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Development and Quality Evaluation of Basil Based Nectar

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ABSTRACT

A study was undertaken for preparation of nectar using basil, papaya, orange. physico-chemical parameters viz.,TSS, acidity, non reducing sugar, total sugars as well as organoleptic attributes viz.,colour, flavour, taste and overall acceptability of nectar were evaluated for 45 days of storage. In the present investigations nectar was developed from basil, papaya and orange as a supplement. The developed nectar was evaluated for sensory as well as nutritional characteristics. On the basis of sensory analysis sample 2 prepared in the ratio 45:40:15 (Papaya:Orange:Basil) was found most acceptable by panel members terms of colour, taste and overall acceptability. Sample two contains 15° Brix, 0.3 % Acidity and 3.25 pH. Procedure of developing nectar was simple and feasible and contributes for the health benefits to all the age groups.

Key words: *Basil; Papaya; Orange; Pulp; TSS; Bio chemical parameters*

INTRODUCTION

India is the second largest producer of fruits and vegetables after China sharing 10% and 13.28% respectively in world production. The major fruits grown in India include mango, banana, papaya, orange, mosumbi, guava, apple, pineapple, sapota, ber, pomegranate, strawberry, litchi etc.. Daily consumption of fruits and vegetables reduce the risk of cancer, heart disease, premature aging, stress and fatigue primarily due to the integrated action of oxygen radical scavengers such as β-carotene and ascorbic acid plus calcium and dietary fibre[16]. Nectars are beverages formulated with the juice or pulp of one or more fruits, plus water and sugar in concentrations resulting in a "ready-to-drink" product. Recently, the market for such products has greatly expanded. Fruit mixtures present a series of advantages, such as the combination of different aromas and flavors and the sum of their nutritional components. The objective of this work was to develop and market nutritious nectar based on papaya, orange, basil enriched with the vitamin C present in Orange juice, optimizing the formulation using sensory consumer tests and a response surface statistical methodology.

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In the present investigations nectar was developed from basil, papaya and orange as a supplement. The developed juices were used to make nectar and evaluated for sensory as well as nutritional characteristics. Nectar is important and rich source of energy and vitamin c in the diets of population in developing countries. FPO specificatipon of Nectar is 20% Fruit content, 15% TSS and 0.3% acidity. Basil leaves are consumed in India. It is mainly used for medicinal purpose. Thus, basil leaves are taken as basic ingredient to make nutritious and functional nectar. Basil Plants are considered as one of the most important source of medicine and drugs of today and they have been used for different ailments of human beings worldwide from the beginning of the civilization. *Ocimum sanctum* (Tulsi or Holy Basil) belongs to Family Some mixed nectars showed good sensory acceptance and a high vitamin C content, suggesting potential commercial success. Increased amounts of papaya pulp and sucrose positively influenced the sensory acceptance of the products (up to 39% and 17%, respectively). Basil used in nectar is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, catarrhal fever, otalgia, lumbago, hiccough, ophthalmia, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress disorders1-2**.** Orange belonging to *Rutaceae* family of *aurantum* species and scientific name *Citrus aurantium* is a very delicious and juicy fruit. It contains essential nutrients, vitamins, minerals for normal growth and development. By using basil juice, Orange juice and papaya pulp we tried to made nutritious nectar acceptable for all age group.

Table no.1. Nutritional composition of basil (per 100gm)

Protein	4.2g
Fat	0.5g
Carbohydrate	2.3mg
Calcium	25mg
Phosphorus	287mg
Iron	15.1mg
Vitamin C	25mg

SOURCE: USDA

Table no.2. Nutritional composition of Papaya and Orange (per 100gm)

