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Abstract

Ultrasound-Assisted Extraction of Bioactive Compounds from Black Currant and Chokeberry Pomaces †

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Abstract: Constantly growing amounts of food waste act as an encouragement to find new solutions to recover valuable components. Fruit industry by-products, such as pomaces obtained after juice pressing, are a source of bioactive compounds, e.g., polyphenols, which are known as anti- oxidative molecules. The process of bioactive compound extraction may be, however, harmful to the environment and energy-consuming. In the following study, sonication was used to improve extraction efficiency and decrease energy and organic solvent consumption. Black currant and chokeberry pomaces obtained as by-products of juice pressing were dried. Bioactive extracts were collected in ultrasound-assisted processes, which were conducted using an ultrasonic homogenizer, applying different parameters of ultrasound amplitudes (30%, 55%, and 80%) and times of sonication (2 min, 6 min, and 10 min) and using water as an extractant. The total polyphenol content of the extracts was determined in a Folin–Ciocalteu assay and their antioxidant capacity of them was determined in an ABTS study. The values of the total polyphenol content were significantly higher when sonication was applied, reaching an over 1.7-fold higher value of polyphenol content in the chokeberry extract when an 80% amplitude and 10 min time of the ultrasound treatment was implemented, compared to the control (maceration with water). According to the literature, the main groups of polyphenols found in chokeberry pomace are anthocyanins, followed by phenolic acids and flavonols, and black currant pomace consists mainly of anthocyanins. Differences in antioxidant capacity values were also significant, reaching a maximum level of 13.7 µmol Trolox equivalent/ml of chokeberry extract and 20.5 µmol Trolox equivalent/ml of black currant extract. Both of the highest results were noted when an 80% amplitude and 10 min time of ultrasound treatment were applied. Alternative extraction methods accelerate the extraction process and allow bioactive compound-rich extracts to be obtained from the berry fruit by-products.

Keywords: ultrasound-assisted extraction; pomace; fruit waste; black currant; chokeberry

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