

**THE ESTIMATION OF ALLELOCHEMICAL POTENTIAL OF WHITE MUSTARD,  
BUCKWHEAT, SPRING BARLEY, OAT AND RYE BY MEASUREMENT  
OF PHENOLICS CONTENT IN PLANTS****Hura T.<sup>1</sup>, Dubert F.<sup>1</sup>, Hochol T.<sup>2</sup>, Stupnicka-Rodzynkiewicz E.<sup>2</sup>,  
Stokłosa A.<sup>2</sup>, Lepiarczyk A.<sup>2</sup>***<sup>1</sup>The Franciszek Górski Institute of Plant Physiology Polish Academy of Sciences,  
Niezapominajek 21, 30-239 Kraków, Poland**<sup>2</sup>Department of Soil Management and Plant Cultivation, Agricultural University of Krakow,  
Al. Mickiewicza 21, 31-120 Kraków, Poland*

Phenolic compounds are secondary metabolites widely distributed in the plant tissue. Some of them have been found as responsible for allelopathic reactions. Identification of such chemicals in plant materials give information about allelopathic properties of crops or crop residues for weed control.

This study was conducted to investigate the allelopathic potential of white mustard (cv. Barka), buckwheat (cv. Hruszowska), spring barley (cv. Klimek), oat (cv. Dragon) and rye (cv. Esprit) grown at field condition. Field experiments were performed during two successive vegetation seasons (2002-2003). The eight phenolic compounds, trans-cinnamic acid, salicylic acid, ferulic acid, chlorogenic acid, p-hydroxybenzoic acid, protocatechuic acid, p-coumaric acid and vanillic acid were analysed. The phenolic compounds were identified with using of TLC (thin layer chromatography). The combination of benzene, acetic acid and MeOH was applied as developing solvent. The concentrations of phenolics were determined using spectroscopic methods.

We noted significant differences among examined plants for concentrations of all the phenolic compounds. Plant species significantly affected the concentration of most phenolics for both vegetation seasons. The highest concentration was noted towards cinnamic acid for all plant species. The relatively high concentration was observed for ferulic acid and p-coumaric acid. Total contents of analysed phenolics permits to arrange of plant species as origin of allelochemicals in following order: spring barley (3,35 mg g DW<sup>-1</sup>) > oat (3,07 mg g DW<sup>-1</sup>) > buckwheat (3,05 mg g DW<sup>-1</sup>) > white mustard (2,19 mg g DW<sup>-1</sup>) > rye (1,77 mg g DW<sup>-1</sup>). Obtained results suggest that examined plants are good source of natural herbicide like phenolics, which can contribute to weed control through allelopathy. Additionally, data indicated that the environmental factors (temperature, rainfall) influence on synthesis and consequently on concentration phenolics in plant tissue. It is known that allelopathic properties of plants are strongly associated with inherent stresses of crop environment. In most cases stress conditions enhance allelochemicals production.