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RESEARCH PAPER

Physico-chemical character, sensory quality and storage behaviour of rose apple RTS blended with jamun

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SUMMARY :

Rose apple is one of the underutilized minor fruit crop. Research was carried out to develop RTS by blending rose apple and jamun in three different proportions of 75:25, 50:50 and 25:75 (rose apple : jamun). Nectar containing 10 per cent blended juice (50: 50 % 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 : Physico-chemical character, Sensory quality, Storage behaviour, Rose apple, Jamun

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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, magnecium-4 mg, phosphorus-13 mg and iron-0.5 mg per 100g of pulp. It also posses 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 diarrhoea, dyscentry and also beneficial against diabetes. The seeds also have an antiseptic property.

EXPERIMENTAL METHODS

The research was carried out at the Undergraduate Processing Laboratory at the Department of Horticulture, University of Agricultural Sciences, G.K.V.K., 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 RTS recipes were prepared using 10 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 RTS was prepared by blends of rose apple and jamun juices in 3 different proportions.

Sugar syrup of 15^0B and 20^0B 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 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 TSS was analyzed by using digital refractometer, titrable acidity, sugars and vitamin-C were estimated by using Ranganna (1977) method. Organoleptic evaluation of the product was done by a panel of 20 judges by numerical scoring method (Amerine *et al.*, 1965).

Treatments:

J_1T_1: 10% juice (75 % rose apple: 25 % jamun) , 15% TSS and 0.5 acidity

J_1T_2: 10% juice (75 % rose apple: 25 % jamun), 20% TSS and 0.5 acidity

J_2T_1: 10% juice (50 % rose apple: 50 % jamun),15% TSS and 0.5 acidity

J_2T_2: 10% juice (50 % rose apple: 50 % jamun), 20% TSS and 0.5 acidity

J_3T_1: 10% juice (25 % rose apple: 75 % jamun), 15% TSS and 0.5 acidity

J_3T_2: 10% juice (25 % rose apple: 75 % jamun), 20% TSS and 0.5 acidity.

EXPERIMENTAL FINDINGS AND ANALYSIS

The results of the present study as well as relevant discussions have been presented under following sub heads:

Storage studies:

The samples of the product were analyzed for the changes in their chemical constituents like TSS, pH, titratable acidity, ascorbic acid and sugars during 90 days of storage.

Total soluble solids (%):

A continuous increasing trend was observed in TSS throughout the storage period (Table 1). Differences were significant at various TSS and juice levels. Interaction effect was also significant at all stages of storage. Maximum increase (3.93 %) in TSS was observed in the treatment J_3T_1 (75: 25 per cent blended juice of jamun and rose apple, respectively and15% TSS).

pH:

Blended RTS beverage exhibited an increasing trend in pH during the storage period (Table 1). Both significant as well as non-significant differences were observed at various concentrations of juice and TSS. Their interaction effect revealed that treatments were significantly different at all stages of storage except for the fresh values. Maximum increase (0.87) was observed in treatment J_1T_2 (75: 25 per cent blended juice of rose apple and jamun, respectively and 20% TSS).

Ascorbic acid (mg/100g):

Ascorbic acid content of blended RTS beverage decreased during storage. Juice concentrations as well as TSS levels were significant for its reduction. Interaction effects were also significant during the storage period (Table 1). Among the treatments, maximum reduction of 6.6 mg/100ml in ascorbic acid content was observed in case of J_1T_1 (75: 25 per cent blended juice of rose apple and jamun, respectively and 15% TSS).

Titrable acidity (%):

Blended rose apple RTS beverage showed gradual decrease in acidity during storage (Table 1). Significant differences were observed at all stages of storage with respect to various concentrations of juice and TSS. Maximum reduction was noticed in treatments J_1T_1 (75: 25 per cent blended juice of rose apple and jamun, respectively and 15% TSS), J_1T_2 (75: 25 per cent blended juice of rose apple and jamun, respectively and 20% TSS) and J_2T_2 (50: 50 per cent blended juice of rose apple and jamun, respectively and 20% TSS).

Total sugars (%):

The content of total sugars of blended RTS increased throughout the storage period (Table 2). Differences were significant at juice, TSS levels and interaction effects. Rate of increment was more when juice concentrations had higher TSS values. However, interaction effect revealed that maximum increase (0.81 per cent) in total sugars content took place in case of treatment J_1T_2 (75: 25 per cent blended juice of rose apple and jamun, respectively and 20% TSS) (Fig. 1).

