



Utilization of Jamun Fruit (*Syzygium cumini*) for Production of Red Wine

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Abstract: Jamun (*Syzygium cumini*) fruit was utilized for the production of red wine which is offering a lot of health benefits by acting as an effective medicine. The alcohol content of wine varied from 6.62 to 10.25 depending upon the variable concentration of total soluble sugars (7.88 to 10.53%) and varying levels of yeast (5, 10, 15 and 20%). *Saccharomyces cerevisiae* was used in the process of fermentation. The wine that had 8.22% alcohol obtained by fermentation with 10% yeast level, 8.18% TSS (Treatment T2) was considered to be the best acceptable when compared with others (T1, T3 and T4 Treatments). This wine was found to be the best by the panel members with respect to colour, taste, astringency and flavour. The wine that had 6.62% alcohol obtained by fermentation with 5% yeast level, 7.88% TSS was considered to be the least preferred and less acceptable when compared with others. No significant changes were observed in colour and clarity of wine obtained with 5% addition of yeast. However, with 5% addition of yeast, the taste, flavor and astringency attributes of wine were the least preferred when compared with others. The highest test score for taste, flavour and astringency properties was obtained for Treatment (T2). The time required for fermentation was 7 days at $28 \pm 2^\circ\text{C}$. The wine obtained with 15% (9.16% alcohol content) and 20% (10.25% alcohol content) yeast levels were found to have moderately acceptable scores.

Keywords: Jamun fruit, Red wine, Yeast (*Saccharomyces cerevisiae*).

1. Introduction

Jamun (*Syzygium cumini*) fruit is an important member of the family Myrtaceae. It is considered to be indigenous to India and the West Indies, being cultivated in the Philippines, West Indies and Africa. Its tree is tall, evergreen and is generally grown as an avenue or as wind north to Tamil Nadu in South. It is also found in the lower range of the Himalaya and Kumaon hills in India. The fruits are a good source of iron and are used as an effective medicine against diabetes, heart and liver trouble. There is no improved variety of Jamun for commercial cultivation. However, the most common type grown in north India is known as Rajamun. This is a large fruited type with oblong deep purple colours (having small seed) which are available in the month of June-July. A Selection known as Narendra Jamun-6 with desirable traits has also been identified at Faizabad (Shrivastava and Kumar, 2009).

India is the second largest producer of the fruit in the world. World production of Jamun is estimated at 13.5 million tonnes 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 followed by Uttar Pradesh, Tamil Nadu, Gujarat, Assam and others. The mainly "Konkan bahadoli" variety are famous. This variety cultivated especially in Konkan region (Anonymous, 2005).

Ripe Jamun contains approximately 83% water with almost solids 14% containing a mixture of fermentable sugar. The pulp of Jamun contains appreciable amounts of fermentable sugar, which can be used for alcoholic fermentation (Kraus, 2003).

India is a major producer of Jamun. However, tremendous quantities of Jamun are lost either through rainfall or in sorting and grading to meet quality standards for the fresh fruit export market, which could otherwise be used for processing. In India alone wastage of Jamun is 0.5 MT. A large quantity of

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marketable surplus fruit is available in all Jamun growing regions which need to be processed and be converted into value-added products.

Since the fruit is a very rich source of anthocyanin, it imparts antioxidant properties too. In view of these many medicinal and therapeutic properties of Jamun fruit and because of its short availability period, an attempt has been made in this study to prepare wine from Jamun fruit juice with the wine yeast, *Saccharomyces cerevisiae* and evaluate the sensory attributes (taste, aroma, flavour, colour/appearance and aftertaste). The Proximate Composition as indicated by Chowdhury and Ray (2007) is presented in Table 1.

2. Materials and Methods

2.1 Jamun (*Syzygium cumini*) fruit collection

The good quality fully ripened Jamun (*Syzygium cumini*) fruit were collected from College of Horticulture, Kharawate-Dahiwali. Sorting out good quality fruits and weighed and Washing and cleaning with tap water and blanching. The juice extracted with help of pressing and then filtered in muslin cloth.

