Development and evaluation of bael–aonla low calorie ready-to-serve (RTS) drink

OM SINGH, RICHA SINGH¹ AND PRATIKSHA SINGH¹

ABSTRACT: The present investigation on development and evaluation of bael-aonla low calorie ready-to-serve (RTS) drink was carried out in the Department of Post Harvest Technology, College of Horticulture, N.D. University of Agriculture and Technology, Kumargunj, Faizabad (U.P.). A blend containing 50 per cent bael pulp + 50 per cent aonla pulp + 50 per cent sugar + 50 per cent stevia prepared from the recipe 10 per cent pulp, 11 per cent TSS and 0.2 per cent acidity was found better for the preparation of ready-to-served drink. In the preparation of low calorie RTS half amount of sugar can be successfully substituted by stevia without impairing the quality of beverage.

KEY WORDS: Aonla, Bael, Blending ratio, Recipe, Low calorie, RTS


Aonla (Emblica officinalis Gaertn) also known as “Indian Gooseberry” belongs to the family Euphorbiaceae. Aonla is one of the minor fruit crops of commercial significance. It is quite hardy and is highly remunerative even without much care. In India, it is more popular in Uttar Pradesh but now a days its area is arising rapidly in many adjoining states like Rajasthan, Haryana, Punjab, Andhra Pradesh, Maharashtra, Madhya Pradesh etc. It is used in Ayurvedic and Unani systems of Indian medicines. This fruit is acrid, cooling, refrigerant, diuretic and laxative. It is useful in anaemia, artherosclerosis, cough, diarrhoea, dysentery, dyspepsia, hemorrhages, leucorrhoea and jaundice. It possesses antibacterial, anticarcinogenic, antiemetic, antioxidative, antipyretic, antitumour, antiviral, cardiotonic, expectorant activities. The fruit is a rich source of ascorbic acid and contains about 20 times more vitamin C than the citrus fruits. The stability of ascorbic acid and presence of astringency in anola fruit is due to the presence of polyphenols and leucoanthocyanins. However, it is not consumed much as fresh fruit as it is highly acidic and astringent in taste. Therefore, it is necessary to convert the anola juice into certain beverages before it can be consumed. Anola has great potentiality for processing into a number of quality products owing to its excellent nutritive and therapeutic values, but aonla fruits are astringent and have no attractive colour and flavour therefore, as such its not much suitable for making of ready-to-serve or other beverages. There is great possibility of obtaining an excellent quality beverage, if aonla pulp is blended with bael fruit. Bael fruit (Aegle marmelos) is an important indigenous fruit of India. It belongs to the family Rutaceae. Bael fruit is rich source of riboflavin, thiamine, niacin and minerals. Bael is the richest source of riboflavin. The ripe fruit is restorative, laxative and good for heart, brain and is usually recommended for control of diarrhoea and dysentery problem. Because of its hard shell mucilaginous texture and numerous seeds it is difficult to eat as table purposes hence, it is not popular as dessert fruit. Bael fruit are generally utilized for making of candy but its fruit lays untapped potentiality for making of beverages due to excellent colour, flavour, nutritive and medicinal value.

Today’s consumers expect more and more pleasure from food. They want it be lower in fat, sugar and calories and to be able to maintain or improve their health conditions. These facts resulted in development of sugar free or low calorie sweeteners. Presently, low calorie sweeteners are being used in a wide variety of foods and other items such as jams, pickles, sauces, fruit preserves, soft drinks, ice creams, pharmaceutical products, tooth paste and mouth wash (Cook, 2000).
RESEARCH METHODS

Two kg of mature aonla (cultivar NA-7) fruits were taken in the month of December and were kept for storage at ambient temperature. Similarly two kg of ripe bael (cv. NB-7) fruits were taken in the month of April for preparation of bael pulp. Stevia used as sugar replacer was purchased from Stevia Biotech Pvt. Ltd., New Delhi. One gram stevia was prescribed for contribution no calorie but equivalent to 300 times in sweetness than sugar (one gram stevia is equivalent to 300 gram of sugar). During investigation making stock solution (9.9 g stevia dissolved in one lit. of water) on the basis of equivalent sweetness for replacement of sugar by stevia. Sugar was also purchased from the local market.

One lit. of RTS was prepared by mixing calculated amount of both the pulp, sugar, citric acid and water according to different blending ratio. The following blending ratios were tested for preparation of bael-aonla blended RTS and evaluated their organoleptic quality.

