

PERTUMBUHAN BAKTERI *Limosilactobacillus fermentum* BN21 PADA SUHU DAN pH YANG BERBEDA SEBAGAI KANDIDAT

PROBIOTIK

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INTISARI

Tujuan Penelitian ini adalah untuk mengetahui pH dan suhu yang optimal untuk pertumbuhan bakteri *Limosilactobacillus fermentum* BN21. Penelitian ini dilakukan dengan dua perlakuan, yaitu suhu inkubasi yang berbeda (30°C, 40°C, 50°C, 60°C) dan pH awal medium yang berbeda (5, 6, 7, 8). Data yang dikoleksi berupa pH medium akhir fermentasi, *optical density* pada panjang gelombang 600 nm, konsentrasi asam laktat, dan zona hambat *Escherichia coli* FNCC0091. Data yang diperoleh dianalisa menggunakan aplikasi SPSS dengan metode statistik yaitu *one-way analysis of variance* (ANOVA), jika terdapat perbedaan yang nyata dilanjutkan dengan uji *Duncan's New Multiple Range Test* (DMRT). Hasil penelitian menunjukkan bahwa suhu inkubasi memberikan pengaruh yang signifikan ($P < 0,05$) terhadap pH medium akhir, *optical density*, konsentrasi asam laktat, dan aktivitas penghambatan terhadap pertumbuhan *E.coli*. pH medium akhir terendah ditunjukkan pada perlakuan suhu 30°C dengan pH akhir yaitu $4,27 \pm 0,01$. *Optical Density* dan konsentrasi asam laktat tertinggi ditunjukkan pada perlakuan suhu 40°C dengan rerata absorbansi $4,68 \pm 0,05$ dan rerata konsentrasi asam laktat yaitu $15,13 \pm 2,6$ g/L. Zona hambat terhadap *Escherichia coli* FNCC0091 paling tinggi ditunjukkan pada perlakuan suhu 30°C dengan rerata $14,04 \pm 1,38$ mm. Perlakuan pH pada medium memberikan pengaruh yang signifikan ($P < 0,05$) terhadap pH medium akhir dan zona hambat *Escherichia coli* FNCC0091. pH terendah diperoleh pada perlakuan pH 5 dengan rerata pH akhir yaitu $4,08 \pm 0,05$. Zona hambat paling tinggi ditunjukkan pada perlakuan pH 5 dengan rerata $15,76 \pm 0,78$ mm. Berdasarkan hasil penelitian ini dapat disimpulkan bahwa suhu 40°C dan pH 5 merupakan kondisi terbaik untuk pertumbuhan bakteri *Limosilactobacillus fermentum* BN21.

Kata kunci : Bakteri asam laktat, Karakterisasi, *Limosilactobacillus fermentum*, Suhu Inkubasi, pH

THE GROWTH OF *Limosilactobacillus fermentum* BN21 AT DIFFERENT pH AND TEMPERATURES AS A CANDIDATE FOR PROBIOTICS

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ABSTRACT

The aim of this research was to determine the optimal pH and temperature for the growth of *Limosilactobacillus fermentum* BN21 bacteria. The study was conducted with two treatments, i.e., different incubation temperatures (30°C, 40°C, 50°C, 60°C) and varying initial pH levels of the medium (5, 6, 7, 8). The collected data included the final pH of the fermentation medium, optical density at 600 nm wavelength, lactic acid concentration, and the inhibition zone of *Escherichia coli* FNCC0091. The data were analyzed using SPSS with statistical methods, specifically one-way analysis of variance (ANOVA), followed by Duncan's New Multiple Range Test (DMRT) if significant differences were observed. The results showed that incubation temperature had a significant effect ($P < 0.05$) on the final pH, optical density, lactic acid concentration, and *E. coli* inhibition activity. The lowest final pH was observed at 30°C, with a value of 4.27 ± 0.01 . The highest optical density and lactic acid concentration were observed at 40°C, with an average absorbance of 4.68 ± 0.05 . average lactic acid concentration of 15.13 ± 2.6 g/L. The largest inhibition zone against *Escherichia coli* FNCC0091 was recorded at 30°C, with an average of 14.04 ± 1.38 mm. The pH treatment also had a significant effect ($P < 0.05$) on the final pH and inhibition zone of *Escherichia coli* FNCC0091. The lowest final pH was obtained at pH 5, with an average of 4.08 ± 0.05 . The highest inhibition zone was recorded at pH 5, with an average of 15.76 ± 0.78 mm. Based on the results, it can be concluded that the optimal conditions for the growth of *Limosilactobacillus fermentum* BN21 are at 40°C and a pH of 5.

Keywords: acteria growth, Lactic acid bacteria, *Limosilactobacillus fermentum* BN21, Incubation temperature, pH.