) = 84.5
 *Calculated using all available data
 Half-life (days) = 22.7
 *Calculated using 0-56 day data

Half-life (days) = 27.6
 *Calculated using 14-139 day data

Days posttreatment	Replicate plot	Pyrasulfotole (ppb)	Ln (pyrasulfotole)	AE B197555 (ppb)	Ln (AE B197555)	Whole soil column		Day 0	Day 350	Day 458
						Pyrasulfotole (ppb)*	AE B197555 (ppb)**			
0	1	61.02	4.11	4.80	1.57	61.90	4.80			
				5.97		65.00				
0	2	64.17	4.16		1.79					
0	3	55.60	4.02	5.47	1.70	56.50	6.00	66.3	5.9	1.3
0	4	51.46	3.94	5.59	1.72	52.30	5.50			
							5.60			
				18.16		49.00				
7	1	33.84	3.52		2.90		27.50			
7	2	54.23	3.99	33.52	3.51	54.50	33.50			
7	3	40.80	3.71	28.50	3.35	41.90	28.50			
7	4	34.44	3.54	19.99	3.00	35.10	20.30			
14	1	33.55	3.51	23.46	3.16	33.80	23.60			
14	2	44.36	3.79	25.67	3.25	44.60	25.90			
14	3	29.86	3.40	36.68	3.60	30.10	37.00			
14	4	22.01	3.09	25.45	3.24	22.20	25.60			
21	1	26.30	3.27	29.71	3.39	26.90	29.90			
21	2	26.00	3.26	22.78	3.13	26.00	22.80			
21	3	27.79	3.32	23.67	3.16	28.00	23.80			
21	4	23.47	3.16	22.65	3.12	23.60	22.90			
30	1	21.26	3.06	17.63	2.87	22.50	20.60			
30	2	20.47	3.02	15.70	2.75	20.80	19.70			
30	3	23.76	3.17	15.34	2.73	24.60	18.30			
30	4	16.02	2.77	13.99	2.64	19.20	18.80			
56	1	9.17	2.22	6.35	1.85	10.60	8.20			
56	2	12.38	2.52	5.70	1.74	14.20	5.90			
56	3	9.02	2.20	3.40	1.22	11.70	4.90			
56	4	8.74	2.17	5.37	1.68	14.50	15.00			
139	1	5.09	1.63	2.42	0.88	6.00	3.10			
139	2	2.92	1.07	0.63	-0.46	3.80	0.60			
139	3	4.30	1.46	0.36	-1.02	7.20	0.70			
139	4	7.33	1.99	3.83	1.34	7.90	6.00			
350	1	1.74	0.55	0.43	-0.84	2.50	0.40			
350	2	2.44	0.89	0.56	-0.58	4.30	0.80			
350	3	4.31	1.46	2.13	0.76	6.80	2.30			
350	4	1.01	0.01	0.29	-1.24	3.30	1.40			
402	1	1.71	0.54	ND		1.90	0.20			
402	2	0.75	-0.29	ND		1.50	0.30			
402	3	0.80	-0.22	0.27	-1.31	1.50	0.30			
402	4	2.00	0.69	1.31	0.27	2.30	1.30			
458	1	0.85	-0.16	0.47	-0.76	0.80	0.500			
458	2	0.91	-0.09	0.27	-1.31	1.20	0.300			
458	3	0.51	-0.67	ND		0.70	0.000			
458	4	0.74	-0.30	0.38	-0.97	0.90	0.400			

Sum of mean parent equivalents at

% carryover (vs. Day 0 observed)

* Data obtained from Appendix C, Table C-8, pp. 88 and 90 of the study report.
 ND = Not detected

* Data obtained from Appendix C, Table C-8, p. 88 of the study report.
 ** Data obtained from Appendix C, Table C-8, p. 90 of the study report.

Shaded values were non-detects, set by peer reviewer to be 1/2 LOD (0.10 ug/kg soil)
ND = Not detected