2.2 Fermentation process

Jamun juice filtered through muslin cloth and adjustment of TSS (24°Bx.), acidity (0.7%) by adding sugar and citric acid, diammonium phosphate and sodium metabisulphite was carried out. The yeast *Saccharomyces cerevisiae* at varying levels (T1 5%, T2

10%, T3 15%, and T4 20%) was inoculated and allowed for 7 days for fermentation at $28 \pm 2^{\circ}\text{C}$.

Table 1. Composition of Jamun fruit (per 100g).

Composition	Value (gm)
Moisture	83.20
Reducing sugar	14.00
Crude fibre	0.90
Ascorbic acid	0.25
Anthocyanin	0.14
Ash	0.33
Nitrogen	0.13
Tannin	1.90
Fat	0.30

2.3 Physicochemical analysis of Jamun and its juice

The ripened Jamun fruit was analyzed for the various physicochemical Characteristics, Viz. moisture, protein, fat, carbohydrate, vitamin C, pH, TSS, Acidity and alcohol by standard methods described by A.O.A.C. (1990).

2.4 Sensory evaluation

The sensory evaluation of wine was carried out by semi-trained panel member. Judgments were made through rating products on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9' like extremely' to 1' dislike extremely'. Characteristic scores for the Jamun wine were colour, flavour, taste, clarity, astringency and overall acceptability. The flow chart for making Jamun wine is represented below in Fig. 1.

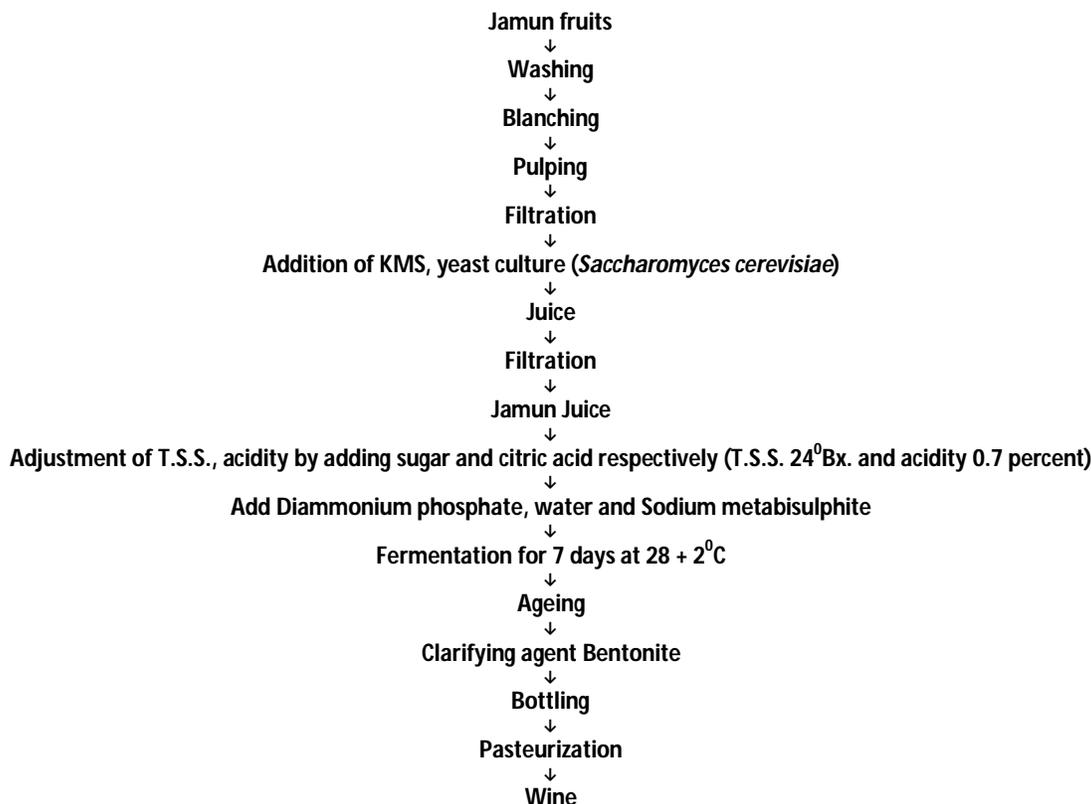


Fig. 1. Flowchart for making Jamun wine.

