



STUDIES ON PROCESSING AND STORAGE STABILITY OF AONLA (*Emblica officinalis* Gaertn) NECTAR

Purandar Mandal¹, Bibhuti Bhusan Sahoo^{1*}, Bhaskar Chandra Das² and Dharendra Katiyar³

¹College of Horticulture, OUAT, Chiplima, Sambalpur-768 025, India

¹AICRP on Onion and Garlic, College of Horticulture, OUAT, Chiplima

²Department of Post Harvest Management, College of Horticulture, OUAT, Chiplima, Sambalpur (Odisha)

³Dept. of Vegetable Science, CSAUA &T, Kanpur(UP).

*E-mail: bibhutihort@rediffmail.com

ABSTRACT: In the study different recipes of Aonla Nectar was standardized to explore the processing potential of Aonla. There were five different possibilities of recipes. The Nectar prepared from the recipes with 20% pulp, 13% TSS and 0.30% acidity gave highest organoleptic quality score followed by Nectar prepared from 20% pulp, 16% TSS and 0.25% acidity and the consumer acceptability of the ideal Nectar was maintained up to fifth month at ambient temperature.

Keywords : Processing, storage, shelf life, Nectar, Aonla.

Aonla (*Emblica officinalis* Gaertn), known as Indian gooseberry, belongs to family Euphorbiaceae and occupies an important place among the indigenous fruits of India. Fruits are acid, cooling, refrigerant, diuretic and laxative. The fruit is highly nutritive and is a good source of vitamin-C. The stability of ascorbic acid and presence of astringency in aonla fruit is due to the presence of polyphenols (Sastry *et al.*, 9). The fruit has also fair amount of iron, calcium and lysine. Aonla fruit is not popular as table fruit due to its sour and astringent in taste. Also it is perishable in nature. But the excellent nutritive and therapeutic values of fruit have great potentiality for processing into quality products which can get position in national and international market. Keeping the above points in view this research problem was designed to find out a nutritional soft drink of consumer acceptability.

MATERIALS AND METHODS

Aonla fruits free from bruises, deformities and infestation were harvested randomly from different plants of central farm of O.U.A.T., Bhubaneswar. Twenty fruits replicated five times were used for assessing the physical characters. The pulp obtained from 100g fruit, replicated three times was subjected to chemical analysis for physical and chemical parameters, respectively (Table 1 and 2).

The pulp was obtained by slightly blanching the fruits, removed the seeds and finally grinded the segments by adding water in the ratio of 1:1. Nectar was prepared accordingly to the following flow sheet.

Fruit pulp according to recipe Straining
 Mixing with syrup according to recipe Straining
 and cooling it Addition of preservative
 Bottling Crown-Corking Pasteurization in
 boiling water for 20 minutes Cooling
 Labelling Storage at ambient temperature.

Following five treatments each with three replications were tried for organoleptic evaluation.

Treatment	Pulp(%)	TSS(%)	Acidity (%)
T ₁	20	15	0.30
T ₂	20	13	0.30
T ₃	20	16	0.25
T ₄	20	18	0.25
T ₅	20	14	0.30

After that it was subjected to organoleptic evaluation. The results obtained are given in the Table 3. After organoleptic evaluation, the ideal recipe selected was subjected to storage studies till its acceptability and the results obtained are given in the Table 4.

The TSS was estimated by hand refractometer. The acidity was determined by method of simple acid base titration method using phenolphthalein as indicator. The ascorbic acid content in the samples was measured by reduction of 2, 6 dichloride phenolindophenol dye as given by Ranganna (7). The reducing, non-reducing and total sugars were estimated as per Lane and Eynon (5). Non-enzymatic browning was estimated by the method of Ranganna (7). Total carbohydrates (%) was determined by calorimetrically. The organoleptic evaluation of Nectar prepared under different treatments was carried out by a panel of six judges using hedonic rating scale given by (Amerine *et al.*, 1).

The analysis of variance of the data was carried out by the techniques as described by Raghuramula *et al.* (6).

RESULTS AND DISCUSSION

Table 1 and 2 indicated the physical character and chemical composition of the aonla fruits.

The perusal of Table 3 revealed that the organoleptic score of T₂ containing 20 per cent pulp, 13 per cent TSS and 0.3 per cent acidity was found to be best followed by the T₃ containing 20 per cent pulp, 16 per cent TSS and 0.25 per cent acidity. There was significant difference among the T₂ and T₃. However the T₁ and T₄ were non significant for their organoleptic score.

Studies on changes during storage of Aonla Nectar indicated that TSS increased slightly after two month of storage, it may be due to the conversion of polysaccharides into sugars confirming the observation recorded by Khurdiya (4) in phalsa beverage.

Total acidity of Nectar did not change up to three months of storage, then gradually increased the acidity of fruit products (Conn and Stumpf, 3). The present findings are also in agreement with the observations of Ashraf (2) and Singh (11). Results indicated that ascorbic acid content of the nectar beverage decreased continuously during the entire

Table 1: Physical characters of aonla fruits.

