

Kithul Flour (*Caryota urens*) as a Potential Flour Source for Food Industry

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Abstract This study search for underutilized flour source, obtained from Kithul (*Caryota urens*) trees in Sri Lanka which is potentially valuable as food ingredient for the industry. The aim of this paper is to discuss the Physico-chemical and functional properties of Kithul flour. The protein content of the flour was 1.0% while the total fat content was 0.33%. It contained considerable amount of Calcium, Potassium, Magnesium and Iron content as 70.1, 59.5, 66.6 and 14.0 mg/100g respectively. Total starch content was 66.82%. In the case of Amylose content, Kithul flour contained 28.42% while amylopectin presented 71.32%. The high moisture sorption value has presented by Kithul flour samples as 29.47%. And also being high density flour (as 0.69g/cm³) this will be better thickener as well as a stabilizer in baking powders and as an emulsifier in the food industry. The measurement of gelatinization temperature which was obtained by Differential scanning calorimetric method was 76.74 °C, while enthalpy for gelatinization of Kithul flour was 11.12 J/g. The least gelation concentration (LGC) was 6. Length of the granules ranged from 26.5 to 64.7 µm and width of granules ranged from 7.0 to 56.9 µm. Three types of granular shapes as oval, spherical and irregular globular shape were exhibited. By considering all above Physico-chemical properties there is high possibility to use Kithul flour for empower the food industry, simultaneously strengthening the Kithul Industry with rural economy in Sri Lanka.

Keywords: Kithul flour, *Caryota urens*, Physico-chemical composition, mineral content, DSC, FT-IR

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1. Introduction

Flour from many sources provides a better raw material for the production of starch and different sweeteners [1,2]. Starch has broad capability to move about wide variety of uses [3]. Due to functional properties affects the physical characteristics of many foods, starch is used to apportion those properties for processed food, in food industries. Starch is mainly applied as taste enhancer, thickener, binder, and filler [1,2,3,4] as well as stabilizer, edible film former in food industry [5], but also in non-food industries such as pharmaceutical, textile [6], Cosmetics, plastics, adhesives and paper industries [7] used to produce adhesive, agro-chemicals, cosmetics and toiletries, detergent, paper making additives, pharmaceuticals, paints, textiles, water purification agents, and biodegradable plastics [2,8].

Palms are proper source for starch production which belongs to oldest families of plants on earth [9]. Contemporary researchers pay their keen attention to discover novel sources of starch, which exist in the wild. Kithul (*Caryota urens*) is a better response for this requirement, which is still keep as semi-wild species [10]. This palm is native for India, Malaysia and Sri Lanka [11]. The bark yields around 100 kg -150 kg of pith per palm

which used to preparation of flour [11]. The main usage of Kithul in current society is production of sap for toddy and jiggery [12]. So then common names for Kithul are Toddy palm and Jaggery palm [13]. The starch stored in trunk of the Kithul tree is the main edible food product of this palm. According to the reported values, palm generates 24 tons/hectare per year compared to rice which produce 6 tons / hectare per year while 5.5 tons/ hectare from corn and 2.5 tons/ hectare from potato [14]. According to the Rajalakshmi (2004) quality of flour from *Caryota urens* to be equal to the best sago of commerce extracted from *Metroxylon sagu rottb* [10].

The national survey conducted in 2009, has reported that the total number of Kithul trees found in the island amounts to 2,977,261 (vastly spread in Sabaragamuwa, Central and Uva provinces) [15]. Although matured or 'peedunu' trees was being 574,259, which sap was extracted amounts to only 89,855 (15.64%). Further evaluation proves that among the opportunities to develop Kithul industry there are 84% of the matured trees to be tapped [15]. This is the main point to deviate another expansion of Kithul industry as Kithul flour because non-tapping trees are more suitable for collecting. According to this statistic data 2,403,002 of new trees are available for maturation in 2014 with expanding the both tapping and flour industries [15].