

HS-SPME/GC-MS-BASED CHARACTERISATION OF VOLATILE COMPOUNDS IN AEGOPODIUM PODAGRARIA L. PARTS AND EVALUATION OF THEIR ANTIMICROBIAL PROPERTIES

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Aegopodium podagraria L. is a widespread member of the *Apiaceae* family, commonly found in forested areas throughout the country. This plant is invasive, spreads easily and outcompetes many plant species, which is why it is often considered disadvantageous [1]. Despite this, it has a long history of use in traditional medicine, with reported antioxidant, anti-inflammatory and even anticancer properties [2]. However, its pharmacological potential remains largely unexplored, even though it is abundant in the environment and easy to obtain. Only recently researchers have begun to recognize its potential, highlighting the need to further study the phytochemicals found in *A. podagraria* and their associated biological activity. To date, very little information is available on chemical composition of the plant, and it is not yet known which compounds contribute to its antimicrobial properties.

Thus, the aim of this study was to characterise volatile compounds present in leaves, stems, flowers and roots of *A. podagraria* using headspace solid phase microextraction (HS-SPME) coupled with gas chromatography-mass spectrometry (GC-MS) and to evaluate the antimicrobial activity of methanolic extracts of these plant parts against selected microorganism strains. The plant material used in the study was collected at 54.8208758°N, 24.0492927°E and air dried, extraction was performed by maceration method, and antimicrobial activity was assessed by well diffusion assay.

A total of 26 volatile compounds were identified across the parts of *A. podagraria*. Caryophyllene, α -pinene, β -pinene, cymene, and spathulenol were common to all plant parts, while β -farnesene and germacrene were major constituents in stems and flowers, with relative abundances of 8.84% and 45.01% for β -farnesene, and 28.00% and 14.97% for germacrene, respectively. β -bisabolene was predominant in roots. Stems exhibited the highest diversity of volatiles, whereas leaves showed the lowest. All extracts displayed antimicrobial activity against *E. coli* and *M. luteus*, with flower extracts being the most effective, correlating with higher concentrations of certain volatile compounds such as β -farnesene. Flower extract also demonstrated highest antimicrobial activity against *C. albicans*, with inhibition zone of 23.00 ± 2.00 mm.

The study highlights the composition and diversity of volatile compounds in *A. podagraria* and their contribution to antimicrobial activity. These findings support further exploration of the plant's bioactive potential and its application in research of antimicrobials.

[1] K. Jakubczyk, K. Janda, D. Styburski, and A. Łukomska, "Goutweed (*Aegopodium podagraria* L.) – botanical characteristics and prohealthy properties*," *Postępy Higieny i Medycyny Doświadczalnej*, vol. 74, pp. 28–35, Feb. 2020, doi: <https://doi.org/10.5604/01.3001.0013.8551>.

[2] S. Yılmaz Sarıaltın, D. Çiçek Polat, and C. Ö. Yalçın, "Cytotoxic and antioxidant activities and phytochemical analysis of *Smilax excelsa* L. and *Aegopodium podagraria* L.," *Food Bioscience*, vol. 52, p. 102359, Apr. 2023, doi: <https://doi.org/10.1016/j.fbio.2023.102359>.