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OPTIMIZATION AND KINETICS OF THE SUPERCRITICAL FLUID EXTRACTION OF TRITERPENOIDS FROM *GANODERMA LUCIDUM* WITH CO_2 AND ETHANOL AS COSOLVENT

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ABSTRACT

This research aims to optimize ethanol-modified supercritical carbon dioxide extraction (SC-CO_2) conditions for extracting triterpenoids from *G. lucidum* using a response surface methodology (RSM). A central composite face-centered design (CCF) was employed to investigate the influences of three independent variables, including ethanol concentration in SC-CO_2 (X_1), extraction pressure (X_2), and temperature (X_3) on the response, triterpenoid content (Y). The results showed that the optimal RSM-based SC-CO_2 conditions were 380 bar, 7%v/v, and 60°C, achieving the maximum value of 1.49g/100g. Under these conditions, the predicted values for triterpenoids agreed well with the experimental results, confirming the validity of the generated model. The SC-CO_2 extraction technique showed clear advantages over conventional maceration extraction and soxhlet extraction in terms of high triterpenoid recovery and antioxidant activity. The kinetics of the solvent-based triterpenoid extraction processes were subsequently assessed via the first-order and second-order kinetic models. The second-order kinetic model was more sufficient to describe the extraction mechanism of triterpenoids from *G. lucidum* in comparison to the first-order kinetic extraction model. According to these findings, SC-CO_2 extraction is a promising and efficient method for triterpenoid extraction from *G. lucidum*.