

## PENGARUH LAMA PENYIMPANAN TERHADAP KUALITAS FISIKO-KIMIA DAN VIABILITAS *LACTICASEIBACILLUS CASEI* AP DALAM SUSU BUBUK PROBIOTIK DENGAN METODE *FREEZE DRYING*

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### INTISARI

Penelitian ini bertujuan untuk mengetahui pengaruh lama penyimpanan terhadap kualitas fisiko-kimia dan viabilitas *Lacticaseibacillus casei* AP dalam produk susu bubuk probiotik. Produk dibuat melalui proses fermentasi dengan inokulasi kultur *Lacticaseibacillus casei* AP, kemudian dikeringkan menggunakan metode *freeze drying*. Parameter yang diamati meliputi kualitas fisik (*insolubility index*, *wettability*, warna), kimia (kadar air, *total solid*, aktivitas air, pH, keasaman, bilangan peroksida, FFA), dan mikrobiologi (viabilitas BAL). Data dianalisis menggunakan *One-Way ANOVA* kemudian data penelitian dengan hasil berbeda nyata ( $P < 0,05$ ) dilakukan uji lanjutan *Duncan's New Multiple Range Test* (DMRT). Hasil penelitian menunjukkan bahwa lama penyimpanan berpengaruh nyata ( $P < 0,05$ ) terhadap seluruh parameter yang diamati. Peningkatan lama penyimpanan menyebabkan peningkatan *insolubility index* ( $3,17 \pm 0,28$  menjadi  $3,67 \pm 0,28$  mL), *wettability* ( $72,00 \pm 0,00$  menjadi  $196,00 \pm 1,00$  detik), kadar air ( $4,26 \pm 0,45$  menjadi  $14,33 \pm 0,35\%$ ), aktivitas air ( $0,18 \pm 0,01$  menjadi  $0,52 \pm 0,01$ ), keasaman ( $0,93 \pm 0,05$  menjadi  $1,57 \pm 0,15\%$ ), bilangan peroksida ( $9,03 \pm 0,74$  menjadi  $14,95 \pm 0,93$  meq  $O_2$ /kg), dan FFA ( $15,49 \pm 0,67$  menjadi  $21,14 \pm 0,26\%$ ). Sebaliknya, terjadi penurunan warna cerah ( $L^*$ ), kekuningan ( $b^*$ ), *total solid*, pH, dan viabilitas BAL ( $6,47 \pm 0,00$  menjadi  $6,08 \pm 0,02$  log CFU/mL). Kesimpulan dari penelitian ini adalah penyimpanan susu bubuk probiotik pada suhu ruang selama lebih dari dua minggu menurunkan kualitas fisik, kimia, dan viabilitas probiotik. Waktu simpan yang direkomendasikan adalah maksimal dua minggu.

**Kata Kunci:** Susu bubuk probiotik, Kualitas fisiko-kimia dan viabilitas, *Lacticaseibacillus casei* AP, *Freeze drying*, Penyimpanan.

## EFFECT OF STORAGE DURATION ON PHYSICO-CHEMICAL QUALITY AND VIABILITY OF *LACTICASEIBACILLUS CASEI* AP IN PROBIOTIC MILK POWDER BY FREEZE DRYING METHOD

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### ABSTRACT

This study aims to determine the effect of storage duration on the physico-chemical quality and viability of *Lacticaseibacillus casei* AP in probiotic milk powder products. The product was made through fermentation process by inoculating *Lacticaseibacillus casei* AP culture, then dried using freeze drying method. Parameters observed included physical (insolubility index, wettability, color), chemical (water content, total solid, water activity, pH, acidity, peroxide number, FFA), and microbiological (LAB viability) qualities. Data were analyzed using One-Way ANOVA then research data with significantly different results ( $P < 0.05$ ) were subjected to Duncan's New Multiple Range Test (DMRT). The results showed that the length of storage had a significant effect ( $P < 0.05$ ) on all parameters observed. The increase in storage duration caused an increase in insolubility index ( $3.17 \pm 0.28$  to  $3.67 \pm 0.28$  mL), wettability ( $72.00 \pm 0.00$  to  $196.00 \pm 1.00$  seconds), moisture content ( $4.26 \pm 0.45$  to  $14.33 \pm 0.35\%$ ), water activity ( $0.18 \pm 0.01$  to  $0.52 \pm 0.01$ ), acidity ( $0.93 \pm 0.05$  to  $1.57 \pm 0.15\%$ ), peroxide number ( $9.03 \pm 0.74$  to  $14.95 \pm 0.93$  meq  $O_2$ /kg), and FFA ( $15.49 \pm 0.67$  to  $21.14 \pm 0.26\%$ ). In contrast, there was a decrease in light color ( $L^*$ ), yellowness ( $b^*$ ), total solid, pH, and LAB viability ( $6.47 \pm 0.00$  to  $6.08 \pm 0.02$  log CFU/mL). The conclusion of this study was that storage of probiotic milk powder at room temperature for more than two weeks decreased the physical quality, chemical, and viability quality of probiotics. The recommended shelf life is a maximum of two weeks.

**Keywords:** Probiotic milk powder, Physico-chemical quality and viability, *Lacticaseibacillus casei* AP, Freeze drying, Storage.