Physicochemical and textural properties of reduced fat Cheddar cheese formulated with xanthan gum and/or sodium caseinate as fat replacers

Abstract

Cheese is becoming one of the most widely utilized food ingredients. Raised awareness of people on healthy lifestyle has led to an increased demand for low-calorie foods particularly for low and reduced fat cheeses. Although low and reduced fat cheese exhibits poor texture and body compared to full fat ones, consumers expect to have all the characteristics of full-fat cheese in its low and reduced fat counterpart. Fat replacers are ingredients intended to be used instead of the fats and they have less caloric value and provide functional properties of the fat to foods. The effect of xanthan gum and sodium caseinate as fat replacers on textural properties and organoleptic attributes of reduced fat cheddar cheeses was studied. The results indicated that type and concentration of fat mimetic significantly affected on characteristics of cheeses. Generally the low-fat cheeses produced with xanthan gum simulated the functions of fat better than the sodium caseinate. The results revealed that, by decreasing the fat content of cheese milk and increasing xanthan gum level, the values of moisture and protein content significantly ($P<0.05$) increased. Separately applying high level of xanthan gum (0.045%) (w/w) or in combination with low level of sodium caseinate in cheese formulation decreased the hardness and gumminess in reduced fat samples. Fat reduction led to increase in the cohesiveness and springiness of fresh Cheddar cheese. Electronic nose for evaluation of volatile flavor compounds showed positive effects of high level of xanthan gum on flavor release of reduced fat cheeses. These results indicated that applying high level of xanthan gum had positive effects on economic consequences such as increase in yield besides acceptable textural properties. Incorporation of xanthan gum allowed a considerable fat reduction with no detrimental effect on Cheddar cheese overall quality.