Reducing sugar (%):

There was a gradual increase in reducing sugars content of blended RTS during the period of storage (Table 2).The

changes were significant at all concentrations of blended juice, total soluble solids and in all of their interaction effects. Maximum increase (5.66%) was found to be in treatment J_2T_2 (50: 50 per cent blended juice of rose apple and jamun, respectively and 20% TSS) (Fig. 1).

Non-reducing sugar (%)

Non-reducing sugars showed a declining trend during the storage period. It varied significantly at all levels (Table 2). Maximum reduction (4.49%) was noticed in the treatment J_3T_2 (25: 75 per cent blended juice of rose apple and jamun, respectively and 20% TSS) (Fig 1).

Organoleptic scores of jackfruit nectar blended with avocado and kokum during storage:

These products prepared with different recipes were

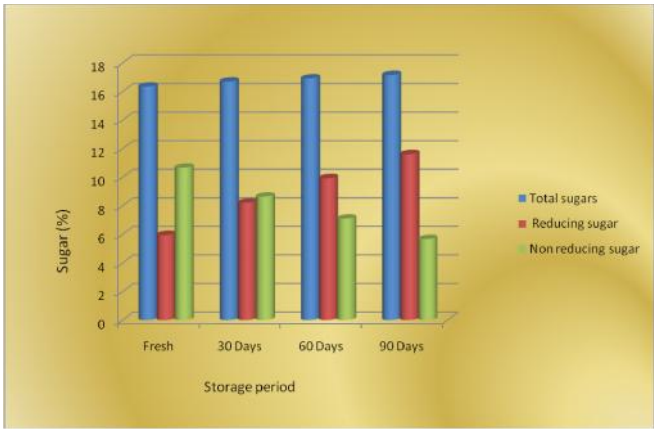

Fig. 1: Changes in total sugars (TS), reducing sugar (RS) and non- reducing sugar (NS) content of rose apple and jamun bended RTS during storage period of 90 days

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

Factors	TSS (%)				pH				Ascorbic acid (mg/100g)				Acidity (%)			
	Fresh	30 days	60 days	90 days	Fresh	30 days	60 days	90 days	Fresh	30 days	60 days	90 days	Fresh	30 days	60 days	90 days
Juice (10%) (Rose apple: Jamun)																
75:25(J_1)	17.50	18.61	19.86	20.64	4.36	4.59	4.81	5.16	19.98	18.07	16.21	13.76	0.50	0.35	0.25	0.14
50:50(J_2)	17.50	18.70	20.03	20.65	4.29	4.39	4.67	4.89	20.07	18.18	16.32	13.89	0.50	0.36	0.27	0.14
25:75(J_3)	17.50	18.86	20.26	21.20	4.24	4.33	4.50	4.75	20.16	18.34	16.47	14.05	0.50	0.37	0.29	0.17
F test	0	*	*	*	*	*	*	*	*	*	*	*		*	*	*
S.E. ±	0.000	0.022	0.022	0.068	0.005	0.005	0.009	0.021	0.006	0.003	0.005	0.005	0.000	0.002	0.002	0.003
C.D.@5%	0.00	0.07	0.07	0.20	0.01	0.01	0.03	0.06	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.01
TSS (%)																
15 (T_1)	15.00	16.46	17.69	18.71	4.25	4.41	4.62	4.86	19.91	17.47	15.64	13.37	0.50	0.37	0.28	0.16
20 (T_2)	20.00	20.99	22.41	22.95	4.35	4.46	4.70	5.00	20.22	18.93	17.02	14.43	0.50	0.34	0.26	0.14
F test	0	*	*	*	*	*	*	*	*	*	*	*		*	*	*
S.E. ±	0.000	0.018	0.018	0.056	0.004	0.004	0.008	0.017	0.005	0.002	0.004	0.004	0.000	0.001	0.002	0.002
C.D.@5%	0.00	0.05	0.05	0.17	0.01	0.01	0.02	0.05	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01
Interaction																
J_1T_1	15.00	16.28	17.55	18.43	4.31	4.55	4.78	5.04	19.82	17.30	15.51	13.22	0.50	0.36	0.26	0.14
J_1T_2	20.00	20.95	22.18	22.85	4.41	4.63	4.85	5.28	20.13	18.85	16.91	14.31	0.50	0.33	0.25	0.14
J_2T_1	15.00	16.43	17.68	18.78	4.24	4.37	4.61	4.86	19.93	17.43	15.63	13.37	0.50	0.37	0.28	0.15
J_2T_2	20.00	20.98	22.38	22.53	4.35	4.41	4.73	4.93	20.21	18.92	17.02	14.42	0.50	0.35	0.26	0.14
J_3T_1	15.00	16.68	17.85	18.93	4.20	4.31	4.48	4.69	19.99	17.67	15.79	13.51	0.50	0.39	0.29	0.18
J_3T_2	20.00	21.05	22.68	23.48	4.28	4.36	4.52	4.81	20.33	19.01	17.14	14.58	0.50	0.35	0.29	0.16
F test	0	*	*	*	NS	*	*	*	*	*	*	*		*	*	*
S.E. ±	0.000	0.031	0.031	0.096	0.007	0.007	0.013	0.030	0.008	0.004	0.007	0.007	0.000	0.002	0.003	0.004
C.D.@5%	0.00	0.09	0.09	0.29	0.00	0.02	0.04	0.09	0.02	0.01	0.02	0.02	0.00	0.01	0.01	0.01

