UNIVERSITI TEKNOLOGI MARA

PHYSICOCHEMICAL PROPERTIES OF ANTHOCYANINS IN ROSELLE , *SENDUDUK* AND PURPLE-FLESHED SWEET POTATO AND ITS APPLICATION IN PINK GUAVA JUICE

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AUTHORS'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic instituition or non-academic instituition for any degree or qualification.

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ABSTRACT

Recently, there is an increase demand for natural food colourant by health-concern consumers. Among all pigments, anthocyanin is the target of numerous studies because of its colourant properties. This study was conducted to evaluate the properties of anthocyanin from three plant sources, roselle calyx (Hibiscus sabdariffa L.), senduduk fruit (Melastoma malabathricum L.) and purple-fleshed sweet potato (PSP) (Ipomoea batatas L.). Their stability in acidic pH range (pH 2.0 to 4.5) and in different combinations ratio between roselle and senduduk and roselle and PSP were evaluated. Total monomeric anthocyanin, degradation index, polymeric colour percentage, colour density and colour parameters (i.e. lightness, chroma and hue angle) were analysed using UV-Visible Spectrophotometer and Chromameter, Among the three sources, aqueous extract of roselle contained the highest total monomeric anthocyaning $(163.32 \pm 4.18 \text{ mg/L})$ that is 3 times higher than *senduduk* and 12 times higher than PSP. In acidic pH conditions, PSP extract was found to be the most stable and the least affected by pH as there was no significant different in its anthocyanin content with increasing pH. For the anthocyanins combination study, the results showed that 70:30 ratio of roselle and *senduduk* have the highest monomeric content $(120.97 \pm 1.80 \text{ mg/L})$, the lowest polymeric colour percentage (6.84 \pm 0.57) and degradation index (1.154 \pm 0.018). Its colour density (60.78 \pm 0.61), chroma value (45.79 ± 0.75) , L* (61.53± 0.30) and H^o(9.22 ± 0.03) was also the highest among all combinations which exhibited an intense red-pinkish shade. Therefore, it was selected for ready-to-drink pink guaya juice application and subjected to further storage stability investigation at 4 °C and 25 °C. Total phenolic content, antioxidant activity (FRAP and DPPH) and colour were evaluated to determine the overall anthocyanins stability in the juice. The results showed that the radical scavenging capacity remain stable and was not affected by storage time and temperature. However, the total phenolic content and FRAP reducing power gradually decreased with the increase of temperature and storage time. Changes in colour parameters were also observed confirming the degradation of anthocyanin colour attributes during storage. In conclusion, this study showed the potential of utilising anthocyanin-based natural colourant in fruit juice with antioxidant health beneficial value to replace the artificial colourant but with a certain time and temperature stability upon storage.

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