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Application of supercritical carbon dioxide extraction of bioactive compounds from cat's whiskers leaves

Abstract

Cat's whiskers, scientifically known as Orthosiphon stamineus, is a widely used herbal remedy in Malaysia for various health issues. This herb is rich in bioactive compounds, particularly phenolics and flavonoids, which are responsible for its therapeutic properties. To enhance the extraction of these beneficial compounds, the bench-scale supercritical carbon dioxide ($SCCO_2$) extraction method was employed. The study was conducted at various extraction conditions from 10 to 30 MPa of pressure and from 40°C to 80°C of temperature, while keeping the carbon dioxide flow rate, mean particle size of the sample, and extraction duration constant at 10 g/min, 300 µm, and 2 h, respectively. The highest extract yield was obtained at optimized condition of 29 MPa and 79°C with 28.12 g/10 g of sample. The highest total phenolic content of approximately 124.324 ppm was obtained at 60°C and 30 MPa, whereas the maximum total flavonoid content reached around 840.595 ppm at 80°C and 30 MPa. This research successfully established the high content of phenolic and flavonoid compounds from cat's whiskers leaves using bench-scale $SCCO_2$ extraction that the extract is applicable for food and pharmaceutical industries.

Keywords

cat's whiskers leaves; Orthosiphon stamineus; supercritical carbon dioxide extraction; total flavonoid content; total phenolic content