SENSORY EVALUATION OF LOW FAT CUSTARD APPLE ICE-CREAM

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ABSTRACT

Low fat ice-cream was prepared from 15 per cent custard apple pulp, 15 per cent sugar and 10 per cent fat with 0 (T₀), 0.2 (T₁), 0.3 (T₂) and 0.4 (T₃) per cent of ascorbic acid and studied for its sensory evaluation. The sensory score for overall acceptability of low fat ice-cream of treatments T₀, T₁, T₂ and T₃ were 7.57, 8.18, 8.67 and 7.50, respectively. It was observed that 0.3 per cent (T₂) level of ascorbic acid was most acceptable and rated between like very much to like extremely for all sensory attributes. Highly perishable custard apple pulp was well utilized in ice-cream.

Key words: Ascorbic acid, Buffalo milk, Custard apple pulp, Ice-cream, Sensory evaluation.

INTRODUCTION

Ice-cream is a delicious, wholesome and nutritious frozen dairy food. Its history goes back to the ancient period, but it’s future seems endless. It represents one of the most dynamic sectors of the dairy industry; and has, for two decades been the sector where in the most value addition has taken place. It is the product liked invariably by one and all and is popular throughout the world. The annual growth rate of ice-cream is 10 - 15 per cent (Chennegowda, 2002). The per capita consumption of ice-cream at present in India is 100 ml /annum (Sodhi, 2004).

The recent trend has been developed to produce low cost and low fat ice-creams by incorporating fruits pulps. In India use of fruits in preparation of ice-cream is accepted by regulations.

Custard apple (Annona squamosa L.) commonly known as sitaphal is one of the major fruits of dry land and abundantly available in range lands where rainfall is minimum. The ripen fruits are very delicate and highly perishable. Hence present investigation was planned to manufacture low fat custard apple with desired levels of ascorbic acid to increase shelf life of the product.

MATERIALS AND METHODS

The present investigation was carried out in the laboratory of the Department of Animal Husbandry and Dairy Science, College of Agriculture, MAU, Parbhani. Buffalo milk was obtained from University Dairy Farm. Skim milk and cream were used for standardization of milk. Ingredients like spray dried Amul skim milk powder of ISI grade, sugar, sodium alginate and ascorbic acid were purchased from local market. Milk was standardized to six per cent fat using Pearson’s square formula. Fruits of custard apple of local variety were obtained from same plants of local farmer in order to keep uniformity in quality. Custard apple pulp, sodium alginate as stabilizer @ 0.15 per cent and L-ascorbic acid (vitamin - C) as preservative were used in ice-cream manufacture. The preliminary trails were conducted for optimizing levels of fat and ascorbic acid in the custard apple ice-cream.
Treatments:

- **T₀** - (Control) no ascorbic acid + 15% sugar + 15% pulp + 9% fat.
- **T₁** - 0.2% ascorbic acid + 15% sugar + 15% pulp + 9% fat.
- **T₂** - 0.3% ascorbic acid + 15% sugar + 15% pulp + 9% fat.
- **T₃** - 0.4% ascorbic acid + 15% sugar + 15% pulp + 9% fat.

**Preparation of low fat custard apple ice-cream:** All ice-cream samples were prepared as per the method described by De and Ray (1982) with slight modification.

**Flow diagram of preparation of custard apple ice-cream:**

1. Receiving of milk
2. Separation of whole milk
3. Figuring of mix (milk, cream, SMP, sugar, stabilizer)
4. Making the mix
5. Pasteurization of mix (68°C for 30 min.)
6. Cooling mix at room temperature
7. Incorporation of custard apple pulp
8. Addition of ascorbic acid (as per treatments)
9. Blending of mix (90 sec.)
10. Freezing of mix (-4 to -5°C)
11. Packaging
12. Storage at -5°C

**Sensory evaluation of ice-cream:** The ice-cream was then filled up in cups and immediately kept at -5°C temperature and then served to a panel of judges for the organoleptic evaluation. The product was evaluated for its sensory quality by a panel of 10 judges using a 9-point Hedonic scale as described by Gupta (1976).

**Statistical analysis of data:** The experiment was laid out in a completely randomized design (CRD) and experimental data was analyzed using the method of Panse and Sukhatme (1967). In all six replications were taken.

**RESULTS AND DISCUSSION**

Sensory attributes of the low fat custard apple ice-cream prepared from different treatment combinations (T₀, T₁, T₂ and T₃) are shown in Table 1.

**Flavour:** It is observed that average flavour score was highest in T₂ (8.58) for low fat custard apple ice-cream with 0.3 per cent ascorbic acid followed by T₁ (8.39) rated in between like a very much to like extremely, T₀ (7.31) and T₃ (7.33) rated equally in between like moderately to like very much.

**Body and texture:** It was observed from result that the low fat custard apple ice-cream prepared with various ascorbic acid combination exhibited wide differences with regards to body and texture ranged from 6.83 (T₃) to 8.91 (T₂). T₂ scored highest at 8.91 followed by T₁ (7.83) and both were rated in between like very much to like extremely, T₀ (7.15) valued in like moderately and T₃ (6.83) scored lowest.

**Colour and appearance:** It is observed that highest colour and appearance score was 8.95 for low custard apple ice-cream with 0.4 per cent ascorbic acid (T₃) whereas, 8.42, 8.23 and 7.89 scores for T₂, T₁ and T₀ (control), respectively. It is further revealed that there was numerical increase in score of colour and appearance with increase in score of colour and appearance with increased levels of ascorbic acid of low fat custard apple ice-cream from 0.2 to 0.4 per cent.

**Taste:** The average score for the taste differed much by the different level of ascorbic acid of low fat custard apple ice-cream samples as the score varied.
from 8.80 ($T_2$) to 6.89 ($T_3$). The best taste was observed in case of $T_2$ ice-cream samples valued at 8.80, followed by $T_1$ (8.30) and $T_0$ (7.86) rated in between like very much to like extremely and $T_3$ (6.86) rated in between like slightly to like moderately. It is important to note that the taste was decisively governed by the level of ascorbic acid. Overall acceptability of ice-cream: The mean score for overall acceptability for treatment $T_0$, $T_1$, $T_2$ and $T_3$ was 7.57, 8.18, 8.67 and 7.50, respectively. It was observed that much variations were found in overall acceptability score and ranged 7.50 ($T_3$) to 8.67 ($T_2$). $T_2$ received top score (8.67) for overall acceptability followed by $T_1$ (8.18) rated in between like very much to like extremely and $T_0$ (7.57) and $T_3$ (7.50) rated like moderately.

The findings are in agreement with the results of Gaikwad (2000) and Bajwa et al. (2003).

**CONCLUSION**

Present study concludes that the 15 per cent incorporation of custard apple pulps was found to be acceptable in the low fat ice-cream with ascorbic acid of 0.3 per cent level is most acceptable. However all the treatments had mean over all acceptability score above 6.5 indicates that all the low fat custard apple ice-cream samples without and with ascorbic acid are acceptable.

**REFERENCES**


**Table 1**: Sensory evaluation for low fat custard apple ice-cream.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Flavour</th>
<th>Body and texture</th>
<th>Colour and appearance</th>
<th>Taste</th>
<th>Overall acceptability</th>
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