Properties of Biodegradable Multilayer Films Based on Plasticized Wheat Starch

Multilayer films based on plasticized wheat starch (PWS) and various biodegradable aliphatic polyesters have been prepared through flat film coextrusion and compression molding. Poly(lactic acid) (PLA), poly(ε-caprolactone) (PCL), poly(butylene succinate adipate) (PBSA), and poly(hydroxybutyrate-co-valerate) (PHBV) were chosen as the outer layers of the stratified "polyester/PWS/polyester" film structure. The main goal of the polyester layers was to improve significantly the properties of PWS in terms of mechanical performance and moisture resistance. Since no specific compatibilizer or tie layer were added, the properties of subsequent films rely on the compatibility between the respective materials only. The effects of glycerol content in PWS, polyester type, and film composition on the mechanical properties and adhesion strength of multilayers were investigated. The conditions for optimal product performance were examined. The multilayer films may be suitable for applications in food packaging or disposable articles.

Keywords: Plasticized wheat starch; Polyesters; Multilayer structures; Adhesion strength