ISSN No:-2456-2165

Studies on Development and Quality Evaluation of Basil Incorporated Beet Root Jam

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Abstract:- Study of preparation of Basil incorporated Beetroot Jam was successfully done and evaluates basil incorporated beetroot jam quality, proximate analysis. The aim to prepare basil incorporated beetroot jam as a nutritional point of view and to provide convenience to the consumer in that we used ingredient like Beetroot, Basil leaves, and Sugar. Beetroot and basil leaves are boiled in cooker at 105^{0}C. Then both the beetroot and basil are grinded to the fine paste. Paste is boiled with sugar and citric acid. Judging point of jam is determined by using hand Refractometer. Observed TSS was 69^{0}Brix. Then jam is stored in HDPE bottles at cool temperature. Nutritional value of basil incorporated beetroot jam was Moisture content (28.5%), Ash (0.6%), Fat (0.66%), Protein (1.4%) and carbohydrate (70%) were best among all the levels basil incorporated beetroot jam prepared recorded highest score in all the quality attributes. Energy value of prepared basil incorporated jam was (291.54 Kcal.). It was concluded that the basil incorporated beetroot jam can be store for three months in high density polyethylene bottles at cool temperature.

Keywords:- *Beetroot, Basil Leaves, Proximate Analysis, Sensory Evaluation, HDPE, Storage.*

I. INTRODUCTION

Jam is a product made by boiling fruit pulp with sufficient sugar to a reasonable thick consistency, firm enough to hold the fruit tissues in position. Apple, pear, sapota, apricot, peach, papaya, karonda, carrot, plum, strawberry, mango, grapes, tomato and muskmelon are used for preparation of jams. It can be prepared from pne kind of fruit or from two or more kinds. Jam contains 0.5-0.6 per cent acid and invert sugar should not be more than 40 per cent. Fruit pulp is boiled with sugar upto specific consistency. End point of jam is determined by measuring TSS (Total Soluble Solids) of jam. TSS of jam varies from 68 to 70 per cent. (Fruits and Vegetable Preservation, Srivastava and Kumar, 2002).

Beetroots are composed of water (88g), protein (1.6g), fats (0.2g), and carbohydrates (9.6 g per 100g). Of the carbohydrates, beets are composed of fibre (29.3%) (2.8 g total dietary fibre/100 g beet) and sugar (70.7%) (6.8 g sugar/ 100 g beets). It has 11% of Vitamin C. It contains calcium (2%) and iron (6%). (Bjarnadottir, 2019).Beetroot is a reach source of phytochemical compounds that includes ascorbic acid, carotenoids, phenolic acids and flavonoids. Betalains are having high antioxidant and anti-inflammatory capabilities in humans. The betanin is the most abundant constituent is found in beetroot (300-600mg/kg). Beetroot also contains several highly bioactive phenolics, such as caffeic acid. (Onkar, *et.al*,2013).Varieties of Beetroot are cultivated in Egypt, India, Europe and Ukraine. It is an excellent dietary supplement and rich in minerals, nutrients and vitamins and has unique phyto-constituents with medicinal properties. Several parts of this plant are used as anti-oxidant, anti-depressant, anti-microbial, anti-fungal, anti-inflammatory properties. It grows best in spring and autumn, but does well in summer. Plant size is upto 120 cm. deep purple roots of beetroot are eaten. (Shultz, 2003).

Beetroot, also called red beet, (*Beta vulgaris* L.) corresponds to a number of varieties of edible taproots cultivated in America, Europe, and Asia. As compared to the sugar beet, the sugar content in beetroot is about 2 times lower. Beetroot contains high amounts of biologically active substances including betalains and inorganic nitrate. The high concentration of betalains, which are water soluble pigments, is responsible for the intense red color of beetroots, especially betacyanins and betaxanthins. Besides the high amount of antioxidants, beetroot contains many other health benefiting compounds like soluble fiber, minerals (ex. calcium, magnesium, iron, potassium, phosphorus, sodium and zinc) and vitamins (ex. biotin, folic acid, niacin and vitamin B6). Betalanins are a group of phenolic compounds, which are secondary plant metabolites. Beetroots are used as sources of natural colorants in many fields of the food industry; however, their importance goes beyond their coloring ability, since many possible benefits for human health have been reported. These include strong antioxidant and anti-inflammatory activities, the inhibition of lipid peroxidation, increased resistance to the oxidation of low density lipoproteins, hepatoprotective activity and chemo-preventive effects. (Raquel, *et.al*, 2015).

