Effect of assimilation of tulsi juice and turmeric powder on sensory quality of softy ice-cream

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Abstract
In present investigation Softy ice cream is prepared by blending 4% tulsi juice with different levels of turmeric powder 0, 0.2, 0.4, 0.6, 0.8 in T₁, T₂, T₃, T₄ & T₅ respectively. On the basis of sensory evaluation the average flavor score of the experimental samples were in the range (6.37) to (8.45). The average color and appearance scores reveal that highest score for color and appearance was recorded for treatment T₃ (8.20) followed by T₁ (8.16), T₂ (7.28), T₄ (6.70.) and T₅ (6.12), respectively. The highest score for body and texture was recorded in treatment T₃ (7.62) followed by T₁ (7.33), T₂ (6.87), T₄ (6.28) and T₅ (6.08), respectively. The highest score for taste was recorded in treatment T₃ (8.53) and lowest score was recorded in T₅ (6.16), besides taste score (8.33), (7.74) and (7.24) was noted for treatment T₁, T₂ and T₄ respectively. The highest score for overall acceptability (8.37) was recorded for treatment T₃, while the least score (6.03) was noted for treatment T₅ on 9 point hedonic scale.

Keywords: Flavor, color & appearance, body & texture

Introduction
Indian ice cream industry is one of the fastest growing segments of the dairy or food processing industry. India has a low per capita ice cream consumption of 400 ml as compared with per capita consumption of ice cream of 22 L in the United States and 3 L in China. With the improving cold chain infrastructure in the country coupled with increasing disposable income and the changing lifestyle, the sector has great potential for growth (Anonymous 2018 b).

The ice cream industry in India generated revenue of about USD 1.5 billion in 2016 and is projected to generate revenue of approximately USD 3.4 billion by 2021. Lately, frozen desserts which are made out of vegetable oils have been eating into the market share of ice cream. Key players offering frozen desserts in India are Kwality Walls, Vadilal, and Cream Bell.

Methodology
Preparation of Softy Ice-Cream

Step - I
Acceptable level of Tulsi juice was evaluated first (as 0%, 2%, 4%, 6%, 8% blends) by sensory evaluation of softy Ice-cream and it was found that 4% Tulsi juice blended softy Ice-cream was separate, accordingly 4% level of Tulsi juice blend was used as base for further studies of Turmeric powder blends.

Step - II
Acceptable level of Tulsi juice blend was used as base to evaluated the level of Turmeric powder (as 0.0%, 0.2%, 0.4%, 0.6%, 0.8% blends) by sensory evaluation in softy Ice-cream as mention below.

Result and Discussion

<p>| Table 1: Sensory evaluation of softy ice-cream |</p>
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Flavor</th>
<th>Color &amp; Appearance</th>
<th>Body &amp; Texture</th>
<th>Taste</th>
<th>Overall Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁</td>
<td>8.24</td>
<td>8.16</td>
<td>7.33</td>
<td>8.33</td>
<td>8.20</td>
</tr>
<tr>
<td>T₂</td>
<td>7.58</td>
<td>7.28</td>
<td>6.87</td>
<td>7.74</td>
<td>7.70</td>
</tr>
<tr>
<td>T₃</td>
<td>8.45</td>
<td>8.20</td>
<td>7.62</td>
<td>8.53</td>
<td>8.37</td>
</tr>
<tr>
<td>T₄</td>
<td>7.45</td>
<td>6.70</td>
<td>6.28</td>
<td>7.24</td>
<td>6.95</td>
</tr>
<tr>
<td>T₅</td>
<td>6.57</td>
<td>6.12</td>
<td>6.08</td>
<td>6.16</td>
<td>6.03</td>
</tr>
<tr>
<td>F-test</td>
<td>Significant</td>
<td>Significant</td>
<td>Significant</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>S.E. (m)</td>
<td>0.12</td>
<td>0.09</td>
<td>0.13</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>C.D. at 5%</td>
<td>0.38</td>
<td>0.29</td>
<td>0.40</td>
<td>0.30</td>
<td>0.26</td>
</tr>
</tbody>
</table>
The average Flavor score of the experimental samples were in the range (6.37) to (8.45). Highest score (8.45) was recorded for treatment T3 and least score (6.37) was noticed for treatment T5, treatment T2 and T4 had intermediate score viz., (7.58) and (7.45) respectively. Treatments namely T1 was followed by treatment T3, T2, T4 and T5 with an average flavor score of (8.45), (8.24), (7.58), (7.45) and (6.37), respectively. The results were supported with those reported by Karkhele et al. (2003) with addition of ginger juice in ice cream. These observations support the trend of their results. The intensity of aroma and pungency of ice cream is optionally blended at 4% level of ginger juice addition. Deshmukh et al. (2010) conducted experiment with 4 treatments viz. T0- ice cream mix without the addition of karonda pulp (control), T1- ice cream mix containing karonda pulp @ 10%, T2- ice cream mix containing karonda pulp @ 20%, T3- ice cream mix containing karonda pulp @ 30% and reported that the flavour score for treatment T0, T1, T2 and T3 was 7.02, 7.26, 7.45 and 7.24, respectively.

