

Analytical method for mesosulfuron-methyl (AE F130060) and its transformation products, AE F154851, AE F099095, and AE F092944, in soil

- Reports:** ECM: EPA MRID No.: 49829803. Miller, A. 2016. Bayer Method MM-001-S14-03: An Analytical Method for the Determination of Residues of Mesosulfuron-methyl (AE F130060) and its metabolites AE F154851, AE F099095, and AE F092944 in Soil Using LC/MS/MS. Bayer Method MM-001-S14-03. Report prepared, sponsored and submitted by Bayer CropScience, Research Triangle Park, North Carolina; 25 pages. Final report completed January 27, 2016.
- ILV: EPA MRID No.: 49829801. Perez, R., and M. Marshall. 2016. Independent Laboratory Validation (ILV) of Bayer Method MM-001-S14-02 for the Determination of Residues of Mesosulfuron-methyl (AE F130060) and its metabolites AE F154851, AE F099095 and AE F092944 in Soil Using LC-MS/MS. ADPEN Study No.: 15L0204. Bayer CropScience Study ID: RAMMN091. Report prepared by ADPEN Laboratories, Inc., Jacksonville, Florida, sponsored and submitted by Bayer CropScience, Research Triangle Park, North Carolina; 183 pages. Final report issued January 25, 2016.
- Document No.:** MRIDs 49829803 & 49829801
- Guideline:** 850.6100
- Statements:** ECM: The study was not conducted in compliance with USEPA Good Laboratory Practice (GLP) standards since it was not an experimental study according to 40 CFR Part 160.3 (p. 3 of MRID 49829803). Signed and dated Data Confidentiality and GLP statements were provided (pp. 2-3). Quality Assurance and Authenticity Certification statements were not provided.
- ILV: The study was conducted in compliance with USEPA FIFRA GLP standards (40 CFR 160; p. 3 of MRID 49829801). Signed and dated Data Confidentiality, GLP and Quality Assurance statements were provided (pp. 2-4). A statement of authenticity was not provided.
- Classification:** This analytical method is classified as Unacceptable. Only one set of performance data was submitted to support the method; the ECM MRID 49829803 was a method description only and did not report any experimental data. The LOD was not reported. The LOQ is greater than the lowest toxicological level of concern in soil. Some correlation coefficients of the linear regressions were unsatisfactory. Sample recoveries for soil were corrected in the ILV.
- PC Code:** 122009
- Reviewer:** Lewis Ross Brown, III
Environmental Biologist
- Signature:** Lewis Ross Brown, III
Date: December 20, 2016

Page citations for MRID 49829801 in this review refer to the page numbers located in the upper right corner of each page of the MRID. Page citations for MRID 49829803 in this review refer to the page numbers located in the bottom-center of each page of the MRID.

Executive Summary

The analytical method, Bayer Method MM-001-S14-02/Bayer Method MM-001-S14-03, is designed for the quantitative determination of mesosulfuron-methyl (AE F130060) and its transformation products, AE F154851, AE F099095, and AE F092944, in soil at the LOQ of 10 ng/g (10 ppb) using HPLC/MS/MS. The LOQ (10 ppb) is greater than the lowest toxicological level of concern in soil (0.07 ppb). Two sets of performance data were not submitted to support the method; the ECM MRID 49829803 was a method only and did not report any experimental data. In the ILV, the method was validated with the first trial for mesosulfuron-methyl and AE F092944, as well as the 10×LOQ samples of AE F154851 and AE F099095; the method was validated with the second trial for the LOQ samples of AE F154851 and AE F099095. No ILV modifications of analytical method were reported; however, the ILV study author recommended additional vortexing of the sample prior to LC/MS/MS analysis for homogeneity. In the ILV, the soil matrix was uncharacterized, chromatograms of the confirmation ion of AE F092944 did not support the specificity of the method, and sample recoveries for soil were corrected for residues quantified in the controls (*ca.* 10-40% of the LOQ). Correlation coefficients of the linear regressions for AE F154851 and AE F099095 were unsatisfactory in the ECM and/or the ILV. The LOD for the method was not reported in the ECM and ILV.

