

Unexplored endemic species of medicinal and aromatic plants as a potential source of natural sanitizers and antioxidants: the case of *Sideritis cypria* Post.

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Scope of the Study

Sideritis cypria Post. is an unexplored and endemic and species of Cyprus flora, that has been introduced to cultivation systems only recently. The overall aim of the present study was to evaluate the biological activities of a series of plant's extracts and essential oils, in order to be used as antioxidant and antimicrobial agents, even as sanitizers for fresh produce preservation.

Analytical methods

The compounds of the extracts were isolated using analytical methods (Column and prep-Thin Layer Chromatography) and were identified using 1D and 2D NMR spectroscopy.

The identification of the EO compounds has been conducted via GC/MS.

This strategy was applied in order to relate the potential biological activities with the obtained chemical groups.

Assays tested

- Antioxidant activity (DPPH, FRAP, ABTS)
- Total Phenolic and Total Flavonoid content
- Cytotoxicity (breast cancer cells)
- Antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*

Antioxidant activity and Total Phenolic and Flavonoid content of extracts

- The comparison of the infusion and the decoction revealed the richness of the flower bulbs, in terms of compounds and activities.
- The methanolic extract appeared to have the strongest activity of all the tested extracts (total phenolic content at 196 mg GAE/g Dw and FRAP 793 mg TROLOX/g Dw).
- Methanolic fractions contain compounds (as acteoside, leucosceptoside A, etc.) with reported antioxidant activity, exhibiting remarkable biological properties.

Evaluated extracts

- Leaf and flower decoction
- Leaf and flower infusion
- Aerial parts methanolic extract
- Aerial parts methanolic fractions
- Aerial parts essential oils

A *S. cypria* cultivation



C Flower bulbs



B Plant before flowering



D Leaves



		Total phenolics (mg GAE/g Dw)	DPPH (IC50 mg/mL)	FRAP (mg TROLOX/g Dw)	Flavonoids (mg RUTIN/g Dw)
Infusion	Leaves	3.022 ± 0.039b	792.992 ± 2.096a	75.926 ± 1.494b	7.721 ± 0.164b
	Flowers	8.019 ± 0.173a	267.891 ± 1.630b	199.374 ± 1.364a	32.004 ± 0.169a
Decoction	Leaves	1.396 ± 0.018b	605.536 ± 9.145a	98.418 ± 3.775b	3.604 ± 0.034b
	Flowers	3.972 ± 0.031a	404.995 ± 6.884b	159.729 ± 3.073a	9.961 ± 0.188a

EO and hydrosol

-β phellandrene, α pinene, β caryophyllene are the dominant compounds of the EO.

-The antimicrobial assays revealed the superiority of the EO against the produced hydrosol, and the higher effectiveness of the EO against gram-positive bacteria.

Minimum inhibitory concentration (MIC) and lethal dose go (LD₉₀) using the micro dilution assay and diameter of the inhibition zone (DIZ) using the disc diffusion method.

	EO			Hydrosol		
	MIC (mg/mL)	LD ₉₀ (mg/mL)	DIZ (mm)	MIC (% v/v)	LD ₉₀ (% v/v)	DIZ (mm)
<i>Escherichia coli</i>	12.5	25	12.33	100	nd	6
<i>Staphylococcus aureus</i>	6.25	12.5	17.67	100	nd	6

Conclusions

- The present study reveals that the cultivation of *S. cypria* is feasible without affecting its chemical profile.
- The plant has a chemical profile rich in bioactive secondary metabolites and can be used as culinary herb, source of antioxidants, and source of extracts/essential oils, with proved antimicrobial activity.

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