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Effect of Extraction Condition, Heat Treatments and Spay-drying on Stability of Roselle Anthocyanins as Natural Food Colorant

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Abstract

The present study was designed to investigate the effect of spray-drying as microencapsulation technique on the stability of roselle calyces (R.C.) anthocyanins. Different extraction conditions were evaluated to identify the best extraction presider for extracting roselle anthocyanins. The results showed that using 2% citric acid solution by 1: 10 solids: solvent ratio with crushed flower at 85°C for 20min. was the best condition for extraction of the red pigments from roselle calyces and recorded the highest anthocyanin yield of 1229mg/100g R.C. Total phenolic contents (TPC) and antioxidant activity was determined and the results showed that roselle calyces had TPC ranged from 12.16 to 14.45mg. gallic acid equivalent/g. depending on the extraction solvent. Methanol: water (80:20 V/V) recorded the highest TPC. Results also reflected that R.C had a strong antiradical efficiency of 0.727 and EC50 of 1.37µg roselle extract/µg DPPH. Thermal stability of roselle anthocyanins was investigated and the results showed that roselle extract heated at 95°C for 30 min. recorded retention value of 80.017%. The effect of three different encapsulating agents i.e. maltodextrin D.E. 18.7, gum Arabic and whey protein isolate on pigments stability was investigated. Maltodextrin DE 18.7 was found as the most effective carrier in stabilizing the pigments under the storage conditions examined with half-life of 577.62days. The application results proved that the addition of encapsulated roselle anthocyanins as a natural color with level of 0.3 % in a strawberry drink model system and 0.5% to jelly formulation was acceptable and can replace the synthetic color.

Keywords: *Roselle (Hibiscus subdariffa L), Anthocyanins, Encapsulation, whey protein, shelf-life, jell*