

DEVELOPMENT OF PCL DIOL/CHITOSAN BLENDS AS TISSUE ENGINEERING SCAFFOLD: COMPATIBILIZATION EFFECTS INDUCED BY THE PRESENCE OF CARBON NANOTUBE

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Chitosan-poly(ϵ)caprolactone diol (PCL) blends have high potential as tissue engineering scaffolds to produce artificial vascular grafts. Modification of mechanical, thermal and barrier properties of blend films by (i) using different amounts of PCL and (ii) the addition of a nanofiller, were determined. Films made from different ratios of chitosan-PCL diol blends were reinforced using multiwalled carbon nanotubes (MWNTs), functionalized with different functional groups (tannic acid via no-covalent functionalization, poly(citric acid), poly(urea-urethane), and poly(amino-amido) dendrimer). Effects on structural interactions, morphological, and mechanical features induced in MWNTs/Blend nanocomposites were studied by Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), scanning electron microscope (SEM), field emission scanning electron microscopy (FE-SEM), and strain–stress testing. It was found that selective insertion of functionalized carbon nanotubes in either PCL or chitosan domains occurs, and some of these interactions improve compatibilization between polymers in the blend.

Keywords: polymer blends, nanocomposites, carbon nanotubes

Acknowledgment:

All authors kindly acknowledge: (i) Apoyo al Fortalecimiento y Desarrollo de Infraestructura Científica y Tecnológica, CONACyT (grant No. 270662) and (ii) Laboratorio de espectrofotometría de Rayos-X (XPS, University of Guadalajara). We are also indebted to Milton Oswaldo Vázquez Lepe and Jose Antonio Rivera Mayorga for helpful discussions.

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