

Effect of epoxidized palm oil on the mechanical and morphological properties of a PLA–PCL blend

ABSTRACT

In this study, the effects of epoxidized palm oil (EPO) on the mechanical and morphological properties of a blend of two types of biodegradable polymer, poly(lactic acid) (PLA) and polycaprolactone (PCL), were investigated. The solution-casting process, with chloroform as a solvent, was used to prepare samples. Addition of EPO reduced the tensile strength and modulus but increased elongation at break for the PLA–PCL blend. The highest elongation at break was observed for the blend with 10 % (w/w) EPO content. Scanning electron microscopy (SEM) indicated that the fractured surface morphology of the PLA–PCL blend became more stretched and homogeneous in PLA–PCL–EPO. Possible interactions between the PLA–PCL blend and EPO were also characterized by use of Fourier-transform infrared (FTIR) spectroscopy. Thermal stability was studied by differential scanning calorimetry and thermogravimetric analysis. The results from FTIR and SEM revealed that the miscibility of the PLA–PCL blend was improved by addition of EPO.

Keyword: Biodegradable polymer blend; Epoxidized palm oil; Mechanical; Morphological properties