Organoleptic Evaluation ofAonla (*Emblica officinalis* G.) nectar during storage

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. It was studied about the preparation of various value added products such as aonlaaonla nectar.From the finding it was observed that, the increase in the percentage of acidity, moisture, phenols and fibre content of aonlaaonla nectar while total soluble solids and total sugars content was decreased. There was gradual 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 of aonla nectar decreased with advancement of storage period. Observations were recorded up to storage period of six months at ambient conditions. This study is analyzed in a completely randomized design with three replications. Laxmi and Chakaiya varieties were found superior with respect to colour, appearance, taste and aroma as well as flavour. It has been noticed that the overall acceptability of processed products have been found significant with the storage intervals such as 30, 60, 90 and 120 days. As far as sensory evaluation of different aonla products was concerned, the Laxmi and Chakaiya varieties are found to be superior for the purpose of the processing industry.

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

INTRODUCTION

"Aonla is one of the oldest minor fruit and considered to be a wonder for human health. India ranks 1 st in aonla area and production all over the world. It belongs to the family Euphorbiaceae. The fruit has high indigenous medicinal value such as an anti- ascorbutic, laxative and antibiotic. 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.

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 aonlaaonla nectar, nectar and squash.

Extraction of Pulp

Aonla fruits that were fully developed, had a firm texture, and were all the 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.

Nectar

Nectar is a type of fruit beverage, which contains at least 20 per centfruitpulp and 15 per centtotal soluble solids.Experiences, however shownthat nectar prepared with 15 per cent sugar is very sweet. It has normally 0.3percentacidity.Dilutionisnotrequiredbeforeserving.

Recipe:

- Aonla pulp 20percent
- Totalsolublesolids 15percent
- Acidity 0.3percent
- SO_2 70ppm

