

Intisari

Penggunaan plastik *non-degradable* sebagai bahan kemasan menyebabkan banyak masalah. Limbah plastik *non-degradable* sulit didegradasi dan mencemari lingkungan. Penggunaan plastik degradasi memberi solusi pada masalah ini. Poli- β -hidroksibutirat (PHB) adalah salah satu bahan baku bioplastik yang dapat disintesis oleh mikroorganisme. Glukosa sebagai bahan baku produksi PHB relatif mahal. Bahan alternatif untuk menekan biaya produksi PHB contohnya berasal dari pati singkong, sagu, jagung, dan lain-lain. Tujuan penelitian ini untuk mendapatkan isolat bakteri amilolitik yang mampu memproduksi PHB dan menggunakan pati jagung (*Zea mays*) sebagai sumber karbon. Bakteri amilolitik diisolasi dari tanah lingkungan sekitar pembuatan tepung mocaf di Paliyan dan Playen, Gunungkidul, Yogyakarta. Metodologi yang dilakukan yaitu isolasi, seleksi dan optimasi isolat terpilih. Seleksi dilakukan berdasarkan aktivitas amilolitik, aktivitas enzim amilase spesifik, dan produksi PHB. Hasil isolasi diperoleh 65 isolat bakteri dan berdasarkan aktivitas amilolitik diperoleh 49 isolat. Seleksi berdasar aktivitas enzim amilase spesifik diperoleh 9 isolat bakteri dan diperoleh 2 isolat berdasar produksi PHB. Untuk meningkatkan produksi PHB, pada 2 isolat terpilih dilakukan optimaslisasi beberapa faktor lingkungan antara lain: konsentrasi inokulum, pH, konsentrasi pati, dan agitasi. Hasil optimasi menunjukkan bahwa kadar produksi PHB isolat PLI-V-5 lebih tinggi daripada isolat PLI-VII-5. Isolat PLI-V-5 optimal pada kondisi pH 8, konsentrasi pati jagung 3%, konsentrasi inokulum 10%, kecepatan agitasi 100 rpm, dan waktu inkubasi 60 jam dengan produksi PHB 0.01003%; 0.25075 mg/L, dan BKS 7,50 g/L. Hasil karakterisasi dan identifikasi menunjukkan bahwa isolat PLI-V-5 memiliki kedekatan sifat dengan genus *Pseudomonas* sp.

Kata kunci : poli- β -hidroksibutirat, bakteri amilolitik, pati jagung

Abstract

The use of undegradable plastic as a packaging material causes many problems. Undegradable plastic waste is difficult to degrade and make pollution in the environment. The use of degradable plastic can solve this problem. Poly- β -hydroxybutyrate (PHB) is one of bioplastic materials that can be synthesized by microorganisms. Glucose as raw material for PHB production is relatively expensive. The alternative materials can reduce the cost of production, for examples; starch of cassava, sago, corn, etc. The aim of study is to find out amylolytic bacteria isolates which can produce PHB using a carbon source of corn (*Zea mays*) starch. The amylolytic bacteria isolated from soil environment around the flour manufacture mocaf in Paliyan and Playen, Gunungkidul, Yogyakarta. The methodology of experiments are; isolation, selection and optimization of selected isolates. Selection was done based on the amylolytic activity, enzyme specific amylase activity, and PHB production. The result of the research showed that 65 isolates bacteria were found and 49 isolates were categorized as amylolytic bacteria. Selection based on the amylase specific activity was found 9 isolates and selection based on PHB production was found 2 isolates. Two selected isolates were optimized for production of PHB. To increase the production, some environmental factors were optimized, such as concentration of inoculum, pH, concentration of starch, and agitation. The optimization results showed that the percentages of PHB production from isolate PLI-V-5 was higher than isolate PLI-VII-5. The optimum condition for isolate PLI-V-5 was pH at 8.0; 3% starch substrate; 10% inoculum concentration; agitation speed at 100 rpm; and incubation time for 60 hours and the PHB production was 0.01003%; 0.25075 g/L and cell dry weight (CDW) 7.50 g/L. Characterization and identification showed that the isolate PLI-V-5 closed to the genus *Pseudomonas* sp.

Keywords : poly- β -hydroxybutyrat, amylolytic bacteria, corn starch