Standardization of Processing Technique for Tumba  
(Citrullus colocynthis)

Chitra Bhansaly* and Vimla Dunkwal**

Department of Food and Nutrition, College of Home Science, SKRAU, Bikaner, Rajasthan, India

KEYWORDS Cucurbitaceae. Saponin. Glycoside. Hypoglycemic

ABSTRACT Tumba is a perennial desert creeper, which has a great medicinal value and is also a good source of protein and fat, but is still an under-utilized fruit due to its bitter taste. Thus, in order to standardize the processing technique to reduce its bitterness, Tumba fruits were subjected to three different treatments of buttermilk and saline solution and deflourinated lime solution at various concentrations. The processed fruits were then evaluated for their sensory characteristics on nine point hedonic ranking scale. The scores of organoleptic acceptability showed that the application of buttermilk and saline solution, and saline solution failed to make them acceptable. However, application of deflourinated lime solution reduced the bitterness significantly hence, made them acceptable for consumption purpose.

INTRODUCTION

India is a veritable emporium of medicinal plant since ancient times, these plants have been used to attempt cures for disease and to relieve physical suffering. Tumba is a perennial, trailing, scabrid herb, belonging to the family cucurbitaceae and genus Citrullus. It is a desert creeper which spreads rapidly after monsoon on the desert land. Its fruits are available in the month of October and November. It is one of the important cucurbits having better xerophytic adaptation, found in warmer climate and tropical areas.

In Biblical times, Tumba was known as a source of seed oil and its fruits were used as a remedy of various diseases. Its seeds constitute the drug colocynth, which is used for acute and chronic constipation and for liver and gall bladder ailments (American Botanical Council 1990). Tumba also acts as a blood purifier and thus, is a good remedy in cases of poisoning like snakebite and scorpion bite. The other uses include scrapping out the corns andwarts on the skin, against menstrual disorders, joint pain, ascites, fever and urogenital disorders. It is more pronouncedly used in anti-cancerous drugs as its saponin glycoside has a hypoglycemic property thus helpful in reducing the blood glucose level.

Though it has great medicinal value and is also a good source of protein and fat, but is still an under-utilized fruit due to its bitter taste. Thus, the present study was undertaken to standardize the processing technique to reduce its bitterness and motivate its utilization in the community.

METHODOLOGY

Processing of Tumba: In order to reduce bitterness of Tumba, the processing technique was standardized. Tumba fruits were washed properly to remove material adhered to it, peeled and cut into small pieces and then subjected to three different types of treatments.

Treatment I-Dipping in Buttermilk and Saline Solution: Tumba pieces were dipped in three different saline solutions of buttermilk, with varying concentration, which were changed after each 24 hours (daily) up to 8 days. The three solutions were:

Ø T1A : Buttermilk and 3% saline solution in ratio of 1:1
Ø T1B : Buttermilk and 4% saline solution in ratio of 1.5:1
Ø T1C : Buttermilk and 5% saline solution in ratio of 2:1

Treatment II-Dipping in Saline Solution: Tumba pieces were treated with three different saline solutions of buttermilk, with varying concentration, which were changed after each 48 hours (2 days) up to 8 days. The three solutions were:

Ø T2A : 3% saline solution
Ø T2B : 4% saline solution
Ø T2C : 5% saline solution
Treatment III-Dipping in Deflourinated Lime Solution: Tumba pieces were immersed in three different deflourinated lime solutions, with varying concentration, which were changed after each 48 hours (2 days) up to 6 days. The three solutions were:

Ø T₃A : 1.5% deflourinated lime solution
Ø T₃B : 2.5% deflourinated lime solution
Ø T₃C : 3% deflourinated lime solution

RESULTS AND DISCUSSION

Processing of Tumba: The processed Tumba fruits were evaluated for sensory characteristics like colour, appearance, aroma, texture, taste and overall acceptability by a panel of ten semi-trained judges using nine point hedonic ranking scale (Swaminathan 1987).

Treatment I-Dipping in Buttermilk and Saline Solution: Table 1 reveals the organoleptic scores of the Tumba samples subjected to the buttermilk and saline solution in varying proportions and concentration. Findings suggest that the application did not bring any significant change in taste of Tumba fruit, this process developed unpleasant sour aroma in the samples and also failed to reduce the bitterness even after a period of 8 days hence, “Disliked extremely” by the panel members on the nine point hedonic ranking scale. Similar results were reported by Bala in 1998, during the processing of Ker (Capparis decidua) with butter milk and saline solution.

