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# Synthesis and Characterization of Cassava Starch-Zinc Nanocomposite Film for Food Packaging Application

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**Abstract :** Application of pure thermoplastic film in food packaging is greatly limited because of its poor service performance, often enhanced by the addition of organic or inorganic particles in the range of 1–100 nm. Thus, this study was conducted to develop cassava starch zinc-nanocomposite films for applications in food packaging. Three blending ratios of 1000 g cassava starch, 45–55 % (w/w) glycerol and 0–2 % (w/w) zinc nanoparticles were formulated, mixed and mechanically homogenized to form the nanocomposite. Thermoplastic were prepared, from a dispersed mixture of 24 g of the nanocomposite and 600 ml of distilled water, and heated to 90oC for 30 minutes. Plastic molds of 350 ×180 mm dimension and 8, 10 and 12 mm depths were used for film casting and drying at 60oC and 80 % RH for 24 hour. The average thicknesses of the dried films were found to be 15, 16 and 17 µm. The films were characterized based on their barrier, thermal, mechanical and structural properties. The results show that the oxygen and water vapor barrier properties increased with glycerol concentration and decreased with thickness; but the full width at half maximum (FWHM) and d- spacing increased with thickness. The higher degree of d-spacing obtained is a consequence of higher polymer intercalation and exfoliation. Also, only 2 % weight degradation was observed when the films were exposed to temperature between 30–60oC; indicating that they are thermally stable and can be used for packaging applications in the tropics. The mechanical properties of the film were higher than that of the pure thermoplastic but comparable with the LDPE films. The information on the characterized attributes and optimization of the cassava starch zinc-nanocomposite films justifies their alternative application to pure thermoplastic and conventional films for food packaging.

**Keywords :** synthesis, characterization, casaava Starch, nanocomposite film, packaging
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