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Cost economics and sensory quality of jackfruit nectar blended with avocado and kokum

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Abstract

Jackfruit (*Artocarpus heterophyllus* L.) is largest edible fruit in the plant kingdom. Research was carried out to study the effect of blending jackfruit with jam jackfruit (65%), avocado (15%) and kokum (20%) in various proportions, to improve its sensory qualities and sensory evaluation. Results showed that the Jackfruit nectar blended with avocado and kokum containing 23 per cent juice, 0.3 per cent of acidity and 18°Brix was found to be acceptable with good organoleptic scores for appearance (4.15), aroma and flavour (4.10), taste (3.95) and overall acceptability (3.96). The Product was free from spoilage even at 120 days of storage. The benefit cost ratio of the product was 2.23:1. Hence, commercial production of the products can be taken up and promoted as a small scale income generating activity.

Keywords: jack fruit, avocado, kokum, total soluble solids

Introduction

Jackfruit (*Artocarpus heterophyllus* L.) is one of the underutilized fruits, belongs to family moraceae. It is popularly known as "poor man's food". The ripe jackfruit bulbs are rich in sugars with a calorific value of about 90 calories per 100 g fresh weight. Jackfruit is nutritious, rich in vitamins (A and B), minerals (Ca, K and Fe) and contains considerable amounts of carotene and vitamin-C. It is an important source of pectin and protein (Anon., 2000) [2]. Fruit is a highly fibrous and has nutritive value, containing 18.9 g carbohydrates, 0.8 g minerals, 30 IU vitamin-A and 0.25 mg thiamine for every hundred grams (Sammaddar, 1985) [9]. Jackfruit is being valued by the processor to make the best use of enormous production and glut in the market during the season.

The research on the utilization of jackfruits blended and value added products are very scanty. Blending becomes the one of the way of utilization of more number of fruits for high quality in respect of both sensory and nutritional aspects. Keeping in view the above facts and in order to explore the possibility of preparing the processed and value added products from jackfruit hygienically. The present study was undertaken with the following objectives.

1. To standardize the recipes for preparation of product of jackfruit nectar blended with avocado and kokum
2. To study the keeping quality of prepared product at ambient condition
3. To study sensory evaluation of prepared product for quality and acceptability
4. To study the cost of economics of the prepared product.

Materials and 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.

Preparation of blended juice

For the extraction of jackfruit juice, outer rind was removed using stainless steel knife and bulbs were cut into small pieces. Fresh pulp was separated and filtered with the help of muslin cloth. Juice from avocado was obtained, Kokum fruits were first, washed with water and then the fleshy pulp was separated from the rind. The FPO minimum specification for jam is as follows. The blended juice to be used for the preparation of products was prepared by mixing jackfruit, avocado and kokum juice in the ratio of 65:15:20. For nectar minimum percentage of fruit juice/pulp 20 minimum percentage TSS 15° Brix and acidity percentage 0.3, Recipes were prepared with 20 and 23 per cent and TSS 15 and 18° Brix and 0.5 per cent acidity.

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Preparation of product

Recipe for jackfruit nectar blended avocado and kokum

Sugar syrups of desired strength 15⁰B and 18⁰B were prepared by dissolving sucrose into warm water. A known amount of blended juice was added to it. As the TSS value dropped due to addition of the juice, it was adjusted by adding required amount of sucrose while making up the total volume with water for each treatment. Acidity was checked and adjusted to the desired level by using citric acid. Sodium benzoate (120ppm) was dissolved in a spoonful of warm water and was added to the product as a preservative. The prepared product was filtered with the help of muslin cloth and was filled into pre-sterilized bottles of 200 ml. capacity each and sealed with crown caps 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 measured by using Erma-hand refractometer, titrable acidity was estimated by using Ranganna, (1997) [7] and Somogyi (1945) [7, 12] method respectively. Organoleptic evaluation of the product was done by a panel of 20 judges by numerical scoring method (Amerine *et al.*, 1965) [11].

