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COMPATIBILIZATION AND PROPERTIES OF PLA/PBAT BLENDS

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Poly (lactic acid) and poly (butylene adipate-co-terephtalate) blend were prepared by reactive extrusion. Epoxy functional styrene-acrylic oligomer has been used as chain extender of PLA in order to increase its thermal stability and as reactive compatibilizer to ensure an improvement of the interface between PLA and PBAT. In this work, the effect of this oligomer on thermal, mechanical, rheological performances and microstructure of PLA/PBAT blends was investigated. Thermal results showed improved properties as compared with virgin PLA; DSC results indicated that with the introduction of chain extender, the activity of molecular chain of the blend declined inducing a decrease of cristallinity. It can be linked to molecular interactions at the interface between PLA and PBAT via ester bonds. Besides, Mechanical studies indicated an increase of the elongation at break with PBAT loading. Further incorporation of chain extender up to 0.5 phr was able to effectively enhance the mechanical properties. This can be illustrated by epoxy-acid and/or epoxy-hydroxyl reactions which can generate bloc or grafted copolymers increasing the interface bonding force. Otherwise, an increase of the viscosity and a pronounced shear-thinning are observed for PLA-PBAT blends with chain extender based on rheological results. This is probably due to macromolecular interactions between several functional groups of components in the blend as already mentioned. Morphological interpretations through TEM revealed improved interfacial adhesion between PLA and PBAT following the addition of functional oligomer by reducing sizes of dispersed phase. Compatibilizer effect of the chain extender used in this study is highlighted once again by TEM micrographs. Key words: PLA/PBAT blends, chain extender, compatibilizer.