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Research Article

Production and Sensory Evaluation of Composite Jam Produced from Three Different Tropical Fruits

Laveena KB[1]*, Samriddhi Bhat[1], Vaishnavi[1], Vignesh Ravi Nayak[1], Akshata Pai[2] and Akshaya Pai[2]

[1]Department of Postgraduate Studies and Research in Biosciences, Mangalore University, Mangalagangothri, Mangalore, Karnataka, India

[2]Biotechnology Programme, Food Science and Nutrition Programme, Department of Biosciences, Mangalore University, Mangalagangothri, Karnataka, India

Abstract

Introduction: Tropical fruits like banana, orange, and apple are widely available and rich in nutrients, flavour, and aroma. Jam production is a great way to preserve and utilize these fruits. Traditional jam production often focuses on a single fruit type. This study explores the production and sensory evaluation of a composite jam made from a combination of apple, banana, and orange.

Objectives: The aim of this study is to develop a composite jam using apple, banana, orange and combination of these three fruits and to evaluate its sensory properties.

Study Approach: Tropical fruits were selected and jam was prepared by following traditional method of jam preparation. Jam is also produced using a combination of the three fruits (apple, banana and orange). Sensory evaluation by a panel of judges using a hedonic scale for attributes like taste, texture, color, and overall acceptability. The sensory evaluation results showed that orange jam was the most preferred among the three composite jams, with significantly higher scores for taste and texture. Based on the overall acceptability scores, the jams are ranked in the following order orange jam (8.5±0.5), banana jam (7.8±0.28), apple jam (7.33±0.76). Pairwise comparison tests revealed significant differences ($p<0.05$) in the taste, texture and overall acceptability scores between the orange jam and the other two jams. No significant differences were found between the apple and banana jams. The sensory evaluation results showed that the mixed jam made from, Banana, Orange and Apple (BOA jam) received significantly high scores than the individual jams (banana, orange and apple) for all the attributes.

Results and Conclusion: The composite jam showed a unique flavour profile, combining the sweetness of banana, tartness of orange, and crunch of apple. Sensory evaluation revealed high scores for taste, texture, and overall acceptability. Colour and consistency were also rated positively. The composite jam produced from apple, banana, and orange was well-received by the sensory panel. The results suggest that the mixed BOA jam is promising product with high consumer acceptance. Its unique flavour profile and smooth texture make it a great option for consumers looking for a new and exciting jam experience. This study demonstrates the potential for creating a unique and delicious jam by combining different tropical fruits. The results can be used to develop new jam products and promote the utilization of underutilized fruits. Further research can explore different fruit combinations and processing techniques to enhance the sensory properties of the jam.

Keywords: Composite fruits; Jam; Sensory evaluation

Introduction

Jam is an example of fruit preserve usually made from pulp and juice of one fruit (whole fruit). It can be defined as cooked and gelled fruit purses packaged for long term storage which is normally used as bread spread, fillings and food jellies. The preparation of fruit jam traditionally involves the use of pectin as a gelling agent, although sugar or honey and citric acid may be added as well [1]. Good jam has a soft even consistency without distinct pieces of fruit, a bright colour, good flavour and a semi-jelled texture that is easy to spread but has no free liquid [2].

Nowadays, fruits and vegetables are increasingly vital for healthy food consumption. Not only are they highly recommended aspects of health-promoting diets, but they also contain minerals, phytochemicals, and vitamins [3-5]. Public awareness of the beneficial properties of fruits and vegetables continues to increase due to recommendations of dieticians and physicians, educational programs, and media [6]. However, poor availability and considerable post-harvest losses challenge both consumption and processing of fruits and vegetables. Moreover, fruits and vegetables are not always accessible at the same time due to peculiarities of location and seasonality.

The main objective of the study was to develop a composite jam using apple, banana, orange and combination of these three fruits and to evaluate its sensory characteristics.

Study Approach

Tropical fruits were selected and jam was prepared by following traditional method of jam preparation. Jam is also produced using a combination of the three fruits (banana, orange and apple). Sensory evaluation by a panel of judges using a hedonic scale for attributes like taste, texture, aroma, colour, and overall acceptability.

***Corresponding author:** Laveena KB, Department of Postgraduate Studies and Research in Biosciences, Mangalore University, Mangalagangothri, Mangalore, Karnataka, India, E-mail: laveenavenkatesh@gmail.com

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Figure 1: Preparation of composite jam using apple, banana, orange and combination of these three fruits.

