

**PENGARUH PENYALUT CAMPURAN TAPIOKA, SKIM, DAN ALGINAT TERHADAP STABILITAS DAN *RELEASING TIME* MIKROKAPSUL PROBIOTIK BAKTERI ASAM LAKTAT DENGAN METODE PENDINGINAN SEMPROT**

NOVILIANA KUSUMA ASTUTI  
16/400542/TP/11755

**INTISARI**

Penelitian ini bertujuan untuk mengetahui viabilitas probiotik bakteri asam laktat (BAL) hasil enkapsulasi menggunakan bahan penyalut tapioka dan susu skim saat sebelum dan sesudah *spray drying*, stabilitas selama penyimpanan, serta lama waktu terjadinya pelepasan enkapsulasi probiotik BAL dalam kondisi simulasi gastrointestinal.

Pembuatan mikrokapsul diawali dengan probiotik BAL yang terdiri dari *Lactobacillus murinus* Ar-3, *Streptococcus thermophilus* Kp-2, dan *Pediococcus acidilacti* Kd-6 diremajakan pada media *peptone glucose yeast* (PGY) kemudian sekitar 50 ml starter kultur campuran ketiga probiotik BAL dengan rasio 1; 1,16; 1,18 v/v dimasukkan ke dalam 1 liter media fermentasi molase. Fermentasi dilakukan selama 18 jam pada suhu 37°C. Enkapsulasi dilakukan setelah biomassa dipanen dengan sentrifugasi pada suhu 4°C dan direkonstitusi. Kemudian dilapisi menggunakan bahan penyalut tapioka, skim, dan alginat lalu dikeringkan menggunakan *spray drying*. Viabilitas, stabilitas, dan waktu pelepasan dihitung dengan *standar total plate count*.

Hasil penelitian menunjukkan bahwa viabilitas bakteri terenkapsulasi mengalami penurunan selama proses *spray drying* dari  $1,27 \times 10^{26}$  menjadi  $1,22 \times 10^{20}$  CFU. Stabilitas selama 21 hari penyimpanan juga mengalami penurunan sebanyak 5,13 sampai 8,37 siklus log dalam berbagai kondisi penyimpanan. Mikrokapsul probiotik dalam larutan *bile salt* 0,3% w/v pada menit ke -220 melepaskan bakteri sejumlah  $7,2 \times 10^5$  CFU yang diperkirakan berada pada segmen usus halus.

**Kata kunci:** bakteri asam laktat, enkapsulasi, viabilitas, *releasing time*, pendinginan semprot

Pembimbing : Dr. Ir. Muhammad Nur Cahyanto, M.Sc., Prof. Dr. Ir. Sri Harimurti, SU.

## THE EFFECT OF TAPIOCA FLOUR, SKIM, AND ALGINATE MIXED COATING ON THE STABILITY AND RELEASING TIME OF MICROENCAPSULATED LACTIC ACID BACTERIA PROBIOTIC BY SPRAY DRYING METHOD

Noviliana Kusuma Astuti  
16/400542/TP/11755

### ABSTRACT

This study aimed to determine the viability of the probiotic lactic acid bacteria (LAB) encapsulated using tapioca flour and skim milk coating materials before and after spray drying, as well as the stability during storage, and the time needed for the encapsulated LAB probiotic to be released under simulated gastrointestinal conditions.

Microcapsules production begin with LAB probiotics studied consisted of *Lactobacillus murinus* Ar-3, *Streptococcus thermophilus* Kp-2, and *Pediococcus acidilacti* Kd-6 were rejuvenated in peptone glucose yeast (PGY) media and then approximately 50 ml of culture starter of a mixture of three LAB probiotics with ratio of 1:1,6:1,8 v/v was added into 1 liter of molasses fermentation medium. Fermentation was carried out for 18 hours at 37°C. Encapsulation was carried out after harvesting the biomass by centrifugation at 4°C and reconstituted. Coating was conducted using tapioca flour, skim milk, and alginate and then spray dried. Viability and stability were calculated by standar total plate count as well as releasing time.

The results showed that the encapsulated bacteria's viability decreased during the spray drying process from  $1,27 \times 10^{26}$  to  $1,22 \times 10^{20}$  CFU. Stability during 21 days storage was also decrease as many as 5.13 to 8.37 log cycles under various storage conditions. Probiotic microcapsules in a bile salt solution of 0.3% w/v at 220 minutes released bacteria in the amount of  $7,2 \times 10^5$  CFU which were thought to be in the small intestine segment.

**Keywords: lactic acid bacteria, encapsulation, viability, releasing time, spray drying**

Pembimbing : Dr. Ir. Muhammad Nur Cahyanto, M.Sc., Prof. Dr. Ir. Sri Harimurti, SU.