INTISARI

Sintesis dan Karakterisasi Biodegrabilitas Bioplastik dari Mikrofiber Selulosa Kulit Jagung *(Zea Mays)* dengan *Plasticizer Polyvinyl Alcohol* (PVA) dan Sorbitol

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Sintesis bioplastik dari mikrofiber selulosa kulit jagung dengan *plasticizer polyvinyl alcohol* (PVA) dan sorbitol telah berhasil dilakukan. Pada penelitian ini metode sintesis dan metode pencetakan bioplastik yang digunakan adalah metode *melt intercalation* dan metode *solution casting*. Penambahan variasi volume sorbitol sebesar 0 ml, 0,5 ml, 1 ml, 1,5 ml, dan 2 ml pada bioplastik berbahan mikrofiber selulosa kulit jagung dan PVA dilakukan untuk meningkatkan elastisitas dan nilai biodegrabilitas bioplastik. *Water uptake test* digunakan untuk mengetahui daya serap air dan ketahanan air bioplastik. *Soil burial test* digunakan untuk mengetahui % kehilangan berat dan waktu biodegradasi sempurna bioplastik. Uji FTIR *(Fourier Transform Infrared)* digunakan untuk menganalisis gugus fungsi pada struktur kimia bioplastik. Uji SEM *(Scanning Electron Microscopy)* digunakan untuk mengetahui bentuk morfologi bioplastik. Sampel dengan karakteristik terbaik diperoleh pada sampel bioplastik yang dibuat dengan menggunakan 0 ml sorbitol, dengan nilai daya serap air yaitu sebesar $67\% \pm 45\%$ dan ketahanan air sebesar $33\% \pm 45\%$, dimana nilai ketahanan air yang diperoleh masih jauh dari nilai ketahanan air plastik konvensional. Waktu biodegradasi sempurna bioplastik yang dibuat dengan menggunakan 0 ml sorbitol telah memenuhi standar mutu biodegrabilitas bioplastik menurut SNI, dimana memiliki kehilangan berat sebesar $11\% \pm 12\%$ setelah hari keempat penguburan sampel dalam pupuk kompos yang diberi bakteri EM4 dan prediksi waktu biodegradasi sempurna yaitu selama 37 hari. Hasil FTIR menunjukkan serapan (O-H) pada panjang gelombang 3270,64 cm^{-1}. Hasil SEM menunjukkan bentuk permukaan yang halus dengan adanya aglomerasi mikrofiber selulosa kulit jagung yang menandakan proses pencampuran antara mikrofiber selulosa dan plasticizer tidak homogen, serta terdapat *holes* pada permukaan bioplastik.

Kata kunci : bioplastik, mikrofiber selulosa kulit jagung, PVA, sorbitol, biodegrabilitas.

ABSTRACT

Synthesis and Biodegrability Characterization of Bioplastic Made of Corn Husk (Zea Mays) Cellulose Microfibers with the Plasticizer Polyvinyl Alcohol (PVA) and Sorbitol

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Synthesis of bioplastics from corn husk cellulose microfibers with the plasticizer polyvinyl alcohol (PVA) and sorbitol has been successfully carried out. In this study, the bioplastics synthesis and molding method used were melt intercalation and solution casting method. The addition of sorbitol volume variation of 0 ml, 0.5 ml, 1 ml, 1.5 ml, and 2 ml in bioplastics made from corn husk cellulose microfiber and PVA was carried out to increase bioplastics elasticity and biodegradability. Water uptake test was used to determine the water absorption dan water resistance of bioplastics. Soil burial test was used to determine the % of weight loss and biodegradation time of bioplastics. FTIR (Fourier Transform Infrared) test was used to analyze the functional groups in the chemical structure of bioplastics. SEM (Scanning Electron Microscopy) test was used to determine the morphology of bioplastics. Sample with the best characteristics was the sample made using 0 ml sorbitol, with water absorption value of $67\% \pm 45\%$ and water resistance value of $33\% \pm 45\%$, where the water resistance value obtained was still far from the water resistance value of conventional plastics. The complete biodegradation time of bioplastic made using 0 ml of sorbitol had met the quality standard of bioplastic biodegradability according to SNI, which had weight loss of $11\% \pm 12\%$ after the fourth day of sample burial in compost given EM4 bacteria and the predicted time for perfect biodegradation was 37 days. FTIR result showed absorption (O-H) at the wavelength of 3270.64 cm^{-1}. The SEM result showed a smooth surface shape with agglomeration of corn husk cellulose microfibers which indicated the mixing process between cellulose microfibers and plasticizers was not homogeneous, and there were holes on the bioplastic surface.

Keywords: bioplastic, corn husk cellulose microfibers, PVA, sorbitol, biodegradability.