

EVALUATION OF AEGOPODIUM PODAGRARIA ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY USING DIFFERENT EXTRACTION SOLVENTS

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The problems of the modern world, such as increasing threats to human health or bacterial resistance to antibiotics show an increasing urgency to research natural substances with potential solutions or mitigating effects. A widely distributed plant in Lithuania ground elder (*Aegopodium podagraria*) is a well-known medicinal plant, that accumulates a wide variety of biologically active phytochemicals, such as polyacetylenes falcarinol and falcariindiol, essential oils, vitamins, coumarins, phenolic acids and flavonoids in its various parts [1]. Because of these phytochemicals, the plant exhibits antibacterial and antioxidant properties that have been identified in plant extracts [2].

This research aims to determine the total phenolic content, flavonoid concentration, antioxidant and antimicrobial activity of the plant using different extraction solvents. Leaves, stems and roots were used for the experiment and the extraction was carried out using 3 different solvents – water, 50 % ethanol, and olive oil. Extraction of the herb was performed by incubation shaking maceration method. The amount of biologically active compounds and antioxidant activity were determined by spectrophotometric methods. Antimicrobial effect against 5 different bacteria was determined by well diffusion method.

The results showed that the concentration of biologically active compounds in the extracts depended on the extraction solvent – the highest number of phenolic compounds (9,57 mg RE/g in leaves and 5,73 mg RE/g in stems) was determined in ethanol extracts, the highest number of flavonoids (3,87 mg RE/g in leaves and 3,25 mg RE/g in stems) – in oil extracts. Root extracts demonstrated different results – the highest concentration of phenolic compounds (5,99 mg RE/g), flavonoids (0,36 mg RE/g) and antiradical activity (2,16 mg RE/g) were all obtained using water as an extraction solvent. A correlation between the concentration of phenolic compounds and antioxidant activity was established. The ethanolic root extract showed inhibitory effects on *Micrococcus luteus*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Leuconostoc mesenteroides*, while leaf extracts were also effective on *E. coli*. The established antimicrobial and antioxidant properties of *Aegopodium podagraria* indicate the plant's potential applicability in food, pharmaceutical, cosmetic and other industries.

[1] Kyrbassova, E. A., Dyuskaliev, G., Baitasheva, G. U., Imanova, E. M. (2019). Biological and phytochemical features of underground organs of medicinal plants of the genus *aegopodium* L. *Experimental Biology*, 78(1), 28-35.

[2] Jakubczyk, K., Janda, K., Styburski, D., Łukomska, A. (2020). Goutweed (*Aegopodium podagraria* L.)—botanical characteristics and prohealthy properties. *Advances in Hygiene and Experimental Medicine*, 74, 28-35.