Ripe Fruit

⇩

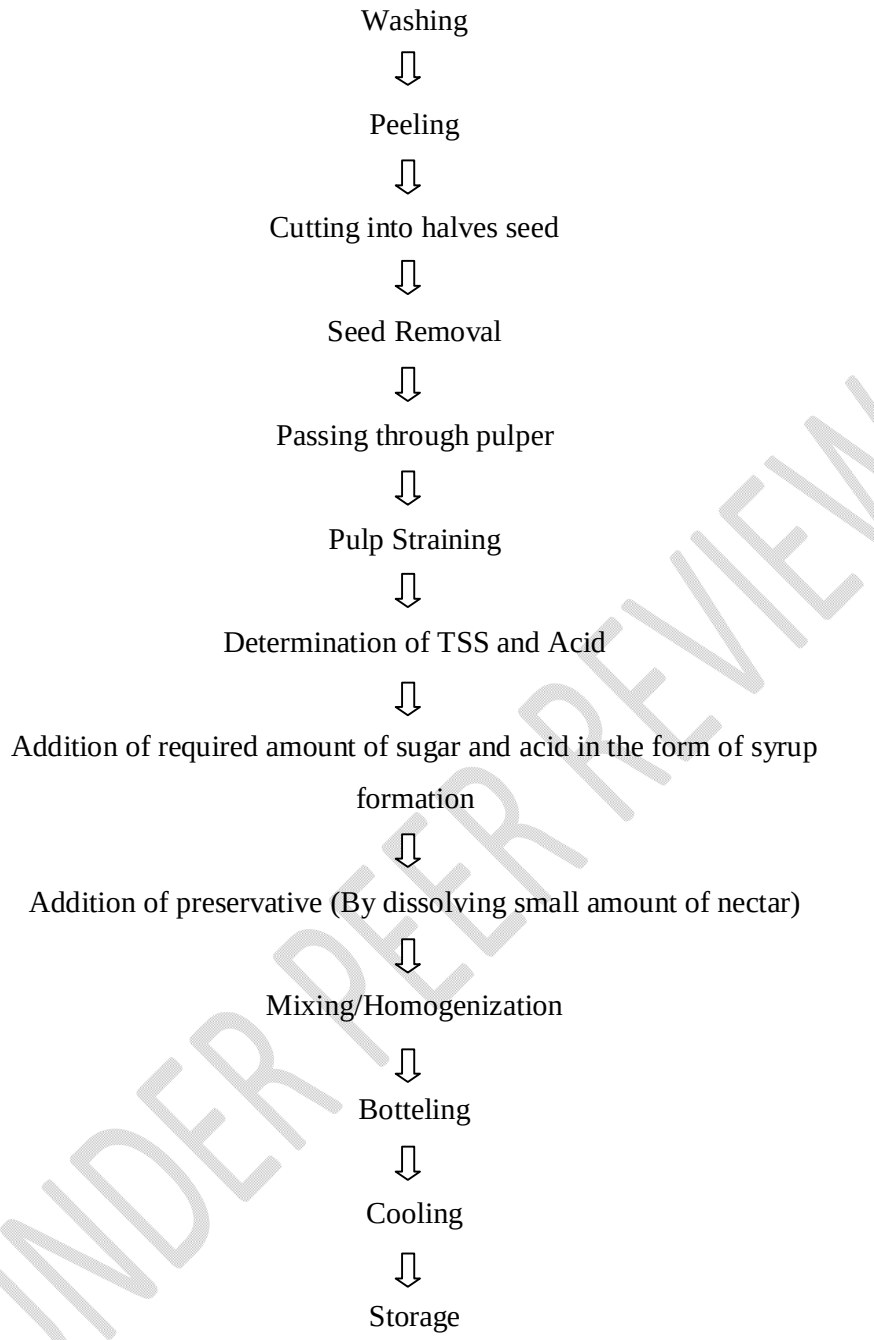

Fig1 .Flowchart forpreparation ofAonla Nectar

3.1 Sensoryevaluation(9-point hedonicscale)

Aonla Nectar was subjected to evaluation soon after preparation and after one, two, threeand four months of storage by a panel of ten judges following 9-point hedonicscale(Ranganna,1986).Theseproductswereassessedforcolourandappearance,taste,aroma,flavorandoverallacceptability.

Image 1 :

Photographs of Sensory Evaluation




The overall acceptability of squash, nectar, RTS, sauce and toffee was basedon mean score obtained from all the sensory characters. The characters withmeanscores of6andaboveoutof9wereconsideredacceptable.

List 1 :Organoleptic score calculation

Organolepticscore	**Rating**
9	Likeextremely (LE)
8	Likevery much (LVM)
7	Likemoderately (LM)
6	Likeslightly (LS)
5	Neither likednordisliked (NLND)
4	Disliked slightly (DS)
3	Dislikedmoderately (DM)
2	Dislikedverymuch (DVM)
1	Dislikedextremely (DE)

Overall,thefinalratingwasobtainedbyaveragingthescoreormarks. Score of 7rating“Like moderately”was consideredtothe acceptable limit.

Result

ColourandAppearance

DataoncolourandappearanceofaonlanectararepresentedinTable1. Among different varieties, significantly higher colour and appearancewere recorded with Chakaiya (7.55, 7.42, 7.32, 7.19 and 7.05) in the pooleddata. 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 colourandappearanceofaonlanectar.

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

TableNo 1 Effectofdifferentvarietiesand storageoncolour andappearanceofAonla Nectar

Cultivars	StoragePeriod(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

TableNo 2 Effectofdifferentvarietiesandstorage ontasteofAonla Nectar

Cultivars	StoragePeriod(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

Taste

Closeexaminationofdatapresentedin Table2revealedthattasteof the aonla nectar varied significantly due to different aonla varieties andstorage.Higher valuesoftastewere noticed insecondyearthanfirstyear.

Criticalprobingofpooleddata,itwasrevealedthatdecreasingnoticeabletastesignificantlyi ntheaonlanectarthereaftersignificantlynoticed.Theindecenttastewasob servedinraunchytasteofaonla nectar (8.11),inNA-4,respectively.

A significant effect of different aonla varieties and their storability withrespect to the taste of aonla nectar found between the varieties examinedduring ofboththeyear.

Aroma

It is clearly evident from data presented in Table 3 that the aroma ofaonla nectarbased on organoleptic evaluation was significantly influenceddue to the different aonla varieties and storage 30 to 150 days after storage(DAS) during both the year of experiment.

The effect of different aonla varieties and their storability with respect tothearomacouldattainlevelofsignificance.Theproducts wise given a bad smell after 90

days of storage, fusty aroma of aonla nectar (6.26)inNA-4variety,respectively.With respect to the sweet-smelling, significantly maximum response tofragrant aroma was recorded in (7.44) for aonla nectarin Chakaiya varietyfor the preparation which wassignificantlyhighly suitabletill90daysofstorage.

