

PRODUCTION AND NUTRITIONAL ASSESSMENT OF VEGETABLE JAM WITH BEET-ROOT AND BASIL SEED -A PILOT SCALE TRIAL

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ABSTRACT

Vegetable-jam is the most common preserved vegetable product. Jams are solid gel prepared from vegetable and ripe fruits and are one of the most important breakfast ingredients. Beetroot serves as an excellent dietary supplement due to its rich mineral, nutrient, and vitamin content, as well as its unique phyto-constituents that offer numerous medicinal benefits. On the other hand, basil seeds provide essential vitamins, minerals, and antioxidants, which can enhance overall well-being like, have impact on digestion, weight control, as well as their antioxidant and anti-inflammatory traits. In this pilot scale trial, we had developed beetroot jam as a valued for its nutritional benefit. Beetroot jam plays a significant role in preventing hypertension. It is rich source of antioxidant and nutrients that increase our stamina. It has anti inflammatory properties. It may also increase cognitive ability and attention power. In this study, it was observed that, beetroot jam contains essential micronutrient such as iron, calcium, folic acid, dietary fibre etc. In the beet root jam preparation, coconut jaggery was used as a rich source of potassium to reduce obesity and to help in digestion and fight against oxidative stress. The sensory evaluation revealed that the jam having 2:2 ratio of beetroot and coconut jaggery that is a good source of nutritional compound but, compromised on color, while the jam with 2:1:1 beetroot, honey and coconut jaggery has excellent nutritional composition that was equally acceptable all attributes and it's shelf life was maintained upto 3 months at room temperature without adding any chemical preservative.

KEYWORDS: Beet root jam, basil seed, coconut jiggery, antioxidant, hypertension, blood cholesterol.

INTRODUCTION

Vegetables are a valuable source of nutrients that need to be preserved to extend their shelf life. Humans have developed various methods to keep these foods available all year round [1]. Fruits and vegetables are important in human nutrition; however, these are seasonal and highly perishable and need to be processed into more stable forms such as jams, jellies and juices so as to derive their maximum benefits. Jam is food that is cooked using the juice of fruits or vegetables which are then converted into jelly-like form [2]. Using of sugar in jam, jellies prevent microbial growth and spoilage. There is a high demand for fruits and vegetables because they are rich in essential dietary micronutrients, dietary fiber, and phytochemicals that can benefit human health. However, these products are often seasonal and perishable [3]. Increasing

awareness among consumers regarding importance of consuming healthy foods in preventing disease and improving quality of life has promoted increased consumption of fruits, vegetables and derived products [4]. Sabja seeds also called basil seeds, have been used in traditional medicine for centuries due to their potential medicinal properties. Basil seeds have potential impact on digestion, weight control, as well as their antioxidant and anti-inflammatory traits [5]. The usefulness of beetroot juice supplementation in reducing blood pressure is limited due to its acute effect in lowering blood pressure and its susceptibility to influence by several factors [6]. Jaggery, a natural sweetener derived from concentrated sugarcane or palm tree juices. This energy-packed food offers therapeutic benefits, aiding in blood purification, liver function, and overall blood health. High-quality jaggery displays a golden-yellow hue, a firm texture, crystalline structure, a sweeter taste, and minimal moisture content [7]. The nutritional and medicinal aspects of the micronutrients present in Jaggery was proven to be better compared to white sugar and helps to provide a good source of energy [8]. On the other hand, honey offers numerous health benefits due to its potent antioxidant and anti-inflammatory effects. Studies have shown that honey exhibits antimicrobial and anticancer properties by targeting various molecular pathways involved in cell proliferation [9].

OBJECTIVES OF THE STUDY

To determine the sensory property of the jam, to analyze the differences of beetroot jam by using honey and coconut jaggery, to determine the shelf life of the jam and to determine the over acceptability of jam by the consumers.

MATERIALS AND METHODS

Preparation of jam

Selection of ingredients:

Beetroot was brought from local market Barrackpore, West Bengal, India. Basil seed, Ginger, honey and coconut jaggery were brought from supermarket, MORE, Barrackpore, West Bengal, India.

Evaluation of jam:

The jam was developed by incorporating beetroot, basil seed, ginger powder separately in beetroot pulp in different ratio. Three set of jam were prepared and those were as follows:

SAMPLE NO.	NAME OF SAMPLE WITH RATIO
Sample 1	Beetroot jam with honey (2:2)
Sample 2	Beetroot jam with coconut jaggery (2:2)
Sample 3	Beetroot jam with honey & coconut jaggery (2:1:1)

Preparation of jam

At first the raw beetroot was washed and peeled it. Then, the beetroot was cut into cubes and boiled in boiling water. The boiled cube was cooled down and allowed to transfer into mixer jar for blending. After blending, it was strained and the pulp was taken. Then, basil seed, honey and coconut jaggery (separately and together with ratio) were added and cooked for sometimes. Then, it was kept on fire till the required consistency (continuous stirring). Lemon juice was added and mixed well. Next, bubble test, plate test, and fork test were done to know the right consistency of pulp. At the end, the jam was poured into a glass jar immediately and stored.

Sensory Evaluation:

The three types of beetroot jam were given to 100 persons for evaluating taste, aroma, color, texture, appearance and overall acceptability on a 9 point hedonic scale with a scores ranging from 9 to 1, which represents extremely good and extremely disgusted respectively. The collected data was analyzed and plotted those data in Microsoft Excel and compared the overall acceptability of those samples [10].

RESULT AND DISCUSSION

Results

Sample 1: Beetroot and honey mix 2:2 and 5% of basil seed and 3% of ginger powder of the total amount.

Sample 2: Beetroot and coconut jaggery powder mix 2:2 and 5% of basil seed and 3% of ginger powder of total amount.

