ABSTRACT

The current study was aimed to production of exopolysaccharides (EPSs) by some lactic acid bacteria (LAB) and their application in some dairy products to improve their rheological properties, nutritional and healthy benefits. A total 46 LAB strains isolated from different Egyptian dairy products (Fermented butter milk and Kareish cheese) were screened for production of EPSs. The highest EPS-producing strains, $H1^T$, $H2^T$ and $H4^T$ were chosen for studying and complete identification (phenotypically and genotypically)by API 50CHL kits, 16S-rDNA techniques and further detailed analysis.H1 and H2 were identified as *Lactobacillus plantarum* with gene bank accession numbers JQ011464 and JQ011465 respectively, while H4 was identified as *Lactobacillus pentosus* with gene bank accession numberJQ011466.The effect of fermentation Period, fermentation temperature, pH of the medium, sugars(glucose, fructose, galactose, lactose and sucrose)substitutions in MRS medium and the use of some by-products (permeate, date debs and molasses) in MRS as a carbon source on the biomass concentration C_B and production of EPSs by the three strains H1, H2 and H4 was estimated. The results showed that the highest production of EPSs by the three strains was at the period of 72 h of incubation, 40°C of fermentation temperature and medium pH 8. Also, the highest production of EPSs by the three strains was from glucose as a monosaccharide, lactose as a disaccharide and molasses as a by-product. Pure polymers of EPSs were hydrolyzed and analyzed by Electrospray Ionization Mass Spectrometry(ESI MS).The chemical structure of EPS from strains H1 and H2 was the same and composed of D-Glucose, D-Galactose, D-glucoseamine 6-phosphate and α-D-Fructose 2, 6-diphosphate, while the EPS from H4 composed of D-glucose, D-galactose and α-D-N-acetyl-glucoseamine.The EPS produced by the strain H2 had high ropiness, therefore, it was used as a stabilizer in the manufacture of full and free fat yoghurt and free fat UF soft cheese. Six treatments of full and free fat yoghurt (Control I, Y_1 and Y_2) and (Control II, Y_3 and Y_4) were manufactured by different concentrations of the EPS (0.0, 0.2 and 0.4%) and (0.0, 0.4, and 0.8%), respectively and analyzed when fresh and (3, 6 and 10 days). Also, five treatments of free fat UF soft cheese (C, Ch_1, Ch_2, Ch_3 and Ch_4) were manufactured by different concentrations of EPS (0.0, 0.2, 0.4, 0.8 and 1.0%), respectively and analyzed when fresh and (5, 10 and 15 days).The results also showed that the treatments containing EPS of full and free fat yoghurt had high titratable acidity (TA), acetaldehyde, diacetyl, moisture, water soluble nitrogen/total nitrogen (WSN/TN) contents, total viable counts (TVC), *Str.thermophilus*, *Lb. bulgaricus* counts, firmness, cohesiveness, gumminess, chewiness, springiness and resilience and low pH and syneresis more

than the control treatments that made without adding EPS. The best concentrations of EPS added to full and free fat yoghurt were 0.4 and 0.8%, respectively. Whilst, the treatments containing EPS of free fat UF soft cheese had high TA, moisture, WSN/TN contents, TVC, streptococci, lactobacilli counts and cohesiveness and low pH, firmness, gumminess, chewiness, springiness and resilience more than the control. The best concentrations of EPS added to free fat UF soft cheese were 0.2 and 0.4%, but because of the economic status 0.2% was preferred.

Key words: *Lactobacillus plantarum* H1, H2 - *Lactobacillus pentosus* H4 – fermentation period– fermentation temperature – pH – monosaccharides – disaccharides – by-products – full and free fat yoghurt – free fat UF soft cheese.