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Microstructure and physical properties of nano-biocomposite films based on cassava starch and laponite

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Abstract

The aim of this research was to study the effects of laponite concentrations on some properties of nano-biocomposite films based on cassava starch, focusing mainly the relation between the properties of the surface microstructure and roughness, water contact angle and gloss. Nano-biocomposite films were produced by casting. We analyzed gloss, color, opacity, water contact angle, crystallinity by X-ray diffraction, and microstructure by scanning electron microscopy and atomic force microscopy. Texture parameters (energy, entropy and fractal dimension) were extracted from micrographs. We observed a great impact of laponite in the morphology of nano-biocomposite films. Texture parameters correlated with surface heterogeneity and roughness. Finally, surface roughness affected the surface hydrophilicity of nano-biocomposite films. Laponite platelets were exfoliated and/or intercalated with amylose and amylopectin chains. This research reports new information on the effects of laponite concentrations on the morphological, optical and wetting properties of nano-biocomposite films aiming future industrial applications.

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