

Study of the sensory quality and determine the optimum level of Karonda pulp for ice-cream preparation

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● ABSTRACT ●

Present study was carried out to study the chemical and sensory quality and determine the optimum level of Karonda pulp for ice-cream preparation at Department of Animal Husbandry and Dairy Science, Dr. B.S.K.K.V., Dapoli. The experiment was conducted with four treatments viz., T₀ : Ice-cream mix without the addition of Karonda pulp (control), T₁ : Ice-cream mix containing Karonda pulp @ 10 per cent, T₂ : Ice-cream mix containing Karonda pulp @ 20 per cent, T₃ : Ice-cream mix containing Karonda pulp @ 30 per cent. The results revealed that the average fat content in T₁, T₂ and T₃ was 10.71, 10.87 and 10.95 per cent, respectively. The average total solids content in ice-cream containing 30 per cent Karonda (T₃) was highest i.e. 38.73 per cent followed by (T₂) ice-cream containing 20 per cent Karonda pulp (38.11 per cent) T₁ ice-cream containing 10 per cent Karonda pulp (37.58 per cent) and the control T₀ ice-cream with no Karonda pulp (36.66 per cent). While the highest average acidity i.e. 0.38 per cent was observed in (T₃) treatment containing 30 per cent Karonda pulp. The gradual rise in the acidity of ice-cream mix was due to the increasing level of Karonda pulp. The highest average score was obtained for ice-cream prepared by incorporation of 20 per cent Karonda pulp (T₂) i.e. 7.45 per cent and lowest in control (T₀) i.e. 7.02 per cent.

KEY WORDS : Ice-cream, Karonda pulp

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● INTRODUCTION ●

The milk production in the country has gone through a radical change and attempts are being made to gain entry into the international market of milk and milk products. To increase the demand of milk by increasing its keeping quality and acceptability, conversion of surplus milk into more palatable and delicious products is today's need. The Indian milk production system is getting a pull according to the demands of the segmentised milk and milk products market. The conversion of milk into various milk products has become the golden mean between supply and demand of milk. Ice-cream is one such product which is popular among the young as well as old literally from China to Peru, from Iceland to India and from Alice springs

to Zanzibar.

Ice-cream is a highly delicious and nutritionally rich-frozen product. It has evolved as convenient food having good nutritive value, produced by intelligent manufactures in various style and forms at an affordable price and easily available. Palatability of food is an important aspect of nutrition and there is no point in denying the fact that ice-cream is a very palatable food. It is also highly nutritious on an average a cup of good quality ice-cream (100 ml) supplies approximately 200 cal, 300 g proteins, 0.319 calcium, 0.104 mg phosphorous, 0.14 mg iron, 5.48 IU vitamin A, 0.038 mg thiamine and 0.236 mg riboflavin. It is also rich in amino acids like tryptophan and lysine which are lacking in plant proteins. It also contains iron and some trace minerals. Hence, it is distinct that ice-cream contributes high food value in an attractive and appealing form and hence universally liked.

Incorporation of fruit and fruit products in the milk products to render good flavour, increase palatability and nutritive value is a very old practice. Some of the most commonly used flavour for ice-cream are Vanilla, Strawberry, Vaspberry, Pineapple, Pistachio, Cashew nut etc.

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The fruits which are popular among Indians, if added to the ice-cream, not only improve its acceptability among average Indian people but will also improve its nutritional quality with the addition of essential vitamins and minerals. The ripe fruits are acidic in nature having cooling effects and are useful in bilious complaints. The fully ripe fruit yield, a juice that may be used to good advantage to enhance the flavour of other fruit juice by blending. The ripe fruit of Karonda contains 73.89 per cent moisture, 20.17 Brix TSS, 11.48 per cent total sugars, 0.3411 per cent acidity, 3.46 pH and 1.75 mg/100g ascorbic acid (Joshi *et al.*, 1986). Karonda fruit is one of the richest sources of iron *i.e.* 39.1 per cent (Anonymous 1979).

● MATERIALS AND METHODS ●

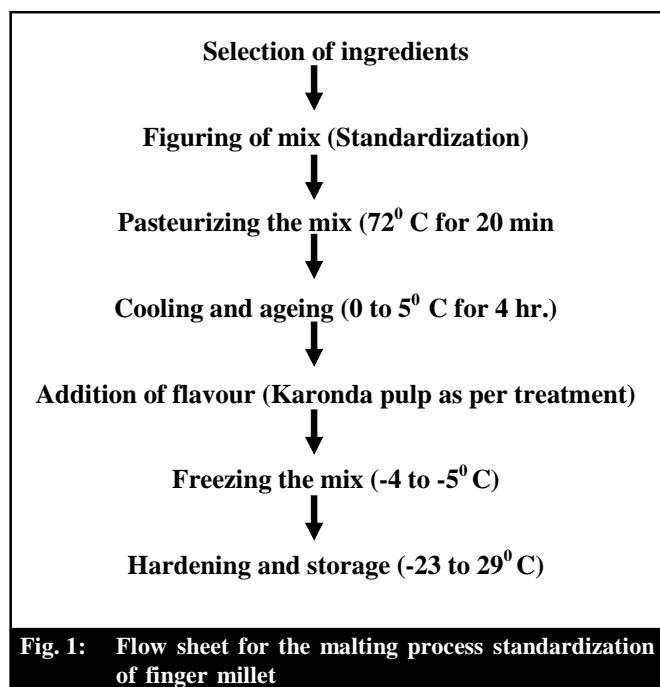
Some initial pilot trials were conducted to determine the level of Karonda pulp to be added. Based on the organoleptic evaluation (9 Point Hedonic Scale), the 0, 10, 20, and 30 per cent levels of Karonda pulp were finalized for further studies. The experiment was conducted with four treatments and seven replications in a Randomized Block Design as under.