Characters	Average Value
Average weight (g)	38.25
Volume (ml)	93.25
Specific gravity (g/cc)	0.410
Overall length (cm)	3.40
Maximum width (cm)	3.60
Juice content (%)	98.25
Sphericity (%)	98.94
Bulk density (kg/m ³)	108
True density (kg/m ³)	210
Moisture content (%)	84.5

Table 2: Chemical composition of aonla fruits.

Characters	Average Value
Total Soluble Solids (%)	5.96
Total Titrable acidity (%)	1.27
Ascorbic acid (mg/100g)	330.24
Reducing Sugar (%)	2.63
Total carbohydrates (%)	14.00

period of storage (Table 4). The reduction may be due to oxidation of ascorbic acid in to dehydroascorbic acid by oxygen. Roy and Singh (8) and Singh (11) have also reported losses of ascorbic acid in fruit beverages during ambient storage. Browning of nectar increased continuously throughout the entire period of storage. It may be due to non-enzymatic reactions, which occurs between nitrogenous compounds with sugar or organic acids with sugars. Increase in browning was also observed by Siddappa *et al.* (10). Reducing sugars increased continuously and total carbohydrates decreased continuously.

The organoleptic scores of Nectar decreased gradually during storage at room temperature. The acceptability of Nectar was maintained up to fifth months of storags.

Table 3: Organoleptic quality of different recipes of Aonla Nectar.

Recipe No	Pulp (%)	TSS (%)	Acidity (%)	Organoleptic quality	
				Score	Rating
1-T ₁	20	15	0.30	7.16	Liked moderately
2-T ₂	20	13	0.30	8.43	Liked very much
3-T ₃	20	16	0.25	7.29	Liked moderately
4-T ₄	20	18	0.25	7.24	Liked moderately
5-T ₅	20	14	0.30	6.51	Liked slightly
C.D. (P = 0.05)				0.37	

Table 4: Changes in chemical characters during storage studies.

Character	Storage period in months						
	0	1	2	3	4	5	6
TSS (%)	13.00	13.00	13.00	13.42	14.21	14.42	14.80
Acidity (%)	0.30	0.30	0.30	0.30	0.31	0.32	0.34
Ascorbic Acid (mg/100g)	342.64	342.62	340.44	338.38	338.21	338.10	331.02
Browning (O.D)	0.052	0.052	0.059	0.062	0.064	0.068	0.072
Reducing Sugar (%)	14.39	14.44	14.49	14.55	14.62	14.71	14.78
Total carbohydrates (%)	24.20	24.17	24.09	24.05	24.00	23.91	23.87
Organoleptic quality	8.43	8.33	8.21	7.64	7.32	7.21	6.68

REFERENCES

- Amerine, M.A.; Pangborn, R.M. and Roessler, E.B. (1965). *Principles of sensory evaluation of food*. Academic press inc., New York.
- Ashraf, S.M. (1987). Studies on post harvest technology of Jamun (*Syzgium cumunii* Skeels) fruit. *Ph.D. thesis*, N.D.U. & T, Faizabad. (U.P).
- Conn, E.E. and Stumpf, P.K. (1976). *Outlines of biochemistry* Wiley Eastern Ltd., New Delhi.
- Khurdiya, D.S. (1979). Nature and retention of anthocyanin pigment in phalsa (*Grewia subinaequalis*.) juice. *Ph.D. thesis*, IARI, New Delhi.
- Lane, J.H. and Eynon, L. (1923). Determination of reducing sugar by Fehling solution with methylene blue as indicator, *J. Soc. Chem. Inci.*, **42**: 327.
- Raghuramula, H.; Madhavan, Nair, K. and Sundaram, K. (1983). *A manual of Lab technology*. National Institute of Nutrition. ICMR. Hyderabad.
- Ranganna, S. (1986). *Manual of Analysis of Fruit and Vegetable Products*. Tata Mc Graw Hill pub. Co. Ltd., New Delhi.
- Roy, S.K. and Singh, R.N. (1979). Studies on utilization of bael fruit products. *Indian Food Pack.*, **33**; 9-14.
- Sastry, L.W., Satyanarayan, M.N., Srinivasan, M., Subramanian, N. and Subrahmanyam, V. (1966). *Fruit and Vegetable Preservation. J. Sci. Industries. Res.*, **15**: 70-80.
- Siddappa, G.S.; Bhatia, B.S. and Lal, G. (1959). Effect of added ascorbic acid and minerals on browning of Coorg orange juice and squash and model system of ordinary etiolated temperature. *Indian J. Apple Chem.*, **22**: 159.
- Singh, J. (2000). Studies on processing of carambola (*Averrhoa carambola* Linn.) fruit. *M.Sc. thesis*, NDU&T, Faizabad, U.P.