

Analytical method for propargite and its metabolite TBPC in soil

Reports: ECM: EPA MRID No.: 50593501. Batorewicz, W. 2003. Validation of the Analytical Method for the Determination of Propargite (Omite ®) and the Metabolite TBPC in Soil. Report prepared, sponsored and submitted by Crompton Corporation (a Legacy Company of MacDermid Agricultural Solutions, Inc., c/o Arysta LifeScience North America, LLC), Middlebury, Connecticut. Crompton Corporation Study No.: 2002-061. 105 pages. Final report issued April 30, 2003.

ILV: EPA MRID No.: 50393501. Zhang, L. and K.H. Martin. 2017. Independent Laboratory Validation of Methods for the Determination of Propargite and its Metabolite TBPC in Soil by GC/MS. Report prepared by EAG Laboratories™, EAG, Inc., Easton, Maryland; sponsored and submitted by MacDermid Agricultural Solutions, Inc., c/o Arysta LifeScience North America, LLC, Cary, North Carolina. EAG Project No: 443C-127. Sponsor Study No.: 2016-004. 57 pages. Final report issued September 18, 2017.

Document No.: MRIDs 50593501 & 50393501

Guideline: 850.6100


Statements: ECM: The study was conducted in compliance with USEPA FIFRA Good Laboratory Practice (GLP) standards, with the exception that the computer system was not fully validated (40 CFR 160; p. 3 of MRID 50593501). Signed and dated Data Confidentiality, GLP, Quality Assurance, and Certification of Authenticity statements were provided (pp. 2-5).


ILV: The study was conducted in compliance with USEPA FIFRA and OECD GLP standards (p. 3 of 50393501). Signed and dated Data Confidentiality, GLP and Quality Assurance statements were provided (pp. 2-4). The statement of authenticity was not included.

Classification: This analytical method is classified as **acceptable**. The method generally satisfied the repeatability and reproducibility criteria, with RSDs \leq 20% and mean recoveries in the range of 70 – 120%, except the ILV linearity was not satisfactory for TBPC analysis and the ECM linearity was not satisfactory for propargite or TBPC analysis.

PC Code: 097601

EFED Final Reviewer: William Gardner, Ph.D.,
Environmental Scientist
Signature: _____
Date: 11/19/18

CDM/CSS-Dynamac JV Reviewers: Teresa Nelis,
Environmental Scientist
Signature: 
Date: 10/8/18

Lisa Muto, M.S.,
Environmental Scientist
Signature: 
Date: 10/15/18

This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel. The CDM/CSS-Dynamac Joint Venture role does not include establishing Agency policies.

Executive Summary

The analytical method, Crompton Corporation Study No. 2202-061, is designed for the quantitative determination of propargite and its metabolite TBPC in soil at the stated LOQ of 0.01 mg/kg using GC/MS. The LOQ is lower than the lowest toxicological level of concern (1.22 a.i. mg/kg; USEPA 2014) in soil for the two analytes. The ECM validated the method for the two analytes using one characterized sandy loam soil matrix and incorporated an internal standard for analysis and quantification. The ILV validated the method using one characterized loamy sand soil matrix and incorporated an internal standard for analysis only. It could not be determined if the ILV was provided with the most difficult matrix with which to validate the method. Additionally, more than one soil matrix would need to be included in an ILV to cover the range of soils used in the terrestrial field dissipation studies. In the ECM and ILV, three ions were monitored for propargite and TBPC, but only the response of the primary ion was quantified. The number of trials in the ILV was not specified, but the reviewer assumed that the method was validated in the first trial based on communications between the ILV and the Study Sponsor. The ECM was performed by the ILV with only insignificant modifications to the analytical equipment and the identification of two critical steps: segregation of matrix blank samples and matrix fortification samples on the N-EVAP evaporator, and the importance of transferring the exact specified amount of the hexane extract to clean glass tubes after extraction. All ILV and ECM data regarding repeatability, accuracy, precision, and specificity were satisfactory for propargite and TBPC. ECM linearity was not satisfactory for propargite or TBPC analysis in sandy loam soil matrix; ILV linearity was not satisfactory for TBPC analysis in loamy sand soil matrix.