Treatment II-Dipping in Saline Solution: The application of treatment T, i.e. dipping in 3% saline solution (T₃A), 4% saline solution (T₃B) and 5% saline solution (T₃C) also failed to make it acceptable even after 8 days and scored in range of 1.0 to 1.8 for taste on nine point hedonic ranking scale (Table 2). The mean overall acceptability of processed Tumba fruit samples T₃A, T₃B and T₃C were found to be 1.3, 1.2 and 1.2 respectively thus “Disliked extremely”. This is line with the work of Bala (1998) which stated that application of saline solution on Ker (Capparis decidua), was failed to make the samples acceptable by the panel members on nine point hedonic scale.

Treatment III-Dipping in Deflourinated Lime Solution: Table 3 unfolds the organoleptic scores obtained by the samples treated with various deflourinated lime solutions. Results suggest that the treatment T₃A (1.5% deflourinated lime solution), T₃B (2.5% deflourinated lime solution) and T₃C (3% deflourinated lime solution) developed changes in various sensory characteristics of Tumba fruits. Though, significant changes were seen in case of treatment T₃A, but the bitterness was quite higher and not up to the acceptable level. However, treatment T₃B (2.5 per cent deflourinated lime solution) and T₃C (3 per cent deflourinated lime solution) found to be most effective in all sensory attributes and also reduces

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Table 1: Organoleptic acceptability of Tumba fruit processed with buttermilk and saline solution

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean scores of sensory characteristics on nine point scale</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Colour</td>
</tr>
<tr>
<td>T₃A</td>
<td>2.0 ± 0.66</td>
</tr>
<tr>
<td>T₃B</td>
<td>2.0 ± 0.78</td>
</tr>
<tr>
<td>T₃C</td>
<td>2.2 ± 0.33</td>
</tr>
</tbody>
</table>

Values are ± SD of ten panelists
T₃A: Buttermilk and 3% saline solution (1:1)
T₃B: Buttermilk and 4% saline solution (1.5:1)
T₃C: Buttermilk and 5% saline solution (2:1)

Table 2: Organoleptic acceptability of Tumba fruit processed with saline solution

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean scores of sensory characteristics on nine point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Colour</td>
</tr>
<tr>
<td>T₃A</td>
<td>2.2 ± 0.70</td>
</tr>
<tr>
<td>T₃B</td>
<td>2.2 ± 0.33</td>
</tr>
<tr>
<td>T₃C</td>
<td>2.3 ± 0.57</td>
</tr>
</tbody>
</table>

Values are ± SD of ten panelists
T₃A: 3% saline solution
T₃B: 4% saline solution
T₃C: 5% saline solution
the bitterness after the 6 days of treatment. The mean scores obtained through treatment T_B and T_C for sensory characteristics like colour (8.6 and 8.5), appearance (7.8 and 7.4), aroma (7.2 and 7.2), texture (7.9 and 7.8), taste (8.5 and 8.5) were found in harmony and fall in category of “Liked very much” for overall acceptability on nine point hedonic ranking scale. This is in conformity with the study of Sharma (2005), which stated that the treatment of anola (Amblica officinalis) with salt solution followed by lime solution in the preparation of anola preserve was well-accepted by the panel members.

**CONCLUSION**

Tumba is an herbaceous weed with great therapeutic value. It is grown in huge amount in arid regions. However, it is an under-utilized crop due to the bitterness it possesses, which makes it unacceptable for consumption. Thus in order to reduce its bitterness, a processing technique was standardized. Tumba fruits and seeds were subjected to three different treatments i.e. treatment with buttermilk and saline solution (T_1) treatment with saline solution (T_2) and treatment with deflourinated lime solution (T_3). The findings suggested that the application of T_1 (buttermilk and saline solution) in varying proportions and concentration i.e. T_A (buttermilk and 3% saline solution in ratio of 1:1), T_B (buttermilk and 4% saline solution in ratio of 1.5:1), and T_C (buttermilk and 5% saline solution in ratio of 2:1) did not bring any significant change in taste of Tumba fruit and fall in the category “Disliked extremely” and “Disliked very much” on nine point hedonic ranking scale. Similarly, the application of treatment T_2 i.e. dipping in 3% saline solution (T_A), 4% saline solution (T_B) and 5% saline solution (T_C) also failed to make it acceptable and scored in range of 1.2 to 2.3 for various sensory characteristics. However, application of various deflourinated lime solutions i.e. T_3 A (1.5% deflourinated lime solution), T_3 B (2.5% deflourinated lime solution) and T_3 C (3% deflourinated lime solution) developed significant change in various sensory characteristics of Tumba fruit. Though, the samples treated with T_B and T_C were found to be best accepted by the panel members. Hence, it can be concluded that the application of deflourinated lime solution can reduce its bitterness and hence can make it acceptable for consumption purpose.

**REFERENCES**


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