Recipe for jackfruit nectar blended avocado and kokum

Treatments	Juice (%)	Juice ratio (%)			TSS ^o B	Acidity (%)
		Jackfruit	Avocado	kokum		
N ₁ T ₁	20	65	15	20	15	0.30
N ₁ T ₂	20	65	15	20	18	0.30
N ₂ T ₁	23	65	15	20	15	0.30
N ₂ T ₂	23	65	15	20	18	0.30

N₁T₁: 20(%) pulp, 15⁰B

N₁T₂: 20(%) pulp, 18⁰B

N₂T₁: 23(%) pulp, 15⁰B

N₂T₂: 23(%) pulp, 18⁰B

Design: Factorial CRD

Number of replication: 4

Number of treatments: 4



Fig 1: Jackfruit nectar blended with avocado and kokum Recipes were prepared with 20 and 23 per cent and TSS 15 and 18° Brix and 0.3 per cent acidity

Cost of economics of prepared product

Table 1: Jackfruit nectar blended with avocado and kokum

Materials	Quantity	Amount (Rupees)
Jackfruit (g)	239	1.19
Avocado (g)	36.89	1.5
Kokum (g)	73.6	1
Sugar (g)	546	10
Sodium benzoate (g)	0.384	0.17
Citric acid (g)	10	0.8
Bottles and corks	16	40
Miscellaneous	-	5

Total cost 59.6659.66 + 11.99 Rs (Labour charge) = 71.59

Total quantity of production = 3.2 liters Cost of production = 22.37 Number of bottles = 1616 x 10 = 160

Cost involved in the preparation of product was calculated after choosing the best treatment and total revenue was also estimated. Net revenue was calculated by following formulae

Net revenue = Total revenue – Total cost

160 – 71.59 = 88.41 Rs

Benefit – cost ratio = 2.23:1

Observations and Results

Table 2: Organoleptic scores of jackfruit nectar blended with avocado and kokum during storage

Factors	Appearance	Aroma and flavour	Taste	Over all acceptability
Interaction				
N ₁ T ₁	3.50	3.22	3.62	3.75
N ₁ T ₂	3.85	3.75	3.80	3.70
N ₂ T ₁	4.05	4.02	3.20	3.82
N ₂ T ₂	4.15	4.10	3.95	3.96
F-test	*	*	*	*
SEm±	0.004	0.004	0.082	0.004
CD (5%)	0.013	0.012	0.252	0.012

* Significant at 5%; NS = Non-significant

N₁T₁: 20(%) pulp, 15⁰B N₁T₂: 20(%) pulp, 18⁰B N₂T₁: 23(%) pulp, 15⁰B N₂T₂: 23(%) pulp, 18⁰B

Discussion

Appearance of blended nectar was influenced by high levels of pulp and sugars interaction i.e., 23 per cent pulp and TSS 18⁰B (N₂T₂). This might be due to higher pulp levels of Jackfruit, avocado and kokum (65:15:20) which might have imparted better eye appeal and 18⁰B sugar level gives good viscosity to the blended nectar, Prasanna (1999) [6] made similar observations in watermelon nectar.

Aroma and flavour of blended nectar was influenced by levels of pulp and sugars interaction i.e., 23 per cent pulp and TSS 18⁰B (N₂T₂) was scored highest. This might be due to higher pulp levels, which imparted better aroma and flavour, the findings, were in agreement with findings of Bhatnagar (1999) [3] in watermelon nectar.

23 per cent pulp and TSS level of 18⁰B (N₂T₂) was having acceptable taste among all the recipes in the blended nectar. Appropriate combination of pulp and sugar at suitable levels might have contributed higher score for the blended nectar, the findings were in agreement with findings of Roy and Singh (1979) [8] in bael fruit nectar.

Highest score of 3.96 for over all acceptability was observed for the N₂T₂ (23% pulp, 18⁰B). This might be due to better consistency, acceptable colour and sugar acid blend at this level, Sreelakshmi (1999) [11] made similar observations in simarouba nectar.

During processing aseptic methods followed for handling the products, bottles used for storing products were pre-sterilised and dried properly before filling the products, Therefore there was no visible spoilage of products during storage. The findings were in agreement with findings of Giridharlal *et al.*, (1986)

Benefit cost ratio of the product was 2.23:1. It was more than the benefit cost ratio of pummelo-sweet orange (50:50) ready to serve beverage in which benefit cost ratio of 1.58:1 was achieved (Navya, 2006) [5]. It was due to low cost of fruits and more juice recovery percentage of jackfruit (42 %).

Benefit cost ratio of all the prepared products was above 1, hence commercial production of the products can be taken up. Though jackfruit is the minor crop but available in plenty during the season. These products showed high sensory

acceptance and cost economic, so these products can be prepared commercially.

Nectar prepared with the recipe having 23 per cent pulp, 18⁰B and 0.30 per cent acidity was rated best for quality attributes like appearance, aroma, flavour and overall acceptability through organoleptic evaluation. No spoilage was noticed during storage.

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