ABSTRAK

SINTESIS DAN KARAKTERISASI BIOPLASTIK KITOSAN CANGKANG KEPITING RAJUNGAN (*Portunus sanginolentus*) DENGAN PENAMBAHAN PATI KULIT SINGKONG

Bioplastik kitosan memiliki karakteristik lapis tipis jernih, kuat tarik tinggi, dan memiliki sifat antimikroba namun, bersifat kaku. Penambahan *plasticizer* dapat memperbaiki sifat mekanik tetapi tidak signifikan, sehingga dibutuhkan penambahan bahan lain seperti pati yang dapat meningkatkan sifat mekanik, fisik dan biodegradabilitas bioplastik. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan pati kulit singkong dengan konsentrasi 0; 0,5; 1,0; dan 1,5 gram terhadap pembuatan bioplastik berbasis kitosan cangkang kepiting rajungan dengan *plasticizer* gliserol. Penelitian ini terdiri dari sintesis dan karakterisasi kitosan cangkang kepiting rajungan, isolasi dan karakterisasi pati kulit singkong, pembuatan bioplastik dengan metode *melt intercalation* serta analisis karakteristik sifat mekanik, sifat fisik, gugus fungsi, morfologi dan biodegradabilitas dari bioplastik. Hasil penelitian menunjukkan nilai derajat deasetilasi kitosan sebesar 87,69%, kadar pati kulit singkong sebesar 61,67% dengan kadar amilosa 16,82% dan amilopektin 83,18%. Bioplastik hasil sintesis memiliki tekstur kasar dengan jernih tidak berwarna sampai dengan berwarna cokelat. Penambahan pati dapat mempengaruhi karakteristik bioplastik. Semakin besar massa pati yang ditambahkan, semakin tinggi nilai ketebalan, kadar air dan elongasinya. Namun, ketahanan air, kuat tarik, dan modulus putus menurun. Pengujian dengan SEM menunjukkan adanya campuran bahan yang kurang homogen, sementara pengujian FTIR menunjukkan pergeseran bilangan gelombang pada setiap gugus fungsi. Bioplastik terdegradasi lebih cepat ketika massa pati meningkat. Komposisi optimum bioplastik dalam penelitian ini ditemukan pada penambahan pati 1,5%, menghasilkan ketebalan sebesar 0,0708 mm, daya serap air 65,32%, ketahanan air 34,68%, kadar air 17%, kuat tarik 14,43 MPa, elongasi 12,4%, elastisitas 1,16 MPa, dan biodegradabilitas 77,06% selama kurang dari satu minggu.

Kata-kata kunci: bioplastik, karakteristik, kitosan cangkang kepiting rajungan, pati kulit singkong

ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF BIOPLASTIC CHITOSAN FROM CRAB (Portunus sanginolentus) SHELLS WITH THE ADDITION OF CASSAVA PEEL STARCH

Chitosan bioplastic have characteristics of a clear thin layer, high tensile strength, and antimicrobial, however, it is rigid. The addition of plasticizers can improve mechanical properties but not significantly, so it requires the addition of other materials such as starch that can improve the mechanical, physical and biodegradability properties of bioplastics. This study aims to analyze the effect of the addition of cassava peel starch with a concentration of 0; 0.5; 1.0; and 1.5% on the production of chitosan-based bioplastics of crab shells with glycerol plasticizer. This research consists of the synthesis and characterization of chitosan from crab shell, isolation and characterization of cassava peel starch, making bioplastics by intercalation method and analyzing the characteristics of mechanical properties, physical properties, functional groups, morphology and biodegradability. The results showed that the degree of deacetylation of chitosan was 87,69%, cassava peel starch content was 61,67% with amylose content of 16,82% and amylopectin 83,18%. The synthetic bioplastic has a rough texture with a clear colorless to brown color. The addition of starch affects the characteristics of bioplastics. The greater the mass of starch added, the higher the thickness, moisture content and elongation values. However, the water resistance, tensile strength and young modulus decreased. SEM testing showed a less homogeneous mixture of materials, while FTIR testing showed a shift in the wave number of each functional group. Bioplastics degraded well when the mass of starch increased. The optimum composition of bioplastics in this study was found at 1,5% starch addition, resulting in a thickness of 0.0708 mm, water absorption of 65,32%, water resistance of 34,68%, moisture content of 17%, tensile strength of 14,43 MPa, elongation of 12,4%, elasticity of 1,16 MPa, and biodegradability of 77,06% for less than one week.

Keywords: *bioplastic, cassava peel starch, characteristic, chitosan from crab shells*