Basil (*Ocimumbasilicum*L.) is an annual herb belonging to the mint family *(Lamiacea).* O. basilicum is an upright, branching herb, 0.6–0.9 m high with square, stems and branches, usually green but sometimes purple in colour. Basil requires warm temperature and conditions. Genus Ocimum (*Lamiaceae*; formerly called *Labiatae*) collectively called ‘‘basil’’ contains about 50–150 species belonging to herbs and shrubs from the tropical regions of Asia, Africa and Central and South America (Lupton,*et.al*, 2012). It has long been recognized as a rich source of essential oil used as

a major aromatic agent in the food, pharmaceutical, cosmetic and aromatherapy industries. The nutritional value of basil is also high as it contains Vitamin A (105%) and vitamin C (30%) Vitamin B-6 (10%), calcium (17%), iron (17%), magnesium (16%). It has fat (0.6 g) and total carbohydrates (2.7gm). It contains potassium (295 mg). (Khair-ul-Bariyah, *et.al*, 2012).

II. MATERIALS AND METHODS

➢ *Ingredients, Chemical and Equipments*

Raw materials required during present investigation were procured from local market of Saralgaon such as beet root, sugar, basil leaves, etc. Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from College of Food Technology Saralgaon, Thane.

➢ *Physical and Chemical Analysis*

A physical characteristic such as colour of Jam was determined by visual observation and Total Soluble solids determined by using hand refractometer. Chemical Analysis such as moisture is determined by using hot air oven, fat is determined by Soxhlet apparatus and protein is determined by using Kjeldahls method. Acidity is determined by using titration method and pH is measured by digital pH meter. All quality parameters were determined by AOAC (2000).

➢ *Organoleptic Evaluation*

Prepared product were evaluated for sensory characteristics in terms of appearance, color, flavor, aftertaste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 'like extremely' to 1 'dislike extremely'. The obtained results were recorded in sensory score card.

➢ *Statistical Analysis*

The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $p<0.005$ level S.E and C.D. at 5 percent level is mentioned wherever required.

➢ *Formulation of Basil Incorporated Beetroot jam*

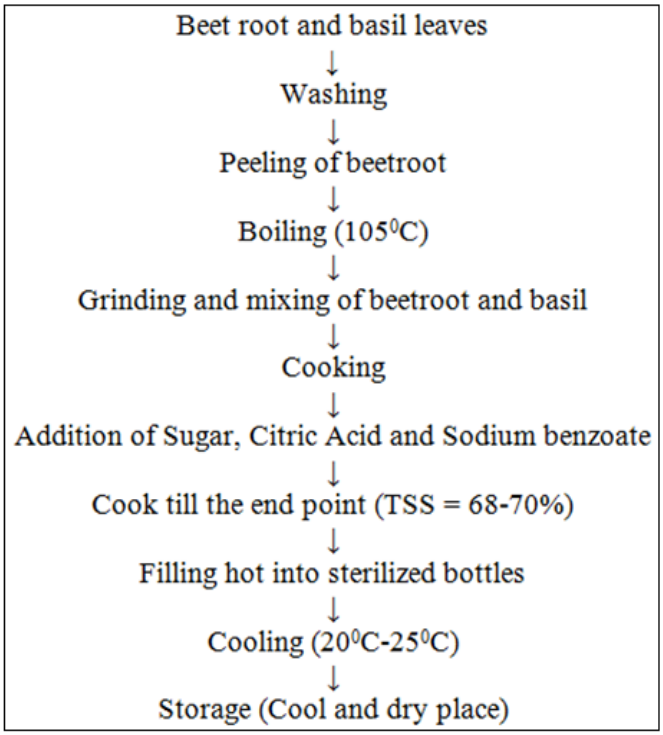
Jam prepared with incorporation varying levels of beet root paste, basil leaves paste and sugar was investigated. The formulation was made by varying levels of beetroot paste and basil leaves paste *viz.*, 57:00:42, 50:07:42, 43:14:42 and 36:21:42 percent respectively and data given are illustrated in Table 1.

