



PREPARATION AND STANDARDIZATION OF JAMUN JAM (*SYZYGIUM CUMINI* L) IT'S CHEMICAL AND STORAGE STUDIES.

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ABSTRACT

Jamun fruit is enriched with nutritive values. It has various ayurvedic and medicinal uses. Jamun should be used in the form of value added food products due to its nutritional property. The Jamun Jam was prepared and preserved by boiling Jamun pulp with water and sugar up to 68.3 to 68.5 % TSS. Nutrient analysis Carbohydrates (58.11%), Protein (1.04%), Lipid (0.15%), Ascorbic acid (11.17mg) and Moisture (32%) carried out for Jamun Jam. The result of storage studies of jamun Jam showed increased in TSS and acidity. In three month storage period Jam decreased its pH as well as Ascorbic acid Properties slightly. The overall acceptability of Jamun Jam is good up to 3 months.

KEYWORDS: Jamun, medicinal use, value addition, sensory evaluation, nutritive evaluation. Quality analysis.

INTRODUCTION

Jamun (*Syzygium cumini* L. Skeels/ *Eugenia Jambolana* Lam) is an evergreen tropical tree which belongs to family 'Myrtaceae'. Jamun It is commonly known as Black Plum, Jambhul, Java Plum, Indian Blackberry, Jamb lag, Jambu, Jamboola in various regions of India. It is identified as important dry land fruit crops of India. The origin of Jamun is considered to be India and Indonesia.

The Jamun is prolific and regular bearer tree. It starts flowering from March-April followed by fruiting (berry), which appears in May-June. Fruits ripen in June-July or on the onset of rains and takes about 3-4 months to ripen after full bloom. Fruit color change from green to

deep-red or bluish-black at full ripening stage. Berry appears oblong, ovoid and crimson black in color when fully ripe. Fruits from grafted tree are large and deliciously sweet but slightly sour in taste (Pathak and Pathak, 1993).

This fruit is mostly considered as a minor dry land fruit crop but, because of its high nutritional value and excellent processing qualities, it is now gaining popularity in sub-tropics and arid region of the country. India is the second largest producer of the fruits in the world. World production of Jamun is estimated to 13.5 million tones, out of which 15.4% is contributed by India. India ranks second in production of Jamun in the world. Maharashtra state is the largest Jamun producer (Anon., 2005).

There are several fruits like Jamul, which having indigenous origin has tremendous potentiality for value-addition due to their medicinal properties and high processing qualities. Jamul has special significance for medicinal properties. It also pertains to better antioxidant, antibacterial, anticarcinogenic, cardiovascular properties. Jamun fruits are universally accepted for medicinal purpose especially for curing diabetes because of its good effects on pancreas (Joshi, 2001). The fruit or its juice and the seed contain a biochemical called 'jamboline' which is believed to check the pathological conversion of starch into sugar in case of increased production of glucose in blood of human body. The daily use of fruit will be useful for radical cure from the various diseases. Jamun has therapeutic and neutroclinical values. It is highly useful against bleeding piles, correcting liver disorders, jaundice, kidney stone, asthma, blood pressure etc. (Joshi, 2001).

It is a good remedy for cough, constipation, diarrhea, dysentery and germs. The unripe fruit juice is stomachic, carminative and diuretic in nature and has cooling and digestive properties (Kirtikar and Basu, 1975). The technology of postharvest handling bridges the gap between the producer and the consumer-a gap often of time and distance. Postharvest handling involves the practical application of engineering principles and knowledge of fruit and vegetable physiology to solve problems. Besides this, the Jamun fruit has excellent processing qualities for pulp and seed. Fruits are extensively used for the preparation of preserves, jams, squashes, jellies, wine, vinegar, juice etc. (Khurdiya and Roy, 1985).

Jamun is an underutilized fruit crop, gaining popularity among the consumers due to its high neutroclinical values in rural as well as in urban masses. In addition, the ripe berries are good source of anthocyanins, vitamins, minerals, iron and pectin with fair amount of ascorbic acid.

