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# Active Bio-Packaging Fabricated from Coated Bagasse Papers with Polystyrene Nanocomposites

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**Abstract :** The demand for green packagingin the food field has been gained increasing attention in recent decades because of its degradability and safely. Thus, this study revealed that the by-product bagasse papers (BPs) derived from sugarcane waste can be decorated with a thin layer of polystyrene (PS) nanocomposites using the spreading approach.Three variable concentrations of TiO2 nanoparticles (i.e. 0.5, 1.0, 1.5 wt.%) were used to fabricate PS nanocomposites. The morphology of coated BP-PS biofilms was examined by X-ray diffraction, Fourier transferred Infrared spectroscopy (FT-IR), and scanning electron microscopy (SEM). Moreover, other measurements such as mechanical, thermal stability, flammability, wettability by the contact angle, water vapor, and gas barrier properties were carried out on the fabricated BP-PS biofilms. Most outcomes showed that the major properties were enhanced when the PS nanocomposites were implemented. The use of 1.5 wt.% TiO2 in PS nanocomposite for coated BP-PS biofilm increased the tensile stress by ~ 217 % compared to uncoated BP film. Furthermore, the rate of burning for BP-PS-1.5% film was reduced to ~ 33 mm/min because of the crystallinity of PS and the barrier effect provided by $TiO_2$ NPs. These coated sheets provide a promising candidate for use in advanced packaging applications.

**Keywords :** bagasse paper, polystyrene nanocomposites, TiO2 nanoparticles, active packaging, mechanical properties, flammability
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