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Enhancing the Stability of Probiotic Bacteria in Fermented Milk Fortified Using some Food Additives

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Abstract

The present investigation studied the effects of some dates palm (date-paste) and olive oil on the viability of bacterial starter cultures (*Lactobacillus delbrueckii* ssp. *bulgaricus* and *Streptococcus thermophilus*) and probiotics (*Lactobacillus rhamnosus* and *Bifidobacteria breve*) in fermented milk during manufacture and storage period. Date-paste and olive oil were added to fermented milk at different concentrations as follows; 1, 1.5 and 2% for date-paste and 0.5, 1.5, 2.5% for olive oil respectively. Changes in chemical and viable total bacterial count of fermented milk were monitored during manufacture and storage at 4°C for 30 days. Data showed that the incubation time that was needed to reach pH 4.5 was considerably affected by the added ingredients. Also, the drop in pH or the increase in acidity of this fermented milk was dependent on the added ingredients and the percentage of supplementation. Results indicated that addition of date-paste and olive oil improved the viability of probiotic starter culture and the microbiological properties in the treated samples in comparison with control. The survival of probiotic bacteria in all treatments which were in viable counts remained at $> 10^7$ cfu g⁻¹ after 30 days of storage at 4°C. Moreover, addition of dates palm-paste improved the viability and stability of probiotic starter culture than olive oil especially during storage and the total viable counts were 7.1, 7.4, 7.7 and 7.5, 8.0 and 8.1 × 10⁷ for olive oil and dates-paste at the end of storage, respectively. Coliforms, *E. coli* bacteria yeasts, and moulds were not detected in tested samples.

Supplementation of the fermented milk with 2% date-paste and 1.5% olive oil improved the rheological properties and reduced the curd and syneresis rate was in the range of 34 to 47%.

Sensory evaluation showed that fermented milk fortified with 2% date-paste and 1.5% olive oil recorded the highest score and overall acceptability than the other treatments.

It is suggested that the fermented milk of acceptable quality and high total probiotic bacterial count during storage can be made from milk supplemented with adjusted concentration from date-paste and olive oil, which could guide the dairy industry in developing new probiotic dairy products and food safety.

Keywords: Dates and olive oil, fermented milk, fortification, microbiological quality, probiotic bacteria, stability