



MEDITERRANEAN GROUP OF PESTICIDE RESEARCH



PLANT PROTECTION SOCIETY OF SERBIA

Supported by the Ministry of Education, Science, and Technological
Development of Serbia

Organize

Annual MGPR Meeting 2012

and

**International Conference on Food and Health Safety:
Moving Towards a Sustainable Agriculture**

BOOK OF ABSTRACTS

Belgrade (Serbia)

11 - 12 October 2012

Zbornik rezimea radova sa Annual MGPR Meeting 2012 and
International Conference on Food and Health Safety:
Moving Towards a Sustainable Agriculture
Beograd, 11 - 12 October 2012

Izdavač:

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Međunarodni standardni broj knjige /
International Standard Book Number

ISBN 978-86-83017-22-5

Tiraž:

100 primeraka

Realizacija: LEX Print, Beograd

Place: The Annual MGPR Meeting 2012 and International Conference on Food and Health Safety: Moving Towards a Sustainable Agriculture, Belgrade, Hotel MOSKVA - Hall BALKANSKA.

Official language: English

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V. 16. TRACE ANALYSIS OF SULFONYLUREA HERBICIDES IN SOIL SAMPLES USING SOLID-PHASE EXTRACTION AND LIQUID CHROMATOGRAPHY WITH PHOTODIODES DETECTION

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Sulfonylurea herbicides are new class of herbicides that function by inhibiting the action of acetolactate synthase or acetohydroxyacid synthase, key enzymes in the biosynthesis of amino acids in plants. These herbicide class are applied at rates that are typically much lower than those used for the triazine or acetanilide herbicides that are most commonly used in agriculture. Despite the beneficial impact of sulfonylurea herbicides on agricultural productivity, concern has been raised by the public and regulatory authorities regarding the potential for their adverse impact on soil and environmental quality and the productivity of sensitive crop in the following season. The presence of sulfonylurea pesticide residues in soils and the low dosage used requires the application of highly sensitive analytical techniques to detect trace concentrations of residues in soil.

The method has been developed for confirmation and quantitation of three sulfonylurea herbicides including oxasulfuron, triasulfuron and prosulfuron in soil samples by high performance liquid chromatography (HPLC) with photodiodes detection and chromatograms were extracted at 230 nm. Reverse phase liquid chromatography was used for the separation, identification and quantification of these compounds. Analytes were extracted from the soil samples with methanol-phosphate buffer (2:8, v/v) (pH 8) in an ultrasonic bath. The extracts were adjusted to pH 6.5 with 0.5% CH₃COOH and passed, under vacuum, through a solid-phase extraction cartridge. The procedure involves a preconcentration step based on solid-phase extraction with silica-based bonded C18 cartridge and a N-vinyl-pyrrolidone polymer cartridge (Oasis HLB). The best results were obtained with Oasis HLB using 0.1% CH₃COOH in acetonitrile as elution solvent. Spiked soil at 0.01–1.0 mg/kg levels was checked. Average recoveries of analytes from soil samples was in the range of 85-109% with a relative standard deviation of <4.2%. The limit of detection (LOD) of this method was in the range of 0.4 to 3.5 µg/kg. The proposed method is fast, easy to perform and could be utilized for monitoring of of three sulfonylurea herbicides including oxasulfuron, triasulfuron and prosulfuron residues in soil samples.

Keys words: sulfonylurea herbicides, soil and HPLC

Acknowledgments:

Part of this study was conducted as part of the Project No. TR 31072: "Status, trends and possibilities to increase the fertility of agricultural land in the Vojvodina Province", which is supported by the Ministry of Education and Science of the Republic of Serbia