

Ice milk as defined by the FDA is the food prepared from the same ingredients and in the same manner as prescribed for 'ice cream', however its milk fat content is more than 2% but not more than 7%, MSNF content not less than 4%, total milk solids content not less than 11 %, and it may contain added caseinates; it shall contain not less than 156g food solids per liter. No such product-definition exists under PFA Rules at present. However, the market trends indicate a definite scope for such low-fat frozen desserts under our situation as well.

Low fat ice cream (i.e. ice milk) may be frozen hard, or sold in the form of a soft-serve product, as practiced in the USA. In spite of its reduced fat content it is expected to taste like normal ice cream. Therefore, the formulation in terms of total solids content, and emulsification and stabilization must be such that the resulting product has body and texture characteristics similar to those of ice cream. To be able to be served directly on drawing from the freezer, the low-fat product should have a dry appearance, and stiff body which necessitates that the right kind of emulsifier system be used in the mix-formulation. The soft-serve product usually has a lower sugar content (e.g. 13%, with 30-34 % TS) as compared to the hard frozen product (15% with 35-38% T.S.). Work carried out at this Institute showed that a good quality low-fat ice cream containing 6.0% fat and 12.5% MSNF, could be obtained by using 0.35% stabilizer (a 70:30 blend of *isabgol* husk and guar gum) and 0.08% Tween 80 as emulsifier and ageing the mix for 16 h. A soft-serve ice milk composition has been reported to include (0.1% lecithin, 0.15% pectin and 0.1% xanthan gum and/or locust bean gum).

23.4 Kulfi

23.4.1 Introduction

Kulfi is a very popular traditional frozen milk product of Indian origin which provides pleasures of eating. Any satisfactory method for its industrial production has so far not been developed. Itinerant traders have evolved simple technology using a open pan for concentration of milk, followed by addition of locally manageable ingredients, and use of ice salt mixture for freezing. The unhygienic conditions prevailing at the Kulfi making centres and apathy of the traders for adopting sanitary practices may cause health hazards to consumers. Scarcity of published data on the chemical, microbiological and sensory attributes and paucity of information on mechanized production methods discouraged the organized dairy sector to initiate the industrial production of Kulfi.

The studies on quality of market Kulfi samples sold in Karnal and Delhi markets showed wide variations in the chemical, microbiological and sensory properties. The average total solids values of 39.04 and 44.54 per cent in samples of Kulfi collected from Karnal and Delhi markets were accompanied with large variations in fat (6.56 to 11.65 per cent in Karnal and 10.07 to 13.87 % in Delhi samples) and sucrose (13.92 to 17.92 in Karnal and 14.37 to 20.46 in Delhi). Distinct variations between samples were also observed in protein, lactose, ash, and physico-chemical properties like titratable acidity, relative

viscosity, surface tension and melt down quality. Low fat product was criticized by the panel of judges.

Most of the market samples of Kulfi showed the presence of the different types of micro-organisms. The average microbial counts in Kulfi samples per g for Karnal and Delhi markets respectively were: TVC 127.15×10^5 and 15.52×10^5 ; coliforms 61.73×10^2 and 6.20×10^2 ; staphylococci 26.32×10^5 and 8.46×10^5 ; and yeast and mould 6.14×10^2 and 2.11×10^2 .

22.4.2 Sensory properties

The sensory qualities of most preferred samples of Kulfi by the consumers were described as slightly cooked to caramelized flavour, creamy taste, fine grainy texture and slight brown colour. Addition of cardamom, pistachio, almonds, cashewnuts, etc. adds variety to Kulfi. Presence of large sized ice crystals, coagulated milk particles and fast melt down diminished the product acceptability.

22.5 Package

Kulfi is either sold in an individual cone of triangular, conical or cylindrical forms made out of galvanized iron sheets or in capped plastic moulds. 'Matka' kulfi is also popular. The net weight of market samples of Kulfi in cones varied from 95.0 to 107g. The retail price per cone of Kulfi during the year 1997-98 ranged from Rs. 10 to 14. Despite its widely fluctuating properties, Kulfi is generally preferred over ice cream, because of low cost and detectable sensory attributes.

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DT-8