Abstract

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Microstructural, Physicochemical, Microbiological, and Organoleptic Characteristics of Sugar- and Fat-Free Ice Cream from Buffalo Milk

Abstract: Ice cream is a popular dessert product across the world. Structure, body, taste, and odor properties are created by adding non-milk ingredients and milk ingredients. The main aim of the study is to decrease the caloric value of ice cream by using sugar and fat replacements. Ice cream treatments were investigated based on microstructural, chemical, physical, microbiological, sensory, and calorific values. Four different ice creams were used (control ice cream (SC1), ice cream with stevia (SC2), ice cream with sucralose (SC3), and ice cream with sorbitol (SC4)). The chemical properties in all treatments of ice cream were significantly recorded (p < 0.05). The highest sucrose and fat levels were detected in the SC1 treatment compared with the other treatments (p < 0.05). The lowest fat and sugar amounts were observed in the SC2, SC3, and SC4 treatments (p < 0.05). The highest viscosity, overrun, and hardness values (p < 0.05) were detected in the control ice cream. Total aerobic mesophilic bacterial counts were not significantly recorded between different ice cream treatments (p < 0.05). The sensory scores were not significantly affected by sweeteners and bulk agents in the different treatments. The highest calorific value was calculated in the SC1 samples (p < 0.05). On the other hand, the lowest calorific value was calculated in SC2, followed by the SC3 and SC4 treatments. In scanning electron microscopy (SEM), the gel exhibited a homogeneous structure with a fine network within the SC2, SC3, and SC4 treatments, as it contained a cohesive structure with small-sized pores.