THE USE OF PLANT POLYSACCHARIDES IN SOME DAIRY PRODUCTS

By

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B.Sc. Agric. Sci. (Food Sci. and Tech.), Ain Shams University, 2001
M.Sc. Agric. Sci. (Food Sci. and Tech.), Ain Shams University, 2008

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ABSTRACT

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The physical and hypolipidemic activity of ethanol precipitated cress seed mucilage (CSM) and flaxseed mucilage (FSM) solutions compared with commercial guar gum (GG) solution (1.0% w/w) were evaluated. All polysaccharides solutions exhibited shear-thinning behavior, which was more pronounced in GG solution. However, there was no significant difference in water holding capacity (WHC) of starch gel containing GG, FSM or CSM at the same concentration except at 0.4%. The GG solution had the highest clarity and foam stability. Both FSM and CSM solution had the best foaming capacity, while CSM had the lowest foam stability. The antioxidant capacity of the CSM solution was the highest, while that of GG solution was the lowest. In addition, treatment of hyperlipidemic rats with ATOR10®, FSM or CSM induced a significant decrease in the serum triglycerides, total cholesterol, LDL-cholesterol and hepatic MDA. Inversely, treatment of hyperlipidemic rats with ATOR10®, FSM or CSM exhibited marked improvement in both serum HDL and hepatic total antioxidant capacity; CSM performed a stronger dislipidemic potential than that of FSM.

The changes in physicochemical properties of yoghurt containing CSM or FSM compared with yoghurt containing GG or plain set yoghurt during storage at 5±2°C for 15 days were studied. CSM and FSM were added to standardized buffalo's skim milk (~3.2% fat and ~15.0% TS) at rate of 0.025, 0.05 and 0.10% but GG was added at the rate of 0.025 and 0.05% to create 8 treatments, along with a batch had no CSM, FSM or GG which serve as a control (C). Addition of different levels from CSM, FSM or GG had no significant effect on pH value, proteolysis (WSN/TN ratio), and fermentation process of yoghurt samples throughout the storage period. Physically, addition of different levels from CSM or

0.025% GG reduced the yoghurt wheying–off and whey syneresis compared with C, while addition of FSM had no significant effect on whey syneresis. Apparent viscosity of yoghurt containing GG or CSM was higher than that of C until day 10. However, yoghurt containing 0.025 and 0.05% CSM or 0.05% GG showed continued increase in apparent viscosity until day 10 while for yoghurt containing 0.10% CSM, the increase was observed until day 5 and decline thereafter. Concerning to FSM, apparent viscosity of yoghurt containing 0.025% FSM was the highest compared with other yoghurt samples. Finally, addition of 0.025% GG, 0.05% CSM, or 0.05% FSM were sufficient to improve the physical and sensory properties of yoghurt compared with plain set yoghurt (control).

The CSM, FSM and GG were added separately at the rates of 0.025, 0.05 and 0.10% (w/w) to ice cream mixes consisted of 10.0% milk fat (fresh cream) 11.5% milk solids not fat (fresh buffalo's skim milk and skim milk powder) and 15.0% sucrose to create 9 treatments. Protein load was the highest in ice cream mix containing 0.025% GG or CSM, however, protein load decreased, as GG or CSM concentration increased. All ice cream mixes exhibited shear-thinning behavior, which increased by increasing the proportion of GG, CSM and FSM. Ice cream mix containing 0.1% FSM exhibited the highest viscosity followed by that containing 0.1% CSM or 0.05% GG. The overrun was the highest in the frozen ice cream containing 0.025% FSM or CSM, but it was the least in that containing 0.05% GG. The hardness of frozen ice cream decreased, as the concentration of GG, CSM or FSM increased. Finally, addition of 0.025% FSM, CSM or commercial GG was the best percentage to improve the physical and sensorial properties of resultant ice cream.

Keywords: Yoghurt, Ice cream, Flaxseed mucilage, Cress seed mucilage, Guar gum, Physicochemical properties, Hyperlipidemia.

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