Fruit juice and preserve also hold an important position due to their richness in essential minerals, vitamins and other nutritive constituents. Being delicious and appealing, they have great demand and are appreciated by people of all age groups. It would provide numerous benefits to consumers as well as farmers. In view of the rising demands for natural and organic products, fruit juice and preserve have great scope. Though, there is a maximum availability of raw material or Jamun fruits harvested, it cannot be fully utilized, consumed or processed due to lack of processing techniques and technical know-how. Being highly perishable fruit and its short life, it deteriorates at a very faster rate if proper post harvest handling practices and processing techniques are not adopted. The storage life of Jamun fruits restricted to only 24 hrs at room temperature and 12 days at cool temperature *i.e.* 3 to 4 °C (Ramanjaneya, 1985).

Jamun falls in underutilizing fruit species which are neither cultivated in an organized farming system, nor processed by established commercial processing methods. Jamun has almost an exotic flavor and are known for their nutritional and therapeutic values. Jamun fruits, although produced in considerable quantities and consumed, but seldom processed. There is a great scope of the processed products not only because of their exotic flavor, but also due to their nutraceutical importance (Kannan and Thiruman, 2004). Thus, processing of Jamun fruit into value-added products result in a wide variety of exotically flavored products with better nutritional and sensory qualities may unveil new market for export. Therefore, development, standardization and popularization of value-added products from Jamun fruit are essential.

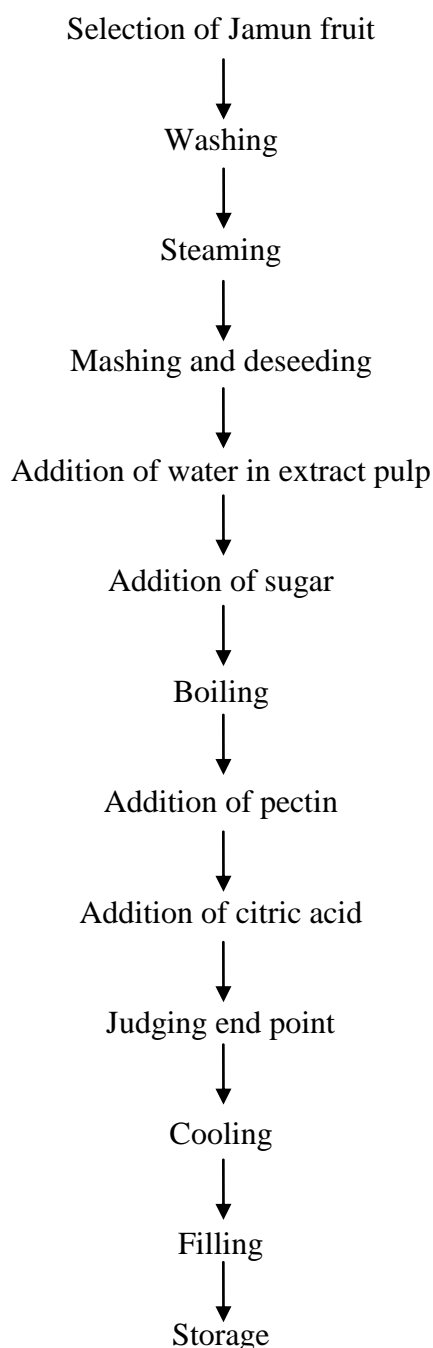
MATERIALS AND METHODS

Ingredients

Ingredient like Jamun fruits, sugar, pectin, citric acid perched from Kalyan super market. Preparation and analysis of Jam was carried at college of food technology Saralgaon, Thane.

Chemicals and Equipments

Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from FST, FCN, FIM, FE Department, College of Food Technology Saralgaon, Thane.

