

Effects of Plasticizer on Viscoelastic Properties of Biodegradable Polymer Blends of Poly (Butylene-Adipate-Co-Terephthalate) with Thermoplastic Starch

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Abstract. Dynamic-mechanical analysis (DMA) was used to study the effects of starch plasticizer type on viscoelastic behaviour in biodegradable polymer blends consisting of synthetic aromatic-aliphatic co-polyester poly(butylene-adipate-co-terephthalate) (PBAT) and thermoplastic corn starch (TPS) plasticized with glycerol and/or urea. Motional heterogeneity of the studied blends was inferred from thermograms acquired by means of DMA. The type of starch plasticizer slightly affected glass-transition relaxation in the PBAT component, and it took place in different temperature ranges in the TPS component. The most significant impact of TPS on the relaxation process in the PBAT component was observed in the as-supplied PBAT blend with glycerol-plasticized starch. The storage modulus increase in the PBAT/TPS blend was observed only below 0 °C, but in PBAT blended with urea-plasticized starch the storage modulus remained higher in the whole studied temperature range. Storage of the blends for seven months caused changes mainly in their TPS components. Crystalline structure of PBAT was observed in all stored blends using X-ray diffraction. Presence of urea crystals was confirmed in the blend with urea-plasticized starch.