

Structural Characterisation of Biodegradable PBAT-TPS Blends Using FT-IR Spectroscopy

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Abstract. Blends of copolyester poly(butylene adipate-co-terephthalate) (PBAT) with thermoplastic starch (TPS) were prepared by melt mixing and the interactions between polymer components as well as the interactions of starch plasticizers (which were glycerol, urea or both) with PBAT and TPS matrices were characterized using Fourier transform infrared (FT-IR) spectroscopy. It was observed that complete disruption of native starch crystalline structure and thus effective starch plasticization was achieved in the presence of urea. Vibrational modes of the carbonyl and C–O groups in PBAT were most affected by the plasticizing system used. For the blend containing TPS plasticized with both plasticizers, strong hydrogen bonding between urea and glycerol as well as between the urea/glycerol plasticizing system with PBAT matrix was deduced. In addition, this blend appeared smooth and no macroscopic phase separation of the plasticizers occurred, as confirmed by digital microscopy. It was suggested that improvement in the blending process was achieved with the urea/glycerol plasticizing system.

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