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Extraction of anthocyanins from haskap berry pulp using supercritical carbon dioxide: Influence of co-solvent composition and pretreatment

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Abstract

Extracts rich in anthocyanin compounds were obtained from haskap berry pulp paste using supercritical carbon dioxide ($scCO_2$) and water as co-solvent. The extraction conditions including pressure, temperature, and amount of water were further optimized by Box-Behnken design. The highest total anthocyanins (TA) yield of 52.7% was achieved at 45 MPa, 65 °C, 5.4 g water to 3.2 g berry pulp paste, 15 min static and 20 min dynamic time. Different combinations of water and ethanol as co-solvent did not significantly affect the TA yield. Furthermore, similar anthocyanin extraction yields were obtained in the case of the pulp paste and rehydrated freeze-dried berry pulp powder, which indicates that freeze dryings pretreatment is not required prior to $scCO_2$ extraction. Compared with conventional extraction, the use of $scCO_2$ and water as co-solvent offered higher anthocyanin extraction efficiency (52.7% versus 38.3%) with improved antioxidant activity (89.8% versus 72.2%).

Keywords

Anthocyanins; Haskap berry; Supercritical fluid extraction; Co-solvent composition; Pretreatment