



Organoleptic Evaluation of Aonla (*Emblica officinalis* G.) Nectar during Storage

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A research experiment was conducted during the year 2019-20 and 2020-21 in the Fruit and Vegetable Processing Unit Laboratory, Department of Horticulture, College of Agriculture, Gwalior with seven different varieties of aonla viz., NA-4, NA-5, NA-6, NA-7, NA-10, Laxmi and Chakaiya. This study was carried out in a completely randomized design with three replications. It was studied about the preparation of various value added products such as aonla nectar. From the finding it was observed that, the increase in the percentage of acidity, moisture, phenols and fiber content of aonla nectar while total soluble solids and total sugar content was decreased. There was gradual

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increase in moisture content of aonla nectar prepared with different pulp combination of aonla fruits during storage period. However, total soluble solids, ascorbic acid content decreased with advancement of storage period. Observations were recorded up to storage period of six months at ambient conditions. Laxmi and Chakaiya varieties were found superior with respect to colour, appearance, taste and aroma as well as flavour. As per the organoleptic evaluation the overall acceptability of aonla nectar was found significant with the storage intervals of 30, 60, 90 and 120 days.

Keywords: Aonla; processing industry; storage; value addition; overall acceptability.

1. INTRODUCTION

“Aonla (*Emblica officinalis*) is one of the oldest minor fruit and considered to be a wonder for human health. India ranks first in aonla area and production all over the world. It belongs to the family Euphorbiaceae [1]. The fruit has high indigenous medicinal value such as anti-ascorbic, laxative and antibiotic [2]. Aonla is used in Ayurvedic systems of Indian medicines. Besides, it is not consumed as fresh or in the raw state as it is acidic and astringent. Due to its perishable nature and glut after harvest, which lowers the market value of fruit, aonla experiences postharvest losses that range from 30 to 40%. Traditional procedures were time-consuming and unhygienic. Due to this, the nutritive losses are seen in higher amounts. Therefore an attempt is made to find out the suitability of some varieties for processing as well as stability of different aonla products.

2. MATERIALS AND METHODS

Fully matured aonla fruits of different varieties such as NA-4, NA-5, NA-6, NA-7, NA-10, Laxmi and Chakaiya etc. are harvested from the main experimental station of Department of

Horticulture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior during the year 2019-20 and 2020-21. All chemicals used in this investigation were of analytical grade. Cane sugar, skimmed milk powder, glucose, butter, citric acid, hot spices, vegetables and salt were obtained from a local market and used as ingredients for the preparation of different products such as nectar and squash.

2.1 Extraction of Pulp

Aonla fruits that were fully developed, had a firm texture, and of same size were blanched and utilized in the experiment. Using small-scale pulping equipment, the fruits were processed to extract pulp, yielding a fine pulp. The final pulp was prepared with an addition of 2% potassium bi-sulphite solution for 15-20 minutes [3].

2.2 Nectar

Nectar is a type of fruit beverage, which contains at least 20 per cent fruit pulp and 15 per cent total soluble solids. Experiences, however shown that nectar prepared with 15 per cent sugar is very sweet. It has normally 0.3percent acidity. Dilution is not required before serving.

List 1. Organoleptic score calculation

Organoleptic score	Rating
9	Like extremely (LE)
8	Like very much (LVM)
7	Like moderately (LM)
6	Likes lightly (LS)
5	Neither liked nor disliked (NLND)
4	Disliked slightly (DS)
3	Disliked moderately (DM)
2	Disliked very much (DVM)
1	Disliked extremely (DE)

Overall, the final rating was obtained by averaging the score or marks. Score of 7 rating “Like moderately” was considered to the acceptable limit

- Aonla pulp 20percent
- Total soluble solids 15percent
- Acidity 0.3percent
- SO₂ 70ppm

