

Extraction and Modification of Palmyrah Tuber (*Borassus flabellifer* L) Starch and Its Applicability as a Thickener

S. Darsiga^{1*}, N. Sobini², and T.C. Kananke¹

¹Department of Food Science and Technology, Faculty of Applied Sciences,
Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka.

²Palmyrah Research Institute, Kaithady, Jaffna, Sri Lanka.

*darsisiva3434@gmail.com

Palmyrah tuber is a seasonal product of palmyrah palm (*Borassus flabellifer* L). Palmyrah tuber flour is used to make starch-based products. However, the native starches have restricted industrial applications. Therefore, modifications of native starches are carried out to provide starch products with specific properties. In the present study, three different starch modification techniques (pre-gelatinization, acid modification and dextrinization) were used to produce modified palmyrah tuber starches. The physicochemical and functional properties of the native and modified palmyrah tuber starches were evaluated and compared. The resultant modified starches were compared with the native palmyrah starch and a commercially available starch to find out their applicability as a thickener. The extracted native starch yield was $16.04 \pm 0.56\%$. The recovery yields of modified starches ranged between 75.90 - 91.96%. The crude protein, lipid and fiber contents of modified starches significantly decreased compared to native starch (at $p < 0.05$). The water and oil absorption capacities of palmyrah starches were significantly increased ($p < 0.05$) after the modification processes. The dextrinized palmyrah starch showed significantly ($p < 0.05$) the lowest swelling power and the highest average solubility. The pre-gelatinized palmyrah starch showed a significantly decreased level of syneresis of its gel. The gelatinization temperature, amylose content (9.2 - 21.69%), amylopectin content and the whiteness index (92.29 - 95.75) varied among the native and modified starches. The total phenolic content (0.12 ± 0.00 mg GAE/g) and the antioxidant activity (DPPH-IC₅₀ value 81.99 ± 0.18 mg/ml) were higher in pre-gelatinized starch. The sensory scores and the apparent viscosity were higher for pre-gelatinized and acid-modified starch incorporated soup mixes than the native and dextrinized starch. The study revealed that the modification processes can greatly improve the physicochemical and functional characteristics of native starch and the feasibility of the application of modified palmyrah starch as a thickening agent.

Keywords: Functional, Modified starch, Palmyrah, Physicochemical, Thickener