Table 1. Analytical Method Summary

Analyte(s) by Pesticide	MRID		EPA Review	Matrix	Method Date (dd/mm/yyyy)	Registrant	Analysis	Limit of Quantitation (LOQ)
	Environmental Chemistry Method	Independent Laboratory Validation						
Propargite	50593501 ¹	50393501 ²		Soil	30/04/2003	MacDermid Agricultural Solutions, Inc. c/o Arysta LifeScience North America	GC/MS	0.01 mg/kg
TBPC								

1 In the ECM, the sandy loam soil (Batch July-01; 77.25% sand, 13.41% silt, and 9.34% clay, pH 6.18 in CaCl₂, 1.15% organic carbon) obtained from Stolpe, Germany was characterized by RCC Ltd., Itingen, Switzerland (p. 15, Appendix II, p. 58 of MRID 50593501). USDA soil texture classification was not specified, but particle size distributions corresponded to USDA soil particle size distributions.

2 In the ILV, the loamy sand soil (PD-SOIL-PF-0-6²; 80% sand, 14% silt, and 6% clay, pH 6.2 in 1:1 soil:water ratio, 0.88% organic matter Walkley-Black) obtained from North Dakota was characterized by Agvise Laboratories, Northwood, North Dakota (USDA soil texture classification; p. 12, Appendix II, p. 48 of MRID 50393501).

I. Principle of the Method

Soil (10 g) was fortified (100 μ L) with the appropriate fortification solution, as necessary, in a 50-mL plastic centrifuge tube (pp. 15, 18, Appendix IV, pp. 85-87 of MRID 50593501). The sample was extracted with 25 mL of acetonitrile, vortexed (30 seconds), sonicated (10 minutes) and centrifuged (5,000-6,000 rpm for *ca.* 10 minutes); the supernatant was decanted into a 50 mL centrifuge tube, and the extraction process was repeated. The supernatants were combined and evaporated in an N-EVAP evaporator (*ca.* 50°C water bath) to a 5 mL volume and transferred to a 15 mL polypropylene centrifuge tube; the 50 mL centrifuge tube was rinsed into the 15 mL centrifuge tube with 0.5 mL of acetonitrile. The 15 mL centrifuge tube was placed on the N-EVAP evaporator under a stream of nitrogen, the supernatant reduced to a 1 mL volume, 5 mL of 10% NaCl and 5 mL of hexane added to the extract, and the extract was vortexed (30 seconds) and centrifuged (2 minutes). Using a disposable plastic pipette, 4 mL of the upper hexane phase was transferred to a new 15 mL polypropylene centrifuge tube, the hexane extraction step repeated, and 5 mL of the upper hexane phase from the second hexane extraction was added to the first hexane extract. Internal standards were added to the hexane extract. For samples fortified at the LOQ, the hexane extract containing the added internal standards was reduced under a stream of nitrogen to 1 mL; for samples fortified at 10 \times LOQ, hexane was added to the extract containing the added internal standards to bring the total volume to 10 mL. Aliquots of the supernatant were transferred to an autosampler vial for analysis by GC/MS (mass selective detector).

Samples were analyzed for propargite and TBPC using an Agilent 5890 capillary GC equipped with an Agilent 5972 MSD and a J & W DB-1 capillary column (30 m x 0.25 mm i.d. x 0.25 μ m film thickness), a temperature gradient of 210°C injector, 60°C initial temperature, 10°C/minute ramp rate and 295°C final temperature, and selective ion monitoring (SIM) mode (pp. 12, 15, 19-20, Appendix IV, pp. 82, 86-87 of MRID 50593501). Injection volume was 2 μ L. Propargite was identified using three ions; one for quantitation (Q) and two for confirmation (C): m/z 350 (Q), m/z 173 (C1) and m/z 150 (C2); the propargite internal standard was monitored at m/z 173. TBPC was identified using three ions: m/z 248 (Q), m/z 150 (C1) and m/z 233 (C2); the TBPC internal standard was monitored at m/z 150. Approximate retention times were *ca.* 22.2 and 21.6 minutes for propargite and the propargite internal standard, respectively, and *ca.* 17.7 and 17.1 minutes for TBPC and the TBPC internal standard, respectively.