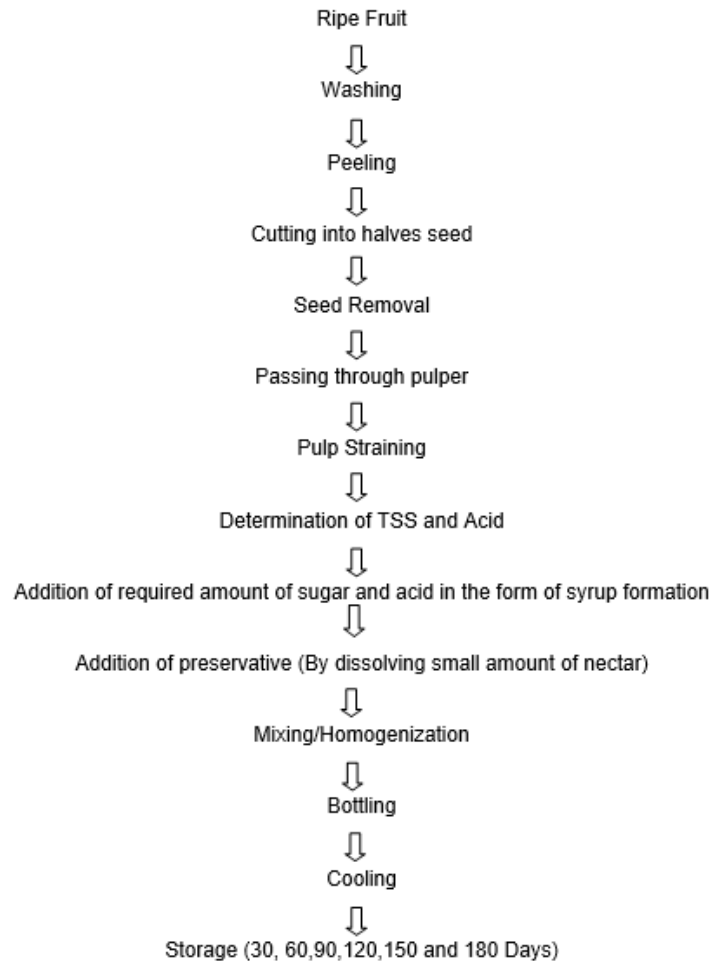


Fig. 1. Flowchart for preparation of Aonla Nectar



Image 1. Photographs of sensory evaluation

2.3 Sensory Evaluation (9-point hedonic scale)

Aonla Nectar was subjected to evaluation soon after preparation and after one, two, three and four months of storage by a panel of ten judges following 9-point hedonic scale [4]. These products were assessed for colour and appearance, taste, aroma, flavor and overall acceptability.

The overall acceptability of squash, nectar, RTS, sauce and toffee was based on mean score obtained from all the sensory characters. The characters with mean scores of 6 and above out of 9 were considered acceptable.

3. RESULTS

3.1 Colour and Appearance

Data on colour and appearance of aonla nectar are presented in Table 1. Among different varieties, significantly higher colour and appearance were recorded with Chakaiya (7.55, 7.42, 7.32, 7.19 and 7.05) in the pooled data. However, it was remained statistically at par with

the Laxmi and NA-7. NA-4 variety recorded least values (6.87, 6.76, 6.64, 6.52 and 6.38) in colour and appearance of aonla nectar.

For the preparation of aonla nectar, dull colour was observed in aonla nectar (6.00) in NA-5 variety, respectively. The bright colour and appearance was observed on the visual basis. For organoleptic evaluation, significantly maximum response was recorded in aonla nectar (6.79) in NA-5 variety.

3.2 Taste

Close examination of data presented in Table 2 revealed that taste of the aonla nectar varied significantly due to different aonla varieties and storage.

A significant effect of different aonla varieties and their storability with respect to the taste of aonla nectar found between the varieties examined. Critical probing of pooled data it was revealed that there is a decreasing noticeable taste in aonla nectar was noticed. In NA-4 the indecent raunchy taste was observed in aonla nectar (8.11).

Table 1. Effect of different varieties and storage on colour and appearance of Aonla Nectar

Cultivars	Storage Period (Days)				
	30	60	90	120	150
NA-4	6.87	6.76	6.64	6.52	6.38
NA-5	7.03	6.79	6.66	6.43	6.28
NA-6	7.21	7.07	6.94	6.86	6.76
NA-7	7.26	7.09	6.99	6.90	6.81
NA-10	6.69	7.04	6.93	6.83	6.76
Laxmi	7.41	7.32	7.25	7.16	7.07
Chakaiya	7.55	7.42	7.32	7.19	7.05
SeM±	0.01	0.01	0.01	0.01	0.01
CD (p=0.05)	0.04	0.04	0.05	0.03	0.04

Table 2. Effect of different varieties and storage on taste of Aonla Nectar

Cultivars	Storage Period (Days)				
	30	60	90	120	150
NA-4	8.54	8.41	8.36	8.30	8.23
NA-5	8.65	8.58	8.50	8.39	8.32
NA-6	8.55	8.41	8.30	8.17	8.11
NA-7	8.56	8.51	8.46	8.37	8.30
NA-10	8.75	8.68	8.60	8.53	8.45
Laxmi	8.58	8.49	8.32	8.20	8.12
Chakaiya	8.65	8.54	8.46	8.36	8.51
SeM±	0.02	0.02	0.02	0.02	0.02
CD(p=0.05)	0.06	0.05	0.07	0.06	0.06

3.3 Aroma

It is clearly evident from data presented in Table 3 that the aroma of aonla nectar based on organoleptic evaluation was significantly influenced due to different aonla varieties and storage.

