

Optimization of total phenolic and flavonoid 2 contents of defatted pitaya (*Hylocereus polyrhizus*) 3 seed extract and its antioxidant properties

ABSTRACT

The present study was conducted to optimize extraction process for defatted pitaya seed extract (DPSE) adopting response surface methodology (RSM). A five-level central composite design was used to optimize total phenolic content (TPC), total flavonoid content (TFC), ferric reducing antioxidant power (FRAP), and 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS) activities. The independent variables included extraction time (30–60 min), extraction temperature (40–80 °C) and ethanol concentration (60%–80%). Results showed that the quadratic polynomial equations for all models were significant at ($p < 0.05$), with non-significant lack of fit at $p > 0.05$ and R^2 of more than 0.90. The optimized extraction parameters were established as follows: extraction time of 45 min, extraction temperature of 70 °C and ethanol concentration of 80%. Under these conditions, the recovery of TPC, TFC, and antioxidant activity based on FRAP and ABTS were 128.58 ± 1.61 mg gallic acid equivalent (GAE)/g sample, 9.805 ± 0.69 mg quercetin equivalent (QE)/g sample, 1.23 ± 0.03 mM Fe^{2+} /g sample, and $91.62\% \pm 0.15$, respectively. Ultra-high-performance liquid chromatography-quadrupole time-of-flight mass spectrometry (UPLC-QTOF/MS) analysis identified seven chemical compounds with flavonoids constituting major composition of the DPSE.

Keyword: Defatted pitaya seed; Extraction; Phenolic content; Flavonoid content; Antioxidant activity; Response surface methodology