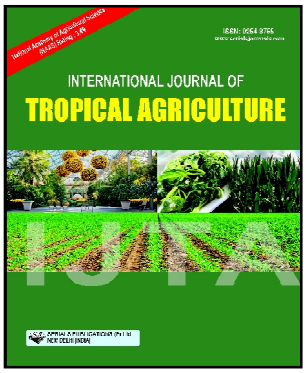


INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at http: www.serialsjournal.com



Volume 35 • Number 4 • 2017

# Studies on Qualitative changes in the Blended Jamun (*Syzygium cuminii* Linn.) and aonla (*Emblica officinalis Gaertn.*) nectar during storage

**A. A. Vaidya, P.P. Relekar and K.H. Pujari**

*Department of Post harvest Management of Fruit, Vegetable and Flower Crops, Post Graduate Institute of Post Harvest Management, Roha- 402116, Raigad, Maharashtra, India*

***Abstract:*** An investigation was undertaken to study the qualitative changes in the blended jamun and aonla nectar during storage. The blended nectar was prepared with different proportions of jamun and aonla juices viz 100:00, 90:10, 80:20, 70:30, 60:40 and 00:100 in the nectar by maintaining 15 $^{0}$B T.S.S., 20 per cent blended juice and 0.28 per cent acidity with 100 ppm sodium benzoate as preservative. Among the chemical parameters, TSS, reducing sugars, total sugars exhibited an increasing trend whereas titratable acidity, ascorbic acid and anthocyanin content of the jamun-aonla blended nectar declined during storage period of 90 days.

***Key words:*** Blended nectar, Jamun, Aonla, Storage

## INTRODSUCTION

Jamun (*Syzygium cuminii* Linn,.), a member of *Myrtaceae* family, is an important minor and dry land fruit of India. Jamun fruits have antioxidant; antibacterial, cardiovascular properties and they are universally accepted to be very good for medicinal purpose especially for curing diabetes because of its effect on the pancreas (Joshi, 2001). Considering the excellent processing qualities of jamun pulp, it is extensively used for the preparation of squashes, jellies, wine, vinegar, juice, etc. (Nawaz, 2010). Good quality jamun juice is excellent for sherbet, syrup and squash (Millar *et al.*, 1955). Aonla, commonly known as Indian Gooseberry (*Emblica officinalis Gaertn.*) belongs to the family Euphorbiaceae and the genus Emblica comprises about 500 species (Bailery, 1917). It is a hardy plant, which grows without much care and thus, an ideal tree for dry regions (Kalra, 1988).

Aonla fruits are well-known for its nutritional and therapeutic values. The fruit is a rich source of vitamin C (600-700mg per 100g of pulp in different varieties) which is present in stable form (Morton, 1987). The consumption of fresh aonla fruits in the country is limited due to its astringent taste. The aonla fruits have been traditionally preserved in the form of *murrumba*, candy, pickle, dehydrated products and used in the preparation of *chyawanprash*. Jamun fruit contains different minerals such as manganese, zinc, iron, calcium, sodium and potassium in an appreciable amount but low in ascorbic acid. The blending of jamun and aonla juice would help to increase the nutraceutical value of jamun beverage. With this view, the present investigation was carried out to study the effect of blending of jamun and aonla juices on the qualitative changes in the blended nectar during storage at ambient condition.

## MATERIAL AND METHDS

Fresh and uniform quality jamun and aonla fruits were procured from local market. Fruits were thoroughly washed with tap water to remove surface dirt and macro flora present on the fruit's surface. Jamun fruits were passed through Jamun pulper to extract the pulp whereas aonla fruits were shredded by using aonla shredder. The juice was then extracted by pressing the jamun pulp and aonla shreds in the basket press. The juices were strained through muslin cloth to get a clean juice free from colloidal particles for the preparation of blended nectar. The blended nectar was prepared with different proportions of jamun and aonla juices i.e. 100:00, 90:10, 80:20, 70:30, 60:40 and 00:100 in the nectar by maintaining $15^0$ B T.S.S., 20 per cent blended juice and 0.28 per cent acidity with 100 ppm sodium benzoate as preservative. The blended nectar was chemically evaluated immediately after preparation and at an interval of 30 days up to 90 days of storage. Total soluble solids were determined using Hand refractometer (Erma Japan, 0-32° Brix). The titratable acidity, ascorbic acid content, reducing and total sugars were estimated by methods suggested by Ranganna (1997). The experiment was laid out in Factorial Completely Randomized Design (FCRD) with three replications and the recorded data were statistically analyzed by the standard procedure given by Panse and Sukhatme (1985).

