

Recovery of Anthocyanins from *Hibiscus sabdariffa* L. Using a Combination of Supercritical Carbon Dioxide Extraction and Subcritical Water Extraction

ABSTRACT

Anthocyanins are one of the bioactive compounds in roselle that has many medicinal purposes. Anthocyanins are placed in the inner part of the roselle; therefore, combinations of two methods were applied to extract the anthocyanins. The first stage is employing supercritical carbon dioxide (ScCO₂) to break the particle surface or outer layer of the roselle based on the total phenolic compounds (TPC) recovery, and the second step was to apply subcritical water extraction (SWE) for the extraction of anthocyanins. The objective is to determine the best conditions to obtain high yields of total anthocyanins compounds (TAC) from the roselle (*Hibiscus sabdariffa*) by employing a combination of ScCO₂ and SWE. The optimal conditions of ScCO₂ (first stage) were 19.13 MPa, 60 °C, and 4.31 mL/min, yielding 18.20%, and 80.34 mg/100 g TPC, respectively. The optimum conditions of SWE (second stage) were 9.48 MPa, 137 °C, and 6.14 mL/min, yielding 86.11% and 1224.61 mg/100 g TAC, respectively. The application of integrated ScCO₂ and SWE proved successful in achieving high anthocyanins production and yield as compared to previous extraction methods. This approach may be used to extract the roselle with a greater anthocyanin's concentration than the prior method.