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DETERMINATION OF SOME ORGANOPHOSPHATE INSECTICIDES AND HERBICIDES IN ROMANIAN SURFACE WATER SAMPLES BY LC-MS/MS

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ABSTRACT

A liquid chromatographic-tandem mass spectrometry method (LC-MS/MS) for the simultaneous identification and quantification of seven organophosphate insecticides (fenthion, disulfoton, azinphos-ethyl, azinphos-methyl, dimethoate, omethoate, demeton-s-methyl) and one herbicide (bentazon) used in agriculture was developed. A complete set of LC, electrospray ionization (ESI) and MS acquisition parameters was established for determination of analytes; these parameters were used in the detection of pesticides in the positive and negative mode. The pesticides were extracted from water by solid phase extraction (SPE) using conditioning and elution with methanol and finally the analytes were separated and detected by LC-MS/MS, under multiple reactions monitoring mode (MRM). The linearity of the calibration curve was good in the concentration range 0.4 ng/mL to 224 ng/mL, and the limits of detection (LOD) ranged from 0.1 ng/L to 4.5 ng/L. The mean recovery ranged from 70.9% to 108%. The method was applied in the analysis of the surface water of Danube Delta in 11 sampling points. The insecticides concentrations were situated below the LOD. Only bentazon herbicide was determined in concentrations ranging from 0.37 to 1.4 ng/L.

Keywords: LC- MS/MS, pesticides, SPE, surface water