## RESULTS AND DISCUSSION

The data presented in Table 1 indicate that the mean TSS of the straight jamun or aonla nectar was higher than that of the blended nectar. This could be due to the fact that the aonla juice rich in vitamin C would have helped to slow down the degradative reactions in the blended beverages. A significant increase in the T.S.S. of blended jamun and aonla nectar was noticed during 90 days of storage period irrespective of treatments. This increase in T.S.S might be due to conversion of polysaccharides to sugars during storage. Similar observation was also recorded by Waskar (2003) in pomegranate and kokum blended juices. It is observed from the data presented in Table 1 that the titratable acidity irrespective of the blends was decreased with increase in the storage period. The decrease in acidity might be due to degradation of organic acids and also utilization of acids for inversion of non-reducing sugars into reducing sugars. Similar observations are also recorded by Singh *et al.* (2016) in blended litchi and pineapple nectar.

A gradual increase in the reducing sugar content irrespective of blends was noticed during the storage period of 90 days (Table 2). The increase in reducing sugars of blended nectar might be due to inversion of non-reducing sugars into reducing sugars during storage at ambient condition. Identical observations are recorded by Vidya *et al* (2013) in jamun and karonda beverage. A significant increase in the total sugar content of blended nectar was recorded during the storage period of 3 months. The increase in total sugar content might be due to conversion of polysaccharides into simpler sugars during storage. Similar results are also reported by Nagpal and

**Table 1**
**Changes in T.S.S. ($^0$B) and titratable acidity (%) of blended jamun and aonla nectar during ambient temperature storage conditions**

| *Treatments* | *T.S.S. ($^0$B)* | | | | | *Titratable acidity (%)* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Storage period (Days)* | | | | | *Storage period (Days)* | | | | |
| | *0* | *30* | *60* | *90* | *Mean* | *0* | *30* | *60* | *90* | *Mean* |
| **T1** | 14.98 | 15.25 | 15.45 | 15.80 | 15.37 | 0.283 | 0.275 | 0.270 | 0.262 | 0.272 |
| **T2** | 14.95 | 15.15 | 15.28 | 15.45 | 15.21 | 0.281 | 0.278 | 0.271 | 0.265 | 0.274 |
| **T3** | 14.98 | 15.20 | 15.35 | 15.50 | 15.26 | 0.284 | 0.279 | 0.275 | 0.270 | 0.277 |
| **T4** | 14.98 | 15.18 | 15.40 | 15.60 | 15.29 | 0.286 | 0.280 | 0.275 | 0.271 | 0.278 |
| **T5** | 14.95 | 15.23 | 15.38 | 15.73 | 15.32 | 0.285 | 0.278 | 0.273 | 0.268 | 0.276 |
| **T6** | 14.95 | 15.28 | 15.48 | 15.90 | 15.40 | 0.283 | 0.278 | 0.272 | 0.267 | 0.275 |
| Mean | 14.96 | 15.21 | 15.39 | 15.66 | | 0.284 | 0.278 | 0.273 | 0.267 | |
| | S.Em. ± | | C.D. at 5 % | | | S.Em. ± | C.D. at 5 % | | | |
| Treatment (T) | 0.01 | | 0.04 | | | 0.000 | 0.001 | | | |
| Storage (S) | 0.01 | | 0.05 | | | 0.001 | 0.001 | | | |
| Interaction (T X S) | 0.04 | | 0.10 | | | 0.001 | N.S. | | | |

**T1:** 100 % jamun **T2:** 90% jamun:10% aonla **T3:** 80% jamun:20% aonla
**T4:** 70% jamun: 30% aonla **T5:** 60% jamun: 40% aonla **T6:** 100% aonla