Table 1. Analytical Method Summary

Analyte(s) by Pesticide ¹	MRID		EPA Review	Matrix	Method Date (dd/mm/yyyy)	Registrant	Analysis	Limit of Quantitation (LOQ)
	Environmental Chemistry Method	Independent Laboratory Validation						
Mesosulfuron-methyl (AE F130060)	49829803 ²	49829801 ³		Soil	27/01/2016 (Final ECM; ECM Rev. 3) ⁴	Bayer CropScience	LC/MS/MS	10 ng/g
AE F154851					01/12/2015 (ECM Rev. 2) ⁵			
AE F099095								
AE F092944								

1 Mesosulfuron-methyl (AE F130060) = Methyl 2-[(4,6-dimethoxypyrimidin-2-ylcarbonyl)sulfamoyl]- α -(methanesulfonamido)-p-toluate (IUPAC); Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoate (CAS). AE F154851 = Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoic acid (CAS). AE F099095 = N-(4,6-dimethoxy-2-pyrimidinyl)-urea (CAS). AE F092944 = 4,6-Dimethoxy-2-pyrimidinamine (CAS).

2 The ECM was a method only; no experimental data was provided.

3 In the ILV, the soil sample was provided by Bayer; a sample code was provided, MEFVP115FL-S001 (1 kg), but the soil characterization data was not provided (p. 15 of MRID 49829801).

4 From Bayer Method MM-001-S14-03 (p. 1; Appendix 6, p. 25 of MRID 49829803; see Reviewer's Comment #2).

5 From Bayer Method MM-001-S14-02; ECM Version which was provided to ILV (Appendix 2, p. 125 of MRID 49829801).

I. Principle of the Method

Samples (10 ± 0.05 g) were placed in 125-mL glass jars and fortified, if necessary (pp. 6-7, 9-10; Appendix 2, p. 16 of MRID 49829803). The samples were extracted twice with 40 mL of acetonitrile:20 mM triethylamine (TEA; 4:1, v:v) via shaking for *ca.* 20 minutes. After centrifugation (5 minutes at *ca.* 2500 rpm), the supernatant was separated. The combined extracts were mixed with 0.8 mL of the 1 $\mu\text{g/mL}$ internal standard solution. An aliquot of the supernatant (0.5 mL) was concentrated to dryness using evaporation (Turbo Vap) at *ca.* 50°C. The residue was reconstituted using 0.5 mL of water:methanol (9:1, v:v) with vortex mixing then analyzed by LC/MS/MS.

Samples are analyzed using an AB Sciex API 6500 equipped with electrospray ionization interface (pp. 6, 10-12 of MRID 49829803). The following LC conditions were used: Thermo Scientific Aquasil C18 column (3.0 mm x 100 mm, 3 μm ; column temperature 50°C), mobile phase of (A) water:methanol (9:1, v:v) containing 10 mM ammonium formate and 120 $\mu\text{L/L}$ formic acid and (B) water:methanol (1:9, v:v) containing 10 mM ammonium formate and 120 $\mu\text{L/L}$ formic acid [percent A:B (v:v) at 0.0-0.5 min. 95:5, 4.0-4.5 min. 0:100, 4.6 min. 95:5], and injection volume of 10 μL (the injection volume was noted as adjustable based on LC/MS/MS system being used). The following MS/MS conditions were used: TEM source temperature, 300°C; positive ion polarity; and multiple reaction monitoring (MRM). Two ion pair transitions were monitored for each analyte (quantitative and confirmatory, respectively): m/z 504.2 \rightarrow 181.9 and m/z 504.2 \rightarrow 83.0 for mesosulfuron-methyl, m/z 490.0 \rightarrow 182.2 and m/z 489.9 \rightarrow 83.0 for AE F154851, m/z 198.9 \rightarrow 156.0 and m/z 198.9 \rightarrow 182.0 for AE F099095, and m/z 156.2 \rightarrow 100.0 and m/z 156.2 \rightarrow 124.0 for AE F092944. Expected retention times were *ca.* 3.9, 2.8, 3.5, and 3.2 minutes for mesosulfuron-methyl, AE F154851, AE F099095, and AE F092944, respectively. Internal standards of mesosulfuron-methyl and AE F092944 were used to quantify the analytes; the internal standard of mesosulfuron-methyl was used to quantify AE F154851 and AE F099095.