- 25 per cent bael pulp + 75 per cent aonla pulp of 10 per cent pulp adjusted to 0.3 per cent acidity and 12 per cent TSS.
- 50 per cent bael pulp + 50 per cent aonla pulp of 10 per cent pulp adjusted to 0.3 per cent acidity and 12 per cent TSS.
- 75 per cent bael pulp + 25 per cent aonla pulp of 10 per cent pulp adjusted to 0.3 per cent acidity and 12 per cent TSS.
- 100 per cent aonla pulp of 10 per cent pulp adjusted to 0.3 per cent acidity and 12 per cent TSS.
- 100 per cent bael pulp of 10 per cent pulp adjusted to 0.3 per cent acidity and 12 per cent TSS.

The sugar and stevia ratios 50 per cent sugar + 50 per cent stevia were selected for this purpose. Best blending ratios (50 % bael pulp + 50 % aonla pulp) were selected for the preparation of low calorie quality RTS and evaluated their organoleptic quality after preparation in following recipes.

- 10 per cent blended pulp adjusted to 10 per cent TSS and 0.2 per cent acidity.
- 10 per cent blended pulp adjusted to 10 per cent TSS and 0.3 per cent acidity.
- 10 per cent blended pulp adjusted to 10 per cent TSS and 0.4 per cent acidity.
- 10 per cent blended pulp adjusted to 11 per cent TSS and 0.2 per cent acidity.
- 10 per cent blended pulp adjusted to 11 per cent TSS and 0.3 per cent acidity.
- 10 per cent blended pulp adjusted to 11 per cent TSS and 0.4 per cent acidity.
- 10 per cent blended pulp adjusted to 12 per cent TSS and 0.2 per cent acidity.

RESEARCH FINDINGS AND DISCUSSION

Data on the organoleptic evaluation of RTS blending ratio are given in Table 1. Results revealed that blending ratio of 50 per cent bael pulp + 50 per cent aonla pulp was found to be best followed by the ratio of 75 per cent bael pulp + 25 per cent aonla pulp and RTS prepared from 100 per cent bael pulp. There was significant difference in the organoleptic score of ratio number 3 and 2 and also between 3 and 4.

Irfan et al. (2008) found that, the blending ratio of 30 : 70 (papaya : mango fruit pulp) secured maximum organoleptic scores. Sharma et al. (2012) reported that in RTS drink maximum acceptability (8.41) was achieved with 20 per cent pulp (50 guava : 50 jamun), 14 per cent TSS and 0.25 per cent acidity. Gehlot et al. (2012) found that in ready-to-serve (RTS) drink maximum acceptability (8.59) was achieved with 20 per cent pulp (25 bael:75 mango), 14 per cent TSS and 0.26 per cent acidity.

Results revealed that half of the sugar can be successfully substituted by stevia in the preparation of bael-aonla blended RTS without impairing the quality of beverages. Data furnished in Table 2 showed that a blends containing 50 per cent bael pulp + 50 per cent aonla pulp + 50 per cent sugar + 50 per cent stevia prepared from the recipe 10 per cent pulp, 11 per cent TSS and 0.2 per cent acidity was found better for the preparation of ready-to-served drink.

Sharma (2006) studied on the preparation of low calorie aonla-ginger, aonla-lime and lime-ginger RTS, sugar can be successfully substituted by stevia up to the extent of 50, 50 and 75 per cent, respectively, which is very close to present findings. Singh et al. (2012) reported that in the preparation of aonla based low calorie quality beverages half of the sugar can be successfully substituted by stevia without impairing the quality of beverages with respect to colour and appearance, taste, flavour and overall acceptability.

