

Extraction and Characterization of Arrowroot (*Maranta arundinacea*) Starch and Fiber

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The arrowroot plant, scientifically known as *Maranta arundinacea* and belonging to the *Marantaceae* family, thrives in tropical forest and it is renowned for its rich starch content and dietary fiber. The focus of this study was on the extraction of arrowroot starch and fiber, analysing physico-chemical properties of starch, coupled with an evaluation of the chemical composition of arrowroot tubers. The starch extraction process employed a wet extraction method from arrowroot tubers, while fiber extraction utilized the remaining fibrous part of the arrowroot starch. Arrowroot tubers demonstrated a carbohydrate content of $72.39 \pm 1.32\%$. The starch's CIELAB values were determined, with a L^* value of 84.44 ± 0.06 , a^* , b^* values of 0.07 ± 0.03 and 2.50 ± 0.02 , respectively. Morphological characteristics of starch and fiber were scrutinized using Scanning Electron Microscopy (SEM), revealing oval and spherical shapes in starch (diameter of 10 to 50 μm) and slots and grooves in fiber (length of 10 to 30 μm). Viscosity exhibited an upward trend with increasing temperatures, peaking at 16.80 cP at 60 °C and 283.1 cP at 90 °C, indicating its potential as a thickening agent. The starch displayed noteworthy swelling power (7.52g/g) and solubility (24.43%) at 90 °C. Water absorption index (WAI) ranged from 1.55-10.57g/g at 30°C, while the Water Solubility Index (WSI) varied from 14.29% to 24.65% at 90 °C, indicating its ability as a stabilizer or a binding agent. Moreover, this research employs dynamic light scattering to analyze arrowroot starch, revealing a mode diameter of 0.025mm, providing essential insights into its particle size distribution and solubility for applications in the food and pharmaceutical industries.

Keywords: Arrowroot, CIELAB values, Viscosity, Water absorption index, Water solubility index

Acknowledgement: Research and Publication Committee, Rajarata University, Sri Lanka (Grant no: RJT/R&PC/2022/R/FOT/02)