

17th World Congress on **Nutrition and Food Chemistry**
&
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Phytochemicals fingerprinting of Romanian sea buckthorn (*Hippophaë rhamnoides L.*): Authenticity evaluation and variety discrimination

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Statement of the Problem: Food authenticity involves a complex and comprehensive approach to food characterization at the molecular level. Quality control assessment is an important step in assuring food authenticity. Thus, exhaustive characterization of food matrices is required. Complex and advanced technologies are used for bioactive compound analysis. Generally, two different approaches, selective (S) - using specific and advanced techniques like high-performance liquid chromatography (HPLC), HPLC coupled with mass spectrometry (HPLC-MS), gas chromatography coupled with mass spectrometry (GC-MS) and, non-selective (NS) - UV-VIS (ultraviolet-visible) spectroscopy, Fourier Transform Infrared spectroscopy (FT-IR) have been used so far in authenticity evaluation. Sea buckthorn (*Hippophaë rhamnoides L.*) represents a valuable source of important bioactive compounds for human health and nutrition, such as fatty acids, minerals, vitamins, phenolics, carotenoids. Carotenoids and phenolic compounds received much interest being associated with lower risk of cardiovascular, neurodegenerative and eye disease, cancer or diabetes. Also, they are considered good biomarkers for quality and authenticity evaluation.

Purpose: The purpose of this study is to analyze the composition of main phenolic and carotenoids compounds and to identify the specific quality and authenticity biomarkers.

Methodology & Theoretical Orientation: HPLC-PAD (High Performance Liquid Chromatography with Pulsed amperometric detector), GC-MS (Gas Chromatography Mass Spectroscopy) and UHPLC-PAD-ESI- MS (Ultra High-Performance Liquid Chromatography – Pulsed amperometric detector - Electrospray ionization mass spectrometry) techniques were used for carotenoids characterization. UHPLC/PDA-ESI/MS (Ultra-High-Performance Liquid Chromatographic-photodiode array-Electrospray ionization mass spectrometry) was used for phenolic compounds analysis. (NS): UV-Vis and FT-IR have been used for both carotenoids and phenolic compounds analysis.

Findings: Regarding carotenoids, berries had zeaxanthin di-palmitate and β carotene as major compounds, while leaves had lutein, β -carotene, violaxanthin and neoxanthin. Regarding phenolic compounds, berries and leaves had isorhamnetin (I) glycosides in different ratios as major compounds. Using Principal Component Analysis (PCA) the carotenoid and the phenolic compounds biomarkers were identified for both berries and leaves. (NS): The specific bands for samples discrimination were also identified.

Conclusion & Significance: Both selective and non-selective approaches were successfully used for sample authenticity determination.

Recent Publications

1. Pop R M, Buzoianu A D and Chedea V S (2016) Analysis of proanthocyanidins: Extraction, liquid chromatography and mass spectrometry methods. In Procyanidins: Characterisation, Antioxidant Properties and Health Benefits. Biochemistry Research Trends. pp:21-68.
2. Pop R M et al. (2014) Untargeted metabolomics for sea buckthorn (*Hippophae rhamnoides ssp. carpatica*) berries and leaves: fourier transform infrared spectroscopy as a rapid approach for evaluation and discrimination. Not. Bot. Horti Agrobot. 42(2):545-550.
3. Pop R M et al. (2013). HPLC-UV analysis coupled with chemometry to identify phenolic biomarkers from medicinal plants, used as ingredients in two food supplement formulas. Bull. Univ. Agric. Sci. Vet. Med. Cluj-Napoca. Food Sci. Technol. 70(2):99-107.

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4. Pop R M et al. (2013) UHPLC/PDA-ESI/MS analysis of the main berry and leaf flavonol glycosides from different carpathian *Hippophaë rhamnoides* L. varieties. *Phytochem. Anal.* 24(5):484.492.
5. Pop R M et al. (2014b) Carotenoid composition of berries and leaves from six Romanian sea buckthorn (*Hippophae rhamnoides* L.) varieties. *Food Chem.* 147:1-9.

Biography

Raluca Maria Pop pursued PhD in Biotechnology (2011) and a master's Degree in Food quality management (2010). Since 2012 she is currently working as a Researcher in the Pharmacology, Toxicology and Clinical Pharmacology Department at the University of Medicine and Pharmacy from Cluj Napoca, Romania (Italy). Her research expertise focuses on the quantitative and qualitative evaluation of different drugs and plant extracts. During her research activity, she used different advanced techniques like high-performance liquid chromatography (HPLC), HPLC coupled with mass spectrometry (HPLC-MS), gas chromatography coupled with mass spectrometry (GS-MS), UV-VIS spectroscopy and Fourier Transform Infrared spectroscopy (FT-IR) to characterize and identify different drugs and plant authenticity biomarkers.

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