

Pilapa Yuennan 2014: The Effect of Okra Cell Wall and Okra Polysaccharide on Physical Properties and Stability of Ice Cream. Doctor of Philosophy (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Tanaboon Sajjaanantakul, Ph.D. 149 pages.

Texture quality of ice cream is strongly affected by ice recrystallization. In this study, water soluble polysaccharide from the okra plant (OKP) and its corresponding cell wall extract (OKW) were prepared, and their physico-chemical properties were determined. OKW showed the better water holding capacity, foaming capacity than OKP. OKP had the high water solubility, foaming stability, apparent viscosity, freeze-thaw stability, and showed synergistic effect with guar gum. The effects of varying concentrations (0.00, 0.15, 0.30, and 0.45% (w/w)) of OKP and OKW on physical characteristics and stability of ice cream were investigated. The ice cream mix viscosity was determined as well as ice cream overrun, ice cream meltdown, and consumer perceptibility. The ice recrystallization was determined after ice cream was subjected to fluctuated temperature in the range of -10 to -20°C storage for 20 days. The content of OKP and OKW increased significantly the ice cream mix viscosity, due to water binding of the polysaccharide. The addition of OKP significantly increased overrun of ice cream and improved the melting characteristic. Moreover, OKP and OKW could slow down ice crystal growth. Thus, our results suggest the potential use of OKP and OKW as stabilizer to control ice recrystallization and ice cream quality. A high relationship ($R^2 = 0.94$) between rheological parameters of ice cream mix and ice crystal growth of ice cream was found. Hence, the measurement of ice cream mix rheological properties (yield stress and storage modulus (G')) can be used to predict ice crystal growth in ice cream.

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