The ILV performed the ECM methods for each analyte as written, except for substitution of glass centrifuge tubes and glass pipettes for plastic, segregation of the matrix blank and low-level fortification samples on the N-EVAP evaporator, and modifications to the analytical equipment (pp. 14-15; Tables 1-2, pp. 20-22, Appendix IV, p. 55 of MRID 50393501). The ILV transferred the reduced acetonitrile extracts into 15-mL glass centrifuge tubes; and glass pipettes were used to transfer the upper hexane phases into clean 15-mL glass centrifuge tubes (p. 14; Table 1, p. 20 of MRID 50393501). The ILV reported the following critical steps: 1) segregating matrix blank samples from matrix fortification samples on the N-EVAP to minimize the potential for cross contamination on the N-EVAP evaporator; and 2) for the step in which hexane extracts are to be transferred to clean glass tubes after extraction, the ILV indicated that the volume transferred for each sample must be the same as specified in the ECM method (Appendix IV, p. 55). The ILV GC/MS parameters, injection volume, and quantitation ion and confirmation ion analysis for propargite and TBPC were the same as those of the ECM. The ILV GC/MS instruments were similar but were newer models compared to those of the ECM: samples were analyzed for propargite in the ILV using an Agilent 7890 capillary GC equipped with an Agilent 5975 MSD and

an Agilent 122-0132DB-1MS column (30 m x 0.25 mm i.d. x 0.25 µm film thickness). ILV reported retention times were similar to the ECM retention times and were 22.0 and 21.5 minutes for propargite and the propargite internal standard, respectively, and 17.6 and 17.0 minutes for TBPC and the TBPC internal standard, respectively; propargite and TBPC were monitored at the same primary and confirmation ions as the ECM.

In the ECM and ILV, the Limit of Quantification (LOQ) was 0.01 mg/kg for propargite and TBPC in soil (p. 26 of MRID 50593501; p. 13 of MRID 50393501). In the ECM and ILV, the Limit of Detection (LOD) for propargite and TBPC was 0.005 mg/kg (p. 26 of MRID 50593501; p. 14 of MRID 50393501).

II. Recovery Findings

ECM (MRID 50593501): Mean recoveries and relative standard deviations (RSDs) for GC-MS analysis using the quantitation ion were within guidelines (mean 70-120%; RSD \leq 20%) for propargite and TBPC at fortification levels of 0.01 mg/kg (LOQ) and 0.10 mg/kg (10×LOQ) in one soil matrix (Tables I-IV, pp. 29-32; Appendix III, pp. 61-64). For the first set of 10×LOQ propargite samples, two out of five recoveries for propargite were greater than 110%; as a result, the analysis was repeated; the high recoveries were attributed to an error in spiking of the two samples (p. 25). Data for the second attempt at 10×LOQ were reported for propargite. Analytes were identified using three ions, but recovery results were only reported for the quantitation ion. The sandy loam soil (Batch July-01; 77.25% sand, 13.41% silt, and 9.34% clay, pH 6.18 in CaCl₂, 1.15% organic carbon) was obtained from Stolpe, Germany and characterized by RCC Ltd., Itingen, Switzerland (p. 15, Appendix II, p. 58). USDA soil texture classification was not specified, but particle size distributions corresponded to USDA soil particle size distributions.

ILV (MRID 50393501): Mean recoveries and RSDs for GC-MS analysis using the quantitation ion were within guidelines (mean 70-120%; RSD \leq 20%) for propargite and TBPC at fortification levels of 0.0100 mg/kg (LOQ) and 0.100 mg/kg (10×LOQ) in one soil matrix (p. 17, Tables 3-4, pp. 23-24). Analytes were identified using three ions, but recovery results were only reported for the quantitation ion. The loamy sand soil (PD-SOIL-PF-0-6"; 80% sand, 14% silt, and 6% clay, pH 6.2 in 1:1 soil:water ratio, 0.88% organic matter Walkley-Black) was obtained from North Dakota and characterized by Agvise Laboratories, Northwood, North Dakota (USDA soil texture classification; p. 12, Appendix II, p. 48). The number of trials in the ILV was not specified, but the reviewer assumed that the method was validated in the first trial based on communications between the ILV and the Study Sponsor (pp. 10, 14-15; Appendix I, p. 41; Appendix IV, p. 56). The ECM was performed by the ILV with only insignificant modifications to the analytical equipment and the identification of two critical steps (pp. 14-15; Tables 1-2, pp. 20-22, Appendix IV, p. 55). The reviewer noted that the ILV substituted glass centrifuge tubes and glass pipettes for plastic, but this appeared to be a lab equipment preference instead of a required ILV modification.

