UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS
ENVIRONMENTAL CHEMISTRY LABORATORY
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November 6, 2008

MEMORANDUM

SUBJECT: Thiencarbazone-methyl - ECM0233W1-W6 DP # 340003

FROM: Joseph Ferrario, Branch Chief
BEAD/Environmental Chemistry Laboratory

TO: Margaret Ervin ECM Gatekeeper
EISB 7507P

The EFED/Environmental Fate and Effects Division requested an Environmental Chemistry Method Review of a method for the determination of Thiencarbazone-methyl and its metabolites in water using the method submitted by Bayer CropScience in accordance with the registration of the above mentioned analyte, MRID No. 470701-14. The method and independent laboratory validation data were reviewed and the conclusions included in the Environmental Chemistry Method Review Report which was sent to EFED on 7/27/2007. In response to a request from EFED on 10/31/08, ECB has addressed comments made on the method and ILV by the U.K. during a global review. ECB's response is contained in a Revision of the original ECM Final Report from 7/27/2008.

The revised report dated 11/05/08 is being sent as an attachment.

The following report includes an overview of the method and the method completeness, statements of adherence to EPA regulations, a presentation of results and a discussion of problems found in the registrant method and those discovered by the independent laboratory. A statement of method acceptability is also included.

If you have any questions concerning this report, please contact Elizabeth Flynt at (228) 688-2410 or me at (228) 688-3212.

Attachments
cc: Dr. Christian Byrne, QA Officer
BEAD/Environmental Chemistry Laboratory

Elizabeth C. Flynt
BEAD/ECL

Thiencarbazone-methyl/015804/Bayer CropScience/264

ENVIRONMENTAL CHEMISTRY METHOD REVIEW REPORT (REVISION 1)

Data Requirement: PMRA Data Code: NA
EPA DP Barcode: 340003
OECD Data Point: NA
EPA Guideline: ECM Method Review

Test material:
Common name: Thiencarbazone-methyl
Chemical name: methyl 4-[[[(4,5-dihydro-3-methoxy-4-methyl-5-oxo-1*H*-1,2,4-triazol-1-yl) carbonyl]amino]sulfonyl]-5-methyl-3-thiophenecarboxylate
IUPAC name: methyl 4-[(4,5-dihydro-3-methoxy-4-methyl-5-oxo-1*H*-1,2,4-triazol-1-yl) carbonylsulfamoyl]-5-methylthiophene-3-carboxylate

Primary Evaluator: Shanda Bennett **Date:** 11/05/2008
Shanda Bennett, Chemist, EPA/OPP/BEAD/ECB

Peer Reviewer: Elizabeth Flynt **Date:** 11/05/2008
Elizabeth Flynt, Chemist, EPA/OPP/BEAD/ECB

QA Officer: Christian Byrne **Date:** 11/05/2008
Dr. Christian Byrne, QA Officer, EPA/OPP/BEAD/ECB

ANALYTICAL METHOD: 470701-14, Netzband, D. J., Wade, J., March 22, 2007. *"An Analytical Method For The Determination Of BYH 18636 And Its Metabolites BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide In Water Using LC/MS/MS"*. The unpublished study was developed by Bayer CropScience, 17745 South Metcalf, Stilwell, Kansas 66085. The study was sponsored by Bayer CropScience, 2 T. W. Alexander Drive, Research Triangle Park, North Carolina 27709. Pages 1-53. The study number is GS-004-W06-02.

EXECUTIVE SUMMARY

The method is applicable for the quantitative determination of residues of Thiencarbazone-methyl and its metabolites, BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide in water.

The method was created and validated by Bayer CropScience in Stilwell, Kansas in accordance with EPA's Good Laboratory Practice Standards, Title 40 Code of Federal Regulations Part 160. An independent laboratory validation was submitted with this method. It was entitled, *"Independent Laboratory Validation of Method GS-004-W06-01 For The Determination Of BYH 18636 And Its Metabolites BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide In Water Using LC/MS/MS"*. The ILV was performed by Bayer CropScience AG in Germany. ECL concludes that this method is

acceptable as submitted with the condition that the registrant provide documentation that the registrant validation data was collected using formic acid in the mobile phase as stated in the registrant revised method. A full discussion of this issue follows in the Method Acceptability/Deficiencies/Clarifications Section below.

Method Summary: Thiencarbazone-methyl and its metabolites were determined from chlorinated, ground, and surface waters by transferring approximately 90 mL of water sample into a 125 mL glass jar. If the sample contains free chlorine, then a sufficient amount of sodium thiosulfate was added to dechlorinate. The water sample was fortified with a specified fortification standard solution, spiked with an internal standard solution, acidified with formic acid, and diluted with acetonitrile to a final sample volume of 100 mL. The water sample was then capped and shaken. The sample was finally filtered and a portion of the sample was transferred into a LC vial for LC/MS/MS analysis.

