Chemical characterization and authentication of *Caryota urens* L. (Kithul) sap and products

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Abstract

Caryota urens L. (Kithul) sap has been used to prepare traditional sweeteners (treacle and jaggery) and fermented drinks..All these products have a very high demand due to their natural origin, and they are recognized as organic food products. The products are highly priced commodities due to the scarcity in production and the high demand due to their uniqueness in taste and aroma as well as due to traditional claims on the health benefits. However, reports available on chemical composition of Kithul sap and its products are very limited and mostly limited to total sugar content and reducing sugar contents. The complete nutritional composition has not been determined for any of the Kithul products. Also the intentional adulteration of the sap and products has become a major challenge to the industry. Furthermore, scientific methods for the detection of such adulterations have not been established. Therefore, in this study, chemical characterization of C.*urens* sap, treacle and jaggery was attempted and new procedures were developed for the authentication of the products. Further, a simple test kit was developed and validated for the detection of adulteration of Kithul treacle and jaggery by cane sugar.

Nutrition labeling of the sap and its products were completed using the established AOAC methods. Amino acids profiles were established based on HPLC separation and fluorescence detection while HPLC separated organic acids were determined using diode array detection. Aroma volatiles of the products were also investigated using GC/MS. Levels of ascorbic acid and total phenolic compounds were also determined.

For the first time, the present study reports the complete nutritional information of Kithul sap and its products. Further, this is also the first report on the amino acid composition and organic acid and polyphenol composition of the Kithul sap and its products. This scientific investigation on the aroma, volatile composition of Kithul treacle paves way for the differentiation of the different types of treacle replacing the traditional organoleptic tests.

Knowledge generated in this study will uplift the value of these traditional products and will open up more avenues for the growth of this sector as an export oriented industry. Further this study will stimulate new research and development projects resulting in new products and value additions to this sector. Thus, this is a pioneering research study benefiting to rural industrialist, farmers in Sri Lanka, product consumers and researchers in allied disciplines.