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Physicochemical, Proximate and Bioactive composition of Jamun (*Syzygium cuminii* L.) fruit

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Abstract

The aim of this study was to determine the physicochemical, proximate and bioactive composition of Jamun fruit. Jamun used in this study was observed dark purple in colour and oblong in shape. The physical parameters includes weight (g), length (cm), breadth (cm), specific gravity (value), volume (ml), pomace percentage (%), stone percentage (%) and juice recovery (%) was recorded to be 18.32g, 3.10cm, 2.87cm, 1.07, 17.12 ml, 17.85%, 28.45% and 53.70% respectively. The values for moisture (%), protein (%), fat (%), ash (%), crude fiber (%) and carbohydrate (%) content of jamun was found to be 81.35%, 1.26%, 0.29%, 0.85%, 1.05% and 15.2 % respectively. The parameters like pH, TSS ($^{\circ}$ B), titratable acidity (%), total sugar (%), reducing sugar (%) and non-reducing sugar (%) was found to be 3.10, 14.00 $^{\circ}$ B, 0.87%, 13.40%, 10.67 % and 2.73% respectively. The bioactive composition like ascorbic acid (mg/100g), anthocyanins (mg/100g), tannin (mg/100g), total phenols (mg GAE/100g) and antioxidant activity (%) of jamun was found to be 21.48 mg/100g, 185.35 mg/100g, 168.24 mg/100g, 2133.50 mg GAE/100g, and 95.81% respectively.

Keywords: specific gravity, stone percentage, juice recovery, titratable acidity, anthocyanin

1. Introduction

Syzygium cumini L., (syn. *Eugenia jambolana*, *Eugenia cumini* and *Syzygium jambolana*) is a polyembryonic species (family Myrtaceae). It is a large, evergreen widely distributed forest tree of India, Sri Lanka, Malaysia and Australia which is also cultivated for its edible fruits. The tree was introduced from India and tropical Asia to southern Africa for its edible and attractive fruits. It has been successfully introduced to many tropical countries like West Indies, East and West Africa and some sub-tropical regions like Florida, California, Algeria and Israel for its commercial importance [7]. Statistically, there is no record of commercial cultivation, and the fruit, therefore, is underutilized. However, in a very recent report it is mentioned that India contributes about 15.4% of total world production (13.5 Mt) [19]. 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 [15].

The jamun fruit has oval shape with 2-3 cm long containing a hard seed inside. The flavor of the fruit is astringent and it looks like blueberry in shape and color [4]. Knowledge of physical properties is important for proper harvesting, handling and storage practices of agricultural materials and proper processing and converting these materials into food and feed products [8]. Physical properties are often required for the development of post-harvest techniques to process them into value-added products [20].

Many other researchers studied the nutritive value of jamun fruit like minerals, vitamins, free sugars and amino acids [14]. Jamun fruit is reported to be rich in carbohydrates, minerals and vitamins and containing glucose and fructose as primary sugars. [5, 16].

Research studies accomplished in last twenty years has explored that jamun have an outstanding complex of naturally present antioxidant compounds [21]. Moreover, studies on bioactive components present in jamun have revealed that jamun has great nutritional and pharmacological potentials [17]. A huge amount of anthocyanins also present in fruit that exhibits good antioxidant characteristics [15]. Hence the present study has been undertaken to study the physicochemical, proximate and bioactive composition of jamun fruit.

2. Materials and Methods**2.1 Materials**

Jamun fruits of Konkan bahadoli variety were obtained from VNMKV Parbhani. Before analysis the fruits were washed with potable water,

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graded to separate the over and under ripe berries. All the chemical reagents used were of analytical grade and available at College of Food Technology, VNMKV, Parbhani.

2.2 Methods

The parameters like colour, shape, weight, length, breadth, volume, specific gravity, pomace percentage, stone percentage, juice recovery were measured according to the method [20]. pH value was measured by using pH meter and TSS by hand refractometer [18]. Acidity, Total sugar, reducing sugar and non-reducing sugar were determined according to [1]. Moisture, crude protein, crude fat, crude fiber and ash measured according to [3]. Carbohydrate content of jamun was determined according to [13]. Ascorbic Acid was determined using the standard procedure of [2]. Anthocyanin was estimated using method [22]. Total tannin and total phenols was determined according to Folin-Ciocalteu Spectrophotometric method [12]. Antioxidant activity was determined by DPPH (2, 2 di phenyl picryl hydrazyl) method according to [6].

