UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS
ENVIRONMENTAL CHEMISTRY LABORATORY
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September 26, 2008

MEMORANDUM

EPA DP Barcode: 343477

SUBJECT: Etofenprox in Water Method Review Report No. ECM0238W1-W3

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

To: Margaret A Ervin, ECM Gate Keeper
OPP/Environmental Fate and Effects Division
EIS Branch (7507C)

The Environmental Fate and Effects Division (EFED) requested a review of the method (MRID No. 467797-16) for the detection of Etofenprox in water. The method entitled, "Analytical Method Validation for the Determination of Etofenprox, α-CO, and 4'-OH in Soil, Water, and Sediment" was submitted by Mitsui Chemicals, Inc in accordance with the registration of Etofenprox. The method validation data was reviewed and the conclusions included in the attached Environmental Chemistry Method Review Report.

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. A statement of method acceptability is also included.

If you have questions concerning this report, please contact Shanda L Bennett at (228) 688-3251 or me at (228) 688-3212.

Attachments
cc: Dr. Christian Byrne, QA Officer
BEAD/ECL

Shanda L Bennett, Chemist
BEAD/ECL

Etofenprox/128965/Mitsui Chemicals, Inc/33657

ENVIRONMENTAL CHEMISTRY METHOD REVIEW REPORT

Data Requirement: PMRA Data Code: NA
EPA DP Barcode: 343477
OECD Data Point: NA
EPA Guideline: ECM 0238W1-W3

Test material:
Common name: Etofenprox
Chemical name: 1-[[2-(4-ethoxyphenyl)-2-methylpropoxy]methyl]-3-phenoxybenzene
IUPAC: 2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether

Primary Evaluator: Shanda Bennett **Date:** 09/25/08
Shanda Bennett, Chemist, EPA/OPP/BEAD/ECB

Peer Reviewer: Elizabeth Flynt **Date:** 09/25/08
Elizabeth Flynt, Chemist, EPA/OPP/BEAD/ECB

QA Officer: Christian Byrne **Date:** 09/25/08
Dr. Christian Byrne, QA Officer, EPA/OPP/BEAD/ECB

ANALYTICAL METHOD: MRID Number: 467797-16, MacGregor, J. A., Nixon, W. B., November 11, 2005. *"Analytical Method Validation for the Determination of Etofenprox, α-CO, and 4'-OH in Soil, Water, and Sediment"*. The unpublished study was performed by Wildlife International, Ltd, 8598 Commerce Drive, Easton, MD 21601. The study was sponsored by Mitsui Chemicals, Inc., Agrochemicals Division, 1-5-2, Higashi-Shimbashi, Minato-ku, Tokyo 105-7117 / Japan. Pages 1-70.

EXECUTIVE SUMMARY

The method is applicable for the quantitative determination of Etofenprox in soil, water, and sediment utilizing high performance liquid chromatography with mass spectrometry/mass spectrometry.

The method was submitted to EPA by Mitsui Chemicals, Inc to support the registration of the insecticide – Etofenprox. The method was performed by Wildlife International Ltd of Easton, Maryland and sponsored by Mitsui Chemicals, Inc of Minato-ku, Tokyo 105-7117 Japan. This method was conducted in the spirit of 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 the Analytical Method for the Determination of Etofenprox, α-CO, and 4'-OH in Water and Soil". The independent laboratory validation method was performed by PTRL West, Inc. in Hercules, California. ECB finds this method unacceptable.

Method Summary: Water samples: A known amount of water was added into a separatory funnel and fortified with the standard solution. Dichloromethane (DCM) was

added to the separatory funnel, vented and shaken. The process was repeated and the extracts combined. The DCM extract was evaporated to dryness under nitrogen and reconstituted with an acetonitrile/formic acid solution. The final samples extracts were transferred into a GC 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) ECB finds this method unacceptable as submitted.

ECB was unable to fully review and evaluate the calculations and results of the method due to the lack of associated method data required in the guidelines.

There were no chromatograms or response values (i.e., peak areas) for the calibration standards used in the calculations of the regression curves of Etofenprox, α-CO, or 4'-OH for the analyses of water. There are no regression results for Etofenprox or α-CO.

There were no chromatograms or response values for the representative reagent blanks for the analyses of water. There are no chromatograms or response values for the representative matrix blanks for Etofenprox and α-CO.

Lastly, there are no chromatograms or response values for the representative spiked matrices at the LOQ or 10 x LOQ for Etofenporx and α-CO for the analyses of water. There are no response values for the representative spiked matrices at the LOQ or 10 x LOQ for 4'-OH.

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

Etofenprox, 2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether, is an insecticide that is used in cereals, rice, orchards, vegetables, and tea.

