

STUDY OF ORGANOLEPTIC QUALITY ON AONLA MURABBA DURING STORAGE

K.K. Patel, Rajesh Gupta and Venkata Satish Kuchi*

Department of Post Harvest Management,
K.N.K. College of Horticulture, Mandsaur-458 001, India

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ABSTRACT

Firm mature fruits of three aonla cultivars, Kanchan, Chakaiya and NA-7 were selected for the preparation of murabba. Each variety was pretreated with water (control), salt 2%, alum 2% and salt+ alum 2% to evaluate the optimum pretreatment for murabba preparation. Murabba samples were analyzed for organoleptic quality during storage for six months. Variety NA-7 with salt+ alum @ 2% proved to be best. Sensory scores decreased and texture improved during the storage.

Key words: Aonla, Murabba, Overall acceptability, Pretreatments, Varieties of aonla.

INTRODUCTION

Aonla is believed to have been originated in tropical, south eastern Asia, particularly in central and southern India. It is one of the most important minor fruits and a crop of commercial significance. It is also known as Indian gooseberry *amlaki*, *amia*, *amali*, *ambala*, *nelli*, etc. Its importance lies in its high richness of vitamin C. It is the second highest source of vitamin C among fruits next only to Barbados cherry. It is prolific and seasonal bearer. Its annual production accounts around 2 lakh metric ton in India (Goyal *et al.*, 2008). It is commercially cultivated in many districts of Madhya Pradesh viz Mandsaur, Neemach, Ratlam, Jabalpur, Jhabua, Bhopal, Betual, Dewas, Hoshangabad, Chindwara, Sheopur, Tikamgarh, Rewa, etc. Fruits of aonla are highly perishable with limited storage period. The fresh fruits are generally not consumed as it is highly acidic and astringent; therefore it is not so popular table fruit. But, it has got great potential in processed forms since, 17% or more of the produced fruit are lost during transport, storage and marketing (Singh *et al.*, 1993). Therefore, modern technologies are needed to reduce the losses. A study was conducted to evaluate the economics of preparation of muraba and the acceptability during its stage.

MATERIALS AND METHODS

Aonla murabba was prepared by processing of freshly harvested matured aonla fruits. The aonla fruits of three cultivars viz., Kanchan (V_1), Chakaiya (V_2) and NA-7 (V_3) were harvested from the Research Farm of College of Horticulture, Mandsaur. Pretreatments with water (control), salt 2%, alum 2% and salt+ alum 2% were done for each variety with three replication. A total of 18 kg aonla (6 kg of each variety) was taken for the experiment. Thus, a total 12 treatment combinations were prepared and stored at room temperature for six months. Aonla murabba was prepared according to the method suggested by Durrani and Verma, (2011). For the packing of aonla murabba rigid glass jars were used. The organoleptic characteristics of the different aonla murabba stored for various time period was done by a panel of 15 judges to assess the acceptability of the products. The evaluation was done on a nine point hedonic scale as given by Ranganna, (1978). The analysis for biochemical parameters of fresh fruits and aonla murabba was done according to the methods suggested by Ranganna, (1978). Completely randomized design was used to test the significance of variation in the data.

*Corresponding author's e-mail: newmoon_9@yahoo.com

Department of Post Harvest Technology, BCKV, Mohanpur, Nadia - 741 252, India.

Significance of the difference in the treatment effect was tested through “F” test.

RESULTS AND DISCUSSION

Nutritive value: Nutritive value of murabba is presented in Table 2. Best quality murabba was prepared from NA-7 variety since it is rich in ascorbic acid and low in total sugars when compared to the other varieties. Data pertaining to physical parameters for the varieties were given in Table 1.

