



DEVELOPMENT AND EVALUATION OF AONLA BASED BLENDED NECTAR DRINK FROM DIFFERENT FRUITS USING STEVIA FOR LOW CALORIE

Om Singh* and Richa Singh

Department of Post Harvest Technology, College of Horticulture, N.D. University of Agriculture and Technology, Kumarganj, Faizabad (Uttar Pradesh), India.

Abstract

The present investigation was carried out in the Department of Post Harvest Technology, N.D. University of Agriculture and Technology, Kumarganj, Faizabad (U.P.), India with the objective to develop aonla based low calorie blended nectar from aonla, mango, guava, jamun and jackfruit using stevia for low calorie. A blends containing 25 per cent aonla pulp + 75 per cent mango pulp was found better for the preparation of nectar. In the preparation of low calorie nectar half amount of sugar can be successfully substituted by stevia without impairing the quality of beverage.

Key words : Aonla, mango, guava, jackfruit, jamun, blending ratio, low calorie, nectar.

Introduction

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 highly remunerative even without much care. In India, it is more popular in Uttar Pradesh, but now a day 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, arteriosclerosis, cough, diarrhoea, dysentery, dyspepsia, haemorrhages, leucorrhoea and jaundice. It possesses antibacterial, anticarcinogenic, antiemetic, antioxidative, antipyretic, antitumour, antiviral, cardiogenic, 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 aonla 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 aonla juice into certain beverages before it can be consumed. Several value added products like RTS, nectar murabba, pickles

and candy, herbal squash, herbal jam, sauce, chayvanprash, triphala have been developed from this acid fruit. Chauhan *et al.* (2005) stated that aonla 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 it's not much suitable for making of ready-to-serve or other beverages. There is great possibility of obtaining an excellent quality beverages, if aonla pulp is blended with guava, jamun, jackfruit and mango pulp, because guava have pleasant flavour and rich source of vitamin C, minerals and antioxidant value. Mango and jackfruit are well known for its attractive colour, pleasant flavour and are also rich in vitamin A. Jamun is a rich source of mineral constituent particularly iron, calcium, phosphorus, vitamin A and C content, it is very well known for curing diarrhoea and diabetic both.

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).

*Author for correspondence- E-mail: omsingh1921@gmail.com

Materials and Methods

Mature aonla (cultivar NA-7), mango (cultivar Amrapali), jackfruit (cultivar NJ₃) and ripe guava (cultivar Allahabad Safeda) were taken from the Main Experimental Station of Department of Horticulture in the month of December, 1st week of July, 2nd week of July and August, respectively. Ripe jamun (round shaped) were taken from the village Singhni in the month of June. The fruits were free from any visible sign of microbiological infection, insect infestation and physical injury. Stevia used as sugar replacer was purchased from Stevia Biotech Pvt. Ltd., New Delhi. One gram stevia was prescribed to contribute 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 gram stevia dissolved in one litre of water) on the basis of equivalent sweetness for replacement of sugar by stevia. Sugar was also purchased from the local market. The pulp of each fruit were extracted and preserved with 700 ppm potassium metabisulphite (mango, guava, jackfruit and aonla), 1400 ppm Sodium benzoate (jamun) and kept till the preparation of final product (fig. 1).

One litre of nectar 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 aonla based blended nectar and evaluated their organoleptic quality.

Nectar

1. 25% aonla pulp + 75% mango pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
2. 50% aonla pulp + 50% mango pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
3. 75% aonla pulp + 25% mango pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
4. 100% aonla pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
5. 100% mango pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
6. 25% aonla pulp + 75% guava pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
7. 50% aonla pulp + 50% guava pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
8. 75% aonla pulp + 25% guava pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
9. 100% guava pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
10. 25% aonla pulp + 75% jamun pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.

Table 1 : Organoleptic quality of different blending ratio of aonla pulp with mango, guava, jamun and jackfruit pulp for blended nectar.