Preparation of Jamun Jam**Flowchart 1: Flow sheet for preparation of Jamun Jam.**

For the experimentation, fully-ripened and uniform sized crimson black color, fresh fruits of Jamun were procured from the market. The selected fruits were thoroughly washed with clean tap water to remove dirt and dusts particles adhered to the pericarp of the fruit and crushed manually without damaging the seeds. The extracted pulp without seeds was heated to 50°C for 5 min. then passed through a fine muslin cloth. The fruits were deseed manually one by one & steamed Jamun fruits were meshed by using mesh into fine pest. The process

was followed by addition of water and sugar where added frequently in the pulp for the preservation and to increase consistency, taste of the Jam. The mixture was boiled with continuous stirring at low flame for about 10 to 15 min. The pectin was added to increase the % of artificial pectin Jam & also to get desired consistency of jam. Citric acid was added as a preservative to increase the shelf life of the jam. The end point of jam is judged by TSS at the level of 68.3 to 68.5% by using hand Refractometer also considered temperature is 110 to 121 °C. Cooled jam at room temperature. Filling Jam into hot sterilized glass bottles and stored at ambient temperature.

Formulation of Jamun Jam

The sample T₀ is the control in proportion of fruit pulp and sugar is 50:50. T₁, T₂, T₃, Sample were prepared by the different proportion like T₁ (45:55), T₂ (55:45) & T₃ (60:40) the jam was taken for the sensory analysis. There were 4 replications for each treatment.

Table 1: Formulation of Jamun Jam.

Parameter	T ₀ (Control)	T ₁	T ₂	T ₃
Pulp	500gm	450gm	550gm	600gm
Sugar	500gm	550gm	450gm	400gm
Water	500ml	450ml	400ml	350ml
Pectin	1gm	2gm	3gm
Citric Acid	1.5gm	1.5gm	1.5gm	1.5gm

The table 1 shows the proportion or the variation which had been done during research. There were 3 samples (T₁, T₂, T₃) taken for the studies and the analysis. The proportion of Pulp: Sugar₂ Where adjusted accordingly and the result where noted. The proportion of water, pectin and citric acid where placed constant After Formulation of T₁, T₂, T₃, was recorded for final evaluation. T₂, with the proportion 55% pulp & 45% sugar was selected for the final product all sensory (color, aroma, texture, sweetness, acceptance) parameters where found better in the sample. The storage property was good. Where above in T₀, T₁, T₃, sample we found some changes in color, flavor, & general acceptance. In T₀ trail the overall sensory attributes where not so good. The jam was no properly set & we found the appearance of sugar crystals in the trial so the jam was rejected. In T₁ trial the storage ability was not so good, after some days we found slightly pungent smell in the jam so the T₁ trail was rejected.

Standardization of product was done by using the standard T₂ sample means fruit pulp and sugar concentration in 55:45 proportion. It was gives better color, good test, best texture that means overall sensory for product was best.

Organoleptic Evaluation

The organoleptic evaluation with respect of colour, flavour, texture, were evaluated by Ten trained/semi trained judges using 9 point hedonic scale

Nutritional analysis

Storage studies of T₂ sample was done to check the shelf life of the product and other physico-chemical parameters like pH, acidity etc. The sample was packed in Plastic Container packaging material and kept for 90 days we observe the changes during the 30 days interval.

Quality analysis

Protein content through Kjendhal method, Fat was estimated by soxhlet method, Carbohydrates, Crude fiber, Moisture and Ash was determined by AOAC, (2002). Ascorbic acid and Acidity estimated through Ranganna, (1986). TSS is measured by refractometer. pH is measured by digital PH meter.

Packaging material

To sample of Jam base for present study were packed in packaging marterials namely Plastic container. In this material Jam was packed by employing retorting treatment and then kept in ambient condition. Packaging material purchased from Saralgaon local market.



Fig. 1: Jamun Fruit.



Fig 2: Packaging of Jam

Statistical Analysis

Means and standard deviation were subjected to analysis of Variance (ANOVA) to see if there is significant difference among the treated samples of jam.

RESULT AND DISCUSSION

Sensory evaluation

In the sensory analysis T₂ showed best results in color (8), appearance (8.5), texture (7.5), taste (8) and overall acceptability (8) score was noticed. The least sensory score observed for T₃ samples.