3. Results and Discussion

Jamun fruit have different colour ranges from purple red, purple black and dark purple. Also, the fruit have different shapes like elliptic, ovoid, round and oblong. Table 1 indicates the physicochemical composition of jamun fruit. The jamun fruit used in this investigation was observed dark purple in colour and oblong in shape. The values for weight (g), length (cm), breadth (cm), specific gravity (value), volume (ml), pomace percentage (%), stone percentage (%)

and juice recovery (%) was recorded to be 18.32g, 3.10 cm, 2.87cm, 1.07, 17.12 ml, 17.85%, 28.45% and 53.70 % respectively (table 1). These values are less or more similar to findings of [9, 10, 20].

The parameters like pH, TSS (°B), Titratable Acidity (%), Total sugar (%), Reducing sugar (%) and Non Reducing Sugar (%) was found to be 3.10, 14.00 °B, 0.87%, 13.40%, 10.67 % and 2.73% respectively. These results are in agreement with the findings of [9-11].

Table 1: Physicochemical composition of Jamun fruit

Sr. No.	Parameter	Value
1	Colour	Dark purple
2	Shape	Oblong
3	Weight (g)	18.32
4	Length (cm)	3.10
5	Breadth (cm)	2.87
6	Volume (ml)	17.12
7	Specific gravity (value)	1.07
8	Pomace percentage (%)	17.85
9	Stone percentage (%)	28.45
10	Juice recovery (%)	53.70
11	pH (value)	3.10
12	TSS (°B)	14.00
13	Acidity (%)	0.87
14	Total Sugar (%)	13.40
15	Reducing Sugar (%)	10.67
16	Non Reducing Sugar (%)	2.73

* Each value is an average of three determinations

Table 2: Proximate composition of Jamun fruit

Sr. No.	Parameter	Value
1.	Moisture (%)	81.35
2.	Crude Fat (%)	0.29
3.	Crude Protein (%)	1.26
4.	Ash (%)	0.85
5.	Crude Fiber (%)	1.05
6.	Carbohydrate (%)	15.2

* Each value is an average of three determinations

Table 2 represents the proximate composition of Jamun fruit. The values for moisture (%), protein (%), fat (%), ash (%), crude fiber (%) and carbohydrate (%) content of Jamun were found to be 81.35%, 1.26%, 0.29%, 0.85%, 1.05% and 15.2% respectively (table 2). The values of moisture, protein, fat, ash, and crude fiber in that order of ingredients are found to be comparable to the values 82.19%, 2.15 %, 0.83%, 2.04% and 1.76% reported by [19] and in accordance with the findings of [11]

Table 3: Bioactive composition of Jamun fruit

Sr. No.	Parameter	Value
1.	Ascorbic acid (mg/100g)	21.48
2.	Anthocyanins (mg/100g)	185.35
3.	Total Tannin (mg/100g)	168.24
4.	Total Phenols (mg GAE/100g)	2133.50
5.	Antioxidant activity (%)	95.81

* Each value is an average of three determinations

Table 3 indicates the bioactive composition of Jamun fruit. Ascorbic acid (mg/100g), anthocyanins (mg/100g), total tannin (mg/100g), total phenols (mg GAE/100g) and antioxidant activity (%) of Jamun was found to be 21.48 mg/100g, 185.35 mg/100g, 168.24 mg/100g, 2133.50 mg GAE/100g and 95.81% respectively. These results are also

similar to [11]. Who observed that ascorbic acid 21.77mg/100g, anthocyanin 126.54mg/100g, total phenol 2250.91 mg GAE/100g and antioxidant activity 91.83% in Jamun fruit. Total phenol content and antioxidant activity are in agreements with the findings of [16] who determined the total phenolics in the range of 1175.17mg/100g to 2097.82 mg/100g and antioxidant activity had 96.55 % in Jamun fruit packaged under different modified atmosphere.

4. Conclusion

The aim of present investigation was to study the physicochemical, proximate and bioactive composition of Jamun fruit. The physical parameters are essential for designing of processing machineries and equipments. Jamun contains enough amount of anthocyanin. Anthocyanins can be used as natural food colorant in place of synthetic ones. It also contain appreciable amount of ascorbic acid, tannin and phenols thus Jamun fruit can be utilized for development of antioxidant rich, therapeutic and nutraceutical products.

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