S. no.	Blending ratio	Organoleptic quality	
		Score	Rating
1.	25% aonla pulp + 75% mango pulp	8.9	LE
2.	50% aonla pulp + 50% mango pulp	8.3	LVM
3.	75% aonla pulp + 25% mango pulp	6.7	LM
4.	100% aonla pulp	6.2	LS
5.	100% mango pulp	7.4	LM
6.	25% aonla pulp + 75% guava pulp	6.3	LS
7.	50% aonla pulp + 50% guava pulp	6.5	LS
8.	75% aonla pulp + 25% guava pulp	8.1	LVM
9.	100% guava pulp	6.3	LS
10.	25% aonla pulp + 75% jamun pulp	6.3	LS
11.	50% aonla pulp + 50% jamun pulp	6.4	LS
12.	75% aonla pulp + 25% jamun pulp	6.8	LM
13.	100% jamun pulp	6.1	LS
14.	25% aonla pulp + 75% jackfruit pulp	6.1	LS
15.	50% aonla pulp + 50% jackfruit pulp	6.2	LS
16.	75% aonla pulp + 25% jackfruit pulp	7.0	LM
17.	100% jackfruit pulp	6.1	LS
CD at 5%		0.91	

LM- Like Moderately, LVM- Like Very Much, LE-Like Extremely, LS-Like Slightly, NLND- Neither Like Nor Dislike.

11. 50% aonla pulp + 50% jamun pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
12. 75% aonla pulp + 25% jamun pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
13. 100% jamun pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
14. 25% aonla pulp + 75% jackfruit pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
15. 50% aonla pulp + 50% jackfruit pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
16. 75% aonla pulp + 25% jackfruit pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.
17. 100% jackfruit pulp of 20% pulp adjusted to 0.3% acidity and 14% TSS.

Best blending ratios (25 per cent aonla pulp + 75 per cent mango pulp, 50 per cent aonla pulp + 50 per cent mango pulp and 75 per cent aonla pulp + 25 per cent

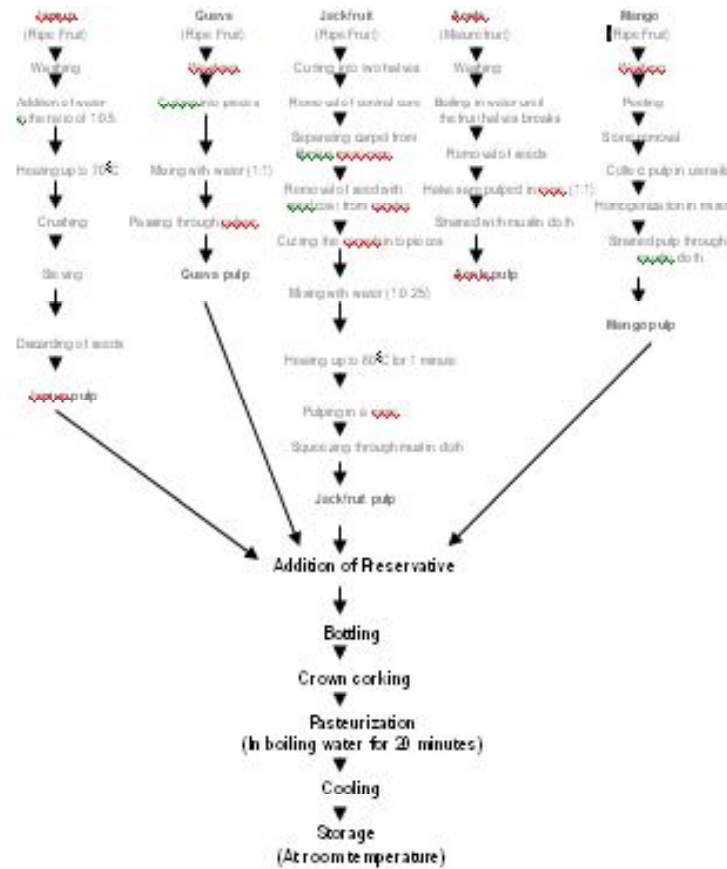


Fig. 1 : Flow sheet for extraction of jamun, guava, jackfruit, aonla and mango pulp.

Table 2 : Organoleptic quality of sugar and stevia ratio for preparation of blended low calories nectar.

