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Editorial board:

Karin Kovačević Ganić, Verica Dragović-Uzelac, Sandra Balbino

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OPTIMIZATION OF EXTRACTION METHODS FOR ISOLATION OF VOLATILE COMPOUNDS AND HESPERIDIN FROM ORANGE PEEL

Stela Jokić¹, Maja Molnar¹, Ana-Marija Cikoš¹, Martina Jakovljević¹, Igor Jerković²

¹ Faculty of Food Technology,

Josip Juraj Strossmayer University of Osijek, Osijek, Croatia

² Faculty of Chemistry and Technology, University of Split, Split, Croatia

* stela.jokic@ptfos.hr

Abstract:

Citrus peels are valuable source of bioactive compounds such as limonoids, dietary fibres and phenolic compounds and must be processed to keep those compounds unchanged for improvement of food, cosmetics and drugs quality. The peel orange from the variety Washington was extracted by supercritical CO₂ (SC-CO₂) at different extraction parameters of temperature and pressure to obtain extracts with different volatile composition. The extracts were analyzed in detail by gas chromatography and mass spectrometry (GC/MS). The limonene predominance were found (up to 89%). The principal oxygenated monoterpenes were linalool, α -terpineol, decanal, and (E)-citral. From the orange peel after SC-CO₂ extraction, the ultrasound-assisted extraction (UAE) was performed to obtain the extracts rich in hesperidin - bioflavonoid with wide range of pharmacological properties. The influence of extraction temperatures (30, 50, 70 °C), time (15, 30, 45 min), ethanol : water ratio (20%, 50%, 80% v/v) and solvent-solid ratio (10, 30 and 50 mL/g) on the hesperidin content in obtained extracts was determined. Hesperidin was analysed by reversed-phase High Performance Liquid Chromatography (HPLC). The extraction optimization was conducted using response surface methodology (RSM). The results showed that concentrations of dominant components were different applying different extraction conditions. Therefore, SC-CO₂ extraction and UAE applied to food by-products such as orange peel exhibited a strong potential for the industrial development in the production of the extracts rich in bioactive compounds.

Keywords:

Orange peel, extraction, GC-MS, hesperidin, optimization