

Thermo-Mechanical and Morphological Properties of Short Natural Fiber Reinforced Poly (Lactic Acid) Biocomposite: Effect of Fiber Treatment

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ABSTRACT

Untreated oil palm empty fruit bunch (REFB), alkali treated EFB (AEFB), ultrasound treated EFB (UEFB) and simultaneous ultrasound-alkali treated EFB (UAEFB) short fibers were incorporated in poly(lactic acid) (PLA) for fabricating bio-composites. The REFB fiber-PLA (REPC) and treated EFB (TEFB) fiber-PLA (TEPC) composites were prepared and characterized. Glass transition temperature, crystal melting temperature, decomposition temperature, melt flow index, density and mechanical properties (tensile strength, tensile modulus and impact strength) of TEPC are found to be higher than those of REPC. The observed crystallization temperature of TEPC is lower than that of REPC. Among all samples, TEPC prepared from UAEFB fiber shows better performances than other samples fabricated by REFB and AEFB fibers. Scanning electron microscopy, Fourier transform infrared spectroscopy and XRD analyses well support all the observed results.

KEYWORDS: Biopolymers and renewable polymers; Extrusion; Morphology; Differential scanning calorimetry (DSC); X-ray

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