ABSTRAK

PENGARUH PENAMBAHAN PATI KULIT SINGKONG (*Manihot esculenta*) TERHADAP PEMBUATAN BIOPLASTIK BERBASIS KITOSAN CANGKANG PUPA *Black Soldier Fly* (*Hermetia illucens*) DENGAN *PLASTICIZER* GLISEROL SEBAGAI *POLYBAG* TANAMAN

Bioplastik merupakan plastik ramah lingkungan yang terbuat dari polimer alami seperti kitosan. Sumber kitosan yang belum banyak dimanfaatkan, salah satunya adalah cangkang pupa *Black Soldier Fly* (BSF). Akan tetapi, bioplastik berbahan dasar kitosan memiliki sifat yang keras, kaku, dan mudah patah. Sehingga diperlukan penambahan *plastizicer* untuk meningkatkan plastisitas bioplastik. Selain itu, penambahan pati dapat memperbaiki sifat fisik, mekanik, dan biodegradabilitas dari bioplastik. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan pati kulit singkong terhadap pembuatan bioplastik berbasis kitosan cangkang pupa *Black Soldier Fly* (BSF) dengan *plasticizer* gliserol. Penelitian ini terdiri dari isolasi dan karakterisasi kitosan cangkang pupa *Black Soldier Fly* (BSF) dan pati kuli singkong, serta pembuatan bioplastik dengan variasi penambahan pati kulit singkong 0; 0,5; 1; dan 1,5 g. Kemudian dilakukan analisis *Fourier Transform Infra Red* (FTIR), sifat fisik, mekanik, dan biodegradabilitas pada bioplastik. Hasil dari penelitian ini menunjukkan adanya pengaruh penambahan pati kulit singkong terhadap spektrum *Fourier Transform Infra Red* (FTIR), sifat fisik, dan mekanik pada bioplastik. Spekrum *Fourier Transform Infra Red* (FTIR) menunjukkan adanya pergeseran bilangan gelombang pada setiap gugus fungsi. Selain itu, penambahan pati meningkatkan daya serap air, kadar air, ketebalan, kuat tarik, elongasi, dan modulus Young. Namun ketahanan air pada bioplastik menurun. Penambahan pati pada bioplastik dapat meningkatkan biodegradabilitas sehingga bioplastik mudah terurai di lingkungan. Komposisi optimum bioplastik pada penelitian ini yaitu pada penambahan pati 1,5 g dengan hasil daya serap air sebesar 42,95±1,025%, ketahanan air 57,05±1,025%, kadar air 8,81±0,142%, ketebalan 0,0146±0,002 mm, kuat tarik 21,14±1,065 MPa, elongasi 4±0,418%, elastisitas 5,47±0,510 MPa, dan biodegradabilitas 74,71±0,067%.

Kata Kunci: bioplastik; kitosan cangkang pupa *Black Soldier Fly* (BSF); pati kulit singkong; *polybag*.

ABSTRACT

THE EFFECT OF ADDITION CASSAVA (Mannihot esculenta) PEEL STARCH ON THE PRODUCTION OF BIOPLASTIC BASED ON BLACK SOLDIER FLY (Hermetia illucens) PUPA SHELL CHITOSAN WITH GLYSEROL PLASTICIZER AS A PLANT POLYBAG

Bioplastic is an environmentally friendly plastic made from natural polymers such as chitosan. Chitosan sources that are not widely utilized include the pupa shells of the Black Soldier Fly (BSF). Bioplastic based on chitosan are rigid, hard, and brittle. Therefore, the addition of plasticizer is necessary to enhance the plasticity of the bioplastic. Additionally, the incorporation of starch to improve the physical, mechanical, and biodegradability properties of the bioplastic. This research aims to analyze the effect of addition of cassava peel starch on the production of bioplastic based on Black Soldier Fly (BSF) pupa shell chitosan with glycerol plasticizer. The research includes the isolation and characterization of Black Soldier Fly (BSF) pupa shells chitosan and cassava peel starch, as well as the production of bioplastic with variations of cassava peel starch at 0; 0,5; 1; and 1,5 g. Subsequently, Fourier Transform Infra Red (FTIR), physical, mechanical, and biodegradable analyses are conducted on bioplastic. The results of this research indicate the effect of cassava peel starch addition on the Fourier Transform Infra Red (FTIR) spectrum, physical, and mechanical properties of the bioplastic. The Fourier Transform Infra Red (FTIR) spectrum reveals wavelength shifts in each functional group. Furthermore, the addition of starch increases water absorption, moisture content, thickness, tensile strength, elongation, and elasticity. However, the water resistance of the bioplastic decreases. The addition of starch to the bioplastic can enhance biodegradability, making the bioplastic easily decompose in the environment. The optimum composition of the bioplastic in this research was the addition of 1.5 g of cassava peel starch, resulting in a water absorption capacity of 42.95±1,025%, water resistance of 57.05±1,025%, moisture content of 8.81±0,142%, thickness of 0.0146±0,002 mm, tensile strength of 21.14±1,065 MPa, elongation of 4±0,418%, elasticity of 5.47±0,510 MPa, and biodegradability of 74,71±0,067%.

Keywords: *Black Soldier Fly* (BSF) *chitosan pupal shells; bioplastic*; *cassava feel starch*; *polybag.*