

PHYSICOCHEMICAL AND MICROBIOLOGICAL CHANGES DURING STORAGE IN GREEK YOGURT FERMENTED WITH *LACTOBACILLUS* *PARACASEI* M104 AND *PEDIOCOCCUS PENTOSACEUS* M103

Devano Athallah Basyir
21/475027/PT/08867

ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi perubahan fisikokimia dan mikrobiologis yogurt Yunani yang difermentasi menggunakan *Lactobacillus paracasei* M104 dan *Pediococcus pentosaceus* M103 selama penyimpanan 30 hari. Yogurt Yunani diproduksi melalui fermentasi susu menggunakan kultur bakteri hidup, kemudian dilakukan proses penyaringan untuk memisahkan whey sehingga menghasilkan tekstur yang lebih kental dan lembut dengan kandungan protein yang lebih tinggi. Perlakuan yang diberikan berupa fermentasi menggunakan kultur bakteri *L. paracasei* M104 (Lp), *P. pentosaceus* M103 (Pp), serta kombinasi kedua galur tersebut. Fermentasi yogurt Yunani dilakukan dengan menginkubasi susu sapi yang telah diinokulasi pada suhu 42 °C selama 8–12 jam, kemudian whey dipisahkan. Parameter yang diamati meliputi kualitas fisikokimia yang terdiri atas kadar laktosa dan protein, uji viskositas, pH dan keasaman, kadar air, serta uji sineresis, serta kualitas mikrobiologis melalui perhitungan total bakteri asam laktat (BAL). Penyimpanan pascafermentasi dilakukan selama 30 hari pada suhu lemari pendingin. Kualitas fisikokimia (pH, keasaman, laktosa, protein, sineresis, kadar air, dan viskositas) serta kualitas mikrobiologis (total BAL) dianalisis sebelum dan setelah 30 hari penyimpanan. Data dianalisis menggunakan Rancangan Acak Lengkap (RAL) pola faktorial yang dilanjutkan dengan uji *Duncan Multiple Range Test* (DMRT). Hasil analisis statistik menunjukkan bahwa perbedaan starter bakteri memberikan pengaruh sangat nyata ($P < 0,01$) terhadap viskositas dan total BAL. Lama penyimpanan memberikan pengaruh sangat nyata ($P < 0,01$) terhadap pH dan kadar protein, serta pengaruh nyata ($P < 0,05$) terhadap nilai keasaman, kadar air, sineresis, viskositas, dan total BAL. Interaksi antara kultur bakteri dan lama penyimpanan memberikan pengaruh sangat nyata ($P < 0,01$) terhadap viskositas dan total BAL. Dapat disimpulkan bahwa starter lokal yang berasal dari susu kambing PE (*L. paracasei* M104 dan *P. pentosaceus* M103) dapat digunakan sebagai starter dalam fermentasi yogurt Yunani, baik sebagai kultur tunggal maupun kultur campuran. Hasil penelitian menunjukkan bahwa *P. pentosaceus* M103 menghasilkan total BAL tertinggi ($9,100 \pm 0,542$ log cfu/mL), sineresis terendah ($15,595 \pm 4,93\%$), serta kadar air terendah ($80,776 \pm 2,029\%$) selama penyimpanan. Sementara itu, *L. paracasei* M104 menghasilkan viskositas tertinggi (29.549 ± 256 cP) selama penyimpanan.

Key words: *Fermentation, Greek yogurt, Storage, Lactobacillus paracasei* M104, *Pediococcus pentosaceus* M103

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Devano Athallah Basyir
21/475027/PT/08867

ABSTRACT

This research aims to evaluate the physicochemical and microbiological changes of Greek yogurt fermented with *Lactobacillus paracasei* M104 and *Pediococcus pentosaceus* M103 during 30 days of storage. Greek yogurt was produced by fermenting milk with live bacterial cultures, then straining to remove the whey, resulting a thick and creamy texture with higher protein content. The treatments were fermentation with different bacterial culture of *L. paracasei* M104 (Lp) or *P. pentosaceus* M103 (Pp) or a mixture of both strains. Greek yogurt fermentation was performed by incubating the inoculated cow milk at 42 °C for 8-12 h, and the whey was then separated/removed. The parameters measured were physicochemical quality which consist of lactose and protein content, viscosity test, pH and acidity test, water content, syneresis test, and microbiological quality by counting total lactic acid bacteria. Post fermentation storage was conducted for 30 days at refrigerator temperature. Physicochemical (pH, acidity, lactose, protein, syneresis, water content, viscosity) and microbiological quality (total lactic acid bacteria/LAB count) were calculated before and after 30 days of storage. Data were analysed using Completely Randomized Design (CRD) with a factorial pattern followed by Duncan's Multiple Range Test (DMRT). Statistical analysis shows different bacterial starters had very significant effect ($P < 0.01$) on the viscosity and total LAB. Storage period had a very significant effect ($P < 0.01$) on the pH and protein content, and significant effect ($P < 0.05$) on acidity value, water content, syneresis, viscosity and total LAB. Interaction of bacterial cultures with storage period had very significant effect ($P < 0.01$) on viscosity and total LAB. It was concluded that local starters derived from PE goat milk (Lp and Pp) can be used as starters for Greek yogurt fermentation, either as single cultures or mixed cultures. The research showed *P. pentosaceus* M103 had the highest total LAB (9.100 ± 0.542 log cfu/ml), lowest syneresis (15.595 ± 4.93 %), and lowest water content (80.776 ± 2.029 %) during storage. *L. paracasei* M104 had the highest viscosity ($29,549 \pm 256$ cP) during storage.

Key words: Fermentation, Greek yogurt, Storage, *Lactobacillus paracasei* M104, *Pediococcus pentosaceus* M103