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Intensification of Antioxidant-Rich Extract from Moringa Oleifera Leaves Using Different Solvents: Optimization and Characterization

Abstract

Natural antioxidants have gained a huge amount of interest due to their ability to combat devastating ailments such as obesity and hypercholesterolemia. Rich in phenolics and flavonoids, Moringa Oleifera (MO) has piqued the interest of many researchers. MO plants have numerous nutritional and therapeutic advantages. The current study aims to maximize yield by optimizing the conditions of MO leaves extraction with the help of a few organic second solvents. Central Composite Design (CCD) of Response Surface Methodology (RSM) was used to optimize total phenolic content (TPC) and total flavonoid content (TFC) of MO extract. Four independent variables (A) type of second solvents, (B) solvent to second solvent ratio, (C) extraction temperature, and (D) extraction time were studied. TPC was evaluated using the Folin–Ciocalteu colorimetric technique, and extract solutions were measured at 765 nm. TFC was determined by aluminium chloride colorimetric test at wavenumber of 416 nm. The functional group of the optimized MO extract was subsequently studied using Fourier Transform Infrared Spectroscopy (FTIR). The optimization studies indicated that the optimum TPC was 313.265 µg · GAE ·mg−1 and TFC was 90.268 µg · QE · mg−1 which were achieved at formulation conditions of (A) acetone, (B) at 1:3, (C) of 100 °C, and (D) of 240 min. The most intense stretching peak of FTIR spectra was detected at 3262.79 cm−1 revealed the characteristics absorption of hydroxyl groups from phenolic content of MO extract. This simulated finding proved that the best extraction solvent elucidates that MO leaves are rich in valuable antioxidants with tremendous therapeutic potency for obesity and hypercholestrolaemia treatment.

Keywords

Moringa Oleifera leaves extract; Phenolic and flavonoid contents; Response surface surface methodology