Sample/ Sensory Attributes Evaluated	Banana Jam	Orange Jam	Apple Jam	Mixed BOA Jam (Banana, Orange, Apple)
Appearance				
Colour	Light yellow to golden brown	Vibrant orange to deep amber	Light golden to deep red-brown	golden brown
Texture	Smooth, spreadable and slightly chunky	Firm, jelly-like, and chunky (peel pieces)	Thick, spreadable, and slightly chunky	Smooth and slightly chunky
Shape	Uniformly filled jar, slightly rounded surface	Uniformly filled jar, slightly rounded surface	Uniformly filled jar, slightly rounded surface	Uniformly filled jar
Clarity	Semi-transparent to opaque	Transparent to semi-transparent	Semi-transparent to opaque	Semi-transparent to opaque
Aroma				
Intensity	7/10 moderate-strong	8/10 strong	6/10 moderate	8/10 strong
Character	Sweet, fruity, ripe banana	Citrusy, sweet, orange peel, slightly bitter	Sweet, fruity, ripe apple, slightly tart	Complex, fruity, sweet with notes of banana, orange and apple
Flavor				
Intensity	8/10 (strong)	9/10 (very strong)	7/10 (moderate)	9/10 (very strong)
Character	Sweet, ripe banana, slightly floral and fruity	Citrusy, bitter-sweet, orange peel	Sweet, tart, ripe apple	Complex, fruity, sweet, with notes of banana, orange, and apple
Aftertaste	Sweet, lingering banana flavor	Lingering citrus bitterness but sweet.	Crisp, refreshing apple flavor	Lingering sweetness, fruity flavors
Texture				
Texture	Smooth, spreadable, slightly chunky	Firm, jelly-like, chunky (peel pieces)	Thick, spreadable, slightly chunky	Smooth, spreadable, slightly chunky
Mouthfeel	Creamy, velvety, slightly sticky	Tart, slightly crunchy, refreshing	Tart, slightly crunchy, refreshing	Complex, fruity, slightly tart
Smoothness	8/10 (very smooth)	6/10 (moderately smooth)	7/10 (moderately smooth)	8/10 (very smooth)
Hedonic Testing (Likability/Preferability)				
9-point Hedonic Scale	5-netural	9-like extremely	9-like extremely	9-like extremely
5-point Likert Scale	3- netural	5- strongly like	5- strongly like	5- strongly like
Overall Acceptability Scores	7.8±0.28	8.5±0.5	7.33±0.76	8.83±0.28

Table 1: Sensory Characteristics of Banana, orange, apple and mixed BOA jams.

Preparation of Jam

1kg of apple, banana and orange was taken. Jam was prepared separately. Peeled its skin, small slice was made. In non-stick pan 1 cup of water and sliced fruits was added and brought to boil. Cooked until the fruits become soft, then cooled and blended until it is smooth. 500gm of sugar was added and again brought to boil, 1tablespoon of lemon juice was added. To avoid boiling pulp lid was used and cooked for 10mins, until thick consistency appeared. If needed food colour can be added. Finally cooled the jam and stored in clean dry glass jar (Figure 1).

Sensory Evaluation

The sensory evaluation was based on a 9-point hedonic scale according to the method described by Iwe [7], with slight modifications. Ten panellist's (N=10) compared the sensorial variations between the different jams based on particular attributes. All the panellists reported zero allergy to the jam ingredients and participated in all sensory tests. Participation was voluntary, with verbal consent obtained prior to the evaluation. Participants were served with ~10g of each jam on white disposable plates with a slice of bread from the same loaf. The plates were coded with three-digit random numbers and

distributed randomly among the panellists. The appearance, aroma, taste, and spread ability of the samples were evaluated according to a nine-point hedonic scale, where 1 represented "dislike extremely" and 9 represented "like extremely". The overall liking was considered as the mean of other attributes. The panellists had clean potable water to rinse/clean their mouths between each taste session to ensure the integrity of the experiment. The participants completed the score sheets after tasting.

Results

Sensory evaluation includes such aspects as appearance, aroma, taste, etc., which cumulatively helps to reveal the overall liking. Typically, aroma plays a key role in the overall liking [8] (Table 1).

The sensory evaluation results showed that orange jam was the most preferred among the three composite jams, with significantly higher scores for taste and texture. Based on the overall acceptability scores, the jams are ranked in the following order orange jam (8.5±0.5), banana jam (7.8±0.28), apple jam (7.33±0.76). Pairwise comparison tests revealed significant differences ($p<0.05$) in the taste, texture and overall acceptability scores between the orange jam and the other two jams. No significant differences were found between the apple and banana jams. The sensory evaluation results showed that the mixed jam made from, Banana, Orange and Apple (BOA jam) received significantly high scores than the individual jams (banana, orange and apple) for all the attributes.

Conclusion

The composite jam showed a unique flavour profile, combining the sweetness of banana, tartness of orange, and crunch of apple. Sensory evaluation revealed high scores for taste, texture, and overall acceptability. Color and consistency were also rated positively. The composite jam produced from apple, banana, and orange was well-received by the sensory panel. The results suggest that the mixed BOA jam is promising product with high consumer acceptance. Its unique flavour profile and smooth texture make it a great option for consumers looking for a new and exciting jam experience. This study demonstrates the potential for creating a unique and delicious jam by combining different tropical fruits. The results can be used to develop new jam products and promote the utilization of underutilized fruits. Further research can explore different fruit combinations and processing techniques to enhance the sensory properties of the jam.

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