Indra Adi Wira Prasetya, 2019. Skrining dan Optimasi Produksi Enzim Kitinase dari Isolat Bakteri Endofit Tapak Liman (*Elephantopus scaber* L.). Tesis ini di bawah bimbingan: Dr. Ni'matuzahroh dan Dr. Fatimah, S.Si., M.Kes., Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui jumlah isolat bakteri endofit *Elephantopus scaber* penghasil enzim kitinase dan menjelaskan pengaruh pH media, kombinasi sumber karbon dan nitrogen, serta kombinasi lama waktu inkubasi dan konsentrasi substrat terhadap produksi enzim kitinase dan jumlah bakteri. Bakteri endofit diskrining dengan media agar yang mengandung 1 % koloid kitin. Bakteri kitinolitik yang didapat kemudian diinokulasikan pada media *Luria Bertani* yang ditambah 1 % koloid kitin untuk diuji produksi enzim kitinasenya dengan adanya variasi pH media (pH 7-9), kombinasi sumber karbon (glukosa, laktosa, sukrosa, amilum dan fruktosa) dan nitrogen (pepton, $(NH_4)_2SO_4$, NH_4NO_3 dan NH_4Cl) serta kombinasi lama waktu inkubasi (hari ke-0 hingga hari ke-6) dan konsentrasi substrat kitin (0 %, 0,5 %, 1 %, 1,5 % dan 2 % (b/v)). Produksi kitinase bakteri ditentukan oleh aktivitas supernatannya. aktivitas kitinase diukur dengan metode kolorimetri menggunakan larutan DNS dan pengukuran pada panjang gelombang 540 nm. Satu unit aktivitas enzim merupakan jumlah enzim yang dibutuhkan untuk membebaskan 1 μmol GlcNAC. Data yang diperoleh dianalisis secara statistik. Berdasarkan hasil uji skrining, didapatkan satu isolat bakteri penghasil kitinase yaitu isolat NA3. Uji produksi enzim kitinase isolat NA3 dengan variasi pH menunjukkan adanya pengaruh dan perbedaan yang signifikan ($p<0,05$). Variasi penambahan sumber karbon dan sumber nitrogen menunjukkan adanya perbedaan signifikan antar kelompok perlakuan ($p<0,05$). Pengaruh variasi lama waktu inkubasi dan konsentrasi substrat menunjukkan aktivitas yang berbeda signifikan ($p<0,05$). Kesimpulan dari penelitian ini adalah telah ditemukan satu isolat bakteri endofit kitinolitik yaitu isolat bakteri NA3 dan variasi pH, kombinasi sumber karbon dan nitrogen, serta variasi lama waktu inkubasi dan konsentrasi substrat mampu memberi pengaruh terhadap produksi enzim kitinase dan jumlah bakteri.

Kata kunci: Enzim kitinase, bakteri kitinolitik, *Elephantopus scaber*, isolat bakteri NA3, koloid kitin, bakteri endofit

Indra Adi Wira Prasetya, 2019. Screening and Optimization of Chitinase Enzyme Production from Endophytic Bacterial Isolates of Tapak Liman (*Elephantopus scaber* L.). This thesis under guidance: Dr. Ni'matuzahroh and Dr. Fatimah, S.Si., M.Kes., Department of Biology, Faculty of Science and Technology, Universitas Airlangga, Surabaya.

ABSTRACT

The aim of this study was to determine the number of chitinase producing endophytic bacteria of *Elephantopus scaber* and to explain the effect of medium pH, combination of carbon and nitrogen sources, and the combination of incubation time and substrate concentration on chitinase enzyme production and the number of bacteria. Endophytic bacteria are screened with agar media containing 1% colloidal chitin. Chitinolytic bacteria were then inoculated on Luria Bertani medium which added 1% colloidal chitin to tested the chitinase enzyme production in the presence of medium pH (pH 7-9) variations, combination of carbon sources (glucose, lactose, sucrose, starch and fructose) and nitrogen source (peptone, $(NH_4)_2SO_4$, NH_4NO_3 and NH_4Cl) and the combination of incubation time (day 0 to day 6) and chitinous substrate concentration (0%, 0.5%, 1%, 1.5% and 2% (w/v)). The production of bacterial chitinase is determined by the activity of the supernatant. Chitinase activity was measured by the colorimetric method using DNS solutions and measurements at a wavelength of 540 nm. One unit of enzyme activity equal to the amount of chitinase enzyme needed to release 1 μmol of GlcNAC. The obtained data analyzed statisticaly. Based on the results of screening tests, one isolate of chitinase-producing bacteria was obtained, namely NA3 isolate. The chitinase enzyme production test of NA3 isolate with variations in pH showed a significant influence and difference ($p<0.05$). Variations in the addition of carbon sources and nitrogen sources showed significant differences between treatment groups ($p<0.05$). The effect of variations in incubation time and substrate concentration showed that activities differed significantly ($p=0,05$). The conclusion of this study is that one isolate of chitinolytic endophytic bacteria has been obtained was NA3 isolate and variations in pH, combination of carbon and nitrogen sources, and variations in incubation time and substrate concentration can affect the production of chitinase enzymes and the number of bacteria.

Key words: Chitinase enzyme, chitinolytic bacteria, *Elephantopus scaber*, NA3 bacterial isolate, colloidal chitin, endophytic bacteria.