

OPTIMALISASI SUHU FERMENTASI TERHADAP JUMLAH SEL *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250 PADA PROSES PEMBUATAN SUPLEMEN KESEHATAN BERBASIS PROBIOTIK

INTISARI

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Saat ini frekuensi konsumsi suplemen kesehatan berbasis probiotik semakin meningkat. Salah satu strain probiotik lokal yang berpotensi untuk dikembangkan menjadi produk suplemen probiotik adalah *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250. Bakteri asam laktat ini diisolasi dari makanan tradisional bernama gatot, yaitu olahan hasil fermentasi singkong yang dikeringkan. Dalam pertumbuhannya, *L. plantarum* FNCC-0250 memerlukan suhu optimum agar dapat tumbuh dengan baik dan menghasilkan jumlah sel yang maksimal. Penelitian ini dilakukan untuk mengetahui pengaruh variasi suhu fermentasi (30°C, 35°C, dan 37°C) terhadap optimasi pertumbuhan dan jumlah sel *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250.

Dalam penelitian ini, starter *L. plantarum* FNCC-0250 diinokulasikan pada media pepton ikan kemudian difermentasi pada suhu 30°C, 35°C, dan 37°C selama ± 20 jam. Selanjutnya, media hasil fermentasi disentrifugasi untuk mendapatkan biomassa basah (pellet) lalu ditambahkan *cryoprotectant* berupa campuran *skim milk* dan sukrosa kemudian dilakukan proses *freeze drying*. Pada awal dan akhir proses fermentasi serta setelah proses *freeze drying* dilakukan pengujian jumlah sel dengan melakukan *plating* menggunakan metode *pour plate* secara duplo dan enumerasi sel dengan metode TPC (*Total Plate Count*). Selain itu, juga dilakukan pengukuran absorbansi dan pH media untuk masing-masing variasi suhu fermentasi setiap 2 jam sekali. Berdasarkan hasil penelitian, diperoleh jumlah sel pada suhu fermentasi 30°C, 35°C, dan 37°C secara berturut-turut sebesar $4,15 \times 10^9$ CFU/mL; $7,05 \times 10^8$ CFU/mL; dan $1,69 \times 10^{10}$ CFU/mL. Suhu fermentasi 37°C menghasilkan jumlah sel akhir proses fermentasi yang paling banyak dibanding variasi suhu fermentasi lainnya dengan absorbansi sebesar 1,677 dan pH sebesar 3,81.

Kata kunci: *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250, fermentasi, suhu, probiotik, suplemen.

OPTIMIZATION OF FERMENTATION TEMPERATURE ON CELL NUMBER OF *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250 IN THE PROBIOTIC-BASED HEALTH SUPPLEMENT MAKING PROCESS

ABSTRACT

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Currently, the frequency of consumption of probiotic-based health supplements is increasing. One local probiotic strain that has the potential to be developed into probiotic supplement products is *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250. This lactic acid bacterium was isolated from a traditional food called gatot, which is processed fermented dried cassava. In its growth, *L. plantarum* FNCC-0250 requires an optimum temperature in order to grow well and produce the maximum number of cells. This study was conducted to determine the effect of fermentation temperature variations (30°C, 35°C, and 37°C) on growth optimization and cell number of *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250.

In this study, *L. plantarum* FNCC-0250 starter was inoculated on fish peptone media then fermented at 30°C, 35°C, and 37°C for ± 20 hours. Next, the fermented media was centrifuged to obtain wet biomass (pellets) and then added cryoprotectant in the form of a mixture of skim milk and sucrose and then freeze drying process. At the beginning and end of the fermentation process and after the freeze drying process, the number of cells was tested by plating using the pour plate method in duplicate and cell enumeration using the TPC (Total Plate Count) method. In addition, absorbance and pH measurements were also carried out for each fermentation temperature variation every 2 hours. Based on the results of the study, the number of cells obtained at fermentation temperatures of 30°C, 35°C, and 37°C was 4.15×10^9 CFU/mL; 7.05×10^8 CFU/mL; and 1.69×10^{10} CFU/mL, respectively. A fermentation temperature of 37°C produced the highest number of cells at the end of the fermentation process compared to other fermentation temperature variations with an absorbance of 1.677 and a pH of 3.81.

Keywords: *Lactiplantibacillus plantarum* subsp. *plantarum* FNCC-0250, fermentation, temperature, probiotic, supplement.