Table 2. Initial Validation Method Recoveries for Propargite and TBPC in Soil

Analyte	Fortification Level (mg/kg)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%)	Relative Standard Deviation (%)
Sandy Loam Soil¹						
Quantitation ion ²						
Propargite	0.01 (LOQ)	5	79.1-102	92.9	9.90	10.7
	0.10	5	92.2-98.9	96.3	2.48	2.57
TBPC	0.01 (LOQ)	5	97.6-119	107	8.07	7.54
	0.10	5	89.1-99.8	94.1	4.27	4.54

Data (uncorrected recovery results, pp. 20-23) were obtained from Tables I-IV, pp. 29-32; Appendix III, pp. 61-64 of MRID 50593501.

- The sandy loam soil (Batch July-01; 77.25% sand, 13.41% silt, and 9.34% clay, pH 6.18 in CaCl₂, 1.15% organic carbon) was obtained from Stolpe, Germany and was characterized by RCC Ltd., Itingen, Switzerland (p. 15, Appendix II, p. 58). USDA soil texture classification was not specified, but particle size distributions corresponded to USDA soil particle size distributions.
- Propargite was identified using three ions; one for quantitation (Q) and two for confirmation (C): *m/z* 350 (Q), *m/z* 173 (C1), and *m/z* 150 (C2); TBPC was identified using three ions; *m/z* 248 (Q), *m/z* 150 (C1), and *m/z* 233 (C2) (pp. 15, 20 of MRID 50593501). The ECM provided recovery values for the quantitation ion but did not provide recovery values for the two confirmation ions.

Table 3. Independent Validation Method Recoveries for Propargite and TBPC in Soil

Analyte	Fortification Level (mg/kg)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%)	Relative Standard Deviation (%)
Loamy Sand Soil¹						
Quantitation ion ²						
Propargite	0.0100 (LOQ)	5	66.9-105	85.1	16.6	19.5
	0.100	5	75.5-103	82.5	11.6	14.0
TBPC	0.01 (LOQ)	5	85.7-95.3	90.1	4.44	4.93
	0.10	5	86.7-91.3	89.2	1.70	1.90

Data (uncorrected recovery results, pp. 15-16) were obtained from p. 17, Tables 3-4, pp. 23-24 of MRID 50393501).

- The loamy sand soil (PD-SOIL-PF-0-6"; 80% sand, 14% silt, and 6% clay, pH 6.2 in 1:1 soil:water ratio, 0.88% organic matter Walkley-Black) was obtained from North Dakota and characterized by Agvise Laboratories, Northwood, North Dakota (USDA soil texture classification; p. 12, Appendix II, p. 48).
- Propargite was identified using the primary ion for quantitation ion of propargite of *m/z* 350, and TBPC was identified using the primary ion for quantitation of TBPC of *m/z* 248 (pp. 15, 20 of MRID 50593501). Quantitation was performed using the primary quantitation ion only. Quantitation was not performed using the response of the two confirmation ions, and as a result, the ILV did not provide recovery values for the two confirmation ions.

III. Method Characteristics

In the ECM, the Limit of Quantification (LOQ) was set at 0.01 mg/kg for propargite and TBPC in soil (p. 26, Appendix IV, p. 70 of MRID 50593501). The LOQ was reported from the ECM in the ILV (p. 13 of MRID 50393501). No calculation was provided for the method LOQ in the ECM or ILV. In the ECM, the Limit of Detection (LOD) for propargite and TBPC was estimated as at least one-half or less of the response of the lowest calibration standard, 0.05 µg/mL, according to:

$$0.05 \mu\text{g (STD)} / 10 \text{ g} = 0.005 \text{ mg/kg}$$

The ECM stated the validity of the LOD must be demonstrated experimentally; the hexane extract of a control sample would be fortified at the level above, and the chromatogram must show that the peak is clearly identifiable (Appendix IV, p. 90 of MRID 50593501). Chromatograms for the lowest calibration standard, 0.05 µg/mL, for propargite and TBPC were provided (Figure 7, p. 40, Figure 10, p. 43 of MRID 50593501), and the ECM reported the LOD as 0.005 mg/kg (p. 26 of MRID 50593501). In the ILV, the LOD for propargite and TBPC were 0.00500 mg/kg and were calculated as the product of the lowest calibration standard (0.0500 mg/L) and the dilution factor of the matrix blank sample (0.100; p. 14 of MRID 50393501).