* indicate significance of value at P=0.05, NS=Non- significant

subjected to organoleptic evaluation after 90 days of storage to assess the quality attributes. Appearance, aroma and flavour, taste and overall acceptability of product prepared with 20 per cent pulp (50: 50 per cent blended juice of rose apple and jamun, respectively) and 20 per cent TSS was more acceptable.

Table 2: Changes in total sugars (%), reducing sugar (%) and non- reducing sugar (%) in rose apple and jamun blended RTS 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 (10 %) (Rose apple: Jamun)												
75:25 (J_1)	13.76	14.01	14.24	14.53	5.17	7.38	9.06	10.30	8.59	6.63	5.18	3.97
50:50 (J_2)	13.93	14.19	14.42	14.60	5.27	7.52	9.15	10.56	8.66	6.68	5.26	3.98
25:75(J_3)	14.10	14.35	14.51	14.74	5.37	7.63	9.22	10.57	8.74	6.72	5.29	3.99
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.003	0.003	0.003	0.004	0.005	0.003	0.003	0.04	0.00	0.00	0.00	0.00
C.D.@ 5%	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.11	0.01	0.01	0.01	0.01
TSS (%)												
40 (T_1)	11.37	11.56	11.78	12.03	4.58	6.82	8.37	9.67	6.79	4.74	3.42	2.31
45 (T_2)	16.49	16.81	16.99	17.22	5.95	8.20	9.92	11.29	10.54	8.61	7.07	5.65
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.002	0.002	0.003	0.003	0.004	0.003	0.003	0.030	0.003	0.004	0.003	0.003
C.D. @ 5%	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.09	0.01	0.01	0.01	0.01
Interaction												
J_1T_1	11.18	11.33	11.57	11.92	4.42	6.67	8.24	9.61	6.76	4.66	3.33	2.31
J_1T_2	16.34	16.69	16.91	17.15	5.91	8.09	9.87	10.99	10.43	8.60	7.04	5.62
J_2T_1	11.38	11.56	11.83	11.99	4.58	6.81	8.38	9.51	6.80	4.75	3.45	2.31
J_2T_2	16.49	16.83	17.00	17.22	5.95	8.22	9.93	11.61	10.52	8.61	7.08	5.65
J_3T_1	11.55	11.78	11.95	12.20	4.74	6.98	8.47	9.87	6.81	4.80	3.48	2.32
J_3T_2	16.65	16.92	17.07	17.28	5.99	8.28	9.97	11.28	10.66	8.64	7.10	5.67
F test	*	*	*	*	*	*	*	*	*	*	*	*
S.E. ±	0.004	0.004	0.005	0.005	0.008	0.005	0.005	0.052	0.005	0.006	0.006	0.005
C.D. @ 5%	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.16	0.01	0.02	0.02	0.02

* indicate significance of value at P=0.05, NS=Non significant

Table 3: Mean sensory scores of rose apple and jamun blended RTS

Treatments	Appearance	Aroma and flavour	Taste	Overall acceptability
J_1T_1	3.64	3.93	3.81	3.96
J_1T_2	3.70	4.11	3.95	4.04
J_2T_1	4.53	4.52	4.33	4.41
J_2T_2	4.62	4.64	4.53	4.62
J_3T_1	4.93	4.10	3.92	4.13
J_3T_2	4.96	4.22	4.05	4.36

J_1T_1:10% juice (75 % rose apple: 25 % jamun) and 15% TSS, J_1T_2: 10% juice (75 % rose apple: 25 % jamun) and 20% TSS,
J_2T_1: 10% juice (50% rose apple: 50 % jamun) and 15% TSS, J_2T_2: 10% juice (50 % rose apple: 50 % jamun) and 20% TSS,
J_3T_1: 10% juice (25 % rose apple: 75 % jamun) and 15% TSS, J_3T_2: 10% juice (25 % rose apple: 75 % jamun) and 20% TSS.

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