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RESEARCH PAPER

Processing and evaluation of avacado nectar blended with sapota and aloe

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SUMMARY : Avocado is one of the most nutritive fruit which is rich in fat (26.40 g) but low in carbohydrate content can be recommended as high energy food for diabetic patients. Research on value addition of avocado fruit is very scanty. So research was carried out to prepare and evaluate the blended avocado nectar with sapota and aloe. The product was subjected to chemical analysis at an interval of 30 days during the storage period of four months. The chemical parameters *viz*., TSS, pH, total and reducing sugars increased whereas, the acidity and non-reducing sugar content decreased throughout the storage period. Product was free from microbial spoilage due to the addition of sodium benzoate (120 ppm) as a preservative during storage. Sensory evaluation data revealed that the blended avocado nectar with a composition of 23 per cent juice, 15^0B TSS scored the highest score for overall acceptability both before and after storage evaluations.

Key Words : Processing, Evaluation, Blending, Avocado, Nectar

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Avocado (*Persea americana* Mill) is a subtropical and highly nutritious fruit known as butter fruit.100g of edible portion of fruit consists of fat (26.40g), protein (1.70 g), vitamin A (0.04 mg), vitamin B (0.21 mg), vitamin C (14 mg) and minerals like potassium (460 mg), phosphorus (29 mg), calcium (29 mg), magnesium (22 mg) but low in carbohydrate (5.10 g) and can be recommended as a high energy food for diabetic patients. Sapota, mainly consumed as a fresh fruit, is a good source of fat, fiber and minerals. Aloe leaf contains a semisolid gel is a rich source of vitamins, minerals, amino acid and sterols *etc*., Due to its immense health benefits it is used as a nutraceutical in the form of juice, emulsion and syrup. In order to utilize the enormous nutritional and medicinal properties of these fruits, present investigation was carried out to develop and evaluate the avocado nectar blended with sapota and aloe in terms of various chemical parameters and sensory evaluvation.

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EXPERIMENTAL METHODS

The research was carried out at the under graduate processing laboratory in University of Agricultural Sciences, Bengaluru. The avocado and sapota fruits were procured from local vendors and aloe leaves were obtained from Sanjivini Vatika of the Division of Horticulture.

Juice from avocado and sapota fruits was extracted after the fruits were washed, cut into two halves and the pulp was scooped out from the fruits manually,after removing the seeds. The pulp was blended in a wearing blender with equal amount of water (1:1 w/v) and the juice was filtered with muslin cloth.

Extraction of aloe juice:

The leaves were washed cut transversely and the yellow juice was allowed to drip down and the traces of it were removed by wiping with a cloth. The leaves were washed thoroughly again and the upper thorn tips, rind and lower epidermal layers were removed with the help of stainless steel knife. The leaves were given transverse cut and the pulp/gel was extracted by scooping with the help of a stainless steel knife and was blended in a wearing blender with equal amount of water and the juice was filtered with muslin cloth.

Blended avocado juice with sapota and aloe was prepared in the ratio of 50:30:20. The recipes for avocado nectar was prepared with 20 and 23 per cent blended juice and TSS 15^{0}B and 16^{0}B with 0.3 per cent acidity.

Preparation of blended avocado nectar and chemical analysis:

The nectar was prepared by using blended juice of avocado, sapota and aloe in the ratio of 50: 30: 20. Sugar syrups having TSS of 15^{0}B and 16^{0}B were prepared by dissolving sucrose in warm water and the required amount of blended juice was added to two sets of these sugar solutions as per the requirement. As the TSS values were dropped due to the addition of juice, TSS values were readjusted by addition of sucrose while, acidity was adjusted by adding citric acid. Sodium benzoate (120 ppm) was added as a preservative to the product. 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 leg operated crown corking machine. The sealed bottles were then kept in boiling water for half an hour for pasteurization and were stored at room temperature.

The TSS was analyzed by using Erma-hand refractometer, titratable acidity and sugars were estimated by using the method described by Ranganna (1997). Organoleptic evaluation of the product was done by a panel members of 5 judges by hedonic rating scale (Amerine *et al*., 1965).

EXPERIMENTAL FINDINGS AND ANALYSIS

The samples of avocado blended nectar were analyzed for changes in their chemical constituents at an interval of 30 days during 120 days of storage. The maximum increase (18:05^{0}B) was noticed in the treatment with 23 per cent juice, 16^{0}B TSS while, the minimum increase (16.73^{0}B) was noticed in the treatment with 20 per cent Juice, 15^{0}B TSS during the storage period (Table 1). This might be due to the increase in total

Table 1 : Changes in TSS, pH and acidity of avocado nectar blended with sapota and aloe when fresh and at the end of 120 days of storage

Treatments	TSS(B)		pH		Acidity (%)	
	Storage period (Days)					
	Fresh	120	Fresh	120	Fresh	120
B_1T_1	15.00	16.73	3.83	3.91	1.00	0.82
B_1T_2	16.00	18.03	3.85	3.94	1.00	0.86
B_2T_1	15.00	17.03	3.83	3.91	1.00	0.88
B_2T_2	16.00	18.05	3.86	3.95	1.00	0.89
F-Test	NS	*	NS	*	NS	*
S.E. ±	0.11	0.05	0.02	0.003	0.11	0.03
C.D. (P=0.05)		0.15		0.01		

