



Teresa Marks
Acting Director

MEMORANDUM

Jared Blumenfeld
Secretary for
Environmental Protection

TO: Joy Dias
Environmental Program Manager I
Environmental Monitoring Branch

FROM: Vaneet Aggarwal, Ph.D. *Original Signed by J. Dias for V. Aggarwal*
Sr. Environmental Scientist (Specialist)
916-324-4244

DATE: May 21, 2019

SUBJECT: THE QUALIFICATION OF METHOD EMON-SM-05-037 AS UNEQUIVOCAL
ACCORDING TO CRITERIA IN THE PESTICIDE CONTAMINATION
PREVENTION ACT

BACKGROUND

The Pesticide Contamination Prevention Act (Food and Agricultural Code [FAC] sections 13141 et seq.) was passed in 1985 to prevent further pesticide pollution of groundwater which may be used for drinking water supplies. FAC section 13149 specifies the conditions under which a pesticide is considered “found” in groundwater or soil, and thus subject to formal review as specified. FAC subsection 13149(d) allows a finding of a pesticide in groundwater or soil to be based on a single analytical method conducted by a single analytical laboratory, only if the analytical method provides unequivocal identification of a chemical. Criteria to identify methods providing unequivocal identification of a chemical are included in a DPR memo entitled “Evaluating analytical methods for compliance with the Pesticide Contamination Prevention Act Requirements” (Aggarwal, 2012).

PURPOSE

Determine if the analytical method (EMON-SM-05-037) for 47 pesticides in surface water used by the California Department of Food and Agriculture (CDFA) meets the definition of an unequivocal detection method.

DISCUSSION AND RECOMMENDATION

CDFA Center for Analytical Chemistry method (EMON-SM-05-037) uses a liquid chromatography coupled to a linear ion trap quadrupole mass spectrometer (LC/MS/MS) system for the detection of 47 pesticides (Table 1) in surface water. Prior to the injection of a sample into the LC/MS/MS, the pesticides are extracted from the surface water sample with methylene chloride.

Table 1. Pesticides determined by LC/MS/MS in CDFA Method EMON-SM-05-037.

Abamectin	Metribuzin
Atrazine	Norflurazon
Azoxystrobin	Oryzalin
Bensulide	Oxadiazon
Bromacil	Prometon
Carbaryl	Prometryn
Chlorantraniliprole	Propanil
Chlorpyrifos	Propargite
Cyprodinil	Propiconazole
Diazinon	Pyraclostrobin
Diflubenzuron	Pyriproxyfen
Dimethoate	Quinoxyfen
Diuron	Simazine
Ethoprop	S-Metolachlor
Etofenprox	Tebufenozide
Hexazinone	Thiobencarb
Imidacloprid	Trifloxystrobin
Indoxacarb	Fipronil
Isoxaben	Fipronil Amide
Kresoxim-methyl	Fipronil Sulfide
Malathion	Fipronil Sulfone
Methidathion	Desulfinyl Fipronil
Methomyl	Desulfinyl Fipronil Amide
Methoxyfenozone	

In CDFA method EMON-SM-05-037 for the above-mentioned pesticide analysis, the first mass spectrometer is set to reject all species with mass/charge values that do not correspond to the analyte's molecular ion eluting at that analyte's particular retention time. Each molecular ion is then fragmented in the next stage, and the final mass spectrometer quantifies the pesticides based on either one or two characteristic fragments. Three stepwise factors are used to eliminate possible interferences for these 47 pesticides: chromatographic retention times, molecular ion masses, and specific daughter ion masses.

In CDFA method EMON-SM-05-037, the following criteria are used to confirm the presence of 47 pesticides in well water:

1. Each set of samples will have a matrix blank and a spiked matrix sample.
2. The retention time should be within ± 0.1 minute of that of the standards.
3. The recoveries of the matrix spikes shall be within the control limits.

4. The sample shall be diluted if results fall outside of the calibration curve.
5. Each analyte has a precursor/parent ion and corresponding product/daughter ion that needs to be present in order to quantify that analyte.

Analysis of these 47 pesticides by method EMON-SM-05-037 is highly specific and qualifies for unequivocal detection designation. Therefore, analysis by a second laboratory or a second method is not necessary for water samples analyzed for these 47 pesticides by this method.

APPROVED: *Original Approved By J. Dias*
Joy Dias
Environmental Program Manager I

Date: *05/21/19*

APPROVED: *Original Approved By P. Wofford*
Pamela Wofford,
Environmental Program Manager II

Date: *05/21/19*

REFERENCES

Aggarwal, V. 2012. Evaluating analytical methods for compliance with the Pesticide Contamination Prevention Act requirements. Memorandum to L. Ross, Ph.D., Environmental Monitoring Branch, Department of Pesticide Regulation, Sacramento, California.