The average color and appearance scores indicated in Table 1 revealed that highest score for color and appearance is recorded in treatment (T3) i.e. softy ice cream prepared with 4% Tulsi juice and 0.4% Turmeric powder (8.20) followed by T3 (7.28) , T2 (6.70) and T3 (6.12). Though there was a difference in color scores was noticed, the differences were statistically non distinguishable (P >0.05). The average range of color and appearance scores was between 6.12 to 8.20 it means softy Ice-cream prepared with T3- 4% Tulsi juice and 0.4% Turmeric powder is found to be superior with 8.20 score and T5- 4% Tulsi juice and 0.8% Turmeric powder secured lowest score i.e. (6.12) for color and appearance for softy Ice-cream it is suppose from the present investigation that the extreme and lowest level of Turmeric powder is detrimental as far as color and appearance is concern while intermediate level of Turmeric powder improves the color and appearance attribute. The results were supported with those reported by Gaikwad (2007) Who found that incorporation of 10% mango pulp was superior in color and appearance over plain ice cream. Patil (2010) observed that score for color and appearance was (11.20), (13.55), (15.63), (11.66) and (8.50) for ice cream samples prepared under treatments T1, T2, T3, T4 and T5, respectively.

The perusal of Table 1 indicated that highest score for body and texture is recorded in treatment (T3) i.e. softy ice cream prepared with 4% Tulsi juice and 0.4% Turmeric powder (7.62) followed by T1 (7.33), T2 (6.87), T4 (6.28) and T5 (6.08), respectively. It means that the addition of 0.4% Turmeric powder in the softy ice-cream prepared with 4% Tulsi juice secured max. score over the rest samples of softy Ice cream. The results were supported with those reported by Karkhele et al. (2003) [8] also observed that ice cream prepared with 4% of Ginger juice level was superior over all other treatment for body and texture. Hanifsha (2016) [5] noticed that the average score for body and texture of finished product in between (7.91) to (8.80) the ice cream prepared in treatment T2 (6% lemon grass extract) secure max. Score (8.80) followed by T1 (8.72), T3 (8.60), T2 (8.48) and T4 (7.91), respectively.

It is seen from table 1 that the highest score for taste is recorded in treatment T1 (8.53) i.e. softy ice cream prepared with 4% Tulsi juice and 0.4% turmeric powder and lowest score was noticed in treatment T3 (6.16) i.e. softy ice cream prepared with 4% Tulsi juice and 0.8% Turmeric powder. Besides score (8.33), (7.74) and (7.24) was found in treatment T1, T2 and T4, respectively. The score for taste varies significantly amongst the treatments. It means that blending of 0.4% Turmeric powder improves the taste significance whereas, the blending of Turmeric powder below or more above 0.4% Turmeric powder had an detrimental effects on taste attributes. Dere (2012) who reported that Ice cream prepared from 0.6% Turmeric powder obtained max. Score for its acceptability in context to taste of the ice cream. He also reported that ice cream in treatment T3 scored max. Score (8.80) followed by T5 (8.63), T3 (8.50), T2 (8.24) and T1 (8.10).

From table 1 it is revealed that overall acceptability of softy ice cream on 9 point Hedonic scale noticed that the highest score for overall acceptability (8.37) was recorded in treatment (T3) i.e. softy ice cream prepared with 4% Tulsi juice and 0.4% Turmeric powder by the panel of judges while the lowest score (6.03) was secured in treatment T5 i.e. softy ice cream prepared with 4% Tulsi juice and 0.8% Turmeric powder. Similarly treatment T2- softy ice-cream prepared with 4% Tulsi juice and 0.2% Turmeric powder secured score (7.70), treatment T4- softy ice-cream prepared with 4% Tulsi juice and 0.6% Turmeric powder secured score (6.95) and treatment T1- i.e. (control) score (8.20) for overall acceptability, respectively. Trivedi (2014) the average total scores of the experimental samples were in the range 84.95 (J3) to 91.73 (J5). It can be seen that J5 maintained its superiority over all other samples in relation to flavor. The color changes were not found to have any hitch on the acceptability of J3 compared to others. On the other hand, the body and texture and melting quality score tended to decrease with increase in level of incorporation of basil juice in ice cream. However, it can be seen from the total score from the table and figure that J3 had significantly (P>0.05) higher score than all other experimental samples. On the basis of average total score values the ice cream containing basil juice at the level of 6% (J3) was preferred the most. The order of preference was in the order of J1 > J2 > J3 > J4 > J5.

Conclusions

On the basis of data obtained in present investigation of sensory evaluation of softy ice cream prepared from blending of 4% Tulsi juice and different levels of Turmeric powder, it was found that softy ice cream on the basis of flavour, colour and appearance, body and texture, taste and overall acceptability in (T3) i.e. Softy ice cream prepared with 4% Tulsi juice and 0.4% Turmeric powder blending was found superior.

References