Chemical Authentication of Rosehip Oils through Combined Spectroscopic and Chromatographic Approaches

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Abstract

Seven commecial samples of cold-pressed rosehip oils (Rosa canina L.) produced in Bulgaria were investigated. The aim of the study was to explore correlations between the fatty acid composition and the optical parameters obtained by non-destructive optical methods, in order to demonstrate that such techniques can be used as practical tools for routine quality control. FTIR spectroscopy, supported by multivariate statistics, identified specific chemical groups, while fluorescence markers (chlorophyll, β-carotene) emerged as indicators of the geographical origin of the raw material and the extraction method. The use of a smartphone spectrometer demonstrated the potential of low-cost, portable devices for rapid screening with minimal sample volumes. GC-MS results highlighted two groups of oils – dominated either by ω-6 or by ω-3 fatty acids – with significant differences in lipid health indices (AI, TI, and h/H). The optical methods revealed clear correlations between the fatty acid profile and the spectral characteristics, enabling reliable differentiation of the samples.

Keywords

Rosehip oils, UV-Vis spectroscopy, FTIR analysis, and 3D excitation–emission fluorescence spectroscopy.

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