

Poly(Lactic Acid)(PLA)-reinforced kenaf bast fiber composites : the effect of triacetin.

ABSTRACT

In this article, the mechanical, morphological, and dynamic-mechanical properties of the blends of PLA and kenaf bast short fiber were investigated. The composites, with different fiber loading and triacetin content, were prepared by melt blending techniques using a Brabender internal mixer at 60 rpm and 170°C for 10 min and their properties were examined. Pure PLA was used as a reference for the biocomposite samples. Triacetin was used as a plasticizer for PLA and PLA/kenaf composites in order to study the improvement in tensile properties. The tensile strength and stiffness of unplasticized biocomposite materials decreased with the addition of kenaf bast fibers but improved with the addition of triacetin. The optimum fiber loading was 30wt% kenaf fibers in the PLA matrix with the addition of 5% triacetin. The dynamic mechanical analyses showed that triacetin improved the thermal stability of the biocomposites. The triacetin increased the storage modulus and gave a lower softening temperature for plasticized biocomposites. The micrographs of the tensile specimens and their fractured surfaces, which were examined by scanning electron microscopy, demonstrated that better adhesion between the fibers and the matrix was achieved with the addition of the plasticizer.

Keyword: PLA; Kenaf; Triacetin; Internal mixer; Biocomposites; Mechanical properties.