

## Effect of Blending on Colour and Sensory Qualities of Blended Jamun: Aonla 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, Raigad, Maharashtra  
email : p\_relekar2007@rediffmail.com

### ABSTRACT

An investigation was carried out to study the effect of blending on colour and sensory qualities of blended jamun: aonla nectar during storage at the Department of Post Harvest Management, P.G. Institute of Post harvest Management, Killa-Roha, Dist. Raigad (M.S.). 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. The  $a^*$  value for colour of blended nectar was significantly more than that of straight aonla nectar. A linear increase in the  $L^*$  and  $b^*$  value for colour with decline in the  $a^*$  value of the product irrespective of the treatments was noticed during storage period of 90 days at ambient conditions. Among the different blends, the jamun and aonla juice in 70:30 proportion was found to be the best combination with respect to the sensory qualities like colour, flavour and overall acceptability of the blended jamun nectar.

**Key words** Jamun, Aonla, Blended nectar, Colour, Sensory qualities

Jamun (*Syzygium cumini* Linn.) is one of the important underutilized fruit crops grown in India which belongs to family *Myrtaceae*. Jamun fruits are known for their medicinal value and it is highly useful against bleeding piles, correcting liver disorders, jaundice, kidney stone, asthma, blood pressure, etc. (Joshi, 2001). The ripe Jamun fruits are usually characterized with edible portion varying from 50 to 92.30 per cent, with 10 to 18° Brix total soluble solids and 0.14 to 2.17 per cent acidity (Daware *et al.*, 1985). The jamun fruits possess very good processing qualities and are used for the preparation of different value added products such as squashes, jellies, wine, vinegar, juice, etc. (Nawaz, 2010). Aonla (*Emblica officinalis* Gaertn.), a member of the family *euphorbiaceae* is another dry land fruit crops which is also known for its nutritional and medicinal value. Aonla fruit is a rich source of vitamin C ranging from 600 to 700mg per 100g of pulp in different varieties. The different value added products such as *murrumba*, candy, pickle, dehydrated aonla, *chyawanprash* are prepared from aonla fruits traditionally. As aonla fruit is acidic as well as astringent in taste, the consumption of fresh aonla fruits is generally not preferred and therefore, blending it with other fruit juices is thought to be a

convenient alternative for utilizing them in developing some value added beverages. Jamun nectar blended with aonla juice would help to increase the nutritive value and sensory qualities of the beverage. Keeping this in view, the studies were conducted to assess the effect of blending of jamun and aonla juices on the colour and sensory qualities of the blended nectar during storage at ambient condition.

### MATERIAL AND METHODS

The healthy and uniform quality jamun and aonla fruits procured from local market were thoroughly washed to remove surface dirt and dust. Jamun fruits were then passed through jamun pulper and the jamun pulp was extracted whereas aonla fruits were shredded by using aonla shredder. Both the juices were extracted by pressing jamun pulp and aonla shreds in the basket press and the juice extracted was then clarified through muslin cloth to get clear juice. The blended nectar was prepared with different proportions of jamun and aonla juices such as 100:00, 90:10, 80:20, 70:30, 60:40 and 00:100 in the nectar by maintaining 15° B T.S.S., 20 per cent blended juice and 0.28 per cent acidity with 100 ppm sodium benzoate as preservative. Prior to the preparation of blended nectar, the clarified fresh jamun and aonla juices were analysed for their physico-chemical qualities such as colour, TSS, titratable acidity, reducing sugars, total sugars and ascorbic acid by using the methods described by Ranganna, (1997). The colour in terms of  $L^*$ ,  $a^*$  and  $b^*$  values of jamun and aonla juice as well as the blended nectar was determined by using colorimeter (make Konica Minolta, Japan). The product was evaluated for its organoleptic qualities like colour, flavour and overall acceptability on a hedonic scale (Amerine *et al.*, 1965). The changes in the colour values and the organoleptic qualities were studied at an interval of 30 days for a period of three months. The experiment was laid out in Factorial Completely Randomized Design (FCRD) with four 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 the Table 1 indicate that the  $a^*$  and  $b^*$  values for colour of jamun fruit juice were higher than that of the aonla juices due to deep pink colour of jamun juice, rich in anthocyanin pigments. Moreover, the  $L^*$  value for colour of aonla fruit juice was higher than that of the jamun fruit juice. The average total soluble solids