Papaya	Energy	39Kcal	Orange	Energy	192KJ
	Carbohydrate	9.81g		Carbohydrate	11.54g
	Sugar	5.90g		Sugar	9.14g
	Dietary fibre	1.8g		Fat	210 mg
	Fat	0.14g		Protein	700 mg
	Protein	0.61g		Dietary fibre	2.4g mg
	Vitamin A	55 µg		Thiamine(vit B1)	100 µg
	Beta-carotene	276 µg		Riboflavin(vit B2)	40 µg
	Thiamine	0.04mg		Niacin(vit B3)	400 µg
	Riboflavin	0.05 mg		Pantothenic acid	250 µg
	Niacin	0.338 mg		Vitamin B6	5 µg
	Vitamin B6	0.1 mg		Folate	17 µg
	Vitamin C	61.8 mg		Vitamin C	45 mg
	Calcium	24 mg		Calcium	43 mg
	Iron	0.10 mg		Iron	90 µg
	Magnesium	10 mg		Magnesium	10 mg
	Phosphorous	5 mg		Phosphorous	12 mg
	Potassium	257 mg		Potassium	16.9 mg
	Sodium	3 mg		Zinc	80 µg

SOURCE: USD

MATERIAL AND METHOD

For the preparation of basil base nectar the required material is collected from local market. These raw materials are easily available in low cost. Basil leaf procured from local area. Freshly harvested leaves were washed thoroughly in water. Fresh quality of a papaya, orange fruits were purchased from Nasik local market. The required packaging material was also purchased from local market. Other raw material such as sugar, preservative (KMS), citric acid, water are made available in laboratory. Fruits are washed to remove dirt, dust and other contaminant on the surface. After washing fruits are peeled out. After peeling the fruits are cut in small size required for the juice extraction by grinder. Juice extraction was done by using grinder. All juices of ingredient are extracting separately and store. After juice extraction, the raw juices are filtered through muslin cloth. All juices were mixed in above formulation with addition of sugar syrup (up to 15° Brix). Mixing of juices and preparation of Nectar was done. The nectar was filled in a glass bottles (capacity 200 ml) and crown cork. Glass bottles are pasteurized at 85° C for 15-20 sec. Labelling was done.

PRODUCT FORMULATION

Table no: 3: formulation of product

Fruit	Sample 1(in %)	Sample 2 (in %)	Sample 3(in %)
Papaya	50	**45**	35
Orange	30	**40**	50
Basil	20	**15**	15

PROCESS FLOW CHART

Blending of Papaya, Orange & Basil juice
↓
Straining of Juice
↓
Preparation of sugar syrup
(Sugar + water + acid)
↓
Mixing of Juice & syrup
↓
Judging end point 15^{o} Brix
↓
Bottling
↓
Pasteurization (82^{o}c for 2 min)
↓
Cooling & Feeling in sterile bottles
↓
Storage

SENSORY ANALYSIS

Different kinds of blends were developed from juices of papaya, orange, and basil as shown in Table no 3. The products were developed after mixing all juices with sugar, preservative, citric acid ,water and subjected to sensory evaluation. The results revealed that the mean score values for various sensory attributes *viz.*, colour, flavour, taste, after taste and overall acceptability varied from 8 to 9. The 3 blends prepared were analysed by 9 point hedonic scale and composite scoring test. Results obtained by composite scoring test were shown in Table no. 4. While, average sensory analysis data analysed by 9 point hedonic scale were shown in figure no. 1.18. It was observed

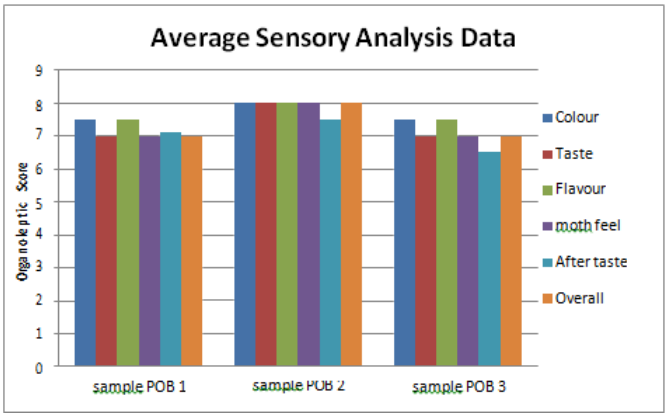
that beverage sample POB 2 prepared in the ratio 45:40:15was found most acceptable by panel members as compared to POB 1 and POB 3 in terms of colour, taste and overall acceptability.