**Table 2**
**Changes in reducing and total sugar (%) content of blended jamun and aonla nectar during ambient temperature storage conditions**

| *Treatments* | *Reducing sugars (%)* | | | | | *Total sugars (%)* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Storage period (Days)* | | | | | *Storage period (Days)* | | | | |
| | *0* | *30* | *60* | *90* | *Mean* | *0* | *30* | *60* | *90* | *Mean* |
| **T1** | 8.73 | 8.93 | 9.08 | 9.18 | 8.98 | 11.41 | 11.52 | 11.64 | 11.78 | 11.58 |
| **T2** | 8.41 | 8.60 | 8.78 | 8.90 | 8.67 | 11.34 | 11.48 | 11.62 | 11.74 | 11.54 |
| **T3** | 8.26 | 8.38 | 8.60 | 8.82 | 8.51 | 11.26 | 11.40 | 11.59 | 11.68 | 11.48 |
| **T4** | 8.23 | 8.36 | 8.46 | 8.58 | 8.41 | 10.98 | 11.22 | 11.41 | 11.60 | 11.30 |
| **T5** | 7.98 | 8.16 | 8.28 | 8.36 | 8.19 | 10.87 | 11.18 | 11.26 | 11.33 | 11.16 |
| **T6** | 8.81 | 8.91 | 9.10 | 9.23 | 9.01 | 11.48 | 11.57 | 11.66 | 11.81 | 11.63 |
| Mean | 8.40 | 8.55 | 8.71 | 8.84 | | 11.22 | 11.39 | 11.53 | 11.65 | |
| | *S.Em. ±* | | *C.D. at 5 %* | | | *S.Em. ±* | *C.D. at 5 %* | | | |
| Treatment (T) | 0.01 | | 0.03 | | | 0.01 | 0.03 | | | |
| Storage (S) | 0.01 | | 0.03 | | | 0.01 | 0.03 | | | |
| Interaction (T X S) | 0.02 | | 0.06 | | | 0.02 | 0.06 | | | |

**T1:** 100 % jamun **T2:** 90% jamun:10% aonla **T3:** 80% jamun:20% aonla
**T4:** 70% jamun: 30% aonla **T5:** 60% jamun: 40% aonla **T6:** 100% aonla

Rajyalakshmi (2009) in blended Ready-To-Serve beverage of bael and citrus fruit.

It is evident from the data presented in Table 3 that the ascorbic acid content of the blended nectar increased with rise in the level of aonla juice in the nectar. All the blends recorded higher ascorbic content and they were significantly superior to straight jamun nectar with respect to the ascorbic acid content in the product. The ascorbic acid content of all the treatments of blended jamun and aonla nectar was decreased up to 90 days of storage period. Singh *et al.* (2005) reported that the decline in ascorbic acid content of nectar during storage could be due to oxidation which results in the formation of dehydro ascorbic acid.

A significant effect of treatments was noticed on the anthocyanin content of blended jamun: aonla nectar. Among the blends, the treatment T2 (90% jamun: 10% aonla) recorded the highest (3.14mg/100g) anthocyanin content. Moreover, it is obvious from the data that the anthocyanin content of the nectar declined with increase in the proportion of aonla juice in the nectar (Table 3). The anthocyanin content in all these blends was decreased up to storage period of 90 days. A decline in the anthocyanin content was also reported by Rashid *et al* (2017) in strawberry based blended squash and they mentioned that the loss of anthocyanin might be due to their high susceptibility to auto-oxidative degradation and due to heat degradation during storage. It is evident from the data presented in Table 3 that the treatments as well as storage period did not show any significant effect on the microbial count of blended nectar and the results were statistically non-significant. Analogues observations were recorded by Reddy and Chikkasubhana (2008). They reported that the lime blended amla squash was free from microbial spoilage during storage period of 90 days.

**Table 3**
**Changes in ascorbic acid (mg/100g), anthocyanin (mg/100g) content and microbial count (cfu/ml) of blended jamun and aonla nectar during ambient temperature storage conditions**