ILV: The extraction procedures were performed exactly as written in the ECM (pp. 15-17; Appendix 1, p. 123 of MRID 49829801). The samples are analyzed for analytes by HPLC/MS/MS using an Agilent 1290 UPLC system and an Agilent 6500 Triple Quad MS (positive ionization; temperature, 300°C; pp. 16-17). The LC parameters were the same as those of the ECM. Two ion pair transitions were monitored for all analytes (quantitative and confirmatory, respectively): m/z 504.1 \rightarrow 182.1 and m/z 504.1 \rightarrow 83.1 for mesosulfuron-methyl, m/z 490.0 \rightarrow 182.1 and m/z 490.0 \rightarrow 82.9 for AE F154851, m/z 199.2 \rightarrow 156.0 and m/z 199.2 \rightarrow 181.9 for AE F099095, and m/z 156.2 \rightarrow 100.1 and m/z 156.2 \rightarrow 123.9 for AE F092944 (these were similar to those reported in the ECM). Expected retention times were *ca.* 4.02, 2.87, 3.44 and 3.22 minutes for mesosulfuron-methyl, AE F154851, AE F099095, and AE F092944, respectively. Internal standards of mesosulfuron-methyl and AE F092944 were used to quantify the analytes; the internal standard of mesosulfuron-methyl was used to quantify AE F154851 and AE F099095.

LOQ and LOD: In the ECM and ILV, Limit of Quantification (LOQ) was 10 ng/g (10 ppb) for all analytes (p. 6 of MRID 49829803; pp. 10, 20 of MRID 49829801). In the ECM and ILV, the Limit of Detection (LOD) was not reported.

II. Recovery Findings

ECM (MRID 49829803): MRID 49829803 was not an experimental study; it was a method only. No recovery data was reported or determined.

ILV (MRID 49829801): Mean recoveries and relative standard deviations (RSDs) were within guidelines (mean 70-120%; RSD \leq 20%) for analysis of mesosulfuron-methyl (AE F130060) and its transformation products, AE F154851, AE F099095, and AE F092944, at fortification levels of 10 ng/g (10 ppb; LOQ) and 100 ng/g (100 ppb; 10 \times LOQ) in one soil matrix (p. 19; Tables 2-9, pp. 24-31). Two ion transitions were monitored for each analyte. Results of the quantitation and confirmation ion transitions were comparable, although generally more similar with 10 \times LOQ samples than LOQ samples. The recovery results were corrected when residues were quantified in the controls; residues were found in the control samples of AE F154851 (LOQ, second trial; 2.2240-2.2960 ppb for quantification ion; 4.1840-4.2080 ppb for confirmation ion) and AE F092944 (LOQ/10 \times LOQ, first trial; 0.8640-2.7438 ppb for confirmation ion; Tables 2-9, pp. 24-31; Appendix 5, p. 165). The soil sample was provided by Bayer; a sample code was provided, MEFVP115FL-S001 (1 kg), but the soil characterization data was not provided (p. 15). The method was validated with the first trial for mesosulfuron-methyl and AE F092944, as well as the 10 \times LOQ samples of AE F154851 and AE F099095; the method was validated with the second trial for the LOQ samples of AE F154851 and AE F099095 (p. 19). No ILV modifications of analytical method were reported; however, the ILV study author recommended additional vortexing of the sample prior to LC/MS/MS analysis for homogeneity.

Table 2. Initial Validation Method Recoveries for Mesosulfuron-methyl (AE F130060) and Its Transformation Products, AE F154851, AE F099095, and AE F092944, in Soil¹

Analyte	Fortification Level (ppb)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%)	Relative Standard Deviation (%)					
Soil											
Quantitation ion transition											
Mesosulfuron-methyl (AE F130060)	10 (LOQ)	No data reported or determined									
	100										
AE F154851	10 (LOQ)										
	100										
AE F099095	10 (LOQ)										
	100										
AE F092944	10 (LOQ)										
	100										
Confirmation ion transition											
Mesosulfuron-methyl (AE F130060)	10 (LOQ)						No data reported or determined				
	100										
AE F154851	10 (LOQ)										
	100										
AE F099095	10 (LOQ)										
	100										
AE F092944	10 (LOQ)										
	100										

¹ Mesosulfuron-methyl (AE F130060) = Methyl 2-[(4,6-dimethoxypyrimidin-2-ylcarbamoyl)sulfamoyl]- α -(methanesulfonamido)-p-toluate (IUPAC); Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoate (CAS). AE F154851 = Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoic acid (CAS). AE F099095 = N-(4,6-dimethoxy-2-pyrimidinyl)-urea (CAS). AE F092944 = 4,6-Dimethoxy-2-pyrimidinamine (CAS).

