

Effects Of Different Starch Types On The Physico-Mechanical And Morphological Properties Of Low Density Polyethylene Composites

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ABSTRACT

The aim of this research is to investigate the effects of different thermoplastic starches and starch contents on the physico-mechanical and morphological properties of new polymeric-based composites from low density polyethylene (LDPE) and thermoplastic starches. Different compositions of thermoplastic starches (5–40 wt%) and LDPE were melt blended by extrusion and injection molding. The resultant materials were characterized with respect to the following parameters, i.e., melt flow index (MFI), mechanical properties (tensile, flexural, stiffness and impact strength) and water absorption. Scanning electron microscopy (SEM) was also used in this study for evaluating blend miscibility. MFI values of all blends decreased as the starch content increased, while the sago starch formulation showed a higher MFI value than others. The incorporation of fillers into LDPE matrix resulted in an increased in tensile modulus, flexural strength, flexural modulus and slightly decreased tensile strength and impact strength. However, sago starch filled composites exhibited better mechanical properties as compared to other starches. The SEM results revealed that the miscibility of such blends is dependent on the type of starch used. The water absorption increased with immersion time and the thermoplastic sago starch samples showed the lowest percentage of water absorption compared with other thermoplastic starches.

KEYWORDS: composites; extrusion; LDPE/thermoplastic starch blends; mechanical properties and morphology; miscibility

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