

ORIGINAL  
RESEARCH

## Effects of guar gum and arabic gum on the physicochemical, sensory and flow behaviour characteristics of frozen yoghurt

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*This study investigated the effect of guar gum and arabic gum on physicochemical, sensory and flow behaviour properties of frozen yoghurt. The results indicated that gums significantly affected the viscosity, overrun and melting rate of frozen yoghurt. The highest overrun value was observed in sample containing 0.5% arabic gum. Frozen yoghurt containing 0.3% guar gum had the highest viscosity. The longest first dripping time was observed in sample containing 0.5% arabic gum. Flow behaviour of samples showed that all frozen yoghurts exhibited shear thinning behaviour. Guar gum at a concentration of 0.2% and arabic gum at a concentration of 0.5% presented the best total acceptability. The results of this study revealed that the frozen yoghurt produced with arabic gum had the better overall sensory and physicochemical characteristics.*

**Keywords** Frozen yoghurt, Guar gum, Arabic gum, Physical properties, Flow behaviour.

## INTRODUCTION

Frozen yoghurt is a refreshing and nutritious dessert that combines the flavour and texture of ice cream and yoghurt. The ingredients used for frozen yoghurt production are like those used for ice cream, including hydrocolloids, emulsifiers, sweeteners and solid not fat. The viscosity of an ice cream mix is considered a very important attribute as it affects the body and texture of the finished product. The most important factor in enhancing the viscosity during ice cream processing is the addition of stabilisers (Minhas *et al.* 2002). Stabilisers also improve shape retention and melting behaviour (Soukoulis and Tzia 2008) and prevent the formation of objectionable large ice crystals in frozen desserts. They are used in such small amounts as to have negligible influence on foods' taste (Issariyachaikul 2008). During consumption, stabilisers provide uniform meltdown, mouthfeel and texture. Stabilisers can also contribute to a smoother and more resistant body. Most polysaccharide-based ice cream stabilisers influence the rheological properties of the continuous phase. The amount of stabiliser used varies with its properties, the solid content of the mix, the type of

processing and other factors. The amount used in regular ice cream may be in the range of 0–0.5% but is usually 0.2–0.3% (Issariyachaikul 2008).

In the food industry, guar gum is used as a thickening and stabilising agent in a wide variety of foods, usually in amounts less than 1% of food weight (Slavin and Greenberg 2003). Arabic gum is used for its nutritional and surface properties (Sanchez *et al.* 2002). Some studies have been conducted on the effect of some gums on the physicochemical properties of ice cream. Soukoulis and Tzia (2008) studied the effect of some hydrocolloids on the physical and sensory properties of frozen yoghurt. They reported that the addition of hydrocolloids increased viscosity significantly and that the use of xanthan gum improved aeration, leading to the highest overrun. Minhas *et al.* (2002) studied the flow behaviour characteristic of ice cream mix with various stabilisers such as gelatin, arabic gum, guar gum and karaya gum. They concluded that all of the mixes indicated pseudo-plastic behaviour.

The determination of rheological properties is essential for design, process and quality control, sensory evaluation, stability and consumer acceptance of a product (Arslan *et al.* 2005). To perform

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