ABSTRACT

THE EFFECT OF ADDING ZINC OXIDE (ZnO) AND MAGNESIUM OXIDE (MgO) TO THE ANTIBACTERIAL PROPERTIES OF POLYLATIC ACID

By

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Polylactic acid (PLA) bioplastics are incresingly being developed due to its very high degradation ability. In this research, PLA bioplastics were made and the effect of the addition of 0,1%, 0,2%, 0,5%, and 1,0% Zinc Oxide (ZnO) and Magnesium Oxide (MgO) were analyzed through characterization and antibacterial testing. The bioplastics are made by the solvent casting method using chloroform solvent. Analysis of functional groups with FTIR shows that the addition of ZnO and MgO does not affect the PLA functional groups. Surface morphological and elemental composition analysis with SEM-EDX shows that ZnO and MgO are dispersed in PLA. The analysis of thermal degredation with TGA shows that the addition of ZnO and MgO decreases the thermal degredation of PLA. Tensile test analysis shows that the addition of ZnO and MgO increases the tensile strength of PLA, but excessive addition decreases its tensile stregth. Antibacterial test shows that the addition of ZnO and MgO increases the antibacterial ativity of PLA

Keyword : Bioplastic, Polylatic acid, Zinc oxide, Magnesium oxide, Antibacterial

ABSTRAK

PENGARUH PENAMBAHAN SENG OKSIDA (ZnO) DAN MAGNESIUM OKSIDA (MgO) TERHADAP SIFAT ANTIBAKTERI BIOPLASTIK POLI ASAM LAKTAT

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Bioplastik Poli Asam Laktat/*Polylatic acid* (PLA) semakin dikembangkan karena kemampuan degradasinya yang sangat tinggi. Pada penelitian ini dilakukan pembuatan bioplastik PLA serta analisis pengaruh penambahan Seng Oksida (ZnO) dan Magnesium Oksida (MgO) dengan variasi konsentrasi 0,1%, 0,2%, 0,5% dan 1,0% melalui karakterisasi dan uji antibakteri. Metode pembuatan bioplastik dilakukan dengan metode *solvent casting* menggunakan pelarut kloroform. Analisis gugus fungsi dengan FTIR menunjukkan bahwa penambahan ZnO dan MgO tidak ada mempengaruhi gugus fungsi PLA. Analisis morfologi permukaan dan komposisi unsur dengan SEM-EDX menunjukkan bahwa ZnO dan MgO telah terdispersi pada PLA. Analisis degradasi termal dengan TGA menunjukkan bahwa penambahan ZnO dan MgO menurunkan degradasi termal PLA. Analisis uji tarik menunjukkan bahwa penambahan ZnO dan MgO meningkatkan nilai kekuatan tarik PLA, namun penambahan berlanjut menurunkan kekuatan tarik PLA. Uji antibakteri menunjukkan bahwa penambahan ZnO dan MgO meningkatkan aktivitas antibakteri PLA

Kata Kunci : Bioplastik, Poli Asam Laktat, Seng Oksida, Magnesium Oksida, Antibakteri