

SATUREJA MONTANA EXTRACTS: THE IMPACT OF TEMPERATURE IN MICROWAVE-ASSISTED EXTRACTION

Natalija Čutović^{1*}, Tatjana Marković¹, Aleksandra Jovanović², Petar Batinić¹

¹*Institute for Medicinal Plant Research, "Dr Josif Pančić", Tadeuša Košćuška 1, Belgrade, Serbia, ncutovic@mochilja.rs**

²*University of Belgrade, Institute for the Application of Nuclear Energy INEP, Banatska 31b, Belgrade, Serbia*

Abstract

Aromatic plants of the Lamiaceae family are valuable food and medicinal sources due to their antioxidant, antimicrobial, antispasmodic, expectorant, carminative, antiulcer, stimulant, anticancer, anti-proliferative, and diuretic effects. Biologically active compounds obtained from plant resources have gained more attention nowadays, due to the consumerism demand for functional food and pharmaceuticals based on natural compounds. In the present study, Satureja montana herba was evaluated as a source of antioxidant polyphenol components, which were extracted by the application of a microwave assisted extraction device. Microwave-assisted extraction has become a good alternative extraction procedure in comparison to traditional techniques due to its high efficiency, faster kinetics, and reduced extraction medium consumption, which is in accordance with the aim of the manufacturing sector to seek out eco-innovative technologies, which minimize the loss of bioactive compounds. Optimization of the extraction was carried out by varying the extraction temperature (60-200°C) in 50% ethanol, at a 1:40 solid-to-solvent ratio for 150 s. The extraction efficiency was expressed in terms of total polyphenol content (TPC), total flavonoid content (TFC), and DPPH radical scavenging capacity (expressed as the IC₅₀, the concentration of the extract requires to neutralize 50% of free radicals). The highest TPC was recorded in the extract prepared at 160°C (1.77±0.14 mg gallic acid equivalent - GAE/g dry extract), while the highest TFC was in the extract obtained at 180°C (0.39±0.01 mg catechin equivalent - CE/g dry extract). Also, the level of polyphenol yield was correlated with free radical scavenging activity and the IC₅₀ value was the lowest (the highest antioxidant activity, 5.30±0.21 mg/mL) in the sample with the highest TPC. This study revealed that polyphenol and flavonoid yields and antioxidant potential of S. montana extracts were significantly affected by the temperature in the microwave-assisted extraction. This is the first step in obtaining the highest amount of bioactive compounds from S. montana that can be used in the food, pharmaceutical, or cosmetic industry, in their free form or encapsulated into adequate carriers.

Keywords: winter savory, bioactive compounds, extraction optimization.