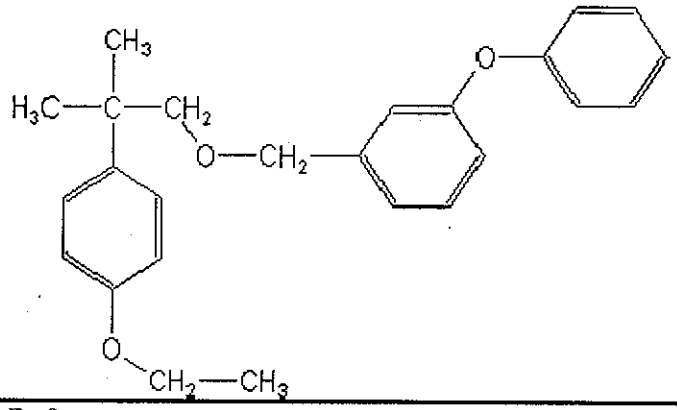
TABLE A.1. Test Compound Nomenclature	
Compound	Chemical Structure 
Common name	Etofenprox
Company experimental name	MTI-500
IUPAC name	2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether
CAS Name	1-[[2-(4-ethoxyphenyl)-2-methylpropoxy]methyl]-3-phenoxybenzene
CAS #	80844-07-1

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound	
Parameter	Value
Melting point/range	36°C
pH	NA
Density	NA
Water solubility (20 °C)	NA
Solvent solubility (mg/ml at 20 °C)	NA
Vapor pressure at ___°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

Water samples: A known amount of water was added into a separatory funnel and fortified with the standard solution. Dichloromethane (DCM) was added to the separatory funnel, vented and shaken. The process was repeated and the extracts combined. The DCM extract was evaporated to dryness under nitrogen and reconstituted with an acetonitrile/formic acid solution. The final samples extracts were transferred into a GC 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	ECM0238W1-W3
Analyte(s)	Etofenprox
Extraction solvent/technique	**Water:** A known amount of the water sample was added into a separatory funnel and fortified with its proper standard solution. DCM was added to each separatory funnel, shaken, vented and the phases were allowed to separate. The lower DCM phase was drained into a round bottom flask. The extraction procedure was repeated with an additional amount of DCM and collected with the first phase into the round bottom flask. A known amount of acetone was added to the flask to remove any excess water.
Cleanup strategies	N/A
Instrument/Detector	Hewlett-Packard Series 1100 HPLC coupled with Perkin-Elmer SCIEX API 3000 Mass Spectrometer operated in the multiple reaction monitoring (MRM) mode

C. RESULTS AND DISCUSSION

C.1. Recovery Results Summary

TABLE C.1.1. Recovery Results from Method Validation

Matrix	Spiking Level (conc. units)	% Recoveries	Standard Deviation
Water			
Etofenprox	0.0500 µg/L	98.0	± 6.07
	0.500µg/L	94.2	± 4.41
α-CO	0.0500 µg/L	98.6	± 7.68
	0.500µg/L	98.1	± 6.82
4'-OH	0.0500 µg/L	94.1	± 10.4
	0.500µg/L	87.5	± 12.2

C.1.2. Method Characteristics

TABLE C.1.2. Method Characteristics	
Analyte	Etofenprox
Limit of Quantitation	Water = 0.0500 µg/L
Limit of Detection (LOD)	Analyte — Water (µg/L) Etofenprox — 0.0095 α-CO — 0.012 4'-OH — 0.016
Accuracy/Precision at LOQ	Mean recovery/RSD values are as follows: **Water:** Etofenprox = 98.0/6.20% α-CO = 98.6/7.80% 4'-OH = 94.1/11.1%
Reliability of the Method/ [ILV]	An independent laboratory method validation [ILV] was submitted with this method.
Linearity	Etofenprox: N/A α-CO: N/A 4'-OH: r=0.9989370
Specificity	The analytical method employs a highly specific and selective detector; therefore, a confirmatory method is not necessary.

C.2. Independent Laboratory Validation (ILV)

TABLE C.2.1. Recovery Results Obtained by an Independent Laboratory Validation of the Method for the Determination of Etofenprox , α-CO, and 4'-OH in water.

Compound	Spiking Level (conc. units)	Average Recoveries Obtained (%)	Relative Standard Deviation (%)
Water			
Etofenprox	0.05 µg/L	95	12.8
	0.50 µg/L	92	5.2
α-CO	0.05 µg/L	107	20.0
	0.50 µg/L	90	6.4
4'-OH	0.05 µg/L	106	1.9
	0.50 µg/L	85	11.4

D. CONCLUSION

From a review of the method, MacGregor, J. A., Nixon, W. B., November 11, 2005, *"Analytical Method Validation for the Determination of Etofenprox, α-CO, and 4'-OH in Soil, Water, and Sediment"*, ECL concludes that this method is unacceptable.