Byanna and Doreyappa Gowda (2010) studies on development of beverages from sweet orange (Citrus sinensis Osbeck) using sugar and sugar substitutes and found that RTS with fructose followed by RTS with 50 per cent sucrose + 50 per cent fructose and RTS with 50 per cent sucrose + 50 per cent saccharose, nectar with fructose followed by nectar with 50 per cent sucrose + 50 per cent sucralose, nectar with sucralose and nectar with 50 per cent sucrose + 50 per cent fructose; squash with sucralose, squash with 50 per cent sucrose + 50 per cent sucralose, squash with 50 per cent sucrose + 50 per cent sucralose, squash with 50 per cent sucrose + 50 per cent sucralose, squash with 50 per cent sucrose + 50...
Table 1: Organoleptic quality of different blending ratio of bael-aonia blended low calories RTS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Blending ratio (Bael pulp : Aonia pulp %)</th>
<th>Juice (%)</th>
<th>T.S.S (%)</th>
<th>Acidity (%)</th>
<th>Organoletic quality Score</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>25:75</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>6.5</td>
<td>LS</td>
</tr>
<tr>
<td>2.</td>
<td>50:50</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>8.9</td>
<td>LVM</td>
</tr>
<tr>
<td>3.</td>
<td>75:25</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>8.0</td>
<td>LVM</td>
</tr>
<tr>
<td>4.</td>
<td>100% Bael pulp</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>7.3</td>
<td>LM</td>
</tr>
<tr>
<td>5.</td>
<td>100% Aonia Pulp</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>6.8</td>
<td>LS</td>
</tr>
</tbody>
</table>

C.D. (P<0.01) 0.6

LM- Like Moderately, LVM- Like Very Much, LS- Like Slightly

Table 2: Organoleptic quality of different recipe of bael-aonia blended low calories RTS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Pulp (%)</th>
<th>T.S.S (%)</th>
<th>Acidity (%)</th>
<th>Sugar + Stevia ratio</th>
<th>Organoletic quality Score</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>10</td>
<td>10</td>
<td>0.20</td>
<td>50 % sugar + 50 % stevia</td>
<td>6.3</td>
<td>LS</td>
</tr>
<tr>
<td>2.</td>
<td>10</td>
<td>10</td>
<td>0.30</td>
<td>50 % sugar + 50 % stevia</td>
<td>5.4</td>
<td>NLND</td>
</tr>
<tr>
<td>3.</td>
<td>10</td>
<td>10</td>
<td>0.40</td>
<td>50 % sugar + 50 % stevia</td>
<td>5.0</td>
<td>NLND</td>
</tr>
<tr>
<td>4.</td>
<td>10</td>
<td>11</td>
<td>0.20</td>
<td>50 % sugar + 50 % stevia</td>
<td>8.9</td>
<td>LVM</td>
</tr>
<tr>
<td>5.</td>
<td>10</td>
<td>11</td>
<td>0.30</td>
<td>50 % sugar + 50 % stevia</td>
<td>7.0</td>
<td>LM</td>
</tr>
<tr>
<td>6.</td>
<td>10</td>
<td>11</td>
<td>0.40</td>
<td>50 % sugar + 50 % stevia</td>
<td>7.5</td>
<td>LM</td>
</tr>
<tr>
<td>7.</td>
<td>10</td>
<td>12</td>
<td>0.20</td>
<td>50 % sugar + 50 % stevia</td>
<td>8.0</td>
<td>LVM</td>
</tr>
<tr>
<td>8.</td>
<td>10</td>
<td>12</td>
<td>0.30</td>
<td>50 % sugar + 50 % stevia</td>
<td>6.2</td>
<td>LS</td>
</tr>
<tr>
<td>9.</td>
<td>10</td>
<td>12</td>
<td>0.40</td>
<td>50 % sugar + 50 % stevia</td>
<td>5.4</td>
<td>NLND</td>
</tr>
</tbody>
</table>

C.D. (P<0.01) 0.8

LM- like moderately, LVM-like very much, LE-like extremely, LS-like slightly, NLND- neither like nor dislike
sucrose + 50 per cent fructose and squash with fructose; sweet orange : kokum (88:12) with 50 per cent sucrose + 50 per cent fructose followed by 50 per cent sucrose + 50 per cent sucralose and fructose; sweet orange : pomegranate (50:50) with 50 per cent sucrose + 50 per cent fructose and 50 per cent sucrose + 50 per cent sucralose were rated as superior recipes based on overall acceptability scores in sensory evaluation.

Conclusion:
A blends containing 50 per cent bael pulp + 50 per cent aonla pulp + 50 per cent sugar + 50 per cent stevia prepared from the recipe 10 per cent pulp, 11 per cent TSS and 0.2 per cent acidity was found better for the preparation of ready-to-served (RTS) drink. In the preparation of low calorie RTS half of the sugar can be successfully substituted by stevia without impairing the quality of beverages.

REFERENCES


