

Composition dependence of the synergistic effect of nucleating agent and plasticizer in poly(lactic acid)S M K Fehri¹, C Mugoni², P Cinelli¹, I Anguillesi¹, M B Coltelli¹, S Fiori³, M Montorsi² and A Lazzeri¹¹University of Pisa, Italy²University of Modena and Reggio Emilia, Italy³Condensia Química S A, Spain

Blends consisting of commercial poly(lactic acid) (PLA), poly(lactic acid) oligomer (OLA8) as plasticizer and a sulfonic salt of a phthalic ester and poly(D-lactic acid) as nucleating agents were prepared by melt extrusion, following a Mixture Design approach, in order to systematically study mechanical and thermal properties as a function of composition. The full investigation was carried out by differential scanning calorimetry (DSC), dynamic mechanical thermal analysis (DMTA) and tensile tests. The crystallization half-time was also studied at 105°C as a function of the blends composition. A range of compositions in which the plasticizer and the nucleation agent minimized the crystallization half-time in a synergistic way was clearly identified thanks to the application of the Mixture Design approach. The results allowed also the identification of a composition range to maximize the crystallinity developed during the rapid cooling below glass transition temperature in injection moulding, thus allowing an easier processing of PLA based materials. Moreover the mechanical properties were discussed by correlating them to the chemical structural features and thermal behaviour of blends.

Biography

S M K Fehri is PhD student in University of Pisa, Italy and as a member of the European Union's Seventh Framework Programme "DIBBIOPACK". He has published 3 papers in reputed journals and working in Multifunctional, Bio-Ecocompatible Materials Lab, Department of Civil and Industrial Engineering, Pisa University.

y.fehri@gmail.com**Notes:**