USE OF EXOPOLYSACHARIDE PRODUCING STARTER CULTURES IN THE PRODUCTION OF FUNCTIONAL DAIRY PRODUCTS

By

DOAA MAAMOUN ABD ALLAH

B.Sc. Agric. Sc. (Dairy Science and Technology), Fac. Agric., Ain Shams Univ., 2004

M.Sc. Agric. Sc. (Dairy Science and Technology), Fac. Agric., Ain Shams Univ., 2014

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ABSTRACT

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The objective of the present study was to improve the functional and sensory characteristics of low fat yoghurt and Ras cheese by using EPS-producing cultures. The study was conducted in two parts, after selection of bacterial cultures. Seven different bacterial cultures were screened for their ability to produce exopolysaccharides. Out of the Seven tested bacterial cultures of *Lactobacillus dulbruekii subsp. bulgaricus* DSM 20080, *Streptococcus thermophilus* CH-1, thermophilic culture Yoflex Express 1.0 and thermophilic culture Yoflex CH-1 were the best. Therefore, these bacterial cultures were selected for further investigations.

In first part of this study, exopolysaccharides producing culture in low-fat yoghurt making. The results showed that addition of exopolysaccharides producing cultures into low-fat milk had no effect on T.S and chemical composition of the resultant yoghurts. Use of exopolysaccharides into low- fat yoghurt improved significant the yoghurt viscosity. Values of the viscosity were increased with extending the storage period in all treatments including the two controls. Low-fat yoghurt with laboratory exopolysaccharides producing culture was the lowest significant syneresis among all treatments. Low-fat yoghurt with exopolysaccharides producing cultures either commercial or laboratory achieved the significantly greatest acetaldehyde and diacetyl content in both fresh and cold stored yoghurt samples compared to low- fat yoghurt control . Also, fresh and stored yoghurts made from low- fat milk with laboratory exopolysaccharides producing culture showed highest counts of *Lb.bulgaricus* and *Str. theromphillus* among all treatments including two the controls (full- and low-fat). The data shown that use of

exopolysaccharides into low-fat yoghurt led to significant decrease of hardness compared to low-fat yoghurt control. Also, the hardness decreased by advancing the storage in all treatments including two controls. Microstructure of fresh yoghurt showed that addition of EPS-producing cultures either commercial or laboratory into low- fat buffaloes milk improved the texture of the resultant yoghurt. All yoghurt treatments were sensory acceptable but the best yoghurt was low- fat yoghurt with laboratory EPS- producing culture.

In the second part, exopolysaccharides producing culture in low-fat Ras cheese making. Fresh low- fat Ras cheese with laboratory EPS-producing culture had the highest yield percent while low- fat Ras cheese control showed the lowest among all treatments. The salt/moisture percent and ash content of all Ras cheese samples tended to increase gradually along the ripening period. Use of exopolysaccharides into low-fat Ras cheese led to significant increase in the soluble tryptophan, soluble tyrosine and TVFA contents compared to low- fat yoghurt control. Total bacterial count, *Str. theromphillus* and *Lb. delbrueckii ssp. bulgaricus* counts in Ras cheese made from low- fat milk with laboratory exopolysaccharides producing culture showed highest counts among all treatments including the two controls (full- and low- fat). Use of exopolysaccharides into low- fat Ras cheese led to significant decrease of hardness compared to low- fat Ras cheese control. Microstructure showed that fresh cheese containing exopolysaccharides exhibit protein network with more and large opened cavities than low- fat Ras cheese control. The body and texture scores in full- fat Ras cheese control and low- fat Ras cheeses including EPS-producing cultures had significantly higher points than those of the cheese 1ow- fat Ras cheese control. All Ras cheese treatments were sensory acceptable but the best cheese was low- fat Ras cheese with laboratory EPS- producing culture as well as the full- fat control.

Key words: Exopolysaccharides starter cultures, Low- fat yoghurt, Ras cheese, Textural properties, Scanning Electron Microscopy, Sensory evaluation.