Table 2: Sensory evaluation of Jamun Jam.

Sample	Color	Appearance	Texture	Taste	Overall Acceptance
Control (T ₀)	7.5±0.49	6±0.52	6±0.12	6.5±0.15	6.5±0.45
Sample(T ₁)	7±0.48	7±0.50	8±0.69	7.5±0.45	7.5±0.95
Sample(T ₂)	8±0.52	8.5±0.45	7.5±0.85	8±0.19	8±0.64
Sample(T ₃)	6.5±0.12	6±0.56	5.5±0.46	6±0.78	6±0.95

Organoleptic evaluation

Colour of the product is the first clue its identity and often a prediction of the degree of satisfaction or pleasure to be derived while eating it. As is evident from the table, the colour score were higher for the jam is 8.09. Texture scores thus obtained also had the same trend. Maximum value was obtained 8.12. Mean scores for taste were also good for glass pack scoring 7.66. The average overall acceptability is 7.89.

Table 3: Organoleptic evaluation of Jamun Jam with different days storage period.

Parameter / Days	0	30	60	90
Colour	8.09	8.51	8.50	8.00
Appearance	7.17	8.00	7.60	7.75
Taste	7.50	7.88	7.50	7.75
Texture	7.56	8.12	8.05	7.89
Overall acceptability	7.59	8.24	7.94	7.79

Physicochemical evaluation

The amount of ascorbic acid is one of the important parameter of jam to test their nutritive value. The initial vitamin C noted in jam was 11.17 mg/100g which decreased to 10.27 to 7.28mg/100g respectively. The loss of vitamin C due to oxidation to light was higher. After processing, the ascorbic acid content in Jamun jam decreased with increase in storage period up to 90 days at ambient condition.

Table 4: Nutritional evaluation of Jamun Jam for 90 days storage period.

Sample	0 day	30 days	60 days	90 days
TSS	68.5±0.12	68.7±0.56	68.8±0.45	69±0.96
PH	3.75±0.15	3.52±0.85	3.35±0.62	3.40±0.45
Acidity	0.34±0.15	0.80±0.96	1.10±0.45	1.24±0.56
Ascorbic acid	11.17±0.96	10.27±0.80.	9.60±0.45	8.05±0.45

The acidity in Jamun jam increased with the recipe treatment at increasing period of storage up to 90 days under ambient condition. The Pronounced oxidative changes might have been responsible for the increased acidity in polypack samples. Similar results are also reported by Ghai (2002) and Sood (2000). The initial pH was 3.75 that decreased to 3.52, 3.35, 3.40, 3.00 in glass bottle. The decrease in pH might be due to the breakdown of organic acids. A similar observation was also made by Kalra and Revanthi in (1981). The TSS increase was higher in glass bottles during the storage. The increase in TSS might be due to solubilization of solids. The same observation was also observed by Prasad and Mali (2000) and Sangita Sood, (2015) with the increasing storage time.

Nutritional composition

The nutritional composition of jamun jam showed carbohydrates (58.11%), protein (1.04%), lipid (0.15%), vitamin C (11.17), moisture (32%), ash (0.2%), energy (583.23 k.cal) (Table 5).

Table 5: Approximate nutritional composition of Jamun Jam.

PARAMETERS	COMPOSITIONITION (%)
Carbohydrates	58.11±3.45
Protein	1.04±2.78
Lipid	0.15±0.15
Vitamin- C	11.17±2.65
Moisture	32±1.99
Ash	0.2 ±0.12
Energy	583.23 kcal± 5.75

CONCLUSION

Jam product prepared from Jamun have a good nutritive value along with storage life. Storage studies showed 90 days for safer to consumption. Therefore, the products prepared from such local and medicinal fruit will be beneficial in all the ways for the farmers providing job opportunities as well as to the health conscious subjects with variety.

The recipe having 55 per cent Pulp, 68.5 per cent TSS and 0.3 per cent acidity was found to be superior for Jam preparation in respect to commercial scale. It contained highest ascorbic acid and organoleptic score as compared to other recipes during storage.

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