Table 4. Method Characteristics for Propargite and TBPC in Soil

		Propargite	TBPC
Limit of Quantitation (LOQ)	ECM	0.01 mg/kg	0.01 mg/kg
	ILV		
Limit of Detection (LOD)	ECM	0.005 mg/kg	0.005 mg/kg
	ILV		
Linearity (calibration curve r^2 and concentration range)	ECM ¹	$r^2 = 0.993317966$ (LOQ) $r^2 = 0.995346457$ (10×LOQ)	$r^2 = 0.964808136$ (LOQ) $r^2 = 0.997234486$ (10×LOQ)
	ILV	$r^2 = 0.9960$	$r^2 = 0.9898$
	Concentration range	0.05-0.2 µg/mL	
Repeatable	ECM ^{2,3}	Yes at LOQ and 10×LOQ.	
	ILV ^{4,5}	Yes at LOQ and 10×LOQ.	
Reproducible		Yes at LOQ and 10×LOQ.	
Specific	ECM	Yes, matrix interferences were ≤30% of the LOQ (based on peak area). ⁶	Yes, no peaks were detected in the controls.
	ILV	Yes, no peaks were detected at the analytes' retention times in the controls.	
	ECM/ILV	Some minor baseline interference was observed in the confirmation ion chromatograms. ⁷	

Data were obtained from Appendix III, pp. 61-64 (calibration coefficients); Tables I-IV, pp. 29-32, Appendix III, pp. 61-64 (recovery results); pp. 21, 26, Figures 1-4, pp. 34-37, Figures 7-18, pp. 40-51 (chromatograms) of MRID 50593501; p. 16, Figures 1 and 7, pp. 25, 31 (calibration coefficients); p. 17, Tables 3-4, pp. 23-24 (recovery results); Figures 1 and 7, pp. 25, 31 (calibration curves); Figures 2-6, pp. 26-30, Figures 8-12, pp. 32-36 (chromatograms) of MRID 50393501. All results reported for Q ions unless otherwise noted.

- In the ECM, two coefficients of determination (r^2) values were provided for propargite and TBPC because the LOQ and 10×LOQ were run as separate batches (Appendix III, pp. 61-64 of MRID 50593501). The calibration curve reported for the propargite 10×LOQ set was the second attempt. The r^2 values for propargite and TBPC presented in Figures 5 and 6 of the ECM were not included in this table because these curves demonstrated detector response using the ratio of the responses of the calibration standards and calibration internal standards (pp. 17, 24, Figures 5-6, pp. 38-39 of MRID 50593501).
- In the ECM, the sandy loam soil (Batch July-01; 77.25% sand, 13.41% silt, and 9.34% clay, pH 6.18 in CaCl₂, 1.15% organic carbon) was obtained from Stolpe, Germany and characterized by RCC Ltd., Itingen, Switzerland. (p. 15, Appendix II, pp. 57-58). USDA soil texture classification was not specified, but particle size distributions corresponded to USDA soil particle size distributions.
- In the first set of ECM 10×LOQ samples, two out of five recoveries for propargite were greater than 110%; as a result, the analysis was repeated; the high recoveries were attributed to an error in spiking of the two samples. Data for the second attempt at 10×LOQ was reported (p. 25, Table II, p. 30, Appendix III, p. 62 of MRID 50593501).
- In the ILV, the loamy sand soil (PD-SOIL-PF-0-6"; 80% sand, 14% silt, and 6% clay, pH 6.2 in 1:1 soil:water ratio, 0.88% organic matter Walkley-Black) was obtained from North Dakota and characterized by Agvise Laboratories, Northwood, North Dakota (USDA soil texture classification; p. 12, Appendix II, p. 48 55 of MRID 50393501).
- The number of trials in the ILV was not specified, but the reviewer assumed that the method was validated in the first trial based on communications between the ILV and the Study Sponsor (pp. 10, 14-15; Appendix I, p. 41; Appendix IV, p. 56 55 of MRID 50393501). The ILV validated the ECM with only insignificant modifications to the analytical equipment and the identification of two critical steps (pp. 14-15; Tables 1-2, pp. 20-22, Appendix IV, p. 55). The reviewer noted that the ILV substituted glass centrifuge tubes and glass pipettes for plastic, but this appeared to be a lab equipment preference instead of a required ILV modification.
- In the ECM, three control samples for propargite at the LOQ were analyzed. There was no response in two of the control samples; one control showed a response of *ca.* 30% of the LOQ based on peak area and was footnoted as an "artifact" (Appendix III, p. 61 of MRID 50593501). The chromatogram of this control was not provided for review.
- A confirmatory method is not typically required where GC/MS methods are used as the primary method(s) to generate study data. Minor baseline interference was observed in the ECM and ILV confirmation ion chromatograms for the controls for propargite and TBPC at the LOQ (Figure 13, p. 46 and, Figure 16, p. 49 of MRID 50593501; Figure 4, p. 28, and Figure 10, p. 34 of MRID 50393501).