TableNo3 Effectof differentvarietiesandstorageonaromaofAonlaNectar

Cultivars	StoragePeriod(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

Flavour

Theunappetizingflavourwasobservedinaonla nectar (6.22)inNA-4variety. However, the palatable flavour was recorded in aonlanectar(6.87)inChakaiyavariety.Whereas, the delicious taste was observed in Chakaiya(8.51)foraonlanectar along with the guidelines of Hedonic scale by the acceptance.

Overallacceptability

The disagreeable acceptability was observed aonla nectar (6.53)inNA-4. Whereas, significantly maximum response to less than excellent wasrecorded in Chakaiya variety (7.03) in aonla nectarforthepreparationwhichwassignificantlyhighlysuitable during 2020 and 2021, respectively.

Theeffect ofdifferentaonla varietiesandtheirstorability upto 150DASwithrespecttotheoverallacceptabilityofaonlanectarcouldattainlevelofsignific ance.

TableNo4Effectofdifferentvarietiesandstorageonflavour ofAonlaNectar

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

TableNo 5 Effectofdifferentvarieties and storageon overallacceptabilityofAonlaNectar

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

Discussion

An unfermented beverage of aonlapulp based nectar was prepared bymuddling of fresh fruits, but it does not include 100 % pure fruit. Based on the organoleptic evaluation and chemical parameters, it canbeconfessed thata bestquality ofaonla nectarcan beprepared bytheChakaiya which was followed by Laxmi variety with reference to the attributessuchascolourandappearance,taste,flavour,aromaanditsoverallacceptability .

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. 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.

The present findings were in the reference of Mandal *et al*. (2013) andShekhawat *et al*. (2014) with regards to aonla nectar.

References

AOAC (1984) Methods of analysis of the association of official analytical chemist:15theditionWashington DC.

Athawale G.H. and Dr. S.H. Akabari. 2017. Amla and its processing – A review.*International Journal of Green and Herbal Chemistry.* Sec B, **6** (3): 62-73.

Balaji, Vikram and Prasad V.M. 2014. Studies on value kinnow- aonla blendedready-to-servebeverage.*Journal of FoodProcessingTechnology*. **5**: 288.

Balaji, Vikram and Purnima Singh Sikarwar. 2017. Studies on preparation of valueadded herbal kinnow-aonla beverages (RTS and Squash) during storage.*Indian Journal* of *Pure & Applied Biosciences*.**6** (1): 758-765.

Bhattacherjee, A.K., Dikshit, Abhay, Kumar, Sanjay and Tandon, D.K. 2012. Qualityof aonla candy and segments-in-syrup prepared from steep

preserved fruits inwater. *Indian Journal of Natural Products and Resources.***4** (1): 119-122.

Bhawna Panda, H.G. Sharma, Abhay Bisen and Krishnakant Rajak. 2019. Microbialandeconomicalstudiesofjamunbeveragespreparedatbyalternativ esweeteners. *International Journal* of *Current Microbiology and Applide Science*s.**8**(12): 187-195.

Devra, Naval Singh, Kaushik R.A. and Meena H.R. 2017. Standardization andstoragestudyofaonla(*Emblicaofficinalis*Gaertn,)basedblendedReady-To-Servebeverages. *International Journal of Current Microbiology and Applied* Sciences.**6** (5): 1275-1284.

Fruit Products Order, https://www.india.gov.in/fruit-products-order-1955

Goyal, Madhu, Sharma, Kavita and Kiradoo Vrinda. 2024. New Vistas of Value Addition to Utilize Amla (*Emblica Officinalis*) and Ber (*Ziziphus Mauritiana*) Fruits. *Asian Journal of Dairy and Food Research.***27** (2): 145-147.

Mandal, Purandar, Sahoo, Vibhuti Bhushan, Das, Bhskar Chandra and Katiyar,Dhirendra.2013.Studiesonprocessingandstoragestabilityofaonla(*Emblicaofficinalis*Gaertn.)Nectar.*HortfloraResearchSpectrum.***2** (3):259-161.

Thakur, N.S., Thakur, Nancy, Thakur, Abhimanyu, Kumar, Pradeep and Hamid. 2018.Physico-chemicalcharacteristicsandstandardizationofjuiceextractionmethodfrom wildaonla(*Phyllanthusemblica*L.)fruitsofHimachalPradesh.*International Journal* of *Current Mocrobiology and Applied* Sciences. **7** (02):731-737.

Yadav, Prem Kant, Vishwakarma, Govind and Yadav, D.K. 2015. Studies ondetermination of storage stability of aonla products. *Research in Environment* and *Life Sciences.***8** (3):425-430.