Significant at 5 per cent , NS = No Significant

B_1T_1 : 20% JUICE AND 15 0 B TSS B_2T_2 : 20% JUICE AND 160 B TSS

B_2T_1 : 23% JUICE AND 15 0B TSS B_2T_2 : 23% JUICE AND 16 0 B TSS

Table 2 : Changes on total, reducing and non-reducing sugar of avocado nectar blended with sapota and also when fresh and at the end of 120 days of storage

Treatments	Total sugars		Reducing sugars		Non reducing sugars	
	Storage period (Days)					
	Fresh	120	Fresh	120	Fresh	120
B_1T_1	3.20	7.14	0.86	5.42	2.41	1.72
B_1T_2	3.52	7.35	0.88	5.37	2.63	1.98
B_2T_1	3.33	7.57	0.85	5.59	2.38	1.99
B_2T_2	3.57	7.81	0.89	5.85	2.75	1.96
F-Test	NS	*	NS	*	NS	*
S.E. ±	0.01	0.01	0.01	0.01	0.00	0.01
C.D. (P=0.05)	0.03	0.03		0.05	0.03	0.05

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

B_1T_1 : 20% JUICE AND 15 ^{0} B TSS B_2T_2 : 20% JUICE AND 16 ^{0} B TSS

B_2T^1 : 23% JUICE AND 15 ^{0}B TSS B_2T_2 : 23% JUICE AND 16 ^{0} B TSS

Table 3 : Changes on total, reducing and non-reducing sugar of avocado nectar blended with sapota and also when fresh and at the end of 120 days of storage

Treatments	Colour		Taste		Aroma and flavour		Overall acceptability	
	Fresh	120 Days	Fresh	120 Days	Fresh	120 Days	Fresh	120 Days
B_1T_1	3.4	3.0	3.4	3.2	3.2	3.0	3.3	3.0
B_1T_2	3.8	3.4	3.6	3.4	3.4	3.2	3.6	3.3
B_2T_1	4.0	3.6	4.0	3.8	3.6	3.2	3.9	3.5
B_2T_2	3.6	3.2	3.8	3.4	4.0	3.4	3.8	3.3

B_1T_1 : 20% JUICE AND 15 ^{0} B TSS B_2T_1 : 20% JUICE AND 16 ^{0} B TSS
B_2T^1 : 23% JUICE AND 15 ^{0}B TSS B_2T_2 : 23% JUICE AND 16 ^{0} B TSS

sugars by inversion of polysaccharides like starch and cellulose into simpler soluble molecules in the presence of organic acids and also due to the inversion of added sucrose into simpler soluble substances in the course of time. Similar results were obtained by Sing *et al*.(2005) in blended bael RTS.

The pH of the blended avocado nectar was gradually increased during the storage period. The maximum (3.95) increase in pH was observed in the treatment with 23 per cent Juice and 16^{0}B TSS whereas, the minimum (3.91) increase was noticed in the treatment with 20 per cent Juice, 15^{0}B TSS and 23 per cent Juice AND 15^{0}B TSS during the stoarge period. A corresponding decrease in acidity of these products could be the reason for the changes in pH. Similar observations were made by Ramajayam and Jaganath (2001) in simarouba- kokum blended squash. During 120 days of storage, the acidity of the nectar showed a gradual decreasing trend.

The total sugars content of the blended nectar samples increased gradually during storage (Table 2). The treatment, 23 per cent juice and 16^{0}B TSS showed the maximum (7.81%) increase in the total sugar content while, the treatment 20 per cent juice and 15^{0}B TSS showed the minimum (7.14%) increase among all the treatments. This could be due to the acid hydrolysis of polysaccharides and also due to increase in the total soluble solids and ultimate decrease in non-reducing sugars. These results are in confirmation with the earlier reports of Garg *et al.* (2008) in blended juices of aonla, apple and ginger.

The reducing sugar content of the blended nectar kept on increasing during storage (Table 2). The maximum (5.85%) reducing sugar content was found in the treatment 23 per cent juice, 16^{0}B TSS whereas, the minimum (5.37%) reducing sugar content was recorded in 20 per cent juice, 16^{0}B TSS treatment at the end of the storage period. This could be due to the inversion of non-reducing sugars to reducing sugars caused by acids present in the products.Similar results were recorded by Jain *et al*. (2006) in aonla squash. The treatment 20 per cent juice, 15^{0}B TSS was found to undergo maximum (1.72%) reduction in the non-reducing sugar content while, the treatment, 23 per cent juice, 15^{0}B TSS showed the minimum (1.99%) reduction in the non-reducing sugar content.

The sensory evaluation data revealed that the treatment 23 per cent juice, 15^{0}B TSS obtained the highest scores for colour, taste and overall acceptability while, the treatment 23 per cent juice, 16^{0}B TSS scored the highest score for aroma and flavour as shown in Table 3 both before and after storage evaluations.

Conclusion:

At the end of the storage period TSS, pH and total and reducing sugar contents increased gradually but, the acidity and non-reducing sugar content kept on decreasing in the blended avocado nectar. Sensory evaluation data showed that the recipe with 23 per cent blended juice, 15^{0}B TSS and 0.3 per cent acidity obtained the highest score for overall acceptability both when fresh and at 120 days of storage period.

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