

## Intisari

Penelitian ini bertujuan untuk 1) memproduksi N-asetilglukosamin (NAG) dari kitin dengan menggunakan kitinase kasar *Serratia marcescens* PT6; 2) melakukan analisis untuk menduga N-asetilglukosamin hasil reaksi enzimatik; dan 3) mengetahui pengaruh konsentrasi N-asetilglukosamin terhadap aktivitas antibakteri (*Staphylococcus aureus* dan *Escherichia coli*). Produksi NAG dilakukan dengan hidrolisis enzimatis kitinase kasar *Serratia marcescens* PT6 pada suhu 45°C, pH 6, dan inkubasi 120 menit. Analisis untuk menduga NAG menggunakan *Thin Layer Chromatography* (TLC) dan *Fourier Transform Infra Red* (FTIR). Aktivitas antibakteri diuji dengan mengukur kepadatan bakteri selama inkubasi 6 pada medium TSB yang ditambahkan NAG dengan berbagai konsentrasi (0,0025; 0,005; 0,01; 0,02; 0,04 ppm). Pengamatan kepadatan bakteri dilakukan setiap satu jam dengan menggunakan spektrofotometer pada panjang gelombang 640 nm. Daya hambat bakteri diukur dengan membandingkan kepadatan bakteri pada perlakuan dan kontrol. Produksi NAG hasil hidrolisis enzimatis didapatkan konsentrasi rerata sebesar 50,43 µg/mL. Analisis produk hidrolisis kitin dengan TLC menunjukkan nilai R<sub>f</sub> yang sama dengan NAG standar sebesar 0,67 dan gugus fungsi hasil analisis FTIR menunjukkan serapan yang sama dengan NAG standar. Terdapat pengaruh konsentrasi NAG terhadap aktivitas antibakteri (*Staphylococcus aureus* dan *Escherichia coli*). Konsentrasi 0,04 ppm memiliki daya hambat tertinggi (*Staphylococcus aureus* 48,21 ± 8,49% dan *Escherichia coli* 52,87 ± 2,16%) dan bersifat bakteriostatik.

Kata kunci: antibakteri, enzimatik, kitinase, N-asetilglukosamin, *Serratia marcescens*.

### *Abstract*

This study aimed to 1) produce N-acetylglucosamine from chitin using crude chitinase from *Serratia marcescens* PT6; 2) perform analyzes to estimate N-acetylglucosamine resulted of from enzymatic reaction; 3) observe the effect of N-acetylglucosamine concentration on antibacterial activity (against *Staphylococcus aureus* and *Escherichia coli*). Production of N-acetylglucosamine was done by performing enzymatic reaction using crude chitinase from *Serratia marcescens* PT6 at 45°C, pH 6, and 120 min incubation. The estimation of N-acetylglucosamine was performed using Thin Layer Chromatography (TLC) and Fourier Transform Infra Red (FTIR). Antibacterial activity was tested by measuring the optical density of the bacterial culture grown on TSB medium added with various concentration of N-acetylglucosamine (0.0025; 0.005; 0.01; 0.02; 0.04 ppm) during six hour. The measurement of bacterial density was made every hour using a spectrophotometer at a wavelength of 640 nm. The percentage of growth inhibition was measured by comparing the bacterial culture density between treatment and control. Enzymatic hydrolysis of chitin using crude chitinase from *Serratia marcescens* PT6 resulted to N-acetylglucosamine concentration of 50,43 µg/mL. Analysis of hydrolysis products of chitin using TLC has an R<sub>f</sub> value similar to the N-acetylglucosamine standard of 0,67 and a functional group of the hydrolysate analyzed by FTIR showed a similar absorbance to N-acetylglucosamine standard. The antibacterial activity (against *Staphylococcus aureus* and *Escherichia coli*) of N-acetylglucosamine was significantly influenced by its concentration. A concentration of 0,04 ppm showed the highest growth inhibition (48,21 ± 8,49% for *Staphylococcus aureus* and 52,87 ± 2,16% for *Escherichia coli*) and the effect was categorized as bacteriostatic.

**Keywords:** antibacterial, enzymatic, chitinase, N-acetylglucosamine, *Serratia marcescens*.