| *Treatments* | *Ascorbic acid (mg/100g)* | | | | | *Anthocyanin (mg/100g)* | | | | | *Microbial count (cfu/ml)* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Storage period (Days)* | | | | | *Storage period (Days)* | | | | | *Storage period (Days)* | | |
| | *0* | *30* | *60* | *90* | *Mean* | *0* | *30* | *60* | *90* | *Mean* | *0* | *90* | *Mean* |
| **T1** | 16.06 | 15.28 | 13.75 | 12.38 | 14.36 | 4.06 | 3.89 | 2.76 | 1.84 | 3.135 | 0 | 0 | 0.00 |
| **T2** | 18.81 | 16.67 | 15.38 | 14.10 | 16.24 | 3.87 | 3.47 | 2.39 | 1.73 | 2.864 | 0 | 0.50 | 0.25 |
| **T3** | 24.65 | 23.40 | 21.41 | 20.50 | 22.49 | 3.32 | 3.11 | 1.94 | 1.51 | 2.468 | 0 | 0.50 | 0.25 |
| **T4** | 30.34 | 27.43 | 25.36 | 23.30 | 26.61 | 2.64 | 2.45 | 1.71 | 1.39 | 2.044 | 0 | 0.50 | 0.25 |
| **T5** | 36.29 | 33.55 | 32.47 | 30.75 | 33.26 | 2.53 | 2.34 | 1.48 | 1.24 | 1.895 | 0 | 0.75 | 0.38 |
| **T6** | 69.46 | 66.95 | 64.66 | 63.15 | 66.05 | 2.09 | 1.95 | 1.20 | 1.03 | 1.564 | 0 | 0.75 | 0.38 |
| Mean | 32.60 | 30.55 | 28.84 | 27.36 | | 3.086 | 2.865 | 1.911 | 1.452 | | 0 | 1.0 | |
| | *S.Em. ±* | | *C.D. at 5%* | | | *S.Em. ±* | | *C.D. at 5%* | | | *S.Em.±* | *C.D. at 5%* | |
| Treatment (T) | 0.70 | | 1.98 | | | 0.001 | | 0.003 | | | 0.19 | NS | |
| Storage (S) | 0.86 | | 2.43 | | | 0.001 | | 0.004 | | | 0.11 | NS | |
| Interaction (T X S) | 1.72 | | N.S. | | | 0.003 | | 0.009 | | | 0.26 | NS | |

**T1:** 100 % jamun **T2:** 90% jamun:10% aonla **T3:** 80% jamun:20% aonla
**T4:** 70% jamun: 30% aonla **T5:** 60% jamun: 40% aonla **T6:** 100% aonla

## LITERATURE CITED


Joshi, S.G. (2001), Medicinal plants, New Delhi, Oxford and IBH Publishing Co.

Bailery, L.H (1917), The standard cyclopedia of Horticulture, The Mac Million Co., London, pp. 34.

Kalra, C.L. (1988), The chemistry and technology of aonla (*Phyllanthus emblica* L.) a resume, *Indian Food Packer*, 38(4): 67.

Miller, C.D, Bazore K. and Bartow M. (1955), Fruits of Hawaii. 2nd ed. Univ. of Hawaii Press

Morton, J.F. (1964), Jamun is a minor fruit crop. *Proc. Fla. St. Hort. Soc.* **76**: 328-38.

Nagpal and P. Rajyalakshmi (2009), Quality and storage of RTS beverage from bael and citrus fruit blends. *Beverage & Food World,* 36(2): 24-26.

Nawaz, M.S. (2010), Determination of mineral elements in Jamun fruit *(Eugenia jambolana)* products. *Pakistan J. of Food Sci*., 20: 1-7.

Panase, V.G and P.V. Sukhatme (1985), Statistical methods for Agricultural workers, I.C.A.R New Delhi.

Ranganna, S. (1997), Manual of analysis of fruit and vegetable products. Tata Mc Graw hill Publishing Company Ltd., New Delhi.

Rashad Aahmad Sherzad, K.N. Sreenivas, H.C. Krishna, H. Mohamad Tayeeb Ulla and M. Gulab Omari (2017), Valorization of strawberry (*Fragaria ananassa*) based blended squash beverage with muskmelon, grape, ginger and lime during storage, *International Journal of Agricultural Science and Research,* 7(1): 465-474.

Reddy A.H. and Chikkasubbanna V. (2008), Standardization of recipe and storage Behaviour of lime blended amla squash.*The asian Journal of Horticulture*, 3(2) : 203-207.

Singh, J., A.K. Singh and H.K. Singh (2005), Evaluation of Pomegranate (*Punica granatum L.*) varieties for nectar making. Beverage & Food World, 32(3): 46-47.

Singh Balveer, Chakarborty IVI and Marak Dombewarisa S. (2016), Studies on blending nectar beverage in different ratio of litchi and pineapple juice. *International Journal of Agriculture Sciences*, 8(52):2504-2507.

Vidya Mhapralkar, P.P. Relekar, P.M. Haldankar, K.H. Pujari and D.J. Dabke (2013), Studies on preparation and storage of unfermented beverages of jamun (*Syzygium cuminii* Linn. Skeels) fruits. *Green Farming*, 4(3): 373.

Waskar, D.P. (2003), Studies on blending of pomegranate and kokum juice. *Beverage and Food World* June : 27-28.