

The effect of starch on biodegradability test of biodegradable polymers under controlled composting condition

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Abstract

In today's society, the rapid growth of municipal waste has come more and more into focus. Because polymeric material constitute a large part of the waste, consumer awareness in conjunction with strict laws and regulation have emphasized the need to develop biologically degradable plastics and products that may composted.

In this study, Poly(butylene succinate-co-adipate) (PBSA)/Poly(ester urethane) (PEU)/Poly(lactic acid) (PLA) were chosen as polymer matrix for the starch. PLA was manufacture by CargillDow Co., with a molecular weight of 8.3×10^4 g/mol, PBSA and PEU was obtain from Shinhan Chemical Co., with each molecular weight of 8.6×10^4 g/mol, 2.0×10^5 g/mol as reported by the manufacture. The organically modified starch was purchased from Deasang., Korea. They were known as biodegradable polymers to be plastics which cause significant environmental pollution after discard. Also, intercalation and exfoliations of starch in PLA and PBSA/PEU blend was fixed at 10/90 on weight basis. Because weakness of PBSA was greatly ameliorated at this blend composition. Biodegradability of PBSA/PEU and PLA were explored before and after compounding with starch. Their blends were characterized by the mechanical properties, thermal properties measurements, and surface morphology. In general, it was concluded that inherent biodegradability depend very significantly on the concentration of starch in the polymer matrix, but on the compatibilization efficiency.