Colour: Colour and appearance of the products is an important parameter because it attracts the eyes of consumer and thus influences the market price. Various varieties and pre-treatments significantly affected the colour of aonla murabba product after storage. Further, the colour value of aonla murabba decreased after 180 days of storage (Table 3). The NA-7 variety resulted in higher colour and appearance value (7.65) whereas minimum in Chakaiya (7.55) after six months of storage. These results agree with the findings of Singh *et al.* (2007) and Singh *et al.* (1993) in aonla. The higher colour score with respect to pretreatments was observed in T₃ (7.58) whereas minimum in T₁ (7.17). Gradual decrease in colour score is expected due to loss in quality and storage stability of product. Temperature plays an important role in inducing certain biochemical changes in the product which leads to discolouration. Similar observations were also reported by Tripathi *et al.* (1988) and, Kumar and Singh (2001) in aonla product, Mehta *et al.* (2005) in galgal peel candy, Geetha *et al.* (2006) and Sahu *et al.* (2011) in aonla preserve.

Flavour: The varieties and pre-treatments had pronounced effect on flavor of fruits. The varieties significantly affected the flavour value on 180 days

of storage (Table 1). At 180 days of storage the maximum flavour value (7.36) was in NA-7 followed by Chakaiya variety (7.35) as compared to minimum (6.99) in Kanchan variety. The treatment T₄ showed higher flavour value (7.71) at the end of storage period as compared to lower value in T₁ (6.86). The maximum value of flavour at the 180 days of storage was found in V₃T₄ (8.13) in aonla murabba whereas the minimum value was found in V₁T₁ (6.36) in aonla murabba. Decomposition of biochemicals and aromatic compounds which impart characteristic flavor may be the cause for decrease in flavor score during storage. Similar observations were also reported by Tripathi *et al.* (1988) in aonla product, Manivarsagan *et al.* (2006) in karonda candy and Sahu *et al.* (2011) in aonla preserve.

Texture: Texture scores of the product increased with the advancement of storage period up to 180 days of storage (Table 4). The maximum texture value (8.61) was observed in T₄ followed by T₂ (8.14) and T₃ (7.95) as compared to minimum (7.71) in T₁ after 180 days of storage. The interaction effect of various varieties and pre-treatments on texture was found to be significant at the beginning of storage and 90 days of storage whereas non-significant on 180 days of storage. Gradual increase in texture score of aonla product was caused by maximum syrup influx in to the fruits. Similar findings were reported by Tripathi *et al.* (1988) in aonla product, Mehta *et al.* (2005) in galgal peel candy and Manivarsagan *et al.* (2006) in karonda candy.

Overall acceptability: Overall acceptability decides the consumer's preference to the product. The pre-treatments exhibited significantly higher

TABLE 1: Physical parameters of aonla varieties

Parameters	Varieties		
	Kanchan	Chakaiya	NA-7
Physical Characteristics			
Skin colour	Light green	Light green	Yellowish green
Average fruit weight (g)	32.3	28.4	42.9
Polar length (cm)	3.36	3.41	3.58
Diameter (cm)	4.00	4.10	4.20
Specific gravity	01.03	01.04	01.06
Pulp seed ratio	17:1	17:1	18:1
Moisture (%)	87.85	87.8	86.20

TABLE 2: Nutritive value of fresh fruits and aonla murabba

Parameters	Kanchan		Chakaiya		NA-7	
	Fruits	Murabba	Fruits	Murabba	Fruits	Murabba
Chemical Characteristics						
TSS ($^{\circ}$ Brix)	9.50	53.00	10.20	54.75	10.96	55.21
Ascorbic acid (mg/100g)	512.5	102.16	634.3	133.60	733.63	158.70
Acidity (%)	1.20	0.734	1.50	0.796	1.95	0.789
Total sugars (%)	15.51	54.85	15.02	51.13	12.30	48.74
Fiber (%)	1.50	1.25	1.93	1.55	1.33	1.15

TABLE 3: Effect of aonla varieties, pre-treatments and their interaction on colour and flavour of aonla murabba during storage

