

Study of Biodegradable Composite Materials Based on Polylactic Acid and Vegetal Reinforcements

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Abstract : This study focuses on biodegradable materials made from Poly-lactic acid (PLA) and vegetal reinforcements. Three materials are developed from PLA, as a matrix, and : (i) olive kernels (OK); (ii) alfa (α) short fibers and (iii) OK+ α mixture, as reinforcements. After processing of PLA pellets and olive kernels in powder and alfa stems in short fibers, three mixtures, namely PLA-OK, PLA- α , and PLA-OK- α are prepared and homogenized in Turbula®. These mixtures are then compacted at 180°C under 10 MPa during 15 mn. Scanning Electron Microscopy (SEM) examinations show that PLA matrix adheres at surface of all reinforcements and the dispersion of these ones in matrix is good. X-ray diffraction (XRD) analyses highlight an increase of PLA inter-reticular distances, especially for the PLA-OK case. These results are explained by the dissociation of some molecules derived from reinforcements followed by diffusion of the released atoms in the structure of PLA. This is consistent with Fourier Transform Infrared Spectroscopy (FTIR) and Differential Scanning Calorimetry (DSC) analysis results.

Keywords : alfa short fibers, biodegradable composite, olive kernels, poly-lactic acid

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