Valorisation of seabuckthorn pomace to obtain bioactive soluble dietary fibre using response surface methodology

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Seabuckthorn pomace is a considered as a valuable industrial by-product acquired after juice extraction that contains various bioactive compounds including dietary fibres. Due to the lack of appropriate processing and handling facilities, most of this pomace is just used as livestock feed or simply discarded. A study was conducted to assess the effects of green extraction methods including ultrasonic-assisted extraction on the yield of soluble dietary fibre (SDF) from seabuckthorn pomace. A response surface methodology (RSM) coupled with a Box-Behnken Design (BBD) was employed for optimising the yield of SDF. The study investigated the impact of varying sonication temperatures, sonication power, and extraction time on yield of SDF. Moreover, this study also examined the hydration properties and color measurement of seabuckthorn pomace powder (STP) and obtained dietary fibre fractions such as soluble and insoluble dietary fibres (SDF and IDF). From the RSM findings, the optimal sonication temperature (67.83 °C), sonication power (105.52 W) and extraction time (51.18 min) were identified. Thus, the modified optimum conductions were standardised to 70 °C, 105 W and 50 min, respectively. Subsequently, the yield of SDF achieved was close to the predicted value. Sonication temperature exhibited significant effects at $p \leq 0.01$, whereas sonication power and extraction time demonstrated significant effects at $p \leq 0.05$ on SDF yield.
Furthermore, SDF demonstrated higher values of hydration properties, compared to STP and IDF. Based on these results, RSM is recommended to be adopted in order to optimise the ultrasonic-assisted extraction to attain maximum yield of SDF from pomaces. The research findings can be useful in designing future functional food formulations suing seabuckthorn pomace.

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