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Exploring the Impact of Diverse Herbal Mixtures on the Quality and Bioactive Attributes of 'Kithul' Treacle in the Sinharaja Forest Region

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Abstract

Sinharaja forest reserve is renowned for the practice of 'Kithul' tapping among traditional people. They collect sap from the young inflorescence of the *Caryota urens* palm by tapping young inflorescence. This study investigates sustainable tapping techniques for enhancing health influencing properties of 'kithul' treacle which produced from sap. This study explores the bioactive properties and quality of 'kithul' treacle where the 'kithul' palm is treated with four distinct tapping mixtures, each utilizing a unique blend of local herbal ingredients found from wilds. Tapping procedures were conducted on four 'kithul' trees, selected to ensure uniformity in environmental conditions and tapping age, facilitating a controlled analysis of treacle properties. Different traditional herbal tapping mixtures are used by villagers to tap kithul palm. The ingredients are secrets and vary from each individual. The antioxidant contents were assessed using DPPH and ABTS assays, while total polyphenol and flavonoid contents were measured using Folin-Ciocalteu and aluminum chloride colorimetric methods, respectively. Treacle from mixture 04 showed the highest antioxidant activity with DPPH and ABTS values of 63.84 ± 0.39 mg GAE/100g and 377.85 ± 3.76 mg TE/100g, respectively. Mixtures 01 and 03 had significantly higher polyphenol content ($P < 0.05$), and mixture 03 exhibited the highest flavonoid content (39.79 ± 0.86 mg QE/100g). pH values of the kithul treacle ranged from 5.12 to 7.19. Notably, treacle from tapping mixture 02 had the highest Brix value at 70.5. Kithul treacle samples were analyzed to determine the proximate composition. Treacle from mixtures 04 exhibited relatively higher fat content, with water content consistently around 30 %. The ash content across all samples remained below 1.5%. High-Performance Liquid Chromatography (HPLC) analysis revealed the highest sucrose content in treacle from tapping mixture 04 (52.4%). Results demonstrated significant differences ($P < 0.05$) in bioactive compounds among the tapping mixtures. The quality and the bioactive properties of kithul treacle was observed to vary depending on the composition of the tapping mixture used, highlighting the impact of mixture composition on the final product's characteristics. This research provides valuable insights into enhancing the nutritional and medicinal properties of 'kithul' treacle through optimized traditional tapping practices.

Keywords: *Caryota urens*, Antioxidants, Total flavonoids, Total polyphenols