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COMPARISON OF THE EFFICIENCY OF DIFFERENT METHODS FOR HESPERIDIN AND NARIRUTIN EXTRACTION FROM ORANGE PEEL

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During industrial citrus processing, large quantities of waste material are produced mainly as citrus peel. These food by-products often contain significantly high amount of bioactive components, therefore representing a highly valuable raw material for production and development of new products. Orange peels contain diversity of bioactive compounds, among which hesperidin is the most abundant flavonoid present in citrus products. Hesperidin possesses different properties, such as positive effects on vascular or cardiovascular system, anti-inflammatory activity, anticancer activity, antimicrobial activity, antioxidant activity, while narirutin exhibits good antioxidant, anti-inflammatory, and produces antidepressant-like properties.

Systematic comparison between microwave-assisted (MAE) and ultrasound-assisted extraction (UAE) was performed. In both MAE and UAE methods, the influence of following extraction parameters was investigated in order to perform adequate comparison; temperature (30, 50, 70 °C), extraction time (5, 10, 15 min), and solvent type (water, 80 % aqueous ethanol solution, 50 % aqueous methanol solution), at investigated microwave power (300 - 800 W) in MAE, as well with frequency (37 Hz) and power (50 W) of ultrasound in UAE method. Extracts were characterized with different levels of hesperidin and narirutin (determined and quantified by HPLC) depending on the applied process parameters and extraction method. Both methods have demonstrated predominance of hesperidin in orange peel compared to narirutin. Extraction efficiency for both compounds was enhanced in aqueous ethanol and methanol solutions.

This study showed that MAE could obtain better extraction yields of hesperidin and narirutin in shorter extraction time, at lower heat exposure and with adequate solvent application compared to the UAE method.

Keywords: *Bioactive compounds, Extraction, Hesperidin, Narirutin, Orange peel*

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