Table 3. Independent Validation Method Recoveries for Mesosulfuron-methyl (AE F130060) and Its Transformation Products, AE F154851, AE F099095, and AE F092944, in Soil^{1,2,3,4}

Analyte	Fortification Level (ppb)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%)	Relative Standard Deviation (%)
Soil						
Quantitation ion transition						
Mesosulfuron-methyl (AE F130060)	10 (LOQ)	5	93-116	106	9.4	8.9
	100	5	87-119	105	11.5	10.9
AE F154851	10 (LOQ)	5	70-77	73	3.4	4.6
	100	5	71-120	99	18.3	18.6
AE F099095	10 (LOQ)	5	87-121	102	14.6	14.3
	100	5	98-112	107	5.2	4.9
AE F092944	10 (LOQ)	5	78-107	95	11.8	12.5
	100	5	76-116	99	15.6	15.7
Confirmation ion transition						
Mesosulfuron-methyl (AE F130060)	10 (LOQ)	5	93-101	96	3.7	3.8
	100	5	87-115	105	10.7	10.2
AE F154851	10 (LOQ)	5	74-93	83	8.3	10.0
	100	5	83-118	102	15.0	14.8
AE F099095	10 (LOQ)	5	107-120	113	5.4	4.8
	100	5	89-125	106	13.2	12.5
AE F092944	10 (LOQ)	5	75-114	96	17.3	18.0
	100	5	72-119	97	18.8	19.4

Data (corrected recovery results when residues found in the controls; Tables 2-9, pp. 24-31; Appendix 5, p. 165) were obtained from p. 19; Tables 2-9, pp. 24-31 of MRID 49829801.

- The soil sample was provided by Bayer; a sample code was provided, MEFVP115FL-S001 (1 kg), but the soil characterization data was not provided (p. 15).
- Mesosulfuron-methyl (AE F130060) = Methyl 2-[(4,6-dimethoxypyrimidin-2-ylcarbamoyl)sulfamoyl]- α -(methanesulfonamido)-p-toluate (IUPAC); Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoate (CAS). AE F154851 = Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoic acid (CAS). AE F099095 = N-(4,6-dimethoxy-2-pyrimidinyl)-urea (CAS). AE F092944 = 4,6-Dimethoxy-2-pyrimidinamine (CAS).
- Two ion pair transitions were monitored for all analytes (quantitative and confirmatory, respectively): m/z 504.1 \rightarrow 182.1 and m/z 504.1 \rightarrow 83.1 for mesosulfuron-methyl, m/z 490.0 \rightarrow 182.1 and m/z 490.0 \rightarrow 82.9 for AE F154851, m/z 199.2 \rightarrow 156.0 and m/z 199.2 \rightarrow 181.9 for AE F099095, and m/z 156.2 \rightarrow 100.1 and m/z 156.2 \rightarrow 123.9 for AE F092944; p. 17).
- Data provided for mesosulfuron-methyl, AE F154851 (10 \times LOQ), AE F099095 (10 \times LOQ) and AE F092944 were from the first trial without modifications; data provided for AE F154851 (LOQ) and AE F099095 (LOQ) were from the second trial without modifications (p. 19).

III. Method Characteristics

In the ECM and ILV, the LOQ was 10 ng/g (10 ppb) for all analytes (p. 6 of MRID 49829803; pp. 10, 20 of MRID 49829801). No justifications, calculations or discussions were provided to support the method LOQ. In the ECM and ILV, the LOD was not reported.

