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Development, standardization, quality evaluation and shelf life studies of indigenous beverage – Jigarthanda

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Abstract
The paper elaborates the investigation carried out to determine and standardize traditional beverage Jigarthanda, indigenous to the state of Tamil Nadu in India, the beverage hails from Madurai district. The paper discusses about the formulating and selecting ingredient levels of almond gum, basil seeds and sherbet concentration for the preparation of Jigarthanda. The chemical attributes comprise of protein, fat, carbohydrate and ash content analysis. From the results of the study it was apparent that 50% almond gum and 5% basil seed, 25g Ice cream and 10 ml evaporated milk as good combination to combine and process a ready to consume Jigarthanda. Different flavours of sherbet like rose, nannari (*Indian sarsaparilla*) and pine apple was subjected to different concentration and added to the beverage. The combination of 50% almond gum, 5% basil seeds and 8% syrup showed the better overall acceptability and comestible than others. The beverage contained Protein in the range of 1.64 to 1.75%, Fat was 3.19 to 3.98%, 0.33 to 0.36% Ash, moisture content ranged between 0.83 to 0.84% and carbohydrate was 9.97% to 11.73%.

Introduction

India is the largest producer of milk in the world. It produces more than 176.3 million tons of milk annually, as in the year 2018. Milk production in India is highly seasonal. The basic ingredients are Milk, Almond gum, Basil seeds, Indian *Sarsaparilla* (nannari) root syrup, Tutti fruity and it is topped with ice cream. Jigarthanda is quite similar to famous Falooda; this drink is made from a mixture of basil seeds, rose water, water and sugar. Basil seed is one of the important ingredients in Jigarthanda.

Basil (*Ocimum basilicum)* is an annual spicy herb, indigenous to India which has been cultivated for several millennia for its aromatic and medical uses. Sweet basil (*Ocimum basilicum*) is well known and appreciated spice and medicinal plant. Apart from biologically active compounds, such as volatile oils, tannins, terpens, flavonoids or glycosides, it is also a valuable source of macro and micro elements. Rich chemical composition as well as unique taste and flavour have recently gained basil a significant position and diverse use in polish cuisine. Basil's leaves are used as spiced both when fresh and after being frozen or dried. The sweet basil seeds do resemble the chia seeds and is known by the names Sabja seeds or Falooda seeds or Tukmaria in India. They are basically the seeds of the sweet basil. Sabja seeds are most commonly used in making Jigarthanda and can be easily added to sherbets, milkshakes and other drinks. Although these sweet basil seeds do not have taste of their own but they give a good texture to the dish and make it healthy too. At present many of the regional specific milk products have been overlooked and neglected. But, this product can cool our body down by reducing its temperature and give the nutritional accomplishment in our diet at a feasible price. As such products like Jigarthanda do not have any recommended standards in dairy industry. Looking towards the enormous acceptance of this product and wide market for it, there lies need to specify the standard for this product. The number of ingredients (fruits, colors, flavours, ice-cream, basil seeds etc.) used in preparation varies according to place and consumer's demand. But the basic ingredients, almond gum, basil seeds, ice-cream and milk are found to be common.

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2. Materials and methods

2.1 Almond gum
Almond gum or Almond rubber or Almond paste is the natural rubber obtained from sweet almond tree. The tree botanical name is *Prunus dulcis* sweet almond. The gum that secretes from the bark of the almond tree dries up to form small light golden brown hued hard granules. This almond gum was purchased from margin free markets and stored at room temperature.

2.2 Full Fat chilled milk
The raw milk was bought from CFDT dairy plant and used for the preparation of Jigarthanda.

2.3 Ice cream
Vanilla flavoured ice cream was purchased from Koduvalli dairy plant, athipet markets and stored at refrigerators.

2.4 Syrup
Nannari syrup is famous for making Jigarthanda. It is also known as sugandi and made from *Sarsaparilla* root, a pleasant smelling herb. Different syrups (Nannari, Pineapple, Rose) was purchased from CFDT Fruit processing plant and stored at room temperature.

2.5 Basil seeds
Seeds of sweet basil plant are called basil seeds or tukmaria seeds. This seeds are purchased from margin free markets, Broadway and stored at room temperature.

2.6 Tutti frutti
Tutti frutti is made from processing and drying of different fruits. It was purchased from margin free markets, Red hills and stored at refrigeration temperature.

