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Betalains from *Hylocereus polyrhizus*: A potential natural red food colourant

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The current trend in food colouring research is the discovery and use of natural food colourants to overcome the potential adverse effects of synthetic colourants. *Hylocereus polyrhizus* (red pitahaya) is rich in betalains, a potential source of natural red colourant. The betalain extracts from *Hylocereus polyrhizus* can contain up to 80% of fermentable sugars. These free sugars result in diluted colourant preparation and possible caramelization during food processing at high temperatures. Fermentation using *Saccharomyces cerevisiae* is a simple technique to remove these free sugars and to concentrate the betalains from *Hylocereus polyrhizus*. This study optimized the fermentation conditions (temperature, duration, inoculum size and agitation speed) using Response Surface Methodology (RSM) to achieve the maximum recovery of betalains. A Box-Behnken design was performed to analyse the effects of fermentation conditions on the yield, Betacyanin Content (BC) and total sugar content of betalains. The study revealed that agitation speed had a significant influence on the yield of betalains while temperature, duration and agitation speed were the key factors for the removal of sugars from betalain extracts. The BC was significantly influenced by temperature and agitation speed. The optimized conditions obtained were as follows: Temperature of 36°C, duration of 16.5 hr, inoculum size of 2.7% and agitation speed of 107 rpm. Under these fermentation conditions, at least 48.8% of betalains with a BC of 132.5 g kg⁻¹ and 2.57% of sugars will be recovered. These optimized fermentation conditions are useful for the production of betalains with low sugar content as potential natural red colourants for the application in the food industry.

Biography

Ashwini Gengatharan is in her final year of PhD degree under the supervision of Dr. Wee Sim Choo and Prof. Gary A Dykes at the School of Science, Monash University Malaysia. She completed her BSc (Hons) Biotechnology at AIMST University, Malaysia with a First-Class Honours and obtained her Masters in Biotechnology from Macquarie University, Australia. Her areas of research interest are mainly on the production of functional foods, application of plant secondary metabolites in food processing and to improve consumer food products.

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