IV. Method Deficiencies and Reviewer's Comments

1. For quantitation analysis, ECM linearity was not satisfactory for propargite analysis in sandy loam soil, $r^2 = 0.993317966$ (LOQ) (Appendix III, p. 61 of MRID 50593501), and TBPC in sandy loam soil, $r^2 = 0.964808136$ (LOQ) (Appendix III, p. 63 of MRID 50593501).

For quantitation analysis, ILV linearity was not satisfactory for TBPC analysis in loamy sand soil, $r^2 = 0.9898$ (p. 41, Figure 7, p. 31 of MRID 50393501).

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

2. The OCSPP 850.6100 guidance suggests for a given sample matrix, the registrant should select the most difficult analytical sample condition from the study (*e.g.*, high organic content versus low organic content in a soil matrix) to analyze from the study to demonstrate how well the method performs. It could not be determined that the ILV were provided with the most difficult matrix with which to validate the method since only one soil matrix was tested. The ECM tested one sandy loam soil matrix having 1.15% organic carbon, and the ILV tested one loamy sand soil matrix having 0.88% organic matter (p. 15, Appendix II, p. 58 of MRID 50593501; p. 12, Appendix II, p. 48 of MRID 50393501). Additionally, since no terrestrial field dissipation studies were submitted, it not be determined if the ILV soil matrix covered the range of soils used in the terrestrial field dissipation studies. Even though a certain number of soil matrices is not specified in the OCSPP guidelines, more than one soil matrix would need to be included in an ILV in order to cover the range of soils used in the terrestrial field dissipation studies.

Additionally, the ECM soil matrix characterization was not specified as USDA soil texture classification, but particle size distributions corresponded to USDA soil particle size distributions (p. 15, Appendix II, p. 58 of MRID 50593501).

3. The number of trials required by the ILV to validate the ECM was not reported in the ILV. The reviewer assumed that the method was validated in the first trial based on communications between the ILV and the Study Sponsor (pp. 10, 14-15; Appendix IV, p. 56 of MRID 50393501). The reviewer also noted that the ILV protocol stated that the Sponsor was to be informed if any of the trials was unsuccessful before additional attempts are made (Appendix I, p. 41). No communication of failed trials occurred between the ILV and the Study Sponsor (Appendix IV, p. 56).
4. In the ECM, three control samples for propargite at the LOQ were analyzed (Appendix III, p. 61 of MRID 50593501). There was no response in two of the control samples; however, one control showed a response of *ca.* 30% of the LOQ (based on peak area) and was footnoted as an "artifact". The "artifact" was quantified as <LOD; the chromatogram of this control was not provided for review.
5. The ILV reported the following critical steps: 1) segregating matrix blank samples from matrix fortification samples on the N-EVAP to minimize the potential for cross contamination on the N-EVAP evaporator; and 2) for the step in which hexane extracts are to be transferred to clean glass tubes after extraction, the ILV indicated that the volume transferred for each sample must

