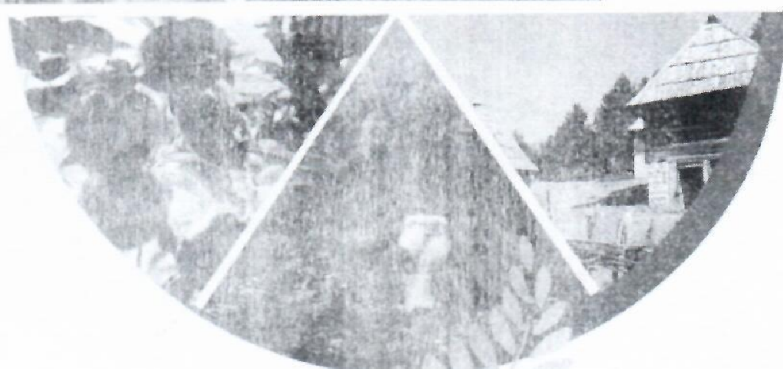


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## DISAPPEARANCE OF NICOSULFURON RESIDUES IN SOIL UNDER LABORATORY CONDITIONS

Nada GRAHOVAC<sup>1</sup>, Dragana ŠUNJKA<sup>2\*</sup>, Sanja LAZIĆ<sup>2</sup>, Jovica VASIN<sup>1</sup>, Ankica KONDIĆ-ŠPIKA<sup>1</sup>, Snežana JAKŠIĆ<sup>1</sup>

<sup>1</sup>Institute of Field and Vegetables Crops, 21 000 Novi Sad, Serbia

<sup>2</sup>University of Novi Sad, Faculty of Agriculture, 21 000 Novi Sad, Serbia

\*Corresponding author: draganas@polj.uns.ac.rs

### Abstract

Sulfonylureas (SUs) present a new generation of herbicides which selectively control broad- and narrow-leaved weeds. Nonetheless, heightened utilization of SUs leads to increased concern about herbicides residues as the consequence of their prolonged persistence in some soils. Nicosulfuron belongs to the group of SUs herbicide. A laboratory experiment at thermostat (temperature of 25°C) was carried out to evaluate the effect of temperature on the dissipation dynamics and final residues of nicosulfuron in soil type Calcic Chernozem Clayic, Pachic. The dissipation of nicosulfuron in soil was described by using the Mittag-Leffler function  $c E_a(-bt)$ . Model coefficients  $a$ ,  $b$ ,  $c$  were obtained from the experimental data. The residues of nicosulfuron were determined by ultra-performance liquid chromatography with diode array detection in the ultraviolet region. In order to investigate dissipation, selected herbicide was applied as aqueous solution of commercial formulation nicosulfuron (Kelvin<sup>®</sup>, 40 g L<sup>-1</sup>). The starting concentrations of nicosulfuron (measured in the samples soil taken on the 0th day, 2 hours after the treatment) on 25°C were 389.84 µg kg<sup>-1</sup>, 595.18 µg kg<sup>-1</sup>, 649.02 µg kg<sup>-1</sup> and 797.69 µg kg<sup>-1</sup> after the treatment with 40 grams active ingredient (a.i.) per hectare of nicosulfuron (g a.i. ha<sup>-1</sup>), 50 g a.i. ha<sup>-1</sup>, 80 g a.i. ha<sup>-1</sup> and 100 g a.i. ha<sup>-1</sup>, respectively. After two days, residues of nicosulfuron were lower more than 86% compared with the initial concentration. Fifty days after the application of all doses the content of residues were below the LOQ for nicosulfuron (3.16 µg kg<sup>-1</sup>). The obtained half-time degradation (DT<sub>50</sub>) values of nicosulfuron were in range of 0.34 d (80 g a.i. ha<sup>-1</sup>) to 0.68 d (40 g a.i. ha<sup>-1</sup>). Significantly greater dissipation of nicosulfuron observed in this laboratory testing was influenced, most probably, by abiotic and biotic processes. Nicosulfuron poses low risks to the ecosystem in similar type soil because of their rapid dissipation.

**Key words:** HPLC-UV-DAD, soil, sulfonylurea herbicide, dissipation.

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