An analysis of regional variations in the physicochemical properties of Cocos nucifera L. var. nana across Sri Lanka

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Abstract

This study explores the intriguing regional disparities in the characteristics of green dwarf tender coconut water (Cocos nucifera L. var. nana) in Sri Lanka. Physicochemical

parameters of coconut water subjected to a comprehensive analysis following standard AOAC methods. The prevalent sugar types in the samples were identifed as fructose and glucose, with a minute amount of sucrose using High-Performance Liquid Chromatography (HPLC). Notably, regional diferences in sugar profles were observed during the analysis. Kurunegala samples exhibited signifcantly higher levels of total soluble solids (5.98±0.12°Brix), along with elevated total sugar (70.13±5.06 mg mL−1), total reducing sugar (68.53±5.57 mg mL−1), glucose (39.65±6.10 mg mL−1), and fructose (37.65±7.12 mg mL−1), while Colombo samples demonstrated the least values. Regarding pH values, Colombo samples exhibited a signifcantly lower value (4.87±0.10). Furthermore, a significant quantity of macro minerals such as calcium, sodium, potassium, and magnesium, along with trace minerals like iron and zinc, were identifed. Fourier-transform infrared spectroscopy analysis indicated the presence of functional groups from simple sugars and phenolic compounds as major chemical bonds for all regions. Principal Component Analysis was performed considering the Electronic Nose (E-nose) data, revealing distinctive volatile profle clusters for Kurunegala and Colombo samples. Moreover, sensory evaluations confrmed Kurunegala as the most preferred, while Colombo was ranked as the least preferred in terms of organoleptic characteristics. These fndings underscore the critical importance of regional variations in the nutritional content and sensory attributes of coconut water, which play a pivotal role in infuencing customer preferences.

Keywords E-nose · HPLC · Physicochemical parameters · Regional variations · Sugar profle · Tender coconut water

Citation

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