Table 4. Method Characteristics

Analyte ¹	Mesosulfuron-methyl (AE F130060)	AE F154851	AE F099095	AE F092944
Limit of Quantitation (LOQ)	10 ppb			
Limit of Detection (LOD)	Not reported			
Linearity (calibration curve r^2 and concentration range)	ECM ²	$r^2 = 0.9992$	$r^2 = 0.9974$	$r^2 = \mathbf{0.9916}$
		0.5-100 ppb		
	ILV ³	$r^2 = 0.9980$ (Q) $r^2 = 0.9972$ (C)	$r^2 = \mathbf{0.9926}$ (Q) $r^2 = \mathbf{0.9932}$ (C)	$r^2 = \mathbf{0.9910}$ (Q) $r^2 = \mathbf{0.9940}$ (C)
Repeatable		0.005-1.000 ng		
	ECM	No data reported or determined; method only.		
	ILV ⁴	Yes at LOQ and 10×LOQ. One uncharacterized, unspecified soil matrix was used.		
Reproducible	First trial with no modifications	First trial, 10×LOQ Second trial, LOQ No modifications reported	First trial with no modifications	
	Could not be determined; only one set of performance data was provided.			
Specific	ECM	Could not be determined. Only chromatograms of standards were provided.		
	ILV	Yes. Matrix interferences were <20% of LOQ, based on peak area, at analyte retention times.		Yes. Matrix interferences were <20% of LOQ, based on peak area, at analyte retention time for Q ion; however, matrix interferences were ca. 40% of the LOQ, based on peak area, at analyte retention time for C ion. ⁵

Data were obtained from pp. 6, 9; Appendix 3, pp. 17-18 (calibration curves); Appendix 4, pp. 19-22 (chromatograms of standards) of MRID 49829803; pp. 10, 19-20; Tables 2-9, pp. 24-31 (data tables); Figures 1-4, pp. 33-40 (calibration curves); Figures 9-24, pp. 89-120 (chromatograms of controls, LOQ and 10×LOQ) of MRID 49829801 and DER Attachment 2. Q = quantitation ion transition; C = confirmation ion transition.

1 Mesosulfuron-methyl (AE F130060) = Methyl 2-[(4,6-dimethoxypyrimidin-2-ylcarbamoyl)sulfamoyl]- α -(methanesulfonamido)-p-toluate (IUPAC); Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoate (CAS). AE F154851 = Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoic acid (CAS). AE F099095 = N-(4,6-dimethoxy-2-pyrimidinyl)-urea (CAS). AE F092944 = 4,6-Dimethoxy-2-pyrimidinamine (CAS).

2 ECM correlation coefficients for all analytes were reviewer-calculated from r values of 0.9958-0.9996 (analytes combined; only one set of calibration curves was provided; Appendix 3, pp. 17-18 of MRID 49829803; DER Attachment 2).

3 ILV correlation coefficients for all analytes were reviewer-calculated from r values of 0.9955-0.9992 (Q) and 0.9966-0.9986 (C; analytes combined; Figures 1-4, pp. 33-40 of MRID 49829801; DER Attachment 2).

4 The ILV soil sample was provided by Bayer; a sample code was provided, MEFVP115FL-S001 (1 kg), but the soil characterization data was not provided (p. 15 of MRID 49829801).

5 Based on Figure 16, p. 104 and Figure 20, p. 112 of MRID 49829801. A confirmatory method is not usually required when LC/MS and GC/MS is the primary method.

Linearity is satisfactory when $r^2 \geq 0.995$.