3. Results and Discussions

The result obtained on chemical analysis of ripened Jamun used for wine preparations is presented in Table 2.

Table 2. Chemical composition of ripened Jamun.

Parameter	Value
Moisture	61.4%
Carbohydrate	14.0%
Protein	0.7%
Fat	0.3%
Vitamin C	0.037%
TSS	10.5 ⁰ Bx
pH	3.2
Acidity	1.3%

The average weight of fully ripe Jamun fruit was 11.0g, which consisted of pulp (8.8g) and seed (2.2g). The yield of pulp was found to be 80% and waste of 20%. From above observations, it can be seen that Jamun contained lower percent of waste in the form of seed. Jamun pulp showed to have TSS of 10.5⁰Bx, pH of 3.20 and acidity of 1.3%. The findings were in good agreement with Chavan (2008) who reported 81.6% pulp, 19.4% seed, T.S.S. of 12⁰Brix, acidity of 1.3% and pH of 3.20 in local variety of Jamun fruit. The physicochemical characteristics of the Jamun fruit wine obtained are presented in Table 3. As indicated in the flowchart, the initial TSS (⁰Brix) was maintained at 24⁰Bx.

The different treatments T1 to T4 were prepared by varying the concentration of yeast addition.

Table 3. Physicochemical characteristics of the Jamun fruit wine.

Treatment	TSS (⁰ Bx)	Acidity (%)	pH	Alcohol (%)
T1	7.88	0.56	3.44	6.62
T2	8.18	0.61	3.25	8.22
T3	9.31	0.70	3.00	9.16
T4	10.53	0.83	2.86	10.25

T1 - yeast (*Saccharomyces cerevisiae*) 5%, T2 - yeast (*Saccharomyces cerevisiae*) 10%, T3 - yeast (*Saccharomyces cerevisiae*) 15%, and T4 - yeast (*Saccharomyces cerevisiae*) 20%.

The effect of fermentation on total soluble solids and alcohol percentage of Jamun wine after adding yeast at 5, 10, 15 and 20% levels were studied for a period of one week and results are furnished in Table 3. The data depicted in Table 3 revealed that the T.S.S. decreased from 24⁰Brix to the range of 7.88⁰Bx to 10.53⁰Bx. Similarly, the alcohol content increased from 0 percent to 10.25%. The results also indicated that the reduction in T.S.S. was faster in the initial stage of all the samples than in the later periods. The colour scores were higher for T2 and T3. The sensory evaluation of the Jamun fruit wine is presented in Fig. 2. The sensory results obtained for colour revealed that wine with dark purple colour was the most preferred by panel members. No significant changes were observed in colour and clarity of wine with 5% addition of yeast. However, with 5% addition of yeast, the taste, flavour and astringency attributes of wine became less acceptable compared to 10% yeast addition as evidenced by the test score for taste, flavour and astringency properties. The wines prepared with 15% and 20% yeast was found to have least score (Fig. 2).

