



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; SP1: 1043-1045

Kushala G
Department of Horticulture,
UAS GKVK Bangalore,
Karnataka, India

Sreenivas KN
Department of Horticulture,
UAS GKVK Bangalore,
Karnataka, India

Vasudeva Naik K
Assistant Professor, College of
Agriculture, Bheemarayanagudi,
Karnataka, India.

Ranjani SN
Department of Microbiology,
UAS GKVK Bangalore,
Karnataka, India

Product development acceptability and cost effectiveness of jackfruit jam blended with avocado and kokum

Kushala G, Sreenivas KN, Vasudeva Naik K and Ranjani SN

Abstract

Jackfruit (*Artocarpus heterophyllus* L.) is largest edible fruit in the plant kingdom, research was carried out to study the effect of blending jackfruit jam jackfruit (65%), avocado (15%) and kokum (20%). In various proportions in an effort to improve its quality and sensory evaluation. Results showed that the Jackfruit jam blended with avocado and kokum containing 55 per cent juice, 0.5 per cent of acidity and 70° Brix was found to be acceptable with good organoleptic scores for appearance (4.12), aroma and flavour (4.33), taste (4.27) and overall acceptability (4.09) Product was free from spoilage during 120 days of storage the benefit cost ratio of the product was 3.53:1. Hence, commercial production of the products can be taken up and promoted as a small scale income generating activity.

Keywords: Organoleptic, Brix

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). 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). 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 objectives of standardize the recipes for preparation of product of jackfruit jam blended with avocado and kokum, study organoleptic evaluation of prepared products for quality and acceptability and 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 jam minimum percentage of fruit juice/pulp 50 minimum percentage TSS 68° Brix and acidity percentage 0.5, Recipes were prepared with 50 and 55 per cent and TSS 65 and 70° Brix and 0.5 per cent acidity.

Preparation of Products

Jackfruit jam blended with avocado and kokum

Jackfruit jam having 4 different compositions (pulp 50 to 55 %, TSS 65 to 70° Brix) with a

Correspondence

Kushala G
Department of Horticulture,
UAS GKVK Bangalore,
Karnataka, India

fixed level of acidity (0.5 %) was prepared. The required quantity of pulp and sugar as per the recipe were taken in a steel vessel and heated over a gas stove with continuous stirring of the mixture separately. Citric acid was dissolved in little water and pulp. Heating was continued until the required (TSS was estimated with the help of hand refractometer) the boiling was continued till the mixture set into clear jam as tested by flow sheet test. The jam was filled into clean, sterilized jam bottles, covered with butter paper, sealed hermetically and stored at ambient condition for making further observations.



The TSS was measured by using Erma-hand refractometer, titrable acidity was estimated by using Ranganna, (1997) [8] and Somogyi (1945) [11] method respectively. Organoleptic evaluation of the product was done by a panel of 20 judges by numerical scoring method (Amerine *et al*, 1965) [1].

Treatments

Treatments	Juice (%)	Juice ratio (%)			TSS° B	Acidity (%)
		Jackfruit	Avocado	Kokum		
J ₁ T ₁	50	65	15	20	65	0.5
J ₁ T ₂	50	65	15	20	70	0.5
J ₂ T ₁	55	65	15	20	65	0.5
J ₂ T ₂	55	65	15	20	70	0.5

- **Design** : Factorial CRD
- **Number of replication**: 4
- **Number of treatments**: 4

Sensory evaluation of jackfruit jam blended with avocado and kokum

Appearance/Colour	Aroma and Flavour	Taste	Overall Acceptability	Scores
Best	Extremely pleasant	Best	Extremely acceptable	5
Very much attractive	Very much pleasant	Better	Highly acceptable	4
Acceptable attractiveness	Pleasant	Good	Acceptable	3
Moderately attractive	Moderately pleasant	Ok	Moderately acceptable	2
Slightly attractive	Slightly pleasant	Bad	Slight acceptable	1
Not attractive	Not pleasant	Very bad	Not acceptable	0

Note: Hedonic rating scale.

Results

Table 1: Organoleptic scores jackfruit jam blended with avocado and kokum during storage

Factors	Appearance	Aroma and flavour	Taste	Over all acceptability
Interaction				
J ₁ T ₁	3.87	3.33	3.75	3.60
J ₁ T ₂	3.85	3.22	3.85	3.87
J ₂ T ₁	4.02	3.91	3.97	4.02
J ₂ T ₂	4.12	4.33	4.27	4.09
F-test	*	*	*	*
SEm±	0.0041	0.0041	0.004	0.004
CD (5%)	0.0126	0.0126	0.0132	0.0126

* Significant at 5%; NS = Non-significant

Studying the Economics of prepared products

Cost involved in the preparation of products 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

