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Abstract

The Effect of *Origanum vulgare* subsp. *hirtum* Essential Oil on Metabolite Profile of *Solanum tuberosum* †

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Abstract: Essential oils are intensively studied in recent years as promising bio-herbicides. A strong inhibitory activity on seed germination and phytotoxic effect on seedling growth has been reported for *Origanum vulgare* subsp. *hirtum* (Link) Ietswaart essential oil. It has also been found that the phytotoxic effect is weaker in the treatment of plants at a more advanced stage in their development. Thus, when treating potato plants with a height of 30–40 cm with aqueous solutions of essential oil, the effect manifests by the appearance of single spots on the leaves, which does not disturb the growth of the plants. In the present study, a comparative analysis was performed regarding the metabolic profiles of healthy leaves of control potato plants and leaves with spots formed as a result of processing with aqueous solutions of *Origanum vulgare* subsp. *hirtum* essential oil. The metabolite analysis was made by GC–MS. Potato plants were treated with concentrations of essential oil—5 and 10 µL/mL. The leaves were collected 7 days after treatment. Metabolites representing basic groups of substances—namely, amino acids, organic and phenolic acids, and mono- and disaccharides—were identified. In the damaged leaves, higher contents of monosaccharides (fructose and glucose), pyroglutamic acid, and amino acids (proline, serine, aspartic acid) were found, compared with control leaves. Fewer differences were found in terms of the accumulation of chlorogenic, ferulic, and quinic acids, sucrose. The results presented in this study contribute to the knowledge of plants' reactions to abiotic stress.

Keywords: GC–MS; potato; phytotoxin

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