ABSTRAK

PENGARUH PENAMBAHAN PATI KULIT SINGKONG (*Manihot esculenta*) TERHADAP PEMBUATAN BIOPLASTIK BERBASIS KITOSAN KULIT UDANG VANNAMEI *(Litopenaeus vannamei)* DENGAN PENGGUNAAN *PLASTICIZER* GLISEROL

Bioplastik merupakan plastik yang terbuat dari sumber alami yang dapat diperbaharui dan mudah terdegradasi. Pembuatan bioplastik dapat disintesis melalui pati, kitosan atau selulosa. Pembuatan plastik *biodegradable* ini dilakukan dengan bahan dasar kitosan kulit udang vannamei dan gliserol sebagai *plasticizer*. Bioplastik berbahan dasar kitosan memiliki kelemahan dalam proses degradasinya dan bersifat keras, kaku dan mudah patah sehingga diperlukan penambahan pati untuk memaksimalkan komposisi bioplastik. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan pati kulit singkong terhadap pembuatan bioplastik berbasis kitosan udang vanamei dengan penggunaan *plasticizer* gliserol. Penambahan pati kulit singkong mampu meningkatkan sifat fisik dan mekanik bioplastik serta mempercepat proses biodegradasi. Variasi massa pati kulit singkong yang digunakan yaitu 0; 0,5; 1; 1,5 gram, dengan massa kitosan 3 gram dan penambahan gliserol 5%. Film bioplastik yang dihasilkan kemudian dilakukan karakterisasi sifat fisik, sifat mekanik, analisis morfologi menggunakan SEM (*Scanning Electron Microscope*), FTIR *Fourier Transform Infrared)* dilakukan uji biodegradasi. Hasil dari penelitian ini menunjukkan penambahan pati mempengaruhi karakteristik bioplastik. Semakin tinggi penambahan massa pati maka nilai ketebalan dan elongasi semakin meningkat. Namun, ketahanan air dan nilai *modulus young* yang dihasilkan semakin menurun. Pengujian SEM menunjukkan masih adanya campuran bahan yang kurang homogen. Sementara pada pengujian *Fourier Transform Infra Red* (FTIR) menunjukkan adanya pergeseran bilangan gelombang pada setiap gugus fungsi. Bioplastik terdegradasi dengan baik ketika massa pati meningkat. Hasil karakterisasi terbaik pada nilai ketebalan sebesar 0,0156 mm dan elongasi sebesar 5,7 %, yaitu pada penambahan pati 1,5 gram. Sementara hasil biodegradasi terbaik pada bioplastik dengan penambahan variasi 1 dan 1,5 gram pati kulit singkong yang mampu terdegradasi hampir 75 % pada hari ke-10.

Kata-kata kunci: biodegradasi; bioplastik; karakteristik; kitosan kulit udang; pati kulit singkong

ABSTRACT

THE EFFECT OF CASSAVA PEEL STARCH (Manihot esculenta) AS AN ADDITION OF BIOPLASTIC BASED ON CHITOSAN OF VANNAMEI SHRIMP SHELL (Litopenaeus vannamei) WITH GLYCEROL AS A PLASTICIZER

Bioplastic is a type of plastic made from renewable natural sources that easily degrade. The production of bioplastic can be synthesized using starch, chitosan, or cellulose. The creation of biodegradable plastic in this study was carried out using chitosan from vannamei shrimp skin and glycerol as a plasticizer. Chitosan-based bioplastic has weaknesses in its biodegradation process, and it tends to be rigid and brittle, so the addition of starch is necessary to optimize the bioplastic composition. This research aims to analyze the influence of cassava peel starch addition on the production of chitosan-based bioplastic from vannamei shrimp with glycerol as a plasticizer. The addition of cassava peel starch enhances the physical and mechanical properties of bioplastic and accelerates the biodegradation process. The variations in cassava peel starch mass used were 0, 0.5, 1, and 1.5 grams, with 3 grams of chitosan mass and the addition of 5% glycerol. The resulting bioplastic films were then characterized for their physical properties, mechanical properties, morphology using SEM (Scanning Electron Microscope), and FTIR (Fourier Transform Infrared) analysis, along with biodegradation tests. The research findings indicate that the addition of starch influences the characteristics of bioplastic. The higher the mass of added starch, the thickness and elongation values increase. However, water resistance and the Young's modulus values decrease. SEM testing shows a lack of homogeneity in the material mixture. FTIR analysis indicates a shift in wave numbers for each functional group. Bioplastic degrades effectively as the starch mass increases. The best characterization results were a thickness of 0.0156 mm and an elongation of 5.7%, achieved with the addition of 1.5 grams of starch. The best biodegradation results were observed in bioplastics with the addition of 1 and 1.5 grams of cassava peel starch, which degraded nearly 75% by day 10

Keywords: biodegradation; bioplastics; cassava peel starch; characteristics; shrimp shell chitosan ;