S.no.	Best blending ratio	Sugar + stevia ratio	Organoleptic quality	
			Score	Rating
1.	25% aonla pulp+75% mango pulp	100% sugar + 0% stevia	7.3	LM
2.	25% aonla pulp+75% mango pulp	75% sugar + 25% stevia	8.1	LVM
3.	25% aonla pulp+75% mango pulp	50% sugar + 50% stevia	8.9	LE
4.	25% aonla pulp+75% mango pulp	25% sugar + 75% stevia	7.4	LM
5.	25% aonla pulp+75% mango pulp	0% sugar + 100% stevia	5.6	NLND
6.	50% aonla pulp+50% mango pulp	100% sugar + 0% stevia	6.5	LS
7.	50% aonla pulp+50% mango pulp	75% sugar + 25% stevia	7.3	LM
8.	50% aonla pulp+50% mango pulp	50% sugar + 50% stevia	7.6	LM
9.	50% aonla pulp+50% mango pulp	25% sugar + 75% stevia	6.8	LM
10.	50% aonla pulp+50% mango pulp	0% sugar + 100% stevia	5.4	NLND
11.	75% aonla pulp+25% guava pulp	100% sugar + 0% stevia	6.4	LS
12.	75% aonla pulp+25% guava pulp	75% sugar + 25% stevia	8.0	LVM
13.	75% aonla pulp+25% guava pulp	50% sugar + 50% stevia	7.4	LM
14.	75% aonla pulp+25% guava pulp	25% sugar + 75% stevia	6.8	LM
15.	75% aonla pulp+25% guava pulp	0% sugar + 100% stevia	5.1	NLND
CD at 5%			0.64	

LM- Like Moderately, LVM- Like Very Much, LE- Like Extremely, LS- Like Slightly, NLND- Neither Like Nor Dislike.

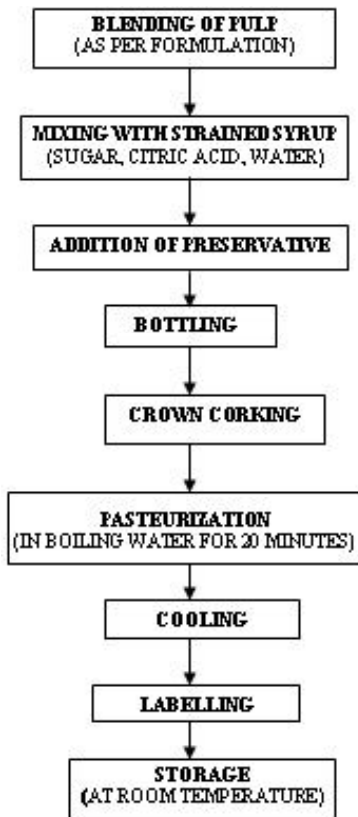


Fig. 2 : Flow sheet for preparation of blended nectar.

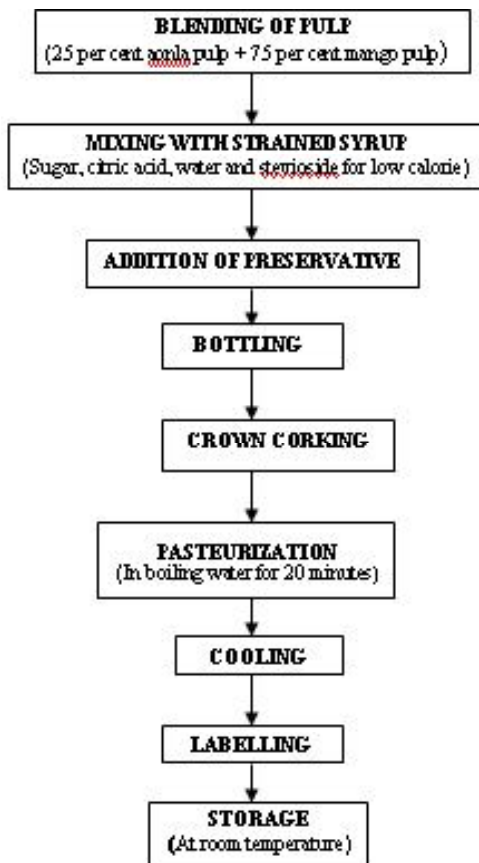


Fig. 3 : Flow sheet for preparation of low calorie nectar.

guava pulp) were selected for the preparation of low calorie quality nectar beverage (fig. 2). The sugar and stevia ratios (100% sugar + 0% stevia, 75% sugar + 25% stevia, 50% sugar + 50% stevia, 25% sugar + 75% stevia, 0% sugar + 100% stevia) were selected for this purpose. One litre of each product were prepared by mixing calculated amount of both pulp, sugar, stevioside, citric acid and water according to selected recipe and evaluated organoleptically (fig. 3).

