MECHANICAL AND PHYSICOCHEMICAL BEHAVIOR OF PCL AND PLA BLENDS USED TO BIOMEDICAL APPLICATIONS

J. Domínguez, G. Martínez, S.A. González-Azcorra, O. Soberanis, J. A. Solís-Ruíz, A. May-Pat, G. M. Alonzo-Medina

a Emot Ingeniería S.A. de C.V. calle 50 #125 local C x 21 y 25 Zona Dorada II Mérida, Yucatán, México. Cp.97229.

b Universidad Anáhuac-Mayab, Carretera Mérida-Progreso Km. 15.5 A.P. 96-Cordemex, CP. 97310 Mérida Yucatán México.

c Centro de Investigación Científica de Yucatán, A.C. Calle 43 No. 130 Colonia Chuburná de Hidalgo, CP 97200, Mérida, Yucatán, México

In the last years, the use of biodegradable polymers have been of great importance in biomedical field. The biopolymers were widely used in traditional applications, such as matrices for long-term drug delivery [1-2], short-term fixation devices in the orthopedic field [3] and surgical sutures [2]. Polylactic acid (PLA) and Polycaprolactone (PCL) are aliphatic polyesters more used due to their excellent biodegradability, biocompatibility and bioresorbability [4].

This work is aimed to study blends of Polylactic acid (PLA) and Polycaprolactone (PCL) and their mechanical behavior. Five formulations of these blends were proposed (PCL/PLA), 90/10, 85/15, 80/20, 75/25 and 70/30. The formulations were prepared through a mixing chamber. The samples were studied by tensile test with a Shimadzu universal testing machine and the DMA technique in order to study the quasi-static mechanical behavior and creep phenomeno. In addition the samples were characterized by mean of angle contact technique in order to study the wettability of surface of blends (a way to quantify the hydrophilic behavior of the material) respectively. The objetive of this study is obtain a polymeric biomaterial, combining the properties of PLA (high strength and low elongation at break value) and the thermoplastic behavior of PCL, and that can be used to multiple biomedical applications.

Keywords: PCL, PLA, Biomaterials

References:

Presenting author’s email: gerardo.alonzo@anahuac.mx