**Optimization of supercritical fluid extraction of phytosterol from roselle seeds with a central composite design model.**


## ABSTRACT

Recovery of phytosterol from roselle (Hibiscus sabdariffa L.) seeds via supercritical carbon dioxide extraction modified with ethanol was investigated at pressures of 200–400 bar, temperatures from 40 to 80 ◦C and at supercritical fluid flow rates from 10 to 20 ml/min. It was found that an entrainer such as ethanol could enhance the solubility and extraction yield of roselle seed oil from the seed matrix, compared to values obtained using supercritical CO2. After a typical run (holding period of 30 min, continuous flow extraction of 3 h), the results indicate that the oil recovery was optimal with a recovery of 108.74% and a phytosterol composition of 7262.80mgkg−1 at relatively low temperature of 40 ◦C, a high pressure of 400 bar and at a high supercritical fluid flow rate of 20 ml/min in the presence of 2 ml/min EtOH as entrainer. The solubility of roselle seed oil increased with temperature at the operating pressures of 200, 300 and 400 bar. Supercritical fluid extraction involved a short extraction time and the minimal usage of small amounts of entrainer in the CO2.



**Keyword:** Carbon dioxide; Optimization; Phytosterol; Response surface methodology; Roselle seed oil; Supercritical fluid extraction.