Development and Quality Evaluation of Beetroot Apple Jam

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ABSTRACT

Jam is a semisolid food product that is created by boiling fruit pulp (not less than 45% by weight) with sufficient sugar (55% by weight) to a reasonably thick consistency, firm enough to hold the fruit tissues in position, and rich in carbohydrates, vitamins, and fiber. The objective of the present work was development and evaluation of the quality of enriched beetroot apple jam. The beetroot apple jam was prepared from 60% apple and 40% beetroot. It was found most acceptable by considering the sensory attributes. Beetroot's low sugar content means it is not utilized to make sugar; instead, it is produced for a variety of food purposes, including as fresh vegetables, dehydrated or frozen goods, or for food preparations like pickles or juices. Apple is rich in Vit. C, Iron, pectin -1-1.5% (unripe apple) Apples are helpful for the prevention of cancer treatment of anemia, for diabetes, and reducing high blood pressure. It is particularly provided with nutrition-rich jam. The developed beetroot applejam was prepared with different formulations. The developed Beetroot Apple Jam was evaluated for Proximate composition. The analysis revealed that percentages of fat, moisture, TSS and Ash value of beetroot apple jam were 0.28%-, 27.80%- ,68.5-degree brix, and 0.45% respectively.

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Keywords- Beetroot, Apple, Jam, Quality evaluation, Sensory analysis.

I. INTRODUCTION

In India, there are both organized and unorganized sections of the fruit industry. The second-largest producer of fruits and vegetables in the world is India. According to APEDA data, India is the world's top producer of ginger and okra, as well as the second-largest producer of potatoes, onions, cauliflower, brinjal, and cabbages. Among other fruits, it is the top producer of bananas, papayas, and mangoes in the world. In India, there is a vast market for the processing of fruits and vegetables into frozen (IQF), dried, pulp, puree, paste, sauces, snacks, dressings, flakes, dice, pickles made through dehydration, slices, chips, jams, and jellies.

Red beetroot, often known as beetroot (Beta vulgaris L.). High levels of biologically active substances, such as nitrate and inorganic nitrate, as well as soluble fibre, minerals (such as calcium, magnesium, iron, potassium, phosphorus, sodium, and zinc), and vitamins (such as biotin, folic acid, and vitamin B6), are all present in beetroot. Blood flow is improved by beetroot, which also quickens the pace of activity. Beetroot juice has been shown in recent clinical trials to lessen the detrimental effects of home quarantine on cardiovascular health (Volino-Souza et al. 2020).

Apple is rich in Vit. c, Iron, pectin -1-1.5% (unripe apple) Apples are helpful for the prevention of cancer treatment of anemia, for diabetes and to reduce of high blood pressure. (Firdous, 2020).

II. MATERIAL AND METHODOLOGY

The present study on the development of Beetroot Apple jam was conducted in the Department of Food Technology, Institute of Bioscience and Technology, MGM University, in the academic year 2022 -2023.

Material:

The following material used for making of jam was Apple, Beetroot, Citric acid, and Water. These all ingredients were purchased from the local market of Chhatrapati Sambhajinagar.

Methodology:

For the preparation of the Beetroot Apple Jam the following method was used: (Shrivastava and Kumar, 2002).

Ripe Fresh Fruits

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Washing

↓

Peeling and Cutting

↓

Addition of Sugar

↓

Boiling

↓

Addition of Citric Acid

↓

Judging of endpoint

(By further cooking up to 105^0C OR 68-70% TSS or by sheet test)

↓

Filling hot into sterilized bottles

↓

Cooling

↓

Waxing

↓

Capping

↓

Storage

Preparation of Sample

Three trails of beetroot apple jam of different variations were attempted. First trail with 50% apple and 50% beetroot, the second trails with 60% apple and 40% beetroot, and the last trail with 40% apple and 60% apple. and all were exposed to sensory analysis.

Sensory Evaluation:

A 9-point hedonic scale with ratings ranging from 9 to 1, which reflect like and dislike greatly, was used to evaluate the developed Beetroot Apple jam's colour, consistency, flavour, taste, and general acceptability when it was presented with bread. The three evaluations' mean scores were computed, and the quality characteristics were quantified.

Chemical Analysis

1. Determination of Moisture:
   Weighing a 5g sample in a Petri plate and drying it in a hot air oven at 105 degrees C for 2 hours will be used to determine the moisture content. After cooling, weigh again until a constant weight dryer is attained. Moisture content is used to compute the final weight reduction. A sample's moisture content is measured in grams per 100 grams of sample.

$$\text{Moisture \%} = \frac{\text{Initial Weight} - \text{Final Weight}}{\text{Initial Weight of Sample Required}} \times 100$$

2. Determination of Fat:
   The AOAC (1990) Method was modified in order to determine the samples' fat content. The material, which weighed 10g, was divided into Soxhlet thimbles and put into an extraction flask with a predetermined weight. It took an hour to extract petroleum ether. The petroleum ether was eventually eliminated through evaporation in an electrical bath. The flask's remaining fat was dried after cooling for ten minutes. This is how the fat content percentage (%) was calculated.

$$\text{Fat \%} = \frac{\text{Weight of Fat}}{\text{Weight of Sample}} \times 100$$

3. Determination of TSS:
   A hand refractometer was used to measure the total soluble solids (TSS) at room temperature according to a standard AOAC (2010) procedure. The equipment's temperature was brought to room temperature before use. The samples were positioned between the two lower prisms, and after rotating the connecting arm until the crucial way could be seen in the eyepiece, a reading in 0brix was taken.