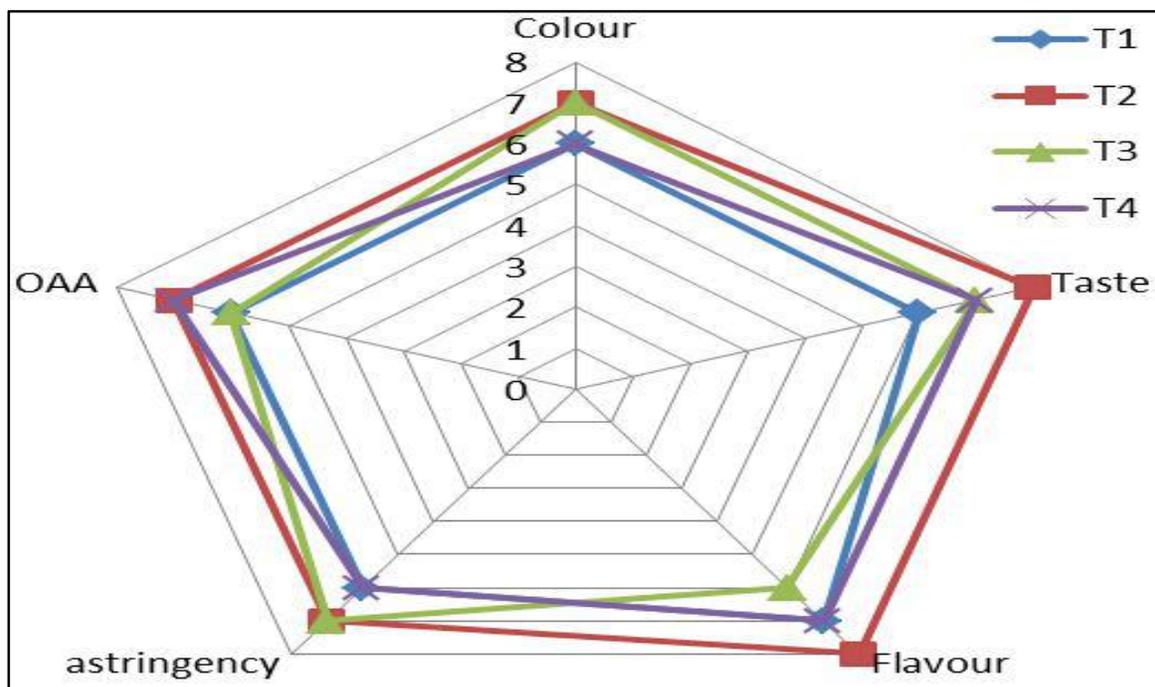


Fig. 2. Sensory evaluation of the Jamun fruit wine.

Table 4. Production Cost of Jamun fruit wine.

S. No.	Materials Required	Quantity	Rate (Rs.)	Amount (Rs.)
1	Jamun fruit	10 kg	2/kg	20.00
2	Juice extractor	1 worker	80/day	80.00
3	Sugar	1 kg	35/kg	35.00
4	Blancher	1 worker	80/day	80.00
5	Chemicals (all)	30g	-	70.00
6	Glass bottle	12	2.50	30.00
7	Total cost	-	-	315.00
8	Additional charges	-	-	150.00
9	Excise duty	12 bottle	3.00/ bottle	36.00
10	Total	-	-	501.00
11	Tax	-	-	120.00
12	Profit	-	-	250.00
13	Total	-	-	871.00
14	Production cost of 1 bottle (650ml)	-	-	72.58

For the development of any technique, the most important factor is the cost of production of the product. The cost of production of the product is Rs. 72.58/650ml bottle and the results are presented in Table 4.

From the results of the above study, it is evident that the Jamun fruit which is generally underutilized can be exploited for the production of red wine which has been a good source for combating several diseases and disorders.

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References

- [1]. Anonymous, (2005). *Jamun production trends in India and World*. Market updates fruits.
- [2]. AOAC, (1990). Official method of analysis: Fifteenth edition. Association of Analytical Chemists, Washington DC.
- [3]. Chavan, V.D. (2008). Fruit-based fermented beverages. *Beverage and food world*, 40(1): 40-43.
- [4]. Chowdhury, P. and Ray, R.C. (2007). Fermentation of Jamun (*Syzygium cumini* L.) fruits to form Red Wine. *ASEAN Food Journal*, 14 (1): 15-23.
- [5]. Kraus, E.C. (2003). Home wine and beer making supplies: <http://www.eckraus.com>.
- [6]. Shrivastava, R.P. and Kumar, S. (2009). *Fruit and vegetable preservation*. Principles and practices, IBDC, New Delhi.