

## **Pesticide residues in agricultural soil of Vojvodina Province, Serbia**

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Modern agriculture depends to a large extent on pesticides used for control of weeds, diseases and pests, in an effort to reduce or eliminate yield losses and preserve high product quality. Their prolonged use involves the risk of their retention and accumulation in the environment, so the analysis of these compounds has become an important part of the monitoring program. The aim of this study was to evaluate the presence of pesticide residues in soil under intensive agricultural production. The survey was conducted at 34 conventional farms in Vojvodina Province, the main agricultural area in the Republic of Serbia. In total, 60 soil samples from fields with different history of farming practices were analyzed. Samples were collected from surface (0–30 cm) soil layer. Soil samples were mixed and the average samples of 500 g were formed and transferred to the laboratory. Laboratory samples of 100 g were air-dried, milled, sieved and analyzed. Extraction and clean-up procedure was carried out using modified QuEChERS method. For pesticides quantification gas chromatographic separation with MS detection (Agilent Technologies GC-MS 7890 A Series, coupled with 5975C mass selective detector and HP 5 MS column) and high performance liquid chromatography with diode array detection (Agilent HPLC 1100 system and an Agilent Zorbax C18 column) were used. The performance characteristics of the method were established by validation procedures employing assays with standard solutions, sample blanks and spiked samples. Linearity, matrix effect, accuracy, precision, limits of detection and of quantification were determined. The suitability of this method was assessed based on its performance characteristics. The obtained results indicated that all validation parameters were satisfactory and the method was applied on real soil samples. Results of the investigated soil samples showed the presence of pesticide residues from different classes - sulfonylureas, triazines and chloroacetanilides herbicides; triazoles fungicides, as well as some insecticides.

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Key words: pesticide residues, agricultural soil

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