

## CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF ESSENTIAL OIL OBTAINED FROM *CHAEROPHYLLUM BULBOSUM* L. DRY INFLORESCENCES

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*Chaerophyllum bulbosum* L. is one of the six species of the genus *Chaerophyllum* L. (Apiaceae) growing wild in Serbia (1). This species, which is known as turnip-rooted chervil, is used as a traditional medicinal plant in Eastern Turkey (2). The present study reports the chemical composition and antibacterial activity of the essential oil obtained from *Chaerophyllum bulbosum* dry inflorescences. The essential oil obtained by hydrodistillation from the air dried samples collected on Vlasina plateau, Serbia, was analysed by the gas chromatography (GC) and gas chromatography-mass spectrometry (GC/MS). Eight components were characterized, representing 99.8 % of the total, with (*E*)- $\beta$ -ocimene (87.9 %) being the major identified constituent. The essential oil was evaluated for its *in vitro* antibacterial activity against two Gram-positive and three Gram-negative bacteria by disk diffusion assay. The obtained results showed that essential oil isolated from dry inflorescences of *C. bulbosum* had significant antibacterial activity against Gram-positive bacteria, *Staphylococcus aureus* and *Bacillus subtilis subsp. spizizenii* (diameter of inhibition zone 24 mm and 21 mm, respectively) and moderate antibacterial activity against *Escherichia coli*, *Salmonella abony* and *Pseudomonas aeruginosa* with inhibition zones of 17 mm, 15 mm, and 14 mm, respectively.

If we compare our results with previously published results regarding the antibacterial effect of *C. bulbosum* essential oils (3, 4), it can be concluded that essential oils isolated from this plant species are more effective against Gram-positive bacteria.

### References

1. Nikolić V, *Chaerophyllum* L. in: *Flora SR Srbije*. Vol. 5. M. Josifović, Ed., Srpska Akademija Nauka i Umetnosti, Beograd, Serbia, 1973, p. 327.
2. Polat R, Cakilcioglu U, Satil F, Traditional uses of medicinal plants in Solhan (Bingöl-Turkey), *J Ethnopharmacol*, 2013, 148, 951-963.
3. Masoudi Sh, Faridchehr A, Alizadehfard S, Zabarjadshiraz N, Chalabian F, Taghizadfarid R, Rustaiyan A, Chemical composition and antibacterial activity of the essential oils of *Semenovia frigida* and *Chaerophyllum bulbosum* from Iran, *Chem Nat Compd*, 2011, 47(5), 829-832.
4. Stamenković J, Đorđević A, Stojanović G, Mitić V, Petrović G, Phytochemical analysis of volatiles and biological activities of *Chaerophyllum bulbosum* L. essential oils, *J Serb Chem Soc*, 2021, 86(3), 257-267.

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# HEMIJSKI SASTAV I ANTIBAKTERIJSKA AKTIVNOST ETARSKOG ULJA IZOLOVANOG IZ SUVIH CVASTI BILJNE VRSTE *CHAEROPHYLLUM BULBOSUM* L.

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*Chaerophyllum bulbosum* L. jedna je od šest vrsta roda *Chaerophyllum* L. (Apiaceae) koje samoniklo rastu u Srbiji (1). Ova vrsta, koja je poznata kao lukovičasta krabljica, koristi se kao tradicionalna lekovita biljka u istočnoj Turskoj (2). U ovom radu je ispitivan hemijski sastav i antibakterijska aktivnost etarskog ulja dobijenog hidrodestilacijom iz suvih cvasti biljne vrste *Chaerophyllum bulbosum* koja je prikupljena na Vlasinskoj visoravni u Srbiji. Hemijski sastav etarskog ulja je analiziran primenom gasne hromatografije (GC) i gasne hromatografije sa masenom spektrometrijom (GC/MS). Identifikovano je osam komponenata, što predstavlja 99,8 % ukupnog sastava, pri čemu je (*E*)- $\beta$ -ocimen (87,9 %) identifikovan kao glavna komponenta. Određivanje *in vitro* antibakterijske aktivnosti etarskih ulja na dve gram-pozitivne i tri gram-negativne bakterije je vršeno disk difuzionom metodom. Dobijeni rezultati ukazuju na to da etarsko ulje izolovano iz suvih cvasti *C. bulbosum* pokazuje značajnu antibakterijsku aktivnost prema gram-pozitivnim bakterijama, *Staphylococcus aureus* i *Bacillus subtilis subsp. spizizenii* (prečnik zone inhibicije je iznosio 24 mm, odnosno 21 mm) i umerenu antibakterijsku aktivnost prema gram-negativnim bakterijama *Escherichia coli*, *Salmonella abony* i *Pseudomonas aeruginosa* sa zonama inhibicije od 17 mm, 15 mm i 14 mm, respektivno.

Dobijeni rezultati su u skladu sa prethodno publikovanim rezultatima o antibakterijskoj aktivnosti etarskih ulja biljne vrste *C. bulbosum* (3, 4), na osnovu kojih se može zaključiti da etarska ulja izolovana iz ove biljne vrste pokazuju bolju aktivnost prema gram-pozitivnim bakterijama.

## Literatura

1. Nikolić V, *Chaerophyllum* L. in: *Flora SR Srbije*. Vol. 5. M. Josifović, Ed., Srpska Akademija Nauka i Umetnosti, Beograd, Serbia, 1973, p. 327.
2. Polat R, Cakilcioglu U, Satil F, Traditional uses of medicinal plants in Solhan (Bingöl-Turkey), *J Ethnopharmacol*, 2013, 148, 951-963.
3. Masoudi Sh, Faridchehr A, Alizadehfard S, Zabarjadshiraz N, Chalabian F, Taghizadfarid R, Rustaiyan A, Chemical composition and antibacterial activity of the essential oils of *Semenovia frigida* and *Chaerophyllum bulbosum* from Iran, *Chem Nat Compd*, 2011, 47(5), 829-832.
4. Stamenković J, Đorđević A, Stojanović G, Mitić V, Petrović G, Phytochemical analysis of volatiles and biological activities of *Chaerophyllum bulbosum* L. essential oils, *J Serb Chem Soc*, 2021, 86(3), 257-267.

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