- be the same as specified in the ECM method (p. 14; Table 1, p. 20, Appendix IV, p. 55 of MRID 50393501). The reviewer noted that the ILV substituted glass centrifuge tubes and glass pipettes for plastic, but this appeared to be a lab equipment preference instead of a required ILV modification.
6. For the ECM method, acetonitrile was specified for rinsing the 50 mL centrifuge tubes after evaporation on the N-EVAP on p. 19 of MRID 50593501; however, the procedures in Appendix IV, p. 85 of MRID 50593501 specifies hexane for the rinse. The ILV used acetonitrile (Table 1, p. 20 of MRID 50393501).
 7. In the ECM, propargite and TBPC were quantified using the peak areas ratio of the m/z 350 ion in the sample or fortified control to that of internal standard, m/z 350_{Spl} / 173_{ISTD} (Ratio_{Spl}; pp. 20-22 of MRID 50593501). The amount (μg) of analyte was determined by using Ratio_{Spl} in the linear regression equation. The concentration was determined using the sample weight. In the ILV, propargite and TBPC were quantified using the response of the primary quantitation ion only (m/z 350 for propargite and m/z 248 for TBPC; pp. 15-16 of MRID 50393501). The concentration was determined using the linear regression equation.
 8. The ECM did not provide the recovery values for the confirmation ions for propargite or TBPC, and the ILV did not report the response or recovery values for the confirmation ions for propargite or TBPC. In the case of the confirmation analyses, the reviewer did not consider this guideline deviation to be significant since a confirmatory method is not typically required where GC/MS methods are used as the primary method(s) to generate study data
 9. Communications were documented on an Arysta LifeScience ILV Assessment Form (Appendix IV, p. 56 of MRID 50393501). All communications were between ILV EAG Laboratories and the sponsor Arysta LifeScience and involved completion and approval of independent validation.
 10. In the ECM, the Limit of Quantification (LOQ) was set at 0.01 mg/kg for propargite and TBPC in soil. The LOQ was reported from the ECM in the ILV. No calculation was provided for the method LOQ in the ECM or ILV. In the ECM, the Limit of Detection (LOD) for propargite and TBPC was estimated as at least one-half or less of the response of the lowest calibration standard, 0.05 $\mu\text{g/mL}$, according to: $0.05 \mu\text{g (STD)} / 10 \text{ g} = 0.005 \text{ mg/kg}$. In the ILV, the LOD for propargite and TBPC was 0.00500 mg/kg and were calculated as the product of the lowest calibration standard (0.0500 mg/L) and the dilution factor of the matrix blank sample (0.100). The reported limit of quantitation (LOQ) was set as the lowest level of method validation (LLMV). Further work could have been done to explore the actual LOQ. This means that concentrations can be reliably quantified at the LOQ (i.e., LLMV), but whether lower concentrations may also be reliably quantified is uncertain.
 11. In the ECM, the time required to complete the preparation of one set of samples for GC-MSD was reported as one working day (8 hours), followed by *ca.* 11 hours for GC/MSD analysis (unattended), and then *ca.* 4 hours of data processing for one chemist totalling 12 person-hours (p. 27 of MRID 50593501). In the ILV, one analyst-day (*ca.* 8 person-hours) was required to prepare stocks and solution, an additional *ca.* 10 person-hours were required to process and extract each set of samples, GC/MS analysis time was *ca.* 20 instrument-hours, and data processing time of one MS transition for quantitation and confirmation analyses (*ca.* 2 person-

hours), totaling 4 days (*ca.* 20 person-hours and *ca.* 20 instrument-hours; Appendix IV, pp. 55-56 of MRID 50393501).

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.
- U.S. Environmental Protection Agency. 2014 Propargite: Problem Formulation for Environmental Fate, Ecological Risk, Endangered Species, and Drinking Water Exposure Assessments in Support of Registration Review. Office of Pesticide Programs, Environmental Fate and Effects Division. DP 416479.
- 40 CFR Part 136. Appendix B. Definition and Procedure for the Determination of the Method Detection Limit-Revision 1.11, pp. 317-319.

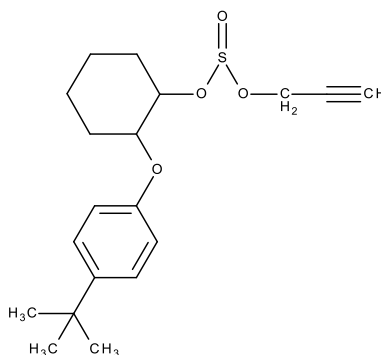
Attachment 1: Chemical Names and Structures**Propargite**

IUPAC Name: (1RS,2RS;1RS,2SR)-2-(4-tert-butylphenoxy)cyclohexyl prop-2-ynyl sulfite

CAS Name: 2-[4-(1,1-dimethylethyl)phenoxy]cyclohexyl 2-propyn-1-yl sulfite

CAS Number: 2312-35-8

SMILES String: CC(C)(C)c2ccc(OC1CCCCC1OS(=O)OCC#C)cc2

**TBPC**

IUPAC Name: 2-(4-(Tert-butyl)phenoxy)cyclohexan-1-ol

CAS Name: Not reported

CAS Number: 1942-71-8

SMILES String: OC1CCCCC1OC2=CC=C(C(C)(C)C)C=C2