2.7 Chemicals used
The chemicals and reagents used were of analytical grade, which was purchased from Hi Media Laboratories Pvt. Ltd., Mumbai. They are Petroleum ether, Ammonium hydroxide, Ethyl alcohol, Diethyl ether, Phenolphthalein indicator, 0.1 N Sodium hydroxide, Conc. Sulfuric acid, Catalyst mixture (cupric sulphate: potassium sulfate,0.5:4.5)
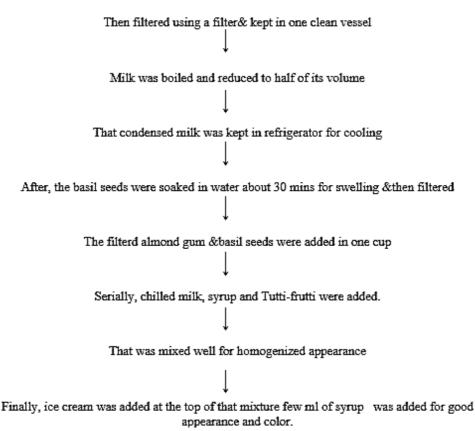
2.2.1 Methodology
Jigarthanda was prepared by using overnight soaked almond gum, basil seeds, condensed chilled milk, ice cream, concentrated syrups and tutti-frutti.

Table 2.1: Ingredients required for making 100g of Jigarthanda.

Ingredients	Nannari flavoured sample(T_2)	Pineapple flavoured sample (T_2)	Rose flavoured sample (T_2)
Almond gum	50g	50g	50g
Milk	10 g	10g	10g
Ice cream	25 g	25g	25g
Basil seed	5g	5g	5g
Syrup (nannari/pine apple/ rose)	8g	8g	8g
Tutti frutti	3g	3g	3g

2.2.2. Flow chart for the preparation of jigardhanda
Almond gum was soaked in a litre of water for overnight period

Then filtered using a filter& kept in one clean vessel

↓

Milk was boiled and reduced to half of its volume

↓

That condensed milk was kept in refrigerator for cooling

↓

After, the basil seeds were soaked in water about 30 mins for swelling &then filtered

↓

The filterd almond gum &basil seeds were added in one cup

↓

Serially, chilled milk, syrup and Tutti-frutti were added.

↓

That was mixed well for homogenized appearance

↓

Finally, ice cream was added at the top of that mixture few ml of syrup was added for good appearance and color.

3. Results and discussion

In the various research reports published, very little information is available on these aspects. Therefore research methodologies in this aspect required to be pretested and standardized. The results obtained during the course of present investigation in relation to the sensory and chemical attribute for different treatments are presented and collected data are tabulated, statistically analyzed and results have been discussed as follows,

3.1 Chemical composition of raw milk

The milk procured from dairy plant was analyzed for its chemical composition.

Table 3.1: Chemical composition of milk

Constituent	Percent
Fat	4.0
Protein	3.43
Carbohydrate	4.45
Ash	12.53
Total solids	0.65
Acidity	0.13

The data presented in Table 3.1 reveal that, milk used for preparation of Jigarthanda had on an average 4.0 per cent fat, 12.53 per cent total solids and 0.13 per cent acidity. Similarly protein, lactose, and ash content were observed to be 3.43, 4.45 and 0.65 respectively. But the condensed chilled milk only added at the time of preparation. So that milk was condensed half of its original volume.

3.2 Chemical parameters of Jigarthanda with different flavour

The chemical parameters of Jigarthanda with different flavours were analysed after preparation. The chemical parameters analysed are Moisture content (%), Fat content (%), Protein content (%), Carbohydrate content (%), Ash content (%), Acidity and TSS by AOAC methods. The proximate composition of Jigarthanda and energy values was calculated. The values are given in the table below.

Table 3.2: Chemical composition of Jigarthanda

Sample Name	CHO (%)	Protein (%)	Fat (%)	Ash (%)	Moisture (%)
T_0	11.14	1.91	3.55	0.40	83
NT_2	11.73	1.75	3.19	0.33	83
PT_2	9.97	1.68	3.98	0.37	84
RT_2	10.16	1.64	3.84	0.36	84

Fig 3.2: Jigarthanda with different flavors

3.2.2 Fat content Jigarthanda samples

Fat content of Jigarthanda samples Con T_0, $NanT_2$, Pine T_2 and Rose T_2 are 3.55%, 3.19%, 3.98% and 3.64% respectively.

3.2.3 Protein content Jigarthanda samples

Protein content of Jigarthanda samples for Con T_0, $NanT_2$, Pine T_2 and Rose T_2 were analysed.

