PERTUMBUHAN BAKTERI *Limosilactobacillus fermentum* PADA SUBSTRAT TEPUNG LABU KUNING *(Cucurbita moschata)* DENGAN LAMA INKUBASI YANG BERBEDA

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INTISARI

Limosilactobacillus fermentum merupakan bakteri asam laktat heterofermentatif penghasil asam laktat melalui proses fermentasi jalur glikolisis. Bakteri asam laktat spesifik ditumbuhkan pada media MRS. Penggunaan media komersial tersebut masih terbatas untuk skala penelitian sehingga diperlukan media alternatif yang mengandung nutrisi untuk pertumbuhan bakteri asam laktat. Penelitian ini bertujuan untuk menganalisis pertumbuhan optimal bakteri *Limosilactobacillus fermentum* yang ditumbuhkan pada media tepung labu kuning dengan lama inkubasi berbeda. Perlakuan yang diberikan yaitu konsentrasi tepung labu kuning (1%, 1,5%, 2%) dan lama inkubasi (jam ke-0, 8, 16, 24). Parameter yang diamati antara lain total koloni bakteri, kadar asam laktat, angka asam, kadar glukosa, dan nilai pH. Data yang diperoleh dianalisis menggunakan *software* SPSS dengan analisis variansi rancangan acak lengkap pola faktorial (3x4). Apabila hasil menunjukkan perbedaan nyata, dilakukan uji *Duncan's Multiple Range Test* (DMRT). Hasil penelitian menunjukkan bahwa perbedaan konsentrasi tepung labu kuning memberikan pengaruh sangat signifikan ($P<0,01$) terhadap pertumbuhan koloni bakteri, produksi asam laktat, penurunan sumber karbon, dan penurunan nilai pH. Semakin tinggi konsentrasi tepung labu kuning yang digunakan menyebabkan semakin tinggi pertumbuhan koloni bakteri, kadar asam laktat, dan angka asam serta penurunan pada nilai pH dan sumber karbon. Perbedaan lama inkubasi menyebabkan peningkatan pertumbuhan koloni bakteri, kadar asam laktat, dan angka asam pada batas maksimum serta penurunan nilai pH dan sumber karbon ($P<0,01$). Lama inkubasi memberikan waktu kepada bakteri untuk mendegradasi substrat melalui proses hidrolisis karbohidrat menghasilkan asam laktat. Semakin lama inkubasi, maka kadar asam laktat, angka asam, dan sel bakteri mengalami peningkatan diikuti dengan penurunan nilai pH dan sumber karbon substrat. Kesimpulan penelitian ini yaitu pertumbuhan optimal bakteri *Limosilactobacillus fermentum* dihasilkan pada konsentrasi tepung labu kuning 2% dan lama inkubasi 8 jam.

Kata kunci: Bakteri asam laktat, labu kuning, media pertumbuhan, lama inkubasi

GROWTH OF *Limosilactobacillus fermentum* BACTERIA ON YELLOW PUMPKIN *(Cucurbita moschata)* FLOUR SUBSTRATE WITH DIFFERENT INCUBATION TIMES

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ABSTRACT

Limosilactobacillus fermentum is a heterofermentative bacteria that produce lactic acid through the fermentation process of the glycolysis pathway. Specifically, lactic acid bacteria are grown on MRS media. The use of commercial media is still limited for research purposes. Alternative media are containing nutrients required for lactic acid bacteria growth. This study was aimed to analyze the optimization of *Limosilactobacillus fermentum* bacteria production grown on pumpkin flour media with different incubation times. Three levels of pumpkin flour (1%, 1.5%, 2%) and different incubation times (0 hours, 8 hours, 16 hours, 24 hours) were applied as treatments in this study. Parameters observed include total bacteria colonies, lactic acid, total acid, glucose levels, and pH values. The data were analyzed using SPSS software with a factorial analysis of variance (3x4). The significant differences between variables due to the treatments have been analyzed by Duncan's Multiple Range Test (DMRT). The results showed that the difference in pumpkin flour concentration significantly influences ($P<0.01$) bacterial growth, lactic acid production, reduction in carbon source, and pH values. Higher concentrations of pumpkin flour lead to increased bacterial growth, lactic acid production, total titratable acidity, as well as a decrease in pH levels and carbon source availability. Differences in incubation times result in increased bacterial growth, lactic acid production, and total titratable acidity up to a maximum limit, along with a decrease in pH levels and carbon source availability ($P<0.01$). Longer incubation times provide bacteria with more time to degrade substrates through carbohydrate hydrolysis, resulting in increased lactic acid production. Consequently, longer incubation times lead to higher lactic acid levels, total titratable acidity, and bacterial cell count, accompanied by a decrease in pH levels and carbon source availability. The conclusion of this research is that optimal growth of *Limosilactobacillus fermentum* bacteria was produced at a concentration of 2% pumpkin flour and an incubation time of 8 hours.

Key word: Lactic acid bacteria, pumpkin powder, growth media, incubation