

Capturing the impact of nanobubble liquid in enhancing the physical quality of ice cream

ABSTRACT

Nanobubbles are bubbles of nanometer to micrometer size and are dispersed in a liquid water. In recent years, nanobubbles technology has been used in an extensive range of application such as in drinking water, agriculture, fishery, wastewater treatment and food. In ice cream, air cells are important for the smooth texture of ice cream. In this study, the effects of using nanobubble liquid in ice cream was compared with the one using normal water. Samples were prepared and analysis was conducted to check the physical properties of ice cream. Based on the results obtained, the apparent viscosity of ice cream made using nanobubble liquid (INBL) and normal water (INW) were 0.211 Pa.s and 0.149 Pa.s, respectively. INBL ice cream had higher density and firmness which were 0.77 g/mL and 34.80 gram-force, respectively while INM ice cream had slightly lower density and firmness which were 0.74 g/mL and 29.93 gram-force, respectively. The overrun of INBL ice cream was lower which was 46 % while INW ice cream was 54 %. For both INW and INBL ice creams, the fastest melting rate was recorded between 10- 30 min at the rate of 1.491 g/min and 1.558 g/min, respectively. INBL ice cream held its body slightly longer and melted a bit later than INW ice cream. As a conclusion, ice cream with lower overrun is denser and has rich texture. Smaller air bubbles are able to hold the ice cream body better than the ones with larger air bubbles. Nanobubble liquid ice cream has higher firmness value which indicates its ability to better retain its shape.

Keyword: Nanobubbles; Ice cream; Air bubbles; Food structure; Dairy processing;