Table no.4 : Average of Sensory analysis Data

Sample	Organoleptic Score*					
	Colour	**Taste**	**Flavour**	**Mouth feel**	**After taste**	**Overall Accept-ability**
POB 1	7.5	7	7.5	7	7.1	7
POB 2	8	8	8	8	7.5	8
POB 3	7.5	7.0	7.5	7	6.5	7

Score between 1- 9 as per liking

Figure No. 1. Average sensory analysis data



*where POB- papaya,orange,basil.

RESULTS AND DISCUSSION

Sample POB 2 prepared in the ratio 45:40:15was found most acceptable by panel members and is carried forward for chemical analysis. TSS of basil base nectar was measured by using a hand refractometer (ERMA INC., Tokyo, Japan) (0- 32^{O}Brix) and values were expressed as ^{O}Brix. The TSS increased with gradual passage of storage time, which might be due to hydrolysis of polysaccharides into monosaccharide and oligosaccharides. It was observed that TSS content of Basil base nectar was found to be 15^{0} to 17^{0} Brix. Acidity of nectar was determined by titrating against 0.1 N NaOH according to A.O.A.C method. It was observed that acidity content of basil base nectar was found to be 0.3 to 0.53%. The pH value was determined with the help of an electronic pH meter (Thermo Scientific, 2 star). It was observed that pH content of basil base nectar was found to be 3.25. Ascorbic acid content was determined by the titration method using 2,6- dichlorophenol indophenol dye ($C_{12}H_7NCl_2$) as recommended by Ranganna[14]. The ascorbic acid (vitamin C) content of the juice decreased during storage with the advancement of storage period, which was probably due to the fact that ascorbic acid being sensitive to oxygen, light and heat was easily oxidized in presence of oxygen by both enzymatic and non- enzymatic catalyst. It was observed that ascorbic acid content of Basil nectar was found to be 1.3mg/100 ml. Reducing and non reducing sugar was determined by Lane Eynons Method Ranganna[14]. Calorific value by calculation may be calculated by using method given by Merril A. and Watt B.[8].

Table no.5: Result of chemical analysis

Sr. no.	Particulars	Value (%)
1	Energy value (Kcal)	60
2	Total sugar	15.2
3	Reducing sugar	6.6
4	Non reducing sugar	5.6
5	Vitamin C (mg)	1.3
6	TSS (^{0}Brix)	15
7	Titrable acidity (%)	0.3
8	pH	3.25

Effect of storage on chemical parameters of herbal nectar

Table no:6 Effect chemical parameters of nectar during storage

Duration (Days)	TSS (^{O}Brix)	Acidity (%)	pH
0	15.2	0.3	3.25
15	15.4	0.3	3.36
30	16	0.2	3.38
45	17	0.2	4.32

Chemical parameters such as pH, acidity and TSS were observed during the storage as shown in table 6. The observation showed that TSS content was increased from 15.2 ^{O}Brix to 17 ^{O}Brix during the storage period of 45 days which could be due to hydrolysis of polysaccharide into monosaccharide and oligosaccharides during storage. The pH of nectar was increased 3.25to 4.32. Decrease in the acidity from 0.3% to 0.2 % was observed during storage, which might be due to co-polymerization of organic acids with sugars and amino acids and loss of volatile oils during storage.

CONCLUSION

Increased amounts of papaya pulp and sucrose positively influenced the sensory acceptance of the products (up to 39% and 17%, respectively). Basil used in nectar is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, catarrhal fever, otalgia, lumbago, hiccough, ophthalmia, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress disorders1-2. Basil based nectar is acceptable by all age group with nutritious taste due to orange and papaya. On the basis of chemical and sensory analysis we conclude that Basil based nectar having shelf life of 45 days and Maintaining FPO Specification for nectar.

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