Preparation and properties of carboxylated styrene-butadiene rubber/cassava starch/nanocellulose-reinforced as green polymeric composites

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Abstract: Many polymer have been used to develop biodegradable film. Starch is a promising material for this purpose owing to their abundance, renewable, and low cost. In this study, the effect of cellulose fiber on the physical properties of carboxylated styrene-butadiene rubber (CSBR)/cassava starch (CS) blend film was investigated. The recycling of plant wasted materials from sugarcane leaves into useful product represents a green alternative in order to prevent environmental problems. Due to the large amount of wasted sugarcane leaves, the cellulose fiber was isolated by using acid hydrolysis under heating. The average particle size of cellulose fiber was 39 microns observed from laser scattering particle size distribution analyzer. The results show that the addition of cellulose exhibited higher in tensile strength compared to unfilled cellulose fiber sample. The films also showed lower water absorption ability and moisture content with increasing concentration of cellulose filer because the cellulose fiber improved the interaction strength between the polymer chains, leading less mobility. This study demonstrated a significant concentration of cellulose fiber improved the film properties and inexpensive biodegradable films have a promising candidate for alternative packaging materials.

Keywords: Carboxylated styrene-butadiene rubber; Cassava starch; Reinforcement; Green polymeric composite