Pitchaya Taechapattarakul 2014: Application of Okra Polysaccharides as Fat Replacer in Ice Cream. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Tanaboon Sajjaanantakul, Ph.D. 125 pages.

Okra pods (*Abelmoschus esculentus* (L.) Moench) was extracted with ethanol to prepared alcohol insoluble solid (AIS), material for 2 types of okra polysaccharide preparation. Okra cell wall powder (OKW) was obtained from reduced size AIS and water soluble okra polysaccharide powder (OKP) was obtained by freeze drying water soluble polysaccharide extracted from AIS. OKW and OKP had 2.70% and 0.74% yield based on okra pods fresh weight, respectively. OKW and OKP solutions at 0.1% - 0.5% (w/w) showed the Herschel-Bulkley flow behavior with yield stress of 32.45 - 744.68 mPa. At the same concentration, the apparent viscosity (at a 50 s^{-1}shear rate) of OKP solutions was 2.5 - 5 times higher than that of OKW solutions.

Physical properties of reduced fat ice cream (RF with 5% fat) made with OKW or OKP, at 0.2% and 0.4% (w/w), were compared with full fat (FF with 10% fat) and RF ice cream without okra polysaccharides as controls. It was found that OKW or OKP significantly increased the apparent viscosity (at a 50 s^{-1} shear rate) of RF ice cream mix, and also the hardness and melting rate of the RF ice cream ($p \leq 0.05$); while resulting in similar overrun ($p > 0.05$). RF ice cream with OKW or OKP at 0.2% could mimic the viscosity and hardness of RF ice cream similar to FF formula. The melting rates of RF ice cream with OKW or OKP were increased for the period of 60 minutes. However, when considered at the first 30 minutes interval, RF ice cream containing OKW or OKP resulted in lower melting rate as compared with FF ice cream sample. Comparison of OKW and OKP with guar gum (GG) and locust bean gum (LBG) at the same concentration (0.2% w/w), as fat replacer in RF ice cream, showed that RF ice cream with OKW or OKP gave similar ice cream mix viscosity and hardness as compared to FF ice cream. OKW and OKP samples also resulted in higher overrun than the other polysaccharides. Difference from control technique was used in sensory evaluation. There were no significantly different in firmness, smoothness, flavor, mouth coating and meltdown of RF ice cream containing each polysaccharide compared with control sample (FF ice cream) ($p > 0.05$)

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