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DOI: 10.1007/s00244-003-3165-8

Environmental

Contamination and Toxicology

A Sonication Extraction Method for the Analysis of Pyrethroid, Organophosphate, and Organochlorine Pesticides from Sediment by Gas Chromatography with Electron-Capture Detection

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Received: 24 July 2003 /Accepted: 2 November 2003

Abstract. A method was developed for the simultaneous determination of 5 pyrethroid, 1 organophosphate, and 20 organochlorine pesticides in sediment. Pesticide residues were extracted using sonication with acetone-methylene chloride (1:1 vol/vol) and the extracts were subsequently cleaned with deactivated Florisil (magnesium silicate; U.S. Silica, Berkeley Springs, West Virginia). Gas chromatography with an electron-capture detector was used for analyte determination, and two columns were used for confirmation of the analytes. Four control sediments from different sources were spiked with a pesticide mix and analyzed for method validation. The method detection limits ranged from 0.22 to 0.85 g/kg dry sediment. Recoveries for spiked samples at four concentrations (1, 5, 20, and 400 g/kg dry sediment) were 71.9% to 129.8% with relative standard deviations (RSDs) 11%. Taking the matrix effect into account, 1 g/kg was chosen for the threshold of detection, but 0.5 g/kg of spiked control sediment still provided good recoveries and RSDs. This method was validated using field-collected sediment taken from agricultural areas of Fresno County, California.