Results and Discussion

Data on the organoleptic evaluation of nectar drink blending ratios are given in table 1. Results revealed that in preparation of nectar the blending ratio of 25 per cent aonla pulp + 75 per cent mango pulp was found to be best followed by the ratio of 75 per cent aonla pulp + 25 per cent guava pulp and prepared from 50 per cent aonla pulp + 50 per cent mango pulp. There was no significant difference in the organoleptic score of ratio number 1, 8 and 2.

Bhosale *et al.* (2000) reported that the RTS prepared from 80 : 20 (aonla : mango) blend had better consumer appeal and nutritional value. The proportion of aonla juice decreased, ascorbic acid content also decreased. Organoleptic score increased with the increased levels of mango pulp in the blend. It might be due to the increased liking for mango colour and flavour in the blend. 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, while in squash, maximum acceptability (8.43) was achieved in beverage blends (50 guava: 50 jamun) with 40 per cent pulp, 50 per cent TSS and 1.00 per cent acidity. Punam *et al.* (2012) state that in RTS drink prepared with 20 per cent pulp (25 bael: 75 mango), 14 percent TSS and 0.26 per cent acidity was found most acceptable (8.59), while in squash prepared with 40 per cent pulp (25 bael : 75 mango), 50 per cent TSS and 1.00 per cent acidity was found most acceptable (8.60).

Results revealed that half of the sugar can be successfully substituted by stevia in the preparation of aonla based low calorie blended nectar without impairing the quality of beverages. Data furnished in table 2 showed that sugar and stevia ratio of 25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia was found to be significantly superior over all sugar and stevia ratios, followed by 25 per cent aonla pulp + 75 per cent mango pulp + 75 per cent sugar + 25 per cent stevia and low calorie nectar prepared from 75 per cent

aonla pulp + 25 per cent guava pulp + 75 per cent sugar + 25 per cent stevia.

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. Byanna *et al.* (2010) studied on development of beverages from sweet orange (*Citrus sinensis* Osbeck) using sugar and sugar substitutes and found that ready-to-serve drink (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 sucralose; 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 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 over all acceptability scores in sensory evaluation.

Conclusion

Blended nectar contains 25 per cent aonla pulp + 75 per cent mango pulp imparts good flavour and colour and also scored highest organoleptic quality. In the preparation of low calorie nectar half of the sugar can be successfully substituted by stevia without impairing the quality of beverages.

References

- Bhosale, V. I., L. S. Kute and S. S. Kadam (2000). Studies on preparation of ready-to-serve beverage from aonla : mango juice blend. *Beverage and Food World*, **27(9)** : 24.
- Byanna, C. N. and I. N. Doreyappa Gowda (2010). Development of beverages from sweet orange (*Citrus sinensis* Osbeck) using sugar and sugar substitutes. *Ph.D. Thesis*, Indian Institute of Horticultural Research, Bengalore.
- Chauhan, O. P., S. Srivastava, P. Pandey and G. K. Rai (2005). A study on the development of aonla blended sauce. *Beverage and Food World*, **32(5)** : 31-32.
- Cook, F. C. C. (2000). Low-calorie sweeteners. Annual Editions: Nutrition- 2000-2001. Ed. **12** : 30-31.
- Irfan, Beg, G. S. Gaur, Angraj Ali and D. P. Singh (2008). Studies on standardization of recipe for the preparation of ready-to-serve beverage from papaya based mixed fruit pulp (papaya : mango). National Seminar on "Sustainable Horticultural Research in India : Perspective, Priorities and Preparedness" held at Lucknow (14-15th April).
- Punam, Gehlot R., R. Singh and S. Siddiqui (2102). Development and evaluation of bael-mango ready-to-serve drink and squash. *Beverage & Food World*, **39(4)** : 43-45.
- Sharma, M., R. Gehlot, R. Singh and S. Siddiqui (2012). Changes in chemical constituents and overall acceptability of guava-jamun blends ready-to-serve drink and squash during storage. *Beverage & Food World*, **39(4)** : 39-42.
- Sharma, R. D. (2006). Studies on preparation of low calorie RTS beverages from aonla, lime and ginger using stevia. *M.Sc. Thesis*, G.B. Pant Univ. of Agric. & Tech., Pantnagar (Uttaranchal).