Sample 3: Beetroot with honey and coconut jaggery powder mix 2:1:1 and 5% of basil seed and 3% of ginger powder of total amount.

From sensory evaluation we found that Sample 3 was more acceptable compared to sample 1 and sample 2.

Table 1. Sensory evaluation of the sample

Sample No	Taste	Aroma	Colour	Texture	Appearance	General Evaluation
Sample 1	9	8	9	8	9	9
Sample 2	8	8	7	8	9	8
Sample 3	9	9	9	9	9	9

Table 2. Assessment of nutritive value of Sample 1

Ingredients	Energy(KCal)	Carbohydrate (gm)	Protein(gm)	Fat(gm)	Calcium(mg)	Iron(mg)
Beetroot	72.50	1.93	1.19	0.37	23.45	2.90

Honey	160	40	-	-	6.50	0.75
Basil seed	6	1.1	Negligible	Negligible	Negligible	Negligible
Ginger powder	Little amount	-	-	-	-	-
Lemon	Little amount	-	-	-	-	-

The analysis was based on per 100 g serving of each component.

Table 3. Assessment of nutritive value of Sample 2

Ingredients	Energy(KCal)	Carbohydrate(gm)	Protein(gm)	Fat(gm)	Calcium(mg)	Iron(mg)
Beetroot	72.50	1.93	1.19	0.37	23.45	2.90
Coconut jaggery	192	45	0.81	104.5	20	1.89
Basil seed	6	1.1	Negligible	Negligible	Negligible	Negligible
Ginger powder	Little amount	-	-	-	-	-
Lemon	Little amount	-	-	-	-	-

The analysis was based on per 100 g serving of each component.

Table 4. Assessment of nutritive value of Sample 3

Ingredients	Energy(KCal)	Carbohydrate(gm)	Protein(gm)	Fat(gm)	Calcium(mg)	Iron(mg)
Beetroot	72.50	1.93	1.19	0.37	23.45	2.90
Honey	80	20	-	-	3.25	0.37
Coconut jaggery	96	22.5	0.405	52	10	0.945
Basil seed	6	1.1	Negligible	Negligible	Negligible	Negligible
Ginger powder	Little amount	-	-	-	-	-
Lemon	Little amount	-	-	-	-	-

The analysis was based on per 100 g serving of each component.

Discussion

In this study three types of beetroot jam samples were prepared by using beetroot, honey, coconut jaggery, basil seed, ginger powder and lemon ; these three types of jams were as follows:

Samples	Ratio
Sample-1	Beetroot jam with honey (2:2)
Sample-2	Beetroot jam with coconut jaggery (2:2)
Sample-3	Beetroot jam with honey & coconut jaggery (1:2:2)

All data analysis was represented as tabular form. The data collecting by 1-9 scale which represented that score of sample 3 is the highest rating score through the sensory evaluation. Comparative study on sensory evaluation taste, aroma, color, texture, appearance, overall acceptability etc between sample 1,2,3 (Table 1) . Here beetroot jam is store 3 month to identify their acceptability and store in air tight container at room temperature.

Beetroot jam is an innovative type of jam is a valued for its nutritional benefit. Beetroot jam can play a significant role in preventing hypertension. It is rich source of antioxidant and nutrients it increase our stamina. It has anti inflammatory properties. It may also increase cognitive ability and attention power. Beetroot also very healthy for children and it's containing vitamin a vitamin c along with manganese, dietary fiber and folic acid. Inclusion of coconut jaggery in jam that increases polyphenolic and flavonoid contain. Nutritional value of beetroot jam such as carbohydrate, protein, fat, calcium, iron and calorie are calculated. Nutritional of this beetroot jam are shown (Table 2-4). Beetroot jam is not very expensive as it contains beetroot that are relatively cheaper compare to other jams. It has a simple preparation process and longer shelf life without inclusion of any chemical preservative. It provides a nutritious component of breakfast. It is an economical choice of middle to lower income group of people.

Beetroot is rich in vitamin A which makes our skin healthy and removes free radical from body. Beetroot is good source of fiber, folic acid, manganese, folic acid, iron, potassium. It may protect the gut and include exercise performance and increase energy level. Basil seed are rich in fibre and reduces obesity. It also helps in digestion and fights against cell damage and prevent cancer. Honey has anti inflammatory, antioxidant, antioxidant property, it is a natural sweetener. It helps to treat cough and promote in wound healing. Coconut jaggery is rich in potassium thereby it helps to reduce obesity beside this it can help in digestion and fight against oxidative stress. It is a low glycemic index food and it will decrease blood cholesterol.

CONCLUSION

In this study, from the above result, it is concluded that the beetroot jam using honey and coconut jaggery and also using basil seed and ginger powder that enhance nutritional properties and flavour of jam. These beetroot jam contain essential micronutrient such as iron calcium, folic acid, dietary fibre etc. The sensory evaluation revealed that the jam sample with 2:2 ratio of beetroot and coconut jaggery that good source of nutritional compound but, compromised on colour while the jam with 2:1:1 beetroot, honey and coconut jaggery has excellent nutritional composition that was equally acceptable all attributes and it is fresh upto 3 months at room temperature without adding any chemical preservative. The study requires further development for this type of beetroot jam, may be it has a great future.

Beetroot helps to maintain blood pressure level. It also contains dietary nitrates that enhance that improve blood flow to the brain and reduce muscle soreness of athletes. Beetroot helps to liver's detoxification process. This beetroot jam helps to maintain blood cholesterol. These jam also helps to cure cough and cold, excellent food to maintain weight for athletes. Beetroot basil jam is nutritious as well as delicious; it is a great option for breakfast.

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