

3- Extraction, Encapsulation and Utilization of Red Pigments from Roselle (*Hibiscus sabdariffa* L.) as Natural Food Colourants

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Abstract

The present work was carried out to produce a dry powder of red colour from roselle calyces for colouring some food products using microencapsulation technique. The stability of the encapsulated pigments was investigated during storage under different water activities. The results showed that ethanol acidified with 1.5N HCl (85:15) had the greatest efficiency in extracting roselle pigments followed by 2% citric acid solution while distilled water was the less effective. The results indicated that at low pH values (1.5, 2, and 3); the pigment extracts exhibited their greatest stabilities during the entire holding time. Data showed that roselle pigment extracts heated for 30 min at temperatures of 60, 70, 80, 90, and 100°C, retained 99.87, 99.24, 94.49, 86.35, and 78.59% of their anthocyanins contents, respectively. As heating time was extended to 60 min., the retention values decreased to 96.99, 86.75, 82.10, 76.72, and 57.69%, respectively. The effect of three different encapsulating agents i.e. Maltodextrin D.E. 10, Maltodextrin D.E. 20, and gum Arabic on pigments stability was investigated. The degradation followed first – order reaction kinetics and was strongly dependent on a_w and the matrix. Among the polymeric matrices, which largely elongated the half-life of roselle anthocyanins, maltodextrin DE 20 was found as the most effective carrier in stabilizing the pigments under all storage conditions examined. The half-life periods for anthocyanins encapsulated in maltodextrin DE 20 were 433.1, 238.96, 80.58, and 94.93 days for storage water activities of 0.43, 0.53, 0.64 and 0.75, respectively. The prepared encapsulated pigments were utilized in colouring some food products included strawberry jam and hard candy.

—**Key words:** *Roselle (Hibiscus subdariffa L), anthocyanins, encapsulation, maltodextrin, gum Arabic, water activity, degradation kinetic, stability, hard candy, jam, shelf-life.*