

Intisari

PENGARUH RASIO VOLUME LARUTAN KITOSAN – CMC (*CARBOXY METHYL CELLULOSE*) TERHADAP SIFAT FISIK DAN KIMIA BIOPLASTIK

Bioplastik merupakan bentuk upaya penanganan sampah plastik yang semakin menumpuk dan sulit terurai. Kitosan menjadi salah satu bahan yang dapat digunakan sebagai alternatif dengan keunggulannya, yang dapat membentuk film, mudah terdegradasi, tidak beracun, dan bersifat antimikroba. Akan tetapi bioplastik berbahan kitosan masih bersifat rapuh (getas), sehingga diperlukan penambahan karboksimetil selulosa (CMC) dalam meningkatkan sifat mekanis bioplastik tersebut. Jumlah penambahan komponen dalam campuran dapat mempengaruhi ikatan yang terbentuk. Penelitian ini dilakukan untuk mengetahui pengaruh rasio volume larutan kitosan:CMC terhadap karakteristik bioplastik yang berbahan dasar kitosan 2%, CMC 0,5%, dan gliserol 0,5%. Variasi rasio volume larutan kitosan:CMC yang digunakan meliputi 1:0,1, 1:0,05, 1:0,03, 1:0,025, dan 1:0,02. Pengujian karakteristik bioplastik yang dilakukan antara lain, uji ketebalan, densitas, kadar air, kelarutan, kuat tarik, elongasi, *water vapor transmission rate* (WVTR), dan analisis gugus fungsi (FT-IR). Variasi rasio volume larutan (kitosan:CMC) menghasilkan peningkatan pada karakteristik ketebalan, densitas, kadar air, dan kelarutan seiring dengan meningkatnya penambahan CMC, akan tetapi memberikan hasil yang sama pada karakteristik kuat tarik, elongasi, dan WVTR. Bioplastik dengan karakteristik terbaik pada penelitian ini diperoleh pada rasio volume larutan 1:0,1 (kitosan:CMC) dengan nilai ketebalan sebesar 0,068 mm, densitas sebesar 0,834 g/cm³, kadar air sebesar 9,07%, kelarutan sebesar 31,38%, kuat tarik sebesar 48,754 MPa, elongasi sebesar 23,876%, dan WVTR sebesar 100,16 g/m².jam.

Kata kunci: bioplastik, karakteristik, karboksimetil selulosa (CMC), kitosan, rasio volume larutan

Abstract

VOLUME RATIO EFFECTS OF CHITOSAN – CMC (CARBOXY METHYL CELLULOSE) SOLUTION ON PHYSICAL AND CHEMICAL PROPERTIES OF BIOPLASTIC

Bioplastic is an effort to handle plastic waste, which is increasingly piling up and difficult to decompose. Chitosan is one of the materials that can be used as an alternative to bioplastic production with its advantages, as forming films, being easily degraded, being non-toxic, and being antimicrobial. However, chitosan bioplastics has brittle characteristic, so it is necessary to add polymer such as carboxy methyl cellulose (CMC) to improve the mechanical properties of these bioplastics. The ratio between the components in the mixture of bioplastic production can affect the bonds formed. This study was conducted to determine the effect of the solution volume ratio of chitosan:CMC on the characteristics of bioplastics made from 2% of chitosan, 0.5% of CMC, and 0.5% of glycerol. Variations in the solution volume ratio of chitosan:CMC used include 1:0,1, 1:0,05, 1:0,03, 1:0,025, and 1:0,02. Analysis of the characteristics of bioplastics that carried out cover thickness, density, water content, solubility, tensile strength, elongation, water vapor transmission rate (WVTR), and functional group analysis (FT-IR). Variations in solution volume ratio (chitosan:CMC) increased the characteristics of thickness, density, moisture content, and solubility as the CMC component increases, but gave the same results in the characteristics of tensile strength, elongation, and WVTR. This study resulted the best treatment for bioplastics with a solution volume ratio of 1:0,1 (chitosan:CMC), resulted a thickness value of 0.068 mm, a density of 0.834 g/cm³, water content of 9.07%, solubility of 31.38%, tensile strength of 48.754 MPa, elongation of 23.876%, and WVTR of 100.16 g/m².hour.

Keyword: bioplastic, carboxy methyl cellulose (CMC), characteristics, chitosan, solution volume ratio