

PERAN PEG 400 DALAM PEMBUATAN LEMBARAN BIOPLASTIK POLIHIDROKSIALKANOAT YANG DIHASILKAN OLEH *Ralstonia eutropha* DARI SUBSTRAT HIDROLISAT PATI SAGU

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ABSTRACT

THE ROLES OF PEG 400 IN THE PRODUCTION OF BIOPLASTIC POLYHYDROXYALKANOATES PRODUCED BY *Ralstonia Eutropha* FROM HYDROLYSED SAGO STARCH SUBSTRATE

The purpose of the research was to investigate the effects of PEG 400 addition on the characteristics of bioplastic polyhydroxyalkanoates (PHA). PHA was obtained by cultivating *Ralstonia eutropha* on hydrolysed sago starch substrate using fed batch method for approximately 96 hours. The biomass concentration obtained was 4 g/L with PHA yield 20-30% of dry cell weight. The bioplastic was formed with solution casting method in which chloroform was used as solvent and PEG 400 was used as plasticizer. The concentrations of PEG 400 added were 10, 20, and 30% (w/w), respectively. Bioplastic properties which were tested were tensile strength, elongation to break, density, thermal properties, cristalinity, and functional group. The addition of plasticizer tend to increase tensile strength and elongation to break, but decrease density, cristalinity and melting point. Bioplastic with 30% PEG 400 addition gave the best results. Bioplastic with 30% PEG 400 gave a value of tensile strength of 0.083 MPa; elongation to break of 0.881%; density of 0.7881 g/cm³; melting point of 158.95 °C; and cristalinity of 44.58%. With these properties, the resulted bioplastic may be used for surgical strings.

Keywords: Bioplastic, Polyhydroxyalkanoates (PHA), *Ralstonia eutropha*, hidrolised sago starch, PEG 400 plastisizer.

ABSTRAK

Tujuan penelitian ini adalah untuk meneliti pengaruh penambahan PEG400 pada ciri bioplastik polihidroksialkanoat (PHA). PHA diperoleh dengan mengkultivasi *Ralstonia eutropha* pada substrat hidrolisat pati sagu menggunakan metode *fed batch* selama 96 jam. Konsentrasi biomassa yang diperoleh adalah 4 g/L dengan rendemen PHA 20-30% dari bobot kering sel. Bioplastik diproduksi dengan metode *solution casting* menggunakan khloroform sebagai pelarut dan PEG 400 sebagai pemlastis. Konsentrasi PEG 400 yang ditambahkan adalah 10, 20, dan 30% (b/b). Ciri bioplastik yang diuji adalah kuat tarik, perpanjangan putus, densitas, sifat termal, kristalinitas dan analisis gugus fungsi. Penambahan pemlastis PEG400 meningkatkan kuat tarik, dan perpanjangan putus, tapi menurunkan densitas, kristalinitas, dan suhu leleh Bioplastik dengan konsentrasi PEG 400 30% memberikan hasil terbaik, yaitu dengan nilai kuat tarik 0.083 Mpa perpanjangan putus 0.881%, densitas 0.7881 g/cm³ titik leleh 158,95 °C, dan kristalinitas 44.58%. Dengan ciri ini bioplastik yang dihasilkan dapat digunakan untuk benang bedah.

Kata kunci: Bioplastik, Polihidroksialkanoat, PHA, *Ralstonia eutropha*, hidrolisat pati sagu, PEG 400