IV. Method Deficiencies and Reviewer's Comments

1. Two sets of performance data were not submitted to support the method; the ECM MRID 49829803 was a method only and did not report any experimental data. According to the OCSPP guidelines, two sets of performance data should be submitted, one for the initial or other internal validation and one for the ILV, with the following exception. If the initial validation was performed by a governmental agency, a reference to the agency's documentation of the ECM will serve as the ECM report.
2. The submitted ECM, EPA MRID 49829803, was for Bayer Method MM-001-S14-03. The ECM submitted with the ILV was Bayer Method MM-001-S14-02 (Miller, A. 2015. Bayer Method MM-001-S14-02: An Analytical Method for the Determination of Residues of Mesosulfuron-methyl (AE F130060) and its metabolites AE F154851, AE F099095, and AE F092944 in Soil Using LC/MS/MS. Bayer Method MM-001-S14-02. Report prepared, sponsored and submitted by Bayer CropScience, Research Triangle Park, North Carolina; 24 pages. Final report completed December 1, 2015). The only difference between version -02 and -03 was noted as "Corrected MS information for AE F154851" (Appendix 6, p. 25 of MRID 49829803). The correction of the AE F154851 MS information was communicated to the ILV in the correspondence, so the ILV was provided with an accurate ECM to validate (Appendix 7, p. 183 of MRID 49829801).
3. The estimations of the LOQ in ECM and ILV were not based on scientifically acceptable procedures as defined in 40 CFR Part 136 (p. 6 of MRID 49829803; pp. 10, 20 of MRID 49829801). No calculations were reported in ECM or ILV to support the method LOQ. The LOD was not reported in the ECM and ILV.
4. The specificity of the method for the soil matrix was not demonstrated in the ILV chromatograms of the confirmation ion of AE F092944 (Figure 16, p. 104; Figure 20, p. 112 of MRID 49829801). The confirmation ion peak was fairly small compared to the baseline height at the LOQ, and matrix interferences in water were *ca.* 40% of the LOQ, based on peak height, at analyte retention time. The reviewer noted that a confirmatory method is not usually required when LC/MS and GC/MS is the primary method.
5. The soil matrix was not characterized or described in ILV; only a sample ID was provided (p. 15 of MRID 49829801). It could not be determined if the ILV was provided with the most difficult matrix with which to validate the method.
6. The following correlation coefficients of the ILV linear regressions were unsatisfactory ($r^2 < 0.995$) for both the quantitative and confirmation ion: AE F154851 and AE F099095 (Figures 1-4, pp. 33-40 of MRID 49829801). The correlation coefficients of the ECM linear regression for AE F099095 was unsatisfactory, as well (Appendix 3, pp. 17-18 of MRID 49829803). Linearity is satisfactory when $r^2 \geq 0.995$.
7. In the ECM, only chromatograms for standards were provided (Appendix 4, pp. 19-22 of MRID 49829803). OCSPP guidelines states that representative chromatograms should be provided for reagent blanks, matrix blanks, standard curves, and spiked samples at the LOQ and $10 \times$ LOQ for all analytes in each matrix. Additionally, chromatograms of the reagent

blanks were not included.

8. The sample recoveries for soil were corrected in the ILV. Calculations allowed for the correction of sample recoveries for residues quantified in the controls; recovery results were corrected when residues were quantified in the controls; residues were found in the control samples of AE F154851 (LOQ, second trial; 2.2240-2.2960 ppb for quantification ion; 4.1840-4.2080 ppb for confirmation ion) and AE F092944 (LOQ/10×LOQ, first trial; 0.8640-2.7438 ppb for confirmation ion; Tables 2-9, pp. 24-31; Appendix 5, p. 165 of MRID 49829801).
9. The LOQ (10 ppb) is greater than the lowest toxicological level of concern in soil (0.07 ppb).
10. No ILV modifications of analytical method were reported; however, the ILV study author reported one recommendation: it was determined that vortexing the samples for at least 40 seconds prior to vialing for LC/MS/MS analysis improved the homogeneity of the samples (p. 20 of MRID 49829801).
11. The reviewer noted that the extraction solvent was reported in the ILV as “acetonitrile:20 mM trimethylamine (TEA; 4:1, v:v)” instead of acetonitrile:20 mM triethylamine (TEA; 4:1, v:v; pp. 15-17; Appendix 1, p. 123 of MRID 49829801). The reviewer did not report this as a modification since the reviewer assumed that the “methyl” was an auto-correction typographical error. The solvent was indicated as “TEA”, which is triethylamine.
12. ECM MRID 49829803 was an amended report. The changes made to the amended final report were listed in Appendix 6, p. 25 of MRID 49829803. The changes involved adding the metabolites to the method and correcting the MS information for AE F154851.
13. In the ILV, the total time required to perform the extraction was *ca.* 8 hours for a set of 13 soil samples (p. 20 of MRID 49829801). The time for LC/MS/MS analysis was not reported.
14. Communications between the ILV and Study Monitor were reported as the discussion of the successful completion of the first and second trials, as well as the correcting the MS information for AE F154851 (p. 20; Appendix 7, p. 183 of MRID 49829801).