Sample T1 has been organoleptically accepted and used for further study.

Ingredients	Treatments			
	T0	**T1**	**T2**	**T3**
Apple Pulp	57 g	**00 g**	00 g	00 g
Beetroot Paste	00 g	**50 g**	43 g	36 g
Basil Leaves Paste	00 g	**07 g**	14 g	21 g
Sugar	42 g	**42 g**	42 g	42 g
Citric Acid	0.5 g	**0.5 g**	0.5 g	0.5 g
Sodium Benzoate	0.5 g	**0.5 g**	0.5 g	0.5 g

Table 1:- Formulation for preparation of Beetroot Jam

Where**,**
T0- 57 g Apple pulp + 42 g Sugar
T1- 50 g Beetroot paste + 07 g Basil leaves paste + 42 g Sugar
T2- 43 g Beetroot paste + 14 g Basil leaves paste + 42 g Sugar
T3- 36 g Beetroot paste + 21 g Basil leaves paste + 42 g Sugar



Flowchart 1:- Flow sheet for Preparation of Basil incorporated Beetroot Jam.

ISSN No:-2456-2165

III. RESULTS AND DISCUSSION

➢ *Physical Properties of Basil Incorporated Beetroot Jam*

Parameter	Observation
Color	Dark Red
TSS	69 ^{0} Brix

Table 2

The physical properties were carried out which shows values colour were Dark Red and TSS-60°Brix Respectively.

➢ *Chemical Properties of Basil Incorporated Beetroot Jam*

Parameters	Sample (T1)
pH	4.12
Acidity	0.53%
Ash	0.6%
Moisture	25.8%
Fat	0.66%
Protein	1.4%
Carbohydrates	70%
Energy Value	291.54 Kcal

Table 3

The chemical properties of Basil Incorporated Beetroot Jam were carried out which shows pH (4.12), Acidity (0.53%), moisture content (25.8%), Fat (0.66 %), Ash (0.6 %), Carbohydrates (70%), Protein (1.4 %) and Energy Value (291.54Kcal) respectively.

➢ *Sensory evaluation*

Sample	Colour	Flavour	Taste	Consistency	Overall Acceptability
T0	9	9	9	9	9
T1	**9**	**9**	**9**	**8**	**9**
T2	7	6	8	7	8
T3	9	7	7	8	8

Table 4:- Sensory evaluation of Basil incorporated Beetroot Jam

In Organoleptic Evaluatin the color score were higher for the sample T1 and T3. The taste and flavour score were 9 is higher than T2 and T3 sample.

The score for consistency is higher for sample T1. Overall acceptability of T1 sample is more acceptable than sample T2 and T3. In the sensory analysis.

T_1 was best results in color (9), Flavour (9), Taste (9), Consistency (8) and Overall acceptability (9) score was noticed. All the Quality attributes value tabulated in table 2.

IV. CONCLUSION

Conclusively, it emerges that the Studies on Development and Quality Evaluation of Basil Incorporated Beet Root Jam was carried out successfully prepared by using Beetroot, Basil leaves and other ingredients. The health benefit of Beetroot and Basil leaves are well known so the product is having nutritional values. This type of value addition by way of nutrient enrichment does certainly help to provide good source of energy.

After consuming the product it can satisfy the nutritional needs of the consumer.

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