METHOD ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS

Based on the parameters set in the *Ecological Effects Test Guidelines, OPPTS 850.7100, Data Reporting for Environmental Chemistry Methods;* "Public Draft." (U.S. Environmental Protection Agency. Office of Prevention, Pesticides, and Toxic Substances (7101). U.S. Government Printing Office: Washington, DC, 1996, EPA-712-C-96-348), ECL finds this method acceptable as submitted only under the conditions explained below.

Correspondence included in the independent laboratory validation report (MRID# 47070118) indicates that on February 22, 2007 the independent laboratory contacted the registrant to verify that acetic acid was used in Mobile Phase A for the LC/MS/MS analyses. The use of acetic acid in the mobile phase as instructed in the method resulted in a first validation set which was not successful regarding one analyte. An attempt by the independent laboratory to analyze the set substituting formic acid for acetic acid was successful for all analytes.

The registrant confirmed that acetic acid was used and agreed to the substitution of acetic acid by formic acid. ECB considers the substitution of acetic acid with formic acid to constitute a significant change to the method.

After careful review of the registrant method, ECB found that the registrant replaced the initial method instruction to use acetic acid in the mobile phase with formic acid in its revised version (March 22, 2007). The revision to a registrant method based on modification/enhancement made during an independent laboratory validation is acceptable, if the registrant uses the changed method to collect new validation data. It is unclear whether or not this was done by the registrant.

The registrant's method does not state that new data was collected using the modified method, nor were dates provided which would enable ECB to make that determination. Therefore, as a condition of acceptability of the validation of the registrant method, ECB recommends that confirmatory documentation be provided by the registrant that the validation data accompanying the registrant method was collected using the revised mobile phase containing formic acid as indicated in the revised method.

COMPLIANCE

Signed and dated statements that this method was conducted in accordance with the requirements for Good Laboratory Practice Standards, 40 CFR 160 were present in the method. Also, a statement of non-confidentiality on the basis of the method falling within the scope of FIFRA Section 10 (d)(1)(A)(B), or (C) was signed and dated along with information on the Quality Assurance inspection dates and signatures.

A. BACKGROUND INFORMATION

Thiencarbazone-methyl is a triazolinone herbicide that is used for the treatment of broad-leaf weeds.

TABLE A.1. Test Compound Nomenclature

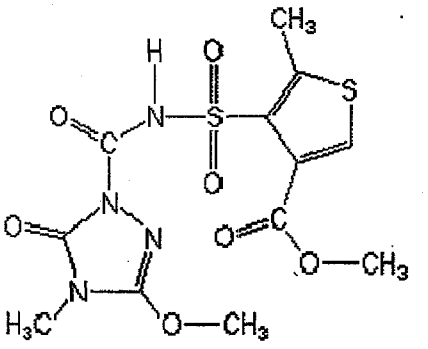
Compound	Chemical Structure
	
Common name	Thiencarbazone-methyl
Company experimental name	NA
IUPAC name	methyl 4-[(4,5-dihydro-3-methoxy-4-methyl-5-oxo-1*H*-1,2,4-triazol-1-yl)carbonylsulfamoyl]-5-methylthiophene-3-carboxylate
CAS Name	methyl 4-[[[(4,5-dihydro-3-methoxy-4-methyl-5-oxo-1*H*-1,2,4-triazol-1-yl)carbonyl]amino]sulfonyl]-5-methyl-3-thiophenecarboxylate
CAS #	317815-83-1

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound	
Parameter	Value
Melting point/range	NA
pH	NA
Density	NA
Water solubility	NA
Solvent solubility (mg/ml at 20 °C)	NA
Vapor pressure at 25°C	NA
Dissociation constant (pK_a)	NA
Octanol/water partition coefficient	NA
UV/visible absorption spectrum	NA

MATERIALS AND METHODS

B.1. Principle of Method

Thiencarbazone-methyl and its metabolites were determined from chlorinated, ground and surface water by transferring approximately 90 mL of the water sample into a 125 mL glass jar. If the water sample contains free chlorine, a sufficient amount of sodium thiosulfate was added to dechlorinate. The water sample was fortified with a specified fortification standard solution, spiked with an internal standard solution, acidified with formic acid, and diluted with acetonitrile to a final sample volume of 100 mL. The water sample was then capped and shaken. The sample was finally filtered and a portion of the sample transferred into a LC vial for LC/MS/MS analysis.

TABLE B.1.1.	**Summary Parameters for the Analytical Method Used for the Quantitation of Chemical Residues in Matrices Studied**
Method ID	ECM0233W1-W6
Analyte(s)	Thiencarbazone-methyl, BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide
Extraction solvent/technique	Thiencarbazone-methyl and its metabolites were determined from chlorinated, ground and surface water by transferring approximately 90 mL of the water sample into a 125 mL glass jar. If the water sample contains free chlorine, a sufficient amount of sodium thiosulfate was added to dechlorinate. The water sample was fortified with a specified fortification standard solution, spiked with an internal standard solution, acidified with formic

