

ABSTRAK

PENGARUH *CROSSLINKER* ASAM SITRAT TERHADAP KARAKTERISTIK BIOPLASTIK DARI KITOSAN CANGKANG PUPA *BLACK SOLDIER FLY* (BSF)

Bioplastik merupakan plastik yang terbuat dari bahan alam yang dapat terdegradasi oleh mikroorganisme. Bioplastik dapat dibuat dari kitosan cangkang pupa *Black Soldier Fly* (BSF) dengan penambahan pati kulit singkong dan *plasticizer* sorbitol. Namun, kuat tarik yang dihasilkan masih rendah. Untuk mengatasi rendahnya kuat tarik, dapat ditambahkan *crosslinker* seperti asam sitrat. Tujuan penelitian ini adalah untuk menganalisis pengaruh penambahan asam sitrat terhadap karakteristik bioplastik. Tahapan pada penelitian ini meliputi isolasi kitosan cangkang pupa BSF, karakterisasi kitosan cangkang pupa BSF, isolasi pati kulit singkong, karakterisasi pati kulit singkong, serta pembuatan bioplastik dengan variasi penambahan asam sitrat 0, 10, 15, dan 20%. Bioplastik dianalisis dengan beberapa pengujian seperti analisis gugus fungsi dengan *Fourier Transform Infrared* (FTIR), ketebalan, kadar air, daya serap air, ketahanan air, kuat tarik, elongasi, modulus elastisitas, dan biodegradabilitas. Spektrum FTIR menunjukkan adanya perbedaan puncak serapan antara bioplastik kontrol dengan bioplastik yang ditambahkan asam sitrat yaitu hilangnya puncak serapan N–H bending yang mengindikasikan terjadinya ikatan silang. Hasil penelitian menunjukkan bahwa penambahan asam sitrat meningkatkan ketebalan, kuat tarik, elongasi, dan modulus elastisitas bioplastik. Sedangkan kadar air, daya serap air dan biodegradabilitasnya menurun. Namun pada konsentrasi asam sitrat 20% daya serap air dan biodegradabilitas meningkat. Biodegradabilitas tertinggi diperoleh pada bioplastik dengan penambahan asam sitrat 20%.

Kata Kunci : asam sitrat; bioplastik; *crosslinker*; kitosan cangkang pupa BSF; pati kulit singkong.

ABSTRACT

EFFECT OF CITRIC ACID CROSSLINKER ON BIOPLASTICS CHARACTERISTICS OF BLACK SOLDIER FLY (BSF) PUPA SHELLS CHITOSAN

Bioplastics are plastics made from natural materials that can be degraded by microorganisms. Bioplastics can be made from chitosan of Black Soldier Fly (BSF) pupa shells with the addition of cassava peel starch and sorbitol plasticizer. However, the resulting tensile strength is still low. To overcome the low tensile strength, crosslinkers such as citric acid can be added. The purpose of this study was to analyze the effect of citric acid addition on bioplastics characteristics. The stages of this study include isolation of BSF pupa shells chitosan, characterization of BSF pupa shells chitosan, isolation of cassava peel starch, characterization of cassava peel starch, and making bioplastic with variations in citric acid addition of 0, 10, 15, and 20%. Bioplastic were analyzed by several test such as functional group analysis by Fourier Transform Infrared (FTIR), thickness, moisture content, water absorption, water resistance, tensile strength, elongation, elastic modulus, and biodegradability. The FTIR spectrum shows the difference in absorption peaks between control bioplastics and bioplastics with citric acid, namely the disappearance of the N-H bending absorption peak whics indicates the occurrence of cross-linking. The results showed that the addition of citric acid increased the thickness, tensile strength, elongation, and elastic modulus of bioplastics. While water content, water absorption, and biodegradability decreased. However, at 20% citric acid concentration, water absorption and biodegradability increased. The highest biodegradability was obtained in bioplastics with the addition of 20% citric acid.

Keywords : bioplastic; BSF pupa shells chitosan; cassava peel starch; citric acid crosslinker.