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Nonmechanical properties of matrix film polylactic acid and polyethylene glycol 400 blend

Kurniawan Yuniarto
University of Mataram, Indonesia

Introducing plasticizer, poly(ethylene glycol) (PEG 400) was applied onto poly(lactic acid) PLA to produce matrix film by direct casting. Non mechanical properties were carried out on plasticized PLA including morphology, crystallinity structure and degree, thermal properties and oxygen barrier properties. Plasticized PLA revealed improving surface structure of PLA matrix film form fractures and homogenous film were achieved at 5% PEG 400. Chromatogram PLA and plasticized PLA categorized crystal structure, a α-form crystal. Intercalated and exfoliated structure did not occur significantly due to dispersion of PEG 400 in the matrix but indicated dispersion structure. Thermal properties did not improve the plasticized PLA significantly for both glass temperature and melting temperature. PEG 400 accelerated the crystal formation that in turn increased the crystallinity degree from 17.71% to 34.64%. Plasticized PLA enhanced permeability value about 20% while largest fraction PEG400 reduced ability to prevent oxygen penetration through the film. The oxygen barrier properties significantly affected the degree of crystallinity in the film with a correlation number of 0.85.

Biography

Kurniawan Yuniarto is pursuing his PhD degree at Bogor Agricultural University. His research interest includes packaging science based on biodegradable polymer. Recently, he developed active film for oxygen scavenging using synthetic and natural antioxidant. He has published some film packaging articles related to oxygen permeability, physical properties, morphological properties and thermal properties. He has research collaboration with Department of Packaging Science, University of Florida from 2013-2015.

kurniawan2006@unram.ac.id

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