TABLE B.1.1.	**Summary Parameters for the Analytical Method Used for the Quantitation of Chemical Residues in Matrices Studied**
	acid, and diluted with acetonitrile to a final sample volume of 100 mL. The water sample was then capped and shaken. The sample was finally filtered and a portion of the sample transferred into a LC vial for LC/MS/MS analysis.
Cleanup strategies	N/A
Instrument/Detector	Perkins Elmer Sciex API 4000 LC/MS/MS System equipped with a Turbo Ion Spray Source/Tandem Mass Spectrometry (MS/MS)

C. RESULTS AND DISCUSSION

C.1. Recovery Results Summary

TABLE C.1.1. Recovery Results from Method Validation of Soil (THIENCARBAZONE-METHYL AND ITS METABOLITES)

Matrix	Spiking Level (ppb)	Individual % Recoveries	Avg Recovery % ± Std Dev (RSD)
BYH 18636	0.5	100, 104, 103, 101, 99, 102, 104, 103, 105	102 ± 2.0 (2.0)
	5.0	101, 101, 104, 99, 103, 102, 102, 101, 101	102 ± 1.4 (1.4)
BYH 18636-carboxylic acid	0.5	101, 106, 99, 109, 108, 107, 106, 99, 98	104 ± 4.4 (4.2)
	5.0	112, 111, 113, 109, 109, 111, 112, 113, 111	111 ± 1.5 (1.4)
BYH 18636-sulfonamide carboxylic acid	0.5	98, 98, 93, 102, 98, 96, 91, 96, 94	96 ± 3.3 (3.4)
	5.0	107, 104, 105, 105, 103, 106, 107, 107, 105	105 ± 1.4 (1.3)
BYH 18636-dicarboxy sulfonamide	0.5	72, 79, 88, 74, 89, 90, 86, 79, 85	82 ± 6.7 (8.2)
	5.0	109, 105, 108, 109, 110, 108, 82, 80, 81	99 ± 13.7 (13.8)
BYH 18636-MMT	0.5	97, 96, 96, 101, 104, 104, 102, 102, 101	100 ± 3.2 (3.2)
	5.0	99, 98, 98, 102, 104, 100, 103, 101, 105	101 ± 2.6 (2.6)
BYH 18636-sulfonamide	0.5	82, 83, 70, 94, 86, 78, 77, 93, 84	83 ± 7.6 (9.2)
	5.0	93, 88, 95, 107, 89, 106,	99 ± 8.1 (8.2)

		105, 109, 100	

C.1.2. Method Characteristics

TABLE C.1.2. Method Characteristics	
Analyte	Thiencarbazone-methyl
Limit of Quantitation (LOQ)	0.5 ng/mL (ppb)
Limit of Detection (LOD)	0.167 ng/mL
Accuracy/Precision at LOQ (% Recovery/RSD)	BYH 18636: 102/2.0 BYH 18636-carboxylic acid: 104/4.2 BYH 18636-sulfonamide: 83/9.2 BYH 18636-sulfonamide carboxylic acid: 96/3.4 BYH 18636-dicarboxy sulfonamide: 82/8.2 BYH 18636 –MMT: 100/3.2
Reliability of the Method/ [ILV]	An independent laboratory method validation [ILV], (MRID No. 470701-14), was conducted to verify the reliability of method for the determination of Thiencarbazone-methyl, BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide in water. The values obtained indicated that the registrant method is acceptable according to *OPPTS 850.7100 Guidelines.*
Linearity	Detector response was linear within the range of 0 – 10.0 ppb for all analytes (r^2 = 0.9990-0.9999).
Specificity	The analytical method employs a highly specific and selective detector; therefore, a confirmatory method is not necessary.

C.2. Independent Laboratory Validation (ILV)

The ILV was conducted in accordance with the *OPPTS 850.7100 Guidelines.*

TABLE C.2.1. Recovery Results Obtained by an Independent Laboratory Validation of the Method for the Determination of Thiencarbazone-methyl and Its Metabolites BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide in water.

Compound	Spiking Level (ng/mL)	Average Recoveries Obtained (%)	Relative Standard Deviation
BYH 18636	0.5 5.0	99 100	1.9 2.1
BYH 18636-carboxylic acid	0.5 5.0	107 108	10.5 7.5
BYH 18636-sulfonamide	0.5 5.0	102 98	7.4 7.1
BYH 18636-sulfonamide carboxylic acid	0.5 5.0	102 105	3.7 5.6
BYH 18636-MMT	0.5 5.0	99 99	2.7 2.7

BYH 18636-dicarboxy sulfonamide	0.5 5.0	102 96	5.7 2.1

D. CONCLUSION

From a further review of the method, Netzband, D. J., Wade, J., March 22, 2007. "*An Analytical Method For The Determination Of BYH 18636 And Its Metabolites BYH 18636-carboxylic acid, BYH 18636-sulfonamide, BYH 18636-sulfonamide carboxylic acid, BYH 18636-MMT, and BYH 18636-dicarboxy sulfonamide In Water Using LC/MS/MS*", ECL concludes that this method is acceptable as submitted on the condition that the registrant provide confirmatory documentation that the registrant's validation data was collected using formic acid in the mobile phase as stated in the registrant revised method.