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Physicochemical properties of fortified flour based modified cassava flour blended with bacterial poly-glutamic acid

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ABSTRACT

Cassava is one of the most important staple crops worldwide. However, cassava flour needs to meet the high-quality requirements in terms of physicochemical characteristics. The present study was designed to investigate properties of fortified cassava flour produced from co-processing of modified cassava flour with poly-glutamic acid (PGA) derived from protein of beans that had been fermented by Bacillus natto. Proximate analysis, cyanide content, swelling power, solubility, and viscosity of modified cassava flour (MCF) which was fortified with poly-glutamic acid (PGA) was found to indicate improvements as compared to the native flour. The modified flours were further investigated for their physicochemical properties after addition of poly-γ-glutamic acid (γ-PGA) at different levels. All flour samples showed no significant ($p>0.05$) differences in terms of lightness (L*), while greenness to redness (a*) of native flours was significantly ($p<0.05$) higher than modified flours with γ-PGA. There were significant ($p<0.05$) differences in the swelling power and solubility measured at various temperatures. From the pasting profiles, there were significant ($p<0.05$) increases in peak viscosity, final viscosity and pasting temperature of cassava flours due to addition of γ-PGA. Observation by scanning electron microscopy (SEM), pronounced cracks were observed in starch granules indicative of enzyme attack. It indicated that starch granules of modified and fortified cassava flour were depolymerized by enzymatic hydrolysis which led to cause change and degrade exterior surface of the granules within corrosion via pores of small granules.