



Department of Pesticide Regulation



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MEMORANDUM

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SUBJECT: DETERMINATION IF CALIFORNIA DEPARTMENT OF FOOD
AND AGRICULTURE'S NAPROPAMIDE AND ORYZALIN METHOD
(EMON-SM-05-004) MEETS THE "UNEQUIVOCAL DETECTION"
CRITERIA

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. As originally adopted, FAC subsection 13149(d) specified that a finding of a pesticide shall be verified by a second analytical method or a second analytical laboratory approved by the Department of Pesticide Regulation (DPR). However, the law was amended by Senate Bill 810 in 1995 to allow a finding of a pesticide in ground water or soil to be based on a single analytical method conducted by a single analytical laboratory, if the analytical method provides unequivocal identification of a chemical. Following this change, criteria were established to identify methods providing unequivocal identification of a chemical in a February 13, 1996, DPR memorandum entitled "Definition of unequivocal detection method for the purposes of Senate Bill 810 (Biermann, 1996)."

ISSUE

Does the analytical method for Napropamide and Oryzalin used by the California Department of Food and Agriculture (CDFA) meet the definition of an unequivocal detection method?



DISCUSSION AND RECOMMENDATION

CDFA Center for Analytical Chemistry, Environmental Monitoring Section (method EMON-SM-05-004) uses a high performance liquid chromatography-tandem mass spectrometry (HPLC-MS) system for the detection of Napropamide and Oryzalin. Prior to injection of sample into the HPLC-MS apparatus, the well water samples are cleaned and extracted using solid phase extraction. Consequently the well water samples generally contain a minimal amount of background/matrix interference, facilitating the goal of unequivocal detection. In CDFA method EMON-SM-05-004 for Napropamide and Oryzalin analysis, the following criteria are used to confirm the presence of Napropamide and Oryzalin:

1. The high performance liquid chromatograph separates each compound according to its characteristic retention time, where the retention time is required to be within twenty seconds of that observed with authentic standard.
2. The mass spectrometer is set to scan for
 - (a) species with mass/charge values equivalent to the analyte's precursor/parent ion.
 - (b) species with mass/charge values equivalent to an analyte's characteristic confirmation product/daughter ion
 - (c) scans for (a) and (b) occur at the elution time of each particular analyte.
 - (d) both precursor/parent ion and corresponding product/daughter ion needs to be present in order to quantify the analyte.
3. The analyte's ratio of product ion to precursor ion shall be within ± 20 percent of the ratio observed with authentic standard.
4. The peak response of each of the unknown analytes is required to be within the linear range of the initial calibration curve.

Two stepwise factors are therefore used to eliminate possible interferences for each analyte: chromatographic retention time and two characteristic masses (molecular ion and confirmation ion) for each analyte. The additional requirement that the relative abundance ratio of the

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REFERENCES

Biermann, H. 1996. Memorandum to Kean S. Goh, Ph.D. "Definition of 'unequivocal detection methods' for the purposes of Senate Bill 810."