

ABSTRACT

Rizki Maulidya. 24020221140059. Production and Characterization of Polyhydroxyalkanoate (PHA) from *Bacillus thuringiensis*, *Burkholderia* sp. and *Cupriavidus oxalaticus* Using Glucose and Sodium Lactate Carbon Sources. Under the guidance of Nurhayati and Radityo Pangestu

Polyhydroxyalkanoate (PHA) is a potential bioplastic alternative to conventional plastic use due to its biodegradable and biocompatible properties. The research aims to determine the effect of *Bacillus thuringiensis*, *Burkholderia* sp. and *Cupriavidus oxalaticus* species using glucose and sodium lactate as carbon sources on the composition and physical characteristics of the produced PHA. PHA production was carried out through fermentation, extraction, and characterization processes using Pyrolysis Gas Chromatography-Mass Spectrometry (Pyrolysis-GC/MS) and Differential Scanning Calorimetry (DSC). The highest PHA extract was obtained from *Burkholderia* sp. treated with Glucose + sodium lactate (78,18%). Pyrolysis-GC/MS analysis showed that *Burkholderia* sp. treated with Glucose + sodium lactate was able to produce the copolymer P(LA-co-3HB), which consists of lactate and 3-hydroxybutyrate units. The DSC results show differences in the physical properties of the PHA produced by *Burkholderia* sp. treated with Glucose (T_g 29 °C, T_m 174,4 °C) and Glucose + sodium lactate. The ANOVA test showed that the isolate factor and treatment factor significantly affected the PHA extract ($p < 0,05$), and the interaction between isolate and treatment was not significant. A Post hoc test (Duncan) was conducted and indicated that *Burkholderia* sp. B73 was the best isolate for the PHA extract, and Glucose + sodium lactate was the best treatment for the PHA extract.

Keywords : DSC, PHA, P(LA-co-3HB), Pyrolysis-GC/MS