

Effect of kenaf and EFB fiber hybridization on physical and thermo-mechanical properties of PLA biocomposites

ABSTRACT

Kenaf/empty fruit bunch/polylactic acid (kenaf/EFB/PLA) hybrid biocomposites were prepared using hot press technique. The ratio of fiber to polylactic acid was set at 60:40 with 1:1 ratio between kenaf and empty fruit bunch fibers. Physical, mechanical and thermal properties of hybrid biocomposites were subsequently characterized using Fourier transform infrared spectroscopy, scanning electron microscope, X-ray diffraction, thermogravimetric analysis, differential scanning calorimetry, tensile and water absorption tests. Test results indicated that mechanically stronger fiber was able to support the weaker fiber. Hybrid fiber biocomposite had higher crystallinity as compared to single fiber biocomposite. Water absorption of hybrid composite was higher as compared to single fiber composite. Thermal result revealed that hybridization of fiber was not significantly influence the thermal properties of composites. However, the presence of two different fibers proposed good wettability properties, which could reduce the formation of voids at the fibers-polymer interface and produce composites with high stiffness and strength.

Keyword: EFB; Kenaf; PLA; Hybrid biocomposite; Mechanical properties; SEM; XRD; FTIR