**Table 1. Physico-chemical composition of fresh jamun (*Syzygium cumini* Linn.) and aonla (*Emblca officinalis* Gaertn.) juice**

Sr.No.	Parameters	Fruits	
		Jamun	Aonla
<b>A</b>	<b>Physical parameters</b>	<b>Mean*</b>	
	<b>Colour</b>		
1	L*value for colour	20.6	23.4
2	a*value for colour	8.8	3.21
3	b*value for colour	7.1	5.3
<b>B</b>	<b>Chemical parameters</b>		
1	T.S.S ( <sup>0</sup> B)	11.4	8.5
2	Acidity (%)	0.814	1.96
3	Reducing sugars (%)	6.95	3.39
4	Total sugars (%)	8.65	4.81
5	Ascorbic acid (mg/100g)	18.2	418.6

**Table 2. Effect of blending on L\* and a\* value for colour of blended jamun: aonla nectar during storage**

Treatments	L* value for colour					a* value for colour				
	Storage period (Days)					Storage period (Days)				
	0	30	60	90	Mean	0	30	60	90	Mean
<b>T1</b>	18.50	19.03	19.20	19.35	19.02	8.45	5.23	4.18	3.80	5.41
<b>T2</b>	18.20	18.85	19.40	19.60	19.01	8.68	5.15	4.15	3.78	5.44
<b>T3</b>	18.45	19.50	19.63	19.80	19.34	8.40	4.13	3.83	3.70	5.01
<b>T4</b>	17.55	19.43	19.58	19.75	19.08	9.73	5.65	3.93	3.60	5.73
<b>T5</b>	17.95	19.78	19.90	20.05	19.42	9.65	4.95	3.25	2.70	5.14
<b>T6</b>	22.00	22.30	22.43	22.75	22.37	2.65	1.75	1.45	1.15	1.75
Mean	18.78	19.81	20.02	20.22		7.93	4.48	3.46	3.12	
	S.Em. ±		C.D. at 5 %			S.Em. ±		C.D. at 5 %		
Treatment (T)	0.02		0.06			0.03		0.07		
Storage (S)	0.03		0.07			0.03		0.09		
Interaction (T X S)	0.05		0.15			0.06		0.18		

**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 3. Effect of blending on b\* value for colour of blended jamun: aonla nectar during storage**

Treatments	b* value for colour				
	Storage period (Days)				
	0	30	60	90	Mean
T1	6.45	7.25	7.70	8.53	7.48
T2	6.28	7.13	7.80	8.45	7.41
T3	6.15	6.90	7.48	8.15	7.17
T4	4.50	6.48	6.80	6.93	6.18
T5	4.35	5.43	6.30	7.43	5.88
T6	5.13	5.65	5.98	6.55	5.83
Mean	5.48	6.47	7.01	7.67	
	S.Em. ±		C.D. at 5 %		
Treatment (T)	0.03		0.08		
Storage (S)	0.04		0.10		
Interaction (T X S)	0.07		0.20		

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 4. Effect of blending on sensory qualities (colour and flavour) of blended jamun: aonla nectar during storage**

Treatments	Sensory score for colour					Sensory score for flavour				
	Storage period (Days)					Storage period (Days)				
	0	30	60	90	Mean	0	30	60	90	Mean
T1	7.43	7.30	7.18	7.05	7.24	7.75	7.38	7.00	6.75	7.22
T2	6.68	6.45	6.23	5.88	6.31	7.25	6.95	6.55	6.45	6.80
T3	7.08	6.85	6.55	6.40	6.72	7.20	6.75	6.43	6.18	6.64
T4	7.68	7.55	7.15	6.88	7.31	8.25	7.75	7.23	6.88	7.53
T5	7.58	7.33	6.88	6.75	7.13	8.05	7.45	7.18	6.50	7.29
T6	7.43	7.30	7.18	7.05	7.24	7.63	7.40	7.00	6.75	7.19
Mean	7.31	7.13	6.86	6.67		7.69	7.28	6.90	6.58	
	S.Em. ±		C.D. at 5 %			S.Em. ±		C.D. at 5 %		
Treatment (T)	0.04		0.12			0.07		0.20		
Storage (S)	0.03		0.10			0.06		0.16		
Interaction (T X S)	0.08		NS			0.14		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