V. References

- U.S. Environmental Protection Agency. 2012. Ecological Effects Test Guidelines, OCSPP 850.6100, Environmental Chemistry Methods and Associated Independent Laboratory Validation. Office of Chemical Safety and Pollution Prevention, Washington, DC. EPA 712-C-001.
- 40 CFR Part 136. Appendix B. Definition and Procedure for the Determination of the Method Detection Limit-Revision 1.11, pp. 317-319.

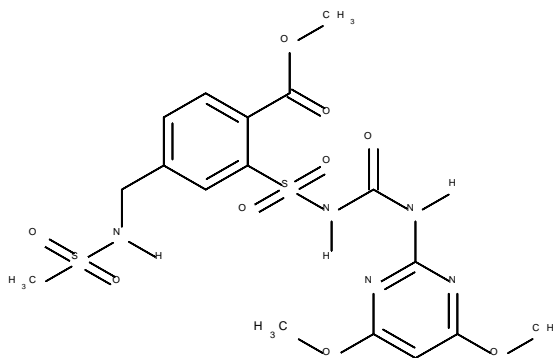
Attachment 1: Chemical Names and Structures**Mesosulfuron-methyl (AE F130060)**

IUPAC Name: Methyl 2-[(4,6-dimethoxypyrimidin-2-ylcarbamoyl)sulfamoyl]- α -(methanesulfonamido)-p-toluate

CAS Name: Methyl 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[methylsulfonyl]amino]methyl]benzoate

CAS Number: 208465-21-8

SMILES String: [H]N(Cc1ccc(c1)S(=O)(=O)N([H])C(=O)N([H])c2nc(cc(n2)OC)OC)OC(=O)OC)S(=O)(=O)C

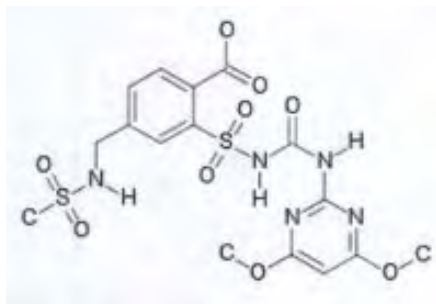
**AE F154851**

IUPAC Name: Not reported

CAS Name: 2-[[[(4,6-Dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[methylsulfonyl]amino]methyl]benzoic acid

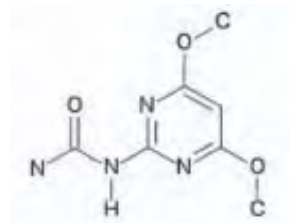
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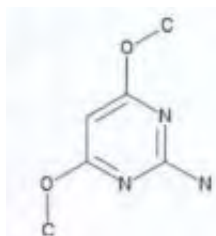


AE F099095

IUPAC Name: Not reported
CAS Name: N-(4,6-dimethoxy-2-pyrimidinyl)-urea
CAS Number: 151331-81-6
SMILES String: Not found

**AE F092944**

IUPAC Name: Not reported
CAS Name: 4,6-Dimethoxy-2-pyrimidinamine
CAS Number: 36315-01-2
SMILES String: Not found



Test Material: Mesosulfuron-methyl (AE F130060)

MRID: 49829803

Title: Bayer Method MM-001-S14-03: An Analytical Method for the Determination of Residues of Mesosulfuron-methyl (AE F130060) and its metabolites AE F154851, AE F099095, and AE F092944 in Soil Using LC/MS/MS


MRID: 49829801

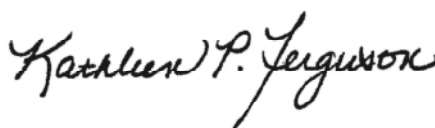
Title: Independent Laboratory Validation (ILV) of Bayer Method MM-001-S14-02 for the Determination of Residues of Mesosulfuron-methyl (AE F130060) and its metabolites AE F154851, AE F099095 and AE F092944 in Soil Using LC-MS/MS


EPA PC Code: 122009

OCSPP Guideline: 850.6100

For CDM/CSS-Dynamac JV

Primary Reviewer: Lisa Muto **Signature:** 
Date: 9/29/16

Secondary Reviewer: Kathleen Ferguson **Signature:** 
Date: 9/29/16

Quality Assurance Manager: Joan Gaidos **Signature:** 
Date: 9/29/16

This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel.