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Physico-chemical character, sensory quality and storage behavior of rose apple nectar blended with *jamun*

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Abstract : Rose apple is one of the underutilized minor fruit crop. Research was carried out to develop nectar by blending rose apple and jamun in three different proportions of 75:25, 50:50 and 25:75 (rose apple : jamun). Nectar containing 20 per cent blended juice (50: 50 per cent juice of rose apple and jamun, respectively), 20 per cent TSS and 0.5 per cent acidity was found to be more acceptable with good organoleptic scores. Various physico chemical parameters were studied during the three months of storage where TSS content, total sugars and reducing sugar had increasing trend whereas ascorbic acid and non reducing sugar had decreasing trend. Decrease in acidity was in corresponding increase in pH. The product was free from spoilage during the storage period

Key words : *Jamun*, Juice, Physico-chemical

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Rose apple (*Syzygium jambos* Alston) is one of the underutilized fruit, belongs to family Myrtaceae. Fruit contains protein- 0.7g, fat- 0.2g, and fibre-1.2 g, minerals like calcium-10 mg, magnesium-4 mg, phosphorus-13 mg and iron-0.5 mg per 100g of pulp. It also possess vitamin-A, thiamine, riboflavin, nicotinic acid and vitamin-C. Crisp fleshed and rose scented fruits are like small apple.

In India fruit is regarded as a tonic for the brain and liver. An infusion of fruit acts as a diuretic. This is also employed against diarrhea, dysentery and also beneficial against diabetes. The seeds also have an antiseptic property.

RESEARCH METHODS

The research was carried out at the Undergraduate Processing Laboratory at the Department of Horticulture, Gandhi Krishi Vigyan Kendra, University of Agricultural Sciences, Bangalore.

For rose apple juice, selected fruits were washed with clean water and boiled for five minutes with an equal amount of water; it was added to reduce enzymatic browning of juice. The pulp was then fed into a warring

blender for mashing into fine texture using the same boiled water. Jamun fruits were thoroughly washed in clean water. Pulp was extracted by squeezing the fruits manually and outer skin was removed. The squeezed pulp was diluted with the water in 1:1 ratio and mixed thoroughly and the juice was filtered by squeezing through the muslin cloth. Thus, the extracted pulp was used for preparation of products.

For nectar, recipes were prepared using 20 per cent pulp with three different proportions of juices of rose apple and jamun *i.e.*, 75:25, 50:50 and 25:75, respectively with TSS of 15 and 20 per cent and 0.5 per cent acidity.

Preparation of products and chemical analysis:

Rose apple nectar blended with jamun:

The nectar was prepared by blends of rose apple and jamun juices in 3 different proportions.

Sugar syrup of 15°B and 20°B total soluble solids were prepared by dissolving sucrose into warm water and the required amount of blended juice was added to two sets of these solutions as per the experimental details. TSS values were re-adjusted by addition of sucrose while

acidity was adjusted by adding citric acid. Sodium benzoate was added at the rate of 120 ppm per litre as a preservative to the product. Then the final product was filtered with muslin cloth and was filled into pre-sterilized glass bottles of 200 ml capacity each. The bottles were corked using crown corking machine followed by pasteurization by holding them in boiling water and later were stored at room temperature.

The products were tested for chemical parameters *i.e.* pH, TSS, titratable acidity, ascorbic acid and sugars just after preparation and subsequently at thirty days interval up to ninety days. Sensory evaluation of the products was done according to five scale hedonic ratio scale (Ranganna, 1977).

Treatments:

- N₁T₁: 20 per cent juice (75 % rose apple: 25 % jamun), 15 per cent TSS and 0.5 acidity
- N₁T₂: 20 per cent juice (75 % rose apple: 25 % jamun), 20 per cent TSS and 0.5 acidity
- N₂T₁: 20 per cent juice (50 % rose apple: 50 % jamun), 15 per cent TSS and 0.5 acidity

- N₂T₂: 20 per cent juice (50 % rose apple: 50 % jamun), 20 per cent TSS and 0.5 acidity
- N₃T₁: 20 per cent juice (25 % rose apple: 75 % jamun), 15 per cent TSS and 0.5 acidity
- N₃T₂: 20 per cent juice (25 % rose apple: 75 % jamun), 20 per cent TSS and 0.5 acidity

RESEARCH FINDINGS AND DISCUSSION

Increasing trend of total soluble solids content was noticed in the products during storage. Maximum increase in total soluble solids level during the storage period of 90 days was observed in treatment N₃T₁ (75: 25 per cent blended juice of jamun and rose apple juice, respectively and 15 per cent TSS) as shown in Table 1. This increase might be due to hydrolysis of polysaccharides. pH of the prepared product showed an increasing trend during storage (Table 1). After 90 days of storage the highest pH of 4.97 was found in treatment N₁T₂ (75: 25 per cent blended juice of rose apple and jamun, respectively and 20 % TSS) (Sreelakshmi 1999).

Acidity of the prepared product significantly decreased at during the storage. The maximum reduction

Table 1 : Changes in total soluble solids (%), pH, ascorbic acid (mg/100g) and Acidity (%) in rose apple nectar blended with jamun during storage

Factors	TSS (%)				pH				Ascorbic acid (mg/100g)				Acidity (%)			
	Fresh	30	60	90	Fresh	30	60	90	Fresh	30	60	90	Fresh	30	60	90
	days	days	days	days	days	days	days	days	days	days	days	days	days	days	days	days
Juice (20%) (Rose apple: Jamun)																
75:25 (N ₁)	17.50	18.17	18.97	19.58	4.28	4.54	4.76	4.91	21.62	19.29	16.47	14.60	0.50	0.37	0.27	0.15
50:50 (N ₂)	17.50	18.28	19.22	19.68	4.18	4.29	4.46	4.74	21.76	19.39	16.86	14.82	0.50	0.37	0.27	0.17
25:75(N ₃)	17.50	18.38	19.36	19.88	4.13	4.23	4.37	4.58	21.97	19.52	16.98	14.96	0.50	0.40	0.31	0.19
F test		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.00	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.006	0.009	0.008	0.00	0.003	0.003	0.002
C.D.(P=0.05)	0.00	0.06	0.06	0.07	0.04	0.03	0.03	0.03	0.03	0.019	0.028	0.022	0.00	0.009	0.01	0.006
TSS (%)																
15 (T ₁)	15.00	15.87	16.71	17.45	4.13	4.29	4.46	4.71	21.36	19.03	16.62	14.70	0.50	0.41	0.30	0.17
20 (T ₂)	20.00	20.69	21.65	21.98	4.26	4.42	4.60	4.77	22.20	19.77	16.92	14.89	0.50	0.36	0.26	0.16
F test		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.00	0.01	0.01	0.020	0.01	0.01	0.01	0.01	0.01	0.005	0.008	0.006	0.00	0.002	0.003	0.002
C.D.(P=0.05)	0.00	0.05	0.05	0.058	0.04	0.03	0.026	0.03	0.03	0.015	0.023	0.018	0.00	0.007	0.008	0.005
Interaction																
N ₁ T ₁	15.00	15.80	16.55	17.25	4.20	4.45	4.67	4.85	21.22	18.94	16.10	14.49	0.50	0.39	0.28	0.16
N ₁ T ₂	20.00	20.55	21.40	21.92	4.36	4.64	4.86	4.97	22.03	19.65	16.83	14.72	0.50	0.36	0.26	0.13
N ₂ T ₁	15.00	15.90	16.75	17.37	4.11	4.24	4.39	4.72	21.37	19.01	16.82	14.75	0.50	0.41	0.31	0.18
N ₂ T ₂	20.00	20.67	21.70	22.00	4.25	4.35	4.52	4.76	22.14	19.77	16.91	14.90	0.50	0.33	0.24	0.16
N ₃ T ₁	15.00	15.92	16.85	17.75	4.08	4.20	4.32	4.57	21.49	19.15	16.94	14.86	0.50	0.42	0.32	0.19
N ₃ T ₂	20.00	20.85	21.87	22.02	4.19	4.27	4.41	4.59	22.44	19.88	17.03	15.07	0.50	0.39	0.29	0.18
F test	-	*	*	*	NS	*	*	*	*	*	*	*	-	*	*	*
S.E. ±	0.00	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.009	0.01	0.011	0.00	0.004	0.005	0.003
C.D.(P=0.05)	0.00	0.09	0.09	0.10	0.00	0.05	0.04	0.05	0.05	0.02	0.03	0.03	0.00	0.01	0.01	0.001

*-Significant @ 5 %, NS= Non-significant

in acidity was found in treatment N₁T₂ (75: 25 per cent blended juice of rose apple and jamun, respectively and 20 % TSS) *i.e.*, from 0.5 to 0.13 per cent during 90 days of storage (Table 1). This might be due to acid hydrolysis of polysaccharides. Analogous results were reported in amla juice (Gajanana, 2002).The ascorbic acid content decreased during the entire storage period. However, the treatment N₃T₂ (75: 25 per cent blended juice of jamun and rose apple, respectively and 20% TSS) recorded maximum ascorbic acid content of 22.44 mg/100 g initially, which declined to 15.07 mg/100 g after 90 days of storage. This might be due to the effect of storage temperature

and catalytic activity of fructose (Brock *et al.*, 1998).

After 90 days storage maximum total sugars (15.86) and reducing sugar (11.99) content was found in treatment N₃T₂ (75: 25 per cent blended juice of jamun and rose apple juice, respectively and 20% TSS) (Table 2). Similar results were reported by Gajanana (2002) in aonla juice. There was a continuous reduction in non-reducing sugar content of nectar throughout the storage period; the maximum reduction (3.85%) of non-reducing sugar content was noticed in treatment N₂T₂ (50: 50 per cent blended juice of rose apple and jamun, respectively and 20% TSS). This increase in reducing, total sugars and

Table 2 : Changes in total sugars (%), reducing sugar (%) and non reducing sugar (%) in rose apple nectar blended with jamun during storage

Factors	Total sugars (%)				Reducing sugar (%)				Non reducing sugar (%)			
	Fresh	30 Days	60 Days	90 Days	Fresh	30 Days	60 Days	90 Days	Fresh	30 Days	60 Days	90 Days
Juice (20 %) (Rose apple: Jamun)												
75:25 (N ₁)	12.80	12.92	13.05	13.19	5.39	7.62	9.53	10.87	7.41	5.30	3.51	2.32
50:50 (N ₂)	12.92	13.06	13.19	13.31	5.45	7.69	9.58	10.93	7.47	5.37	3.61	2.38
25:75(N ₃)	12.97	13.16	13.27	13.39	5.51	7.77	9.64	10.98	7.48	5.38	3.63	2.40
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.016	0.003	0.003	0.003	0.002	0.003	0.003	0.002	0.004	0.004	0.004	0.003
C.D. (P=0.05)	0.04	0.009	0.008	0.008	0.006	0.008	0.009	0.007	0.013	0.012	0.013	0.008
TSS (%)												
40 (T ₁)	10.35	10.50	10.64	10.79	4.72	6.92	8.48	9.90	5.63	3.57	2.16	0.89
45 (T ₂)	15.45	15.60	15.70	15.80	6.18	8.47	10.68	11.95	9.28	7.13	5.02	3.84
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.013	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.003	0.003	0.002
C.D. (P=0.05)	0.03	0.007	0.007	0.007	0.005	0.007	0.007	0.006	0.011	0.009	0.010	0.006
Interaction												
N ₁ T ₁	10.21	10.32	10.47	10.63	4.65	6.82	8.41	9.82	5.55	3.50	2.06	0.82
N ₁ T ₂	15.39	15.53	15.62	15.75	6.12	8.42	10.65	11.92	9.26	7.11	4.97	3.82
N ₂ T ₁	10.38	10.52	10.67	10.82	4.72	6.93	8.48	9.91	5.66	3.59	2.19	0.90
N ₂ T ₂	15.47	15.60	15.71	15.81	6.17	8.45	10.67	11.95	9.28	7.15	5.04	3.85
N ₃ T ₁	10.46	10.64	10.79	10.92	4.78	7.02	8.56	9.98	5.67	3.62	2.23	0.94
N ₃ T ₂	15.49	15.68	15.76	15.86	6.24	8.53	10.71	11.99	9.29	7.14	5.04	3.86
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.022	0.004	0.004	0.004	0.003	0.004	0.004	0.003	0.006	0.005	0.006	0.004
C.D. (P=0.05)	0.06	0.012	0.011	0.011	0.008	0.012	0.013	0.010	0.019	0.016	0.018	0.011

*-Significant @ 5 %, NS- Non-significant

Table 3 : Mean sensory scores of rose apple nectar blended with jamun

Treatments	Appearance	Aroma and flavour	Taste	Overall acceptability
N ₁ T ₁ : 20% juice (75 % rose apple: 25 % jamun) and 15% TSS	3.86	3.83	3.60	3.68
N ₁ T ₂ : 20% juice (75 % rose apple: 25 % jamun) and 20% TSS	3.94	3.93	3.82	3.89
N ₂ T ₁ : 20% juice (50 % rose apple: 50 % jamun) and 15% TSS	4.63	4.36	4.40	4.35
N ₂ T ₂ : 20% juice (50 % rose apple: 50 % jamun) and 20% TSS	4.72	4.40	4.40	4.57
N ₃ T ₁ : 20% juice (25 % rose apple: 75 % jamun) and 15% TSS	4.95	3.91	3.85	3.93
N ₃ T ₂ : 20% juice (25 % rose apple: 75 % jamun) and 20% TSS	4.97	4.06	3.87	4.04

decrease in non reducing sugars may due to acid hydrolysis of polysaccharides.

The prepared product was subjected to organoleptic evaluation after 90 days of storage (Table 3). Highest score of 4.57 was observed in treatment combination N₂T₂ (50: 50 per cent blended juice of rose apple and jamun, respectively and 20% TSS). This might be due to better consistency and sugar acid blend. Sreelakshmi (1999) made similar observation in simsruba value added products.

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