Treatments	Colour			Flavour		
	0 days	90 days	180 days	0 days	90 days	180 days
Varieties (V)						
Kanchan (V_1)	7.89	7.55	7.25	8.36	8.16	6.99
Chakaiya (V_2)	8.01	7.61	7.33	8.45	8.16	7.35
NA-7 (V_3)	8.06	7.69	7.60	8.61	8.18	7.36
S.Em. \pm	NS	NS	0.083	NS	NS	0.081
CD at 5%	NS	NS	0.242	NS	NS	0.239
Pre-treatments (T)						
Water (control) (T_1)	7.76	7.50	7.17	8.16	7.76	6.86
Salt (T_2)	8.01	7.61	7.30	8.44	8.26	7.24
Alum (T_3)	8.14	7.76	7.58	8.03	8.18	7.12
Salt + alum (T_4)	8.04	7.60	7.53	9.00	8.46	7.71
S.Em. \pm	0.074	NS	0.090	0.095	0.080	0.946
CD at 5%	0.216	NS	0.263	0.277	0.236	0.276
Treatment combinations						
$V_1 T_1$	7.60	7.26	6.86	7.93	7.52	6.36
$V_1 T_2$	7.93	7.56	7.30	8.53	8.26	7.20
$V_1 T_3$	8.06	7.70	7.46	8.40	8.20	7.03
$V_1 T_4$	7.96	7.66	7.40	8.60	8.36	7.36
$V_2 T_1$	7.80	7.56	7.16	8.26	8.06	7.33
$V_2 T_2$	8.03	7.53	7.20	8.40	8.16	7.33
$V_2 T_3$	8.16	7.73	7.50	8.13	8.10	7.10
$V_2 T_4$	8.06	7.63	7.46	9.00	8.33	7.63
$V_3 T_1$	7.90	7.66	7.50	8.30	7.80	6.70
$V_3 T_2$	8.06	7.73	7.40	8.40	8.36	7.20
$V_3 T_3$	8.20	7.86	7.80	8.36	8.26	7.23
$V_3 T_4$	8.10	7.50	7.73	9.40	8.70	8.13
S.Em. \pm	NS	NS	NS	0.166	0.140	0.163
CD at 5%	NS	NS	NS	0.485	0.408	0.478

NS-NonSignificant

overall acceptability of the product just after preparation as well as after 6 months of storage. The effect of varieties for overall acceptability is found to be significant (Table 2). The higher initial overall acceptability score was obtained in NA-7 (7.64) followed by Chakaiya (7.40) as compared to lower in Kanchan (7.02). Gradual

decrease in organoleptic score of aonla products during storage was observed. Similar findings were reported by Tripathi *et al.* (1988) and, Kumar and Singh (2001) in aonla product, Mehta *et al.*, (2005) in galgal peel candy, Manivasagan *et al.* (2006) in karonda candy and Durrani and Verma (2011) in honey aonla murabba.

TABLE 4: Effect of aonla varieties, pre-treatments and their interaction on texture and overall acceptability of aonla murabba during storage

