

## PENGARUH JENIS KEMASAN DAN LAMA PENYIMPANAN TERHADAP KUALITAS FISIKO-KIMIA DAN VIABILITAS *Lactocaseibacillus casei* AP DALAM SUSU BUBUK METODE SPRAY DRYING

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### INTISARI

Penelitian ini bertujuan untuk mengetahui pengaruh jenis kemasan dan lama penyimpanan terhadap kualitas fisiko-kimia dan viabilitas *Lactocaseibacillus casei* AP dalam susu bubuk metode *spray drying*. Penelitian ini menggunakan bahan baku susu sapi yang diinokulasikan starter *Lactocaseibacillus casei* AP dengan lama fermentasi 10-12 jam. Hasil fermentasi dilakukan pengeringan dengan metode *spray drying* untuk menghasilkan produk susu bubuk. Susu bubuk yang dihasilkan dikemas dengan kemasan *retort pouch* dan plastik polypropylene (PP) serta dilakukan penyimpanan selama 0, 14, 28, dan 56 hari. Parameter yang diamati yaitu *insolubility index*, *wettability*, aktivitas air (aw), pH dan keasaman, kadar air dan total solid, warna CIELab, kadar lemak, kadar protein, kadar laktosa, dan viabilitas total bakteri asam laktat (BAL). Parameter kunci yang diamati yaitu kadar air dan aktivitas air karena penting untuk menjamin mutu, keamanan, dan kestabilan susu bubuk. Data penelitian dianalisis statistik menggunakan Rancangan Acak Lengkap (RAL) dengan pola faktorial 4x2. Apabila menunjukkan hasil yang berbeda secara signifikan maka akan dilanjutkan dengan uji Duncan multiple range test (DMRT). Hasil penelitian menunjukkan bahwa lama penyimpanan berpengaruh nyata ( $P < 0,05$ ) terhadap kualitas fisiko-kimia dan viabilitas susu bubuk probiotik. Hasil penelitian menunjukkan bahwa perbedaan kemasan berpengaruh nyata ( $P < 0,05$ ) terhadap kadar air, total solid, aktivitas air, *wettability*, *insolubility index*, tetapi tidak berpengaruh nyata ( $P > 0,05$ ) terhadap pH, keasaman, warna CIELab, kadar protein, kadar laktosa, kadar lemak, dan total BAL. Hasil penelitian menunjukkan bahwa interaksi antara beda kemasan dan lama penyimpanan berpengaruh nyata ( $P < 0,05$ ) terhadap kadar air, total solid, aktivitas air, dan total *acidity* susu bubuk probiotik. Perlakuan interaksi terbaik didapatkan pada susu bubuk probiotik yang dikemas *retort pouch* dengan kondisi vakum dan disimpan selama 14 hari karena masih memiliki kadar air dibawah 5%.

**Kata Kunci** : Susu bubuk, *spray drying*, kemasan, penyimpanan, probiotik, *Lactocaseibacillus casei* AP

## EFFECT OF PACKAGING TYPE AND STORAGE DURATION ON THE PHYSICO-CHEMICAL QUALITY AND VIABILITY OF *Lacticaseibacillus casei* AP IN SPRAY DRIED MILK POWDER

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### ABSTRACT

This study aimed to determine the effects of packaging type and storage duration on the physicochemical properties and viability of *Lacticaseibacillus casei* AP in powdered milk produced using the spray drying method. The powdered milk was made from cow's milk inoculated with *Lacticaseibacillus casei* AP for 10–12 hours and then dried using a spray drying technology. The resulting powdered milk was packaged using two types of packaging materials: retort pouch and polypropylene (PP) plastic, and stored for 0, 14, 28, and 56 days. The observed parameters included *insolubility index*, *wettability*, water activity (*aw*), pH and titratable acidity, moisture content and total solids, CIELab color, fat content, protein content, lactose content, and total lactic acid bacteria (LAB) viability. The key parameters observed were moisture content and water activity as they are important to ensure the quality, safety and stability of milk powder. Data were statistically analyzed using a Completely Randomized Design (CRD) with a 4×2 factorial arrangement. If significant differences were found, Duncan's Multiple Range Test (DMRT) was conducted as a post hoc analysis. The results showed that the length of storage had a significant effect ( $P < 0.05$ ) on the physico-chemical quality and viability of probiotic milk powder. The results showed that different packaging had a significant effect ( $P < 0.05$ ) on moisture content, total solid, water activity, *wettability*, *insolubility index*, but no significant effect ( $P > 0.05$ ) on pH, acidity, CIELab color, protein content, lactose content, fat content, and total LAB. The results showed that the interaction between different packaging and storage duration had a significant effect ( $P < 0.05$ ) on water content, total solid, water activity and total acidity of probiotic milk powder. The best interaction treatment was obtained in probiotic milk powder packaged in retort pouch with vacuum conditions and stored for 14 days because it still had a moisture content below 5%.

Keywords: Milk powder, spray drying, packaging, storage, probiotic, *Lacticaseibacillus casei* AP