



# Department of Pesticide Regulation



Brian Leahy  
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## MEMORANDUM

Edmund G. Brown Jr.  
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TO: Joy Dias  
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FROM: Vaneet Aggarwal, Ph.D.  
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*Original Signed by*

DATE: March 22, 2016

SUBJECT: THE QUALIFICATION OF METHOD EM-38.0-MODIFIED AS  
UNEQUIVOCAL ACCORDING TO CRITERIA IN THE PESTICIDE  
CONTAMINATION PREVENTION ACT

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### 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 ground water which may be used for drinking water supplies. FAC section 13149 specifies the conditions under which a pesticide is considered “found” in ground water or soil, and thus subject to formal review as specified. FAC subsection 13149(d) allows a finding of a pesticide in ground water 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 (EM-38.0-MODIFIED) for metolachlor, metolachlor ethanesulfonic acid (ESA), and metolachlor oxanilic acid (OXA) in well 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 (EM-38.0-MODIFIED) uses liquid chromatography coupled to a mass spectrometer (LC/MS/MS) system for the detection of metolachlor, metolachlor ESA, and metolachlor OXA in well water. Prior to injection of the sample into the LC/MS/MS, the pesticides are extracted from the well water by passing the sample through a C18 solid phase extraction cartridge.



In CDFA method EM-38.0-MODIFIED 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 pesticides: chromatographic retention times, molecular ion masses, and specific daughter ion masses.

In CDFA method EM-38.0-MODIFIED, the following criteria are used to confirm the presence of metolachlor, metolachlor ESA, and metolachlor OXA 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  $\pm 2$  percent 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 exceed the calibration curve.
5. The standard curves at the beginning and end of each sample set should not have a percent change greater than 20%.
6. The  $R^2$  of each calibration curve shall be larger than 0.990.
7. When the above criteria are met, the chemist may report the average of the two injections.

Analysis of metolachlor, metolachlor ESA, and metolachlor OXA by method EM-38.0-MODIFIED is highly specific and qualifies for unequivocal detection designation. Therefore, analysis by a second laboratory or a second method is not necessary for well water samples analyzed for metolachlor, metolachlor ESA, and metolachlor OXA by this method.

APPROVED: *Original Signed by*  
Joy Dias,  
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## **REFERENCES**

Aggarwal, V. 2012. Memorandum to Lisa Ross, Ph.D. Evaluating analytical methods for compliance with the Pesticide Contamination Prevention Act requirements.  
[http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/analysis\\_memos/2391\\_ross.pdf](http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/analysis_memos/2391_ross.pdf)  
(accessed 20 March 2016).