3.3 Microbiological analysis for the Jigarthanda samples

All the samples were packed in air tight container after product preparation. These products were stored under refrigeration condition. Then the Jigarthanda samples were analyzed for microbial parameters.

3.3.1 Analysis of microbial content in the Jigarthanda sample

The data with respect to Total plate count (CFU/ml), Coliform counts (CFU/ml), and Yeast and Mold were given in Tables. The comparative study was conducted during of 1, 3 and 5 days respectively. This analysis revealed that there was growth in the Total plate count in the test sample and no growth in the E.Coli test sample.

Table 3.3: Total plate count of all flavoured jigarthanda sample

S. No.	Sample name	Total plate count					
		0th day		3th day		5th day	
		10^{-4}dil	10^{-5}dil	10^{-4}dil	10^{-5}dil	10^{-4}dil	10^{-5}dil
1	Control T_0	Nil	Nil	23	21	29	24
2	Nan T_2	Nil	Nil	43	24	56	29
3	Pine T_2	Nil	Nil	61	42	68	51
4	Rose T_2	Nil	Nil	22	14	33	17

3.3.2 Analysis of Yeast and Mold count in raw materials for the Jigarthanda

Almond gum and Basil seeds are used as primary raw ingredients in the preparation of Jigarthanda. They are purchased in dried condition, then soaked in water to get suitable texture for the preparation of Jigarthanda. The water content of dried almond gum and basil seeds is very less. Due to low water activity, it may contain yeast and mould. Hence, was analyzed for the presence of Yeast and Mold.

Table 3.4: Analysis of Yeast and Mold count in raw materials for the Jigarthanda

S. No.	Parameter	Control sample, Nannari, Pine apple and Rose flavoured Jigarthanda sample		
		0th day	3th day	5th day
1	E. Coli	Nil	Nil	Nil

3.3.3 Shelf life of Jigarthanda

The prepared Jigarthanda was packed in air tight plastic container. It was kept in refrigerated condition at 4^0C. The shelf life of jigarthanda has one week stability. There was no physical and chemical instability.

3.3.4 Sensory evaluation of Jigarthanda

The paper mainly focuses to standardize the technique of the Jigarthanda. Standardization data about Jigarthanda may be helpful to know the technique of Jigarthanda preparation, develop the new processing methods and to enhance equipment designing in industrial level. Proper standardization will help to trade of traditional dairy product

and enhance the traditional dairy products from small scale level to large scale level.

4. Discussions and conclusion

The present study was done under the title of Development and standardization of Jigarthanda to standardize the technique of Jigarthanda. By generating the basic data of standardization of Jigarthanda will helpful to design new equipments and innovation in new processing method on traditional dairy product and packaging methods. It may helpful to trade the traditional dairy products from small scale to large scale. Fat content in Jigarthanda samples differed significantly. The combination of almond gum and basil seeds was non-significant on fat content of Jigarthanda. This may be due to low fat content in the almond gum and basil seeds. Protein content in Jigarthanda samples differed significantly.

The lowest protein content was observed in the combination with rose syrup had 1.64%, while the combination with nannari had the highest 1.75%. Protein mainly got from condensed milk and ice cream. Carbohydrate content in Jigarthanda samples differed significantly. But the interaction effect of the almond gum and basil seeds used was non-significant. Slight changes may be due to syrup. The Carbohydrate content of Jigarthanda was lowest in combination with pine apple syrup (9.97%) while it was highest in combination with nannari (11.73%). The Ash content of Jigarthanda sample varied non significantly. The difference in ash content values is very less. The ash content of Jigarthanda sample was lowest in combination with nannari syrup (0.33%) and highest in combination with pine apple syrup (0.37%).

Sensory evaluation of any food samples includes appearance, color, flavor and texture. Color and appearance of Jigarthanda samples mainly affected by concentration of syrup and type of syrup added. In pretreatment trials, the syrup added at 8% and 10% concentration level. The 10% level gives more color. But the 8% concentration gives more appealing color. It was observed on sensory evaluation by 9 point hedonic scale. In sensory evaluation, flavor includes odour and taste. All samples have good acceptability in case of odour. But pine apple flavoured Jigarthanda sample @8% level was mostly preferred based on sensory evaluation using 9 point hedonic scale. Overall acceptability includes all sensory characteristics of sample. Based on sensory evaluation using 9point hedonic scale, 50% and 5% combination of almond gum and basil seed with 8% syrup concentration was accepted.

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