Table 2: Jackfruit jam blended with avocado and kokum

Materials	Quantity	Amount (Rupees)
Jackfruit (g)	1144	5.72
Avocado (g)	264	9.24
Kokum (g)	352	3.52
Sugar (g)	2240	40.32
Citric acid (g)	16	1.5
Bottles and corks	16	40
Miscellaneous	-	13
Total cost		113.3

Table 3: Cost of product

Sl. No	Particulars	Amount
1	Total cost (113.3 + 22.66 Rs (Labour charge) = 135.96	Rs. 135.96
2	Total quantity of production	3.2 Kg
3	Cost of production	42.48 liter
4	Number of bottles (16bottles X 30 Rs./Bottle)	Rs.480
5	Net revenue= Total revenue – Total cost = 480 – 135.96	Rs 344.0
6	Benefit – cost ratio	3.53:1

Discussion

1. Jackfruit jam blended with avocado and kokum.

a) Appearance

Appearance of blended jam was influenced by high levels of pulp and sugars interaction i.e., 55 per cent pulp and TSS 70°B (J₂T₂). This might be due to higher pulp levels of Jackfruit, avocado and kokum (65:15:20) which might have imparted better eye appeal and 70°B sugar level gives good

viscosity to the blended jam. Harshavardhan Reddy, 2004^[5] observed similar results in aonla jam.

b) Aroma and flavour

Aroma and flavour of blended jam was influenced by levels of pulp and sugars interaction i.e., 55 per cent pulp and TSS 70⁰B (J₂T₂) 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) in watermelon rind jam.

c) Taste

55 per cent pulp and TSS 70⁰B (J₂T₂) was having acceptable taste among all the recipes in the blended jam. Appropriate combination of pulp and sugar at suitable levels might have contributed higher score for the blended jam, Singh and Sanjeev kumar (1995)^[10] reported that aonla jam prepared with 45 per cent pulp, 68 per cent TSS and 1 per cent acidity got highest organoleptic score.

d) Overall acceptability

Highest score of 4.09 for over all acceptability was observed for the 55 per cent pulp and TSS 70⁰B (J₂T₂). This might be due to better consistency, acceptable colour, taste and sugar acid blend at this level, Kaushik *et al* (2002)^[6] made similar observation in bael jam.

e) Microbial spoilage

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)^[4].

2. Economics of jackfruit jam blended with avocado and kokum

Benefit cost ratio of blended jackfruit jam was 3.53:1 it was due to highly concentrated nature of the product and fetched the highest price among all the product. 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)^[7]. It was due to low cost of fruits and more juice recovery percentage of jackfruit (42%).

Conclusion

Jackfruit jam blended with avocado and kokum

Jam prepared with 55 per cent pulp, 70⁰B and 0.5 per cent acidity was found to be the best recipe for quality attributes like appearance, aroma, flavour and overall acceptability through organoleptic evaluation. No spoilage was noticed during storage.

Economics of prepared products

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.

References

1. Amerine MD, Pangborn RM, Roesster EB. Principles of Sensory Evaluation of Foods, Academic Press, London. 1965;

2. Anonymous, Jackfruit Processing-Fruitful Ssi Venture, Indian Food Ind. 2000; 19:323.
 3. Bhatnagar DK. Utilization Of Watermelon Rind For Jam Making. Indian Food Packer. 1991; 45(1):46-48.
 4. Giridharilal, Siddappa GS, Tandon. Preservation Of Fruits And Vegetables. Revised Edition, Indian Council Of Agricultural Research Publication, New Delhi, 1986, 69-80.
 5. Harshavardhan Reddy. Development Of Value Added Products From Aonla (*Emblica Officinalis* L.). M.Sc Thesis Submitted To Uas, Bangalore, 2004.
 6. Kaushik HL, Yamdagni R, Sharma JR. Changes in Quality Parameters during Processing and Storage of Processed Bale Fruit. Indian Food Packer. 2002; 59(1):71-77.
 7. Navya Yadav P. Development of a Rind Peeler for Pomelo (*Citrus Grandis*) and Development of Value Added Products from Pomelo Fruit. M. Tech. Thesis Submitted To University Of Agricultural Sciences, Bangalore, 2006.
 8. Ranganna. Manual of Analysis of Fruit and Vegetable Products, 2nd Edn. Tata Mc Graw-Hill Publishing Company Ltd., New Delhi, India, 1977.
 9. Sammaddar HN, Jack Fruit. In T.K. Bose (Ed.), Fruits of India: Tropical and Subtropical. Calcutta: Naya Prohash: 487-497.
 10. Singh IS, Sanjeev Kumar. Studies on Processing Of Aonla Products. Progressive Horticulture. 1995; 27(1-2):39-47.
 11. Somogyi M. Estimation of Reducing Sugars. J. Biol. Chem. 1945, 160-161.