Treatments	Texture			Overall acceptability		
	0 days	90 days	180 days	0 days	90 days	180 days
Varieties (V)						
Kanchan (V ₁)	6.96	7.46	7.90	8.24	7.65	7.02
Chakaiya (V ₂)	7.33	8.02	8.19	8.38	8.11	7.4
NA-7 (V ₃)	7.40	8.05	8.22	8.48	8.15	7.64
S.Em. \pm	0.086	0.115	0.074	0.079	0.094	0.097
CD at 5%	0.252	0.337	0.216	0.230	0.276	0.285
Pre-treatments (T)						
Water (control) (T ₁)	6.82	7.54	7.71	7.94	7.74	6.91
Salt (T ₂)	7.20	8.07	8.14	8.37	8.15	7.40
Alum (T ₃)	7.18	7.67	7.95	8.22	7.83	7.30
Salt + alum (T ₄)	7.78	8.10	8.61	8.93	8.16	7.81
S.Em. \pm	0.099	0.133	0.085	0.091	0.109	0.113
CD at 5%	0.291	0.390	0.250	0.230	0.319	0.329
Treatment combinations						
V ₁ T ₁	6.43	7.33	7.36	7.66	7.56	6.53
V ₁ T ₂	7.20	8.06	8.16	8.46	8.13	7.26
V ₁ T ₃	7.06	7.13	7.86	8.30	7.36	7.23
V ₁ T ₄	7.23	7.33	8.20	8.53	7.56	7.06
V ₂ T ₁	7.10	8.06	8.00	8.20	8.20	7.16
V ₂ T ₂	7.30	8.00	8.13	8.33	8.06	7.36
V ₂ T ₃	7.16	7.70	7.90	8.06	7.86	7.23
V ₂ T ₄	7.76	8.33	8.73	8.93	8.33	7.83
V ₃ T ₁	6.93	7.23	7.76	7.96	7.46	7.03
V ₃ T ₂	7.10	8.16	8.13	8.33	8.26	7.56
V ₃ T ₃	7.33	8.20	8.10	8.30	8.26	7.43
V ₃ T ₄	8.36	8.63	8.90	9.33	8.60	8.53
S.Em. \pm	0.172	0.231	NS	0.158	0.289	0.195
CD at 5%	0.504	0.675	NS	0.461	0.553	0.571

NS-Non Significant

REFERENCES

- Durrani, A.S. and Verma, S. (2011). Preparation and quality evaluation of honey aonla murabba. *Journal of Industrial Rese Techn.* **1**(1): 40-45.
- Geetha, N.S., Suriender Kumar, Sandooja, J.K. and Rana, G.S. (2006). Effect of osmotic concentration process on biochemical characteristics of aonla preserve during storage. *Haryana J. Hort. Sci.* **35**(3&4): 242-244.
- Goyal, R.K., Patil, R.T., Kingsly, A.R.P., Walia, Himanshu and Kumar, Pradeep. (2008). Status of postharvest technology of aonla-A review. *American J. of Food Technology.* **3** (1): 13-23.
- Kumar, Sanjeev and Singh I.S. (2001). Storage studies of aonla fruit products at ambient temperature. *Prog. Horti.* **33**(2): 169-173.
- Manivasagan, S., Rana, G.S., Kumar, Surinder and Joon, M.S. (2006). Qualitative changes in karonda (*Carissa carandas Linn.*) candy during storage at room temperature. *Haryana J. Hort. Sci.* **35** (1&2):19-21.
- Mehta, Anjali, Ranote, P.S. and Bawa, A.S. (2005). Processing of kandi lemon (Galgal) peel waste for candy making. *Indian. Fd. Pack.*, **54**: 67-74.
- Ranganna, S. (1978). Manual of Analysis of Fruit and Vegetable Products. Tata McGraw-Hill Publisher, New Delhi.
- Sahu, G.D., Singh, P and Singh, A.K. (2010). Studies on the physico-chemical changes in aonla preserve (murabba) of three cultivars during storage. *Res.J. of Agric Sci.* **1**(4):419-425.
- Singh, I.S., Pathak, R.K., Dwivedi, R. and Singh, H.K. (1993). Aonla production and post harvest technology (Bulletin), *Dept. of Horti., N.D. University of Agric. & Technology, Faizabad, U.P.* p-25.
- Singh, N., Saini, A and Gupta, A.K. (2007). Nutritional quality of osmotically dehydrated aonla (*Emblca officinalis Gaertn*) fruit segments. *Indian J. Agric. Biochem.* **20**(2), 89-91.
- Tripathi, V.K., Singh, M.B. and Singh, S. (1988). Studies on comparative compositional changes in different preserved products of aonla (*Emblca officinalis Gaertn.*) var. Banarasi. *Indian Food Packer*, **42**(4): 60-66.