

ABSTRACT

Dual modification of Taro starch was carried out with microwave HMT process and other HMT processes like hot air oven and autoclave and their effect on chemical, physicochemical and functional properties of Taro starch was investigated. A combination of microwave at 180 watt for 5 min with Hot Air Oven & Autoclave treatment respectively is applied on Taro starch adjusted to 25 % moisture content. There is an increase in the crude fibre content of various HMT modified starch samples and the highest content is found in Autoclave HMT modified starch i.e. 2.6 %. There is an increase in the amylose content in 3 different HMT modified samples of which autoclave HMT modified starch showed highest amylose content i.e. 20.08 %. The A-type starch XRD pattern showed that taro starch with microwave HMT method exhibited reduction in peak intensity of α as compared to native starch. Heat-moisture treatment of starch did not change the degree of crystallinity in FT-IR analysis. Native starch has the highest lightness but lowest yellowness. Autoclave HMT modified starch has the highest colour hue and the highest yellowness but it also has the lowest lightness. Generally all the different types of HMT modified starches showed more swelling power and increased solubility than native starch. Microwave HMT starch showed highest solubility of 11.73 % and microwave + hot air oven HMT starch exhibited highest swelling power of 13.25 g/g. There is a general decrease in clarity observed in all the starch samples with the exception of the two dual modification HMT starches which exhibited less alteration of paste clarity. In terms of syneresis, microwave modified Taro starch has the best freeze-thaw stability and native Taro starch has the least freeze-thaw stability. The microwave HMT modified Taro starch showed highest peak viscosity of 5588 and microwave + autoclave HMT starch showed lowest peak viscosity of 198 in RVA analysis. Microwave HMT modified starch granules are least well differentiated and the granules show maximum signs of degradation in scanning electron micrograph. The highest firmness and consistency was observed for Microwave + Autoclave HMT modified starch. Dual modification is useful in altering a particular property of starch which is required for a specific food application.

Keywords: Taro starch, Dual modification, Microwave, HMT, Physicochemical properties, Functional properties.