

Effect of high voltage electric discharge on the extraction of phenolic compounds from mandarin (*Citrus unshiu* M. var. *okitsu*) peel waste

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Abstract

The objective of this study was efficient utilization and valorization of mandarin peel (*Citrus unshiu* M. var. *Okitsu*) using a green extraction technique and water as a solvent. Mandarin peel was subjected to a high voltage electric discharge (HVED) assisted extraction procedure under different experimental conditions: solvent:solid ratio (200, 300, 400 mL/g), frequency (40, 70, 100 Hz) and treatment time (5, 10, 15 min), in order to study the influence of these conditions on the extraction yield and content of phenolic compounds. Using high-performance liquid chromatography, 5 compounds have been identified and quantified, namely hesperidin (50.52-72.91 mg/g), narirutin (7.47-17.39 mg/g), rutin (1.36-5.25 mg/g), cryptochlorogenic acid (0.39-1.10 mg/g) and neochlorogenic acid (0.33-1.10 mg/g). The extraction yield was ranked from 359.5 to 463.2 mg/g showing a strong dependence on the applied process parameters. Moreover, using spectrophotometric assay, total phenol content (expressed as mg of gallic acid equivalents) and antiradical activity (expressed as % DPPH) were determined and were ranked from 96.23 to 275.46 mg GAE/g and from 87.06 to 94.93% respectively. These results clearly demonstrate that HVED treatments can enhance the extraction efficiency due to electrohydraulic discharge phenomena, including the emission of high-intensity UV light, the generation of shock waves, and the generation of free radicals produced by the photodissociation of water which can decrease particle size and influence fragmentation of cell membranes and intensify mass transfer and increase the release of intracellular compounds into the solvent.

Biography

Marija Banožić, MSc, PhD student at the Faculty of Food Technology in Osijek was born on 26 August 1992. She graduated in 2016 at the Faculty of Agriculture and Food Technology Mostar, Bosnia and Herzegovina and started working at the Faculty of Food Technology in 2018. She is part member of

a group from the research project "Application of innovative techniques of the extraction of bioactive components from by-products of plant origin". Until now she has published 12 scientific papers and 3 book chapters.