T₀ - Ice-cream mix without the addition of Karonda pulp (control)

T₁ - Ice-cream mix containing Karonda pulp @ 10 per cent

T₂ - Ice-cream mix containing Karonda pulp @ 20 per cent

T₃ - Ice-cream mix containing Karonda pulp @ 30 per cent



Sensory evaluation:

After hardening the ice-cream from different treatments was served to panel of eight judges for organoleptic evaluation. They were provided with Nine Point Hedonic Score cards for evaluating the quality of ice-cream. As score of 5.5 and above indicates acceptability within the score of 1 to 9.

● RESULTS AND DISCUSSION ●

It is observed from Table 1, that the average fat content in the control group ice-cream (T₀) was highest *i.e.* 11.89 per cent, while in the other treated group ice-creams *i.e.* T₁ (10 per cent pulp), T₂ (20 per cent Karonda pulp), T₃ (30 per cent Karonda pulp), it was found to be 10.71 per cent, 10.87 per cent and 10.95 per cent, respectively. The decrease in fat content in Karonda pulp added group is due to very low fat content in Karonda pulp which resulted in dilution of fat content of ice-cream mix. The fat content in the ice-cream of different treatments observed in the present study compare well with those recommended by Jain (1963) and Arbuckle (1986).

Table 1 : Average fat, total solids and titratable acidity, prepared with different Karonda pulp

Treatment / mean	Fat (%)	Total solids (%)	Titratable acidity
T ₀	11.89	36.66	0.17
T ₁	10.71	37.58	0.24
T ₂	10.87	38.11	0.32
T ₃	10.95	38.73	0.38
Mean	11.10	37.77	0.28

In case of the total solid content of ice-cream incorporated with different levels of Karonda pulp, ice-cream showed a rising trend with on increasing level of Karonda pulp. The average total solids content in ice-cream, containing 30 per cent Karonda T₃ was highest *i.e.* 38.73 per cent followed by T₂ ice-cream containing 20 per cent Karonda pulp (38.11 per cent), T₁ ice-cream containing 10 per cent Karonda pulp (37.58 per cent) and the control T₀ group ice-cream with no Karonda pulp (36.66 per cent). Jain (1963) suggested that a mix containing 38 per cent total solids is desirable for preparing ice-cream incorporated with fruit pulps. The results agree with the report of Arbuckle (1986) who stated total solids content for ice-cream as 36 to 43 per cent.

From the Table 1 it is observed that the titratable acidity of the ice-cream was observed lowest in control group *i.e.* 0.17 per cent, while the highest average acidity

i.e. 0.38 per cent was observed in T₃ treatment, containing 30 per cent Karonda pulp. The gradual rise in the acidity of ice-cream mix was due to the increasing level of Karonda pulp. Finnegan and shearing (1963), based on the consumer's preference for acidity level in vanilla ice-cream reported that 0.27 per cent acidity was the most preferred level for flavour, body and texture by all the individual irrespective of age or sex.

It is observed from Table 2, that for general appearance the highest ranking average score 7.62 was obtained for ice-cream prepared with 20 per cent Karonda pulp (T₂) Where as the lowest score was observed for the ice-cream with 10 per cent Karonda pulp (T₁) *i.e.* 6.89.

Table 2 : Organoleptic quality of ice-cream

Treatment / mean	General appearance	Body and texture	Flavour	Overall acceptability
T ₀	7.33	7.26	7.02	7.20
T ₁	6.89	6.99	7.26	7.04
T ₂	7.62	7.47	7.45	7.51
T ₃	7.15	6.88	7.24	7.11

The appearance of the ice-cream depends on type and level of the stabilizer and the emulsifier used in ice-cream as it checks the mobility of water in serum phase and prevents formation of ice-crystals during storage. This in turn, improves the texture and provides uniformity to the product (Goff and Caldwell, 1991).

The highest ranking average score of body and texture was obtained for 20 per cent Karonda pulp (T₂) was 7.47 per cent, whereas lowest score was observed for the ice-cream with 30 per cent Karonda pulp (T₃) *i.e.* 6.88 per cent. It is also observed from the Table 2 that the highest average score was obtained for ice-cream prepared by incorporation of 20 per cent Karonda pulp (T₂) *i.e.* 7.45 per cent and lowest in control (T₀) *i.e.* 7.02 per cent. Many scientists have recommended use of natural flavoring agents such as fruit pulp in the ice-cream (Ohloff, 1972; Rothwell, 1995 and Malolepszy, 1995).

The overall acceptability of ice-cream was determined on the basis of average scores recorded for different

sensory qualities *viz.*, general appearance, flavour and body and texture, 20 per cent Karonda pulp level (T₂) had the highest acceptability *i.e.* 7.51 and lowest 7.04 per cent was found in the 10 per cent Karonda pulp level (T₁).

Conclusion:

The decrease in fat contents with addition of Karonda pulp is attributed to dilution effect on account of low fat content in Karonda pulp. There was an increase in the total solids content with an increase in level of Karonda pulp and the differences due to treatment were highly significant. The titratable acidity in ice-cream increased with an increased in the level of Karonda pulp. The differences in acidity content of different ice-creams were highly significant.

The ice-cream with 20 per cent Karonda pulp had the superior general appearance and good body and texture and desirable flavour and overall acceptability as compared to rest of the treatments.

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