

**OPTIMASI PERTUMBUHAN *Limosilactobacillus fermentum* BN21
DENGAN PENAMBAHAN SUBSTRAT MOLASES
SEBAGAI MEDIUM PERTUMBUHAN PADA
LAMA INKUBASI YANG BERBEDA**

**Maria Dheana Faradhita
20/455756/PT/08436**

INTISARI

Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi substrat molases serta waktu inkubasi dalam optimasi bakteri *Limosilactobacillus fermentum* BN21. *Limosilactobacillus fermentum* BN21 ditumbuhkan pada medium yang berisi molases, CaCO_3 , dan *yeast extract*. Perlakuan yang dilakukan adalah perbedaan konsentrasi molases yaitu konsentrasi 1%, 1,5%, dan 2% serta waktu inkubasi selama 0 jam, 8 jam, 16 jam, dan 24 jam. Parameter yang diamati meliputi pH, kadar asam laktat, total angka asam, kadar glukosa, *Total Plate Count* (TPC), serta kadar asam asetat, propionat dan butirat. Data yang diperoleh kemudian dianalisis dengan analisis Rancangan Acak Lengkap (RAL) pola faktorial 3x4 (3 konsentrasi molases dan 4 perlakuan waktu) dengan 4 kali ulangan. Dilakukan uji lanjutan *Duncan's Multiple Range Test* (DMRT) pada variabel yang menunjukkan perbedaan signifikan. Hasil penelitian menunjukkan bahwa perbedaan konsentrasi molases memberikan pengaruh yang sangat nyata ($P < 0,01$) terhadap total angka asam, kadar asam laktat, kadar glukosa akhir, dan jumlah bakteri yang tumbuh. Perbedaan konsentrasi molases pada medium pertumbuhan tidak berpengaruh ($P > 0,05$) terhadap pH akhir medium. Semakin tinggi konsentrasi molases yang digunakan, maka total angka asam, kadar asam laktat, serta jumlah sel bakteri akan semakin meningkat, diikuti dengan penurunan pH dan kadar glukosa akhir medium. Perbedaan waktu inkubasi memberikan pengaruh yang sangat nyata ($P < 0,01$) terhadap pH medium, total angka asam, kadar asam laktat, total kadar glukosa akhir, dan jumlah bakteri yang tumbuh. Semakin lama waktu inkubasi, maka total angka asam, kadar asam laktat, serta sel bakteri meningkat sampai batas maksimum pertumbuhannya, diikuti dengan penurunan pH dan kadar glukosa akhir medium. Kesimpulan dari penelitian ini yaitu pertumbuhan *Limosilactobacillus fermentum* BN21 optimal pada medium dengan penambahan molases konsentrasi 2% yang diinkubasi selama 8 jam.

Kata Kunci: Bakteri Asam Laktat (BAL), *Limosilactobacillus fermentum* BN21, optimasi, waktu inkubasi, konsentrasi molases

GROWTH OPTIMIZATION OF *Limosilactobacillus fermentum* BN21 WITH THE ADDITION OF MOLASSES SUBSTRATE AS A GROWTH MEDIUM IN DIFFERENT INCUBATION TIMES

Maria Dheana Faradhita
20/455756/PT/08436

ABSTRACT

This study was aimed to determine the effect of molasses concentration and incubation time to optimize the growth of *Limosilactobacillus fermentum* BN21. *Limosilactobacillus fermentum* BN21 was grown on medium containing molasses, CaCO_3 , and yeast extract. Three levels of molasses concentration i.e. 1%, 1.5%, and 2% and incubation times for 0 hours, 8 hours, 16 hours, and 24 hours were applied as treatments in this study. Each combination treatment was conducted in 4 replications. Parameters observed included pH, lactic acid content, total acid value, glucose content, Total Plate Count (TPC), and acetic, propionic and butyric acid content. The data were then analyzed with a 3x4 factorial pattern (3 molasses concentrations and 4-time treatments). The significant differences between variables due to the treatments have been analyzed by Duncan's Multiple Range Test (DMRT). The results of this study showed that different concentrations of molasses have a highly significant effect ($P < 0.01$) on the total acid value, lactic acid content, final glucose content, and the number of bacteria, but there was no effect ($P > 0.05$) on the medium pH in the end of incubation. The total acid value, lactic acid content, and number of bacterial cells increased in line with the increasing of molasses concentration, in contrast, pH was decreased. The difference in incubation time had a very significant influence ($P < 0.01$) on the pH of the medium, total acid value, lactic acid content total final glucose content, and the number of bacteria. The prolonge of the incubation time, the total acid value and lactic acid content increased, while total bacteria were increased until it's maximum growth followed by the decreasing after 8 hour of incubation. pH and final glucose content of the medium decrease in line with prolonged incubation time. The conclusion of this research is that the growth of the *Limosilactobacillus fermentum* BN21 is optimal in medium with the addition of molasses at a concentration of 2% which is incubated for 8 hours.

Keywords: Lactic Acid Bacteria (LAB), *Limosilactobacillus fermentum* BN21, optimization, incubation time, molasses concentration