4. Determination Of Ash:
   A temperature-controlled furnace that has been preheated to 5500 C should be used to test a 5gm sample of jam, per AOAC. Hold the temperature there for two hours. Directly place the crucible in the desiccator, cool it down, and weigh it right away. Report the percentage of ash to the first decimal place.

$$\text{Ash \%} = \frac{\text{Weight of test portion} - \text{Weight on loss on ash}}{\text{Weight of test portion}} \times 100$$

III. RESULT AND DISCUSSION

Preparation of Sample:

Three trails of beetroot apple jam of different variations were attempted. First trail with 50% apple and 50% beetroot, the second trails with 60% apple and 40% beetroot, and the last trail with 40% apple and 60% apple. and all were exposed to sensory analysis, the weight of beetroot and apple used in different variation for 250 gm.

Sensory Evaluation:

The sensory evaluation for the variation of the S2 gave the highest score for all the parameters by the panellist. The sensory table is as follows: (Figure 2)

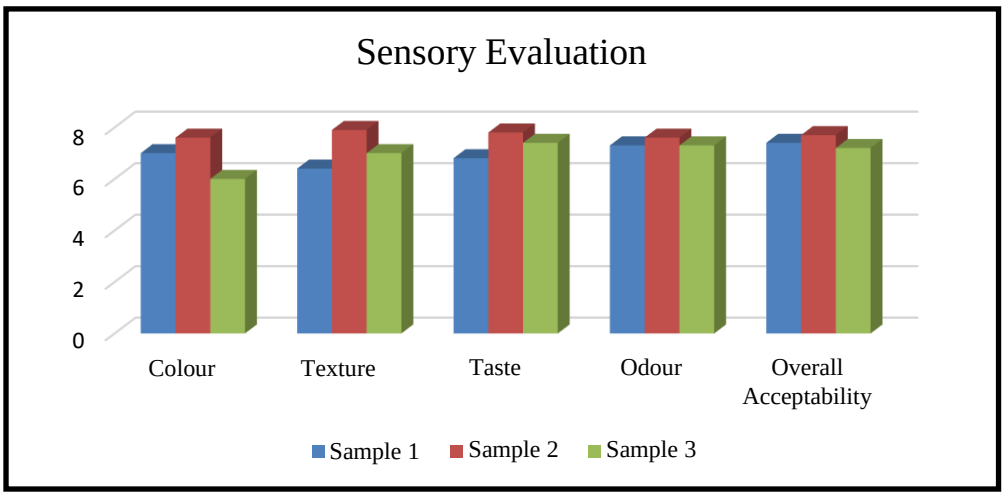

Figure 1: Sensory Evaluation Table of Beetroot Apple Jam

Chemical Analysis:

According to the standardized process product was prepared and exposed to the chemical analysis as follows:

Sr. no.	Analysis	Results
1.	Moisture	27.80%
2.	Fat	0.84%
3.	TSS	68.5 ^{0} brix
4.	Ash	0.45%

Figure 2: Chemical Analysis of Beetroot Apple Jam

IV. CONCLUSION

According to a market assessment, there are many different fruit products available on the market, including jams, pickles, chutneys, concentrates, pulp, canned and dehydrated goods. The jam was discovered to be particularly appealing to kids among these. However, there was no apple and beetroot jam on the market at the time. To fill this gap, a study was conducted to develop and evaluate the quality of apple and beetroot jam, which also had the potential for scaling up as a new innovative product. Three samples of beetroot apple jam were formulated with varying compositions of beetroot and apple: S1 (50% apple-50% beetroot), S2 (60% apple-40% beetroot), and S3 (40% apple-60% beetroot). From 1 kg of fruits, a net weight of 720 gm of the final product was obtained. Sensory analysis was conducted, and the S2 sample was selected for further analysis based on its favourable results. The selected sample (S2) was analysed and found to contain 2.88% fat, 27.80% moisture, and 68.5-degree brix Total Soluble Solids (TSS). Subsequently, the selected sample was introduced into the market to assess its feasibility. Overall, the study successfully developed an apple and beetroot jam, which was well-received in the market. The chosen sample showed promising quality attributes and gained popularity among consumers, indicating potential for scaling up production and commercialization of this innovative fruit product.

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