The effect of different aonla varieties and their storability with respect to the aroma could attain level of significance. The product started smelling bad smell after 90 days of storage. Fusty aroma of aonla nectar (6.26) in NA-4 variety. With respect to the sweet-smelling, significantly

maximum response to fragrant aroma was recorded in Chakaiya variety (7.44) for the preparation which was significantly highly suitable till 90 days of storage.

3.4 Flavour

The unappetizing flavor was observed in NA-4 variety (6.22) aonla nectar preparation. However, the palatable flavor was recorded in Chakaiya variety (6.87). Whereas, the delicious taste was observed in Chakaiya (8.51) for aonla nectar along with the guidelines of Hedonic scale by the acceptance.

Table 3. Effect of different varieties and storage on aroma of aonla nectar

Cultivars	Storage Period (Days)				
	30	60	90	120	150
NA-4	6.52	6.46	6.34	6.60	6.26
NA-5	6.61	6.56	6.54	6.47	6.40
NA-6	6.68	6.62	6.57	6.51	6.47
NA-7	6.98	6.93	6.87	6.83	6.79
NA-10	7.05	6.98	6.95	6.92	6.83
Laxmi	7.47	7.41	7.37	7.32	7.28
Chakaiya	7.62	7.59	7.53	7.48	7.44
SeM±	0.02	0.02	0.02	0.02	0.02
CD(p=0.05)	0.04	0.04	0.05	0.05	0.07

Table 4. Effect of different varieties and storage on flavour of aonla nectar

Cultivars	StoragePeriod(Days)				
	30	60	90	120	150
NA-4	6.57	6.46	6.41	6.30	6.22
NA-5	6.76	6.71	6.63	6.58	6.54
NA-6	6.81	6.76	6.69	6.62	6.65
NA-7	6.88	6.84	6.80	6.76	6.72
NA-10	6.91	6.86	6.82	6.76	6.73
Laxmi	7.03	6.95	6.87	6.84	6.82
Chakaiya	7.08	7.06	6.97	6.91	6.87
SeM±	0.04	0.04	0.04	0.04	0.04
CD(p=0.05)	0.12	0.13	0.12	0.12	0.11

Table 5. Effect of different varieties and storage on overall acceptability of aonla nectar

Cultivars	StoragePeriod(Days)				
	30	60	90	120	150
NA-4	6.85	6.69	6.62	6.58	6.53
NA-5	6.86	6.77	6.72	6.67	6.61
NA-6	6.95	6.89	6.84	6.50	6.76
NA-7	7.04	6.99	6.90	6.84	6.78
NA-10	7.17	7.15	7.08	6.99	6.90
Laxmi	7.30	7.20	7.14	7.05	7.00
Chakaiya	7.00	6.92	6.85	6.80	7.03
SeM ±	0.07	0.07	0.07	0.07	0.07
CD(p= 0.05)	0.21	0.22	0.22	0.20	0.19

3.5 Overall Acceptability

For the preparation of aonla nectar, the disagreeable acceptability was observed in NA-4 (6.53). Whereas, significantly maximum response to less than excellent was recorded in Chakaiya variety (7.03) in aonla nectar for the preparation which was significantly highly suitable during 2020 and 2021, respectively.

4. DISCUSSION AND CONCLUSION

An unfermented beverage of aonla pulp based nectar was prepared by muddling of fresh fruits, but it does not include 100 % pure fruit [5]. Based on the organoleptic evaluation and chemical parameters, it can be confessed that a best quality of aonla nectar can be prepared by the Chakaiya which was followed by Laxmi variety with reference to the attributes such as colour and appearance, taste, flavour, aroma and its overall acceptability.

There was sharp decrease in the organoleptic scores for taste in various treatments during the storage period at ambient condition; this might be due to the production of off taste in nectar as a result of certain bio-chemical changes taking place under high temperature [6]. Thus, based on the above observations, it is concluded that Chakaiya recorded maximum organoleptic score at 30, 60, 90, 120 and 150 days after color/appearance treatment. However, a downward trend was observed in the scores, this can be due to the oxidation of phenols that causes dye degradation or organic non-enzymatic reaction sour with sugar [7].

Varietal aonla products would have great demand because of their nutritional, therapeutic and medicinal value with an amenable flavor [8]. Aonla fruit processing can extend the season of availability and encourage wide promotion of the value-added products [9].

The present findings were in the reference of Mandal et al. [10] and Shekhawat et al. [11] with regards to aonla nectar [12].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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