

Impact of Heat Moisture Treatment on Morphology and Physicochemical Properties of Starches from Kiri Ala (*Xanthosoma sagittifolium*), Hulankeeriya (*Maranta arundinacea*) and Buthsarana (*Canna indica*) Grown in Sri Lanka

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Roots and tubers have the potential to be used as an alternative source of carbohydrates due to their high starch content, with selected starches being significant for food security and industrial applications. In this study, starch was extracted from three underutilized root and tuber crops: *Xanthosoma sagittifolium*, *Maranta arundinacea* and *Canna indica* and those starches were modified and evaluated for their morphology and physicochemical properties in both native and modified forms. Heat moisture treatment as the physical modification, was conducted at moisture levels of 18% and 24%, temperatures of 100 °C and 120 °C for 4 to 6 hours. The granular morphology remained unchanged after HMT, although some granules exhibited rough surfaces. Modified *buthsarana* starch showed lower L* values (lightness) compared to other two types. The ΔE values of starch after modification from *kiri ala*, *hulankeeriya* and *buthsarana* were ranged in between 6.38-10.51, 7.90-8.16 and 12.61-16.05, respectively. Bulk density was decreased in all starches, while water holding capacity was increased in modified starches except 24%, 4h, 100 °C and 24%, 6h, 100 °C treatments in *kiri ala* compared to their native counterparts. Swelling power increased with temperature in both native and modified starches, with native starches showing higher values at higher temperatures compared to modified starches. Maximum water solubility was observed at 70 °C and 80 °C in modified *kiri ala* and *hulankeeriya* starches. Transparency increased after the modification in both *kiri ala* and *hulankeeriya* indicating reduced retrogradation. These findings highlight the potential of HMT to modify the physicochemical characteristics of starches from selected underutilized crops.

Keywords: Heat Moisture Treatment, *Kiri Ala*, *Hulankeeriya*, *Buthsarana*, Morphology, Physicochemical Properties

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