**Table 5. Effect of blending on sensory qualities (overall acceptability) of blended jamun: aonla nectar during storage**

Treatments	Sensory score for overall acceptability				
	Storage period (Days)				
	0	30	60	90	Mean
<b>T1</b>	7.59	7.34	7.09	6.90	7.23
<b>T2</b>	6.96	6.70	6.39	6.16	6.55
<b>T3</b>	7.14	6.80	6.49	6.29	6.68
<b>T4</b>	7.96	7.65	7.19	6.88	7.42
<b>T5</b>	7.81	7.39	7.03	6.63	7.21
<b>T6</b>	7.53	7.35	7.09	6.90	7.22
Mean	7.50	7.20	6.88	6.63	
	S.Em. ±		C.D. at 5 %		
Treatment (T)	0.04		0.19		
Storage (S)	0.03		0.10		
Interaction (T X S)	0.08		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

content in jamun fruit juice was 11.4° B. The mean titratable acidity, reducing and total sugar content in jamun fruit juice was 0.814, 6.95 and 8.65 per cent, respectively. The mean ascorbic acid content was 18.2 mg/100 g of jamun fruit juice. On the contrary, the total soluble solids content in aonla juice was 8.5° B with 1.96, 3.39 and 4.81 per cent titratable acidity, reducing and total sugar content, respectively. The mean ascorbic acid content in aonla juice was 418.6 mg/100 g.

Among the different blends, the L\* for the colour varied from 19.01 to 19.42 which was significantly lower than straight aonla nectar (T6). It is clear from the data presented in Table 2 that the a\* value for colour of blended nectar was significantly more than that of straight aonla nectar due to higher proportion of jamun juice rich in colour pigments. The highest b\* value (7.48) was recorded in the treatment T1 which was at par with T2 (7.41) but significantly superior to rest of the treatments. A linear increase in the L\* and b\* value for colour with decline in the a\* value of the product irrespective of the treatments was noticed during storage period of 90 days at ambient conditions. The changes in the colour values of the blended nectar were probably occurred due to the oxidative and enzymatic reactions during storage. The degradation of colour pigments during storage might have resulted into decrease in the a\* value with rise in the L\* and b\* value for colour of the product. Identical observations to this finding are also reported by Kiattisak *et al.* (2004) while studying the colour appearance of fruit juice affected by vitamin C, Patil (2013) in beet root (*Beta vulgaris*) juice and Wissanee and Renu (2007) in orange juices Cv. Sai Nam Pung.

A significant effect of treatments on the sensory score for colour of blended jamun: aonla was noticed during storage (Table 4). The highest colour score (7.31) was recorded by the treatment T4 which was at par with the treatments T6 and T1. The lowest (6.31) colour score was recorded in the blend T2, followed by T3 (6.72) and T5 (7.13). The nectar with 70:30 ratio of jamun and aonla juice (T4) exhibited better retention of the attractive purplish pink colour of the nectar which was comparatively as good as that of the straight jamun nectar (T1). The sensory score for colour of the product decreased significantly up to 90 days of storage at ambient conditions. The decrease in the colour score might be due to high rate of oxidative reactions at room temperature as well as less retention of antioxidants.

The sensory score for flavour of the blended nectar was influenced by the treatments. More retention of jamun flavour in the nectar was noticed when it was blended with aonla juice in ratio of 70:30 (T4). The sensory score for flavour decreased significantly during 90 days of storage. The decrease in flavour score might be due to oxidative reactions responsible for the degradation of the flavouring compounds during storage. Identical results are also reported by Sharma (2009) in blended guava-jamun RTS drink and squash.

Among the treatments, the highest (7.42) overall acceptability score was recorded by the nectar blend with 70:30 ratio of jamun and aonla juice and it was statistically superior to all other treatments (Table 5). The sensory score for overall acceptability decreased significantly during the storage period of 90 days. Similar results are recorded by Tandon *et al.*, (2007) in blended bael-papaya RTS beverage;

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

## CONCLUSION

The results of the present investigation indicate that the L\* and b\* value for the colour of the blended nectar increased with decline in the a\* value irrespective of the treatments during storage period of 90 days at ambient conditions. Among the different blends, the jamun and aonla juice in 70:30 proportions was found to be the best combination with respect to the sensory qualities like colour, flavour and overall acceptability of the blended jamun nectar.

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Received on 16-11-2017 Accepted on 19-11-2017