

Evaluation of leaves and flowers from *Salvia verticillata* L. as a source of bioactive compounds - Analysis of composition and antioxidant activity

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The genus *Salvia* is the largest of the Lamiaceae family and is used widely in the food and cosmetic industry as well as in traditional medicine. *Salvia verticillata* L., also called “purple rain”, is a herbaceous perennial herb with tiny lilac-blue flowers. *Salvia*'s phytochemical composition is comprised mainly of secondary metabolites such as terpenes (especially phenolic diterpenes) and phenolic compounds like flavonoids and phenolic acids. In particular, caffeic acid derivatives are the most prominent group of compounds in the whole Lamiaceae family, while rosmarinic acid, a dimeric form of caffeic acid, has been reported as the main component in *S. verticillata* ^[1].

For this study, dried leaves and flowers of *S. verticillata*, wild in the area of Kalavryta (Achaia, Greece), were collected. Taking under consideration the need for novel active compounds in the cosmetic industry, we analyzed the profile of lipids and secondary metabolites and determined the antioxidant activity. Ultrasound-assisted extraction with 70% aqueous methanol of 2 g of plant material yielded an orange dry extract in both cases (leaves and flowers). The hydromethanolic extracts were further analyzed with UHPLC-DAD-ESI-MS (Ultra-High Performance Liquid Chromatography–Diode Array Detector–Mass Spectrometry). More than 20 compounds were identified, such as flavonoids, terpenoids and phenolics. Caffeic acid derivatives such as rosmarinic acid, sagerinic acid and methyl rosmarinic acid were in abundance. Fatty acids content and composition of the plant were evaluated with one-step transesterification and subsequent analysis of the derived fatty acid methyl esters (FAMES) with GC-FID (Gas Chromatography - Flame Ionization Detector). About 9 fatty acids were identified in each part of the plant. The main fatty acid detected in leaves was palmitic acid (C16:0) whereas in flowers, linoleic acid (C18:2). Both leaf and flower polar extracts demonstrated strong and similar antioxidant capacity with the FRAP (Ferric Reducing Antioxidant Power Assay) and DPPH (2,2-Diphenyl-1-picrylhydrazyl free-radical scavenging activity) assays. The FRAP values were 1192 and 1084 mg FeSO₄*7H₂O/ g dry extract for leaves and flowers, respectively. At last, the IC₅₀ of the DPPH radical scavenging activity of leaves and flower extracts were 17 and 16 µg/ml, respectively. Our results could contribute to the valorization of *S. verticillata* for the production of cosmetic products and food supplements.

[1] Stanković, J. S. K., Srećković, N., Mišić, D., Gašić, U., Imbimbo, P., Monti, D. M., & Mihailović, V. (2020). *Industrial Crops and Products*, 143, 111932. <https://doi.org/10.1016/j.indcrop.2019.111932>