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A CASE STUDY

Processing and value addition in jamun

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SUMMARY : Jamun (*Syzgium cumini*) is a fruit consumed by all sections of people in India. It is cheaply available and has certain medicinal properties too. The jamun seeds contain an alkaloid, jambosine, and a glycoside, jambolin or antimellin, which halts the diastatic conversion of starch into sugar. The seed extract lowered blood pressure by 34.6 per cent and this action was attributed to the ellagic acid content. It is widely used for the treatment of diabetes in various parts of world. Processing of jamun fruit into value-added products result in a wide variety of exotically flavored product with better nutritional and sensory qualities may unveil new market for export.

Key Words : Jamun, Jamun seed powder, Jamun vinegar, Jamun juice, Jamun wine

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*Eugenia jambolana (*Family Myrtaceae) *is* also known as *Syzygium jambolanum* and *Syzygium cumini*. It is commonly known as java plum, jambul, jamun, black plum, faux pistachier, Indian blackberry, doowet and jambolan (Morton and Miami, 1987; Zaman and Shariq, 1995). Jamun is native to the subtropical Himalayas, India, Sri Lanka, Malaysia and Australia (Bose, 1985). Its fruits are delicious and have great importance in folk medicine (Chopera, 1956). The jamun is of wider interest for its medicinal applications than for its edible fruit. Different parts such as bark, fruit and seed possess medicinal and therapeutic values (Kirtikar *et al*., 1990; Noomrio and Dahot, 1996). Jamun fruit is one of those which contain a variety of important nutritional compositions. The jamun fruit contains 83.7-85.8g moisture, 0.7- 0.129g protein, 0.15-0.3g fat, 0.3-0.9g crude fiber, 14g carbohydrate, 0.32-0.4g ash, 8.3-15mg calcium, 35mg magnesium, 15-16.2 phosphorus, 1.2-1.62mg iron, 26.2mg sodium, 55mg potassium, 0.23mg copper, 13mg sulfur, 8mg chlorine, 80 I.U. vitamin A, 0.008- 0.03mg thiamine, 0.009-0.01mg riboflavin, 0.2-0.29 mg niacin, 5.7-18mg ascorbic acid, 7 mg choline and 3 mcg folic acid per 100 g of edible portion (Noomrio and Dahot, 1996).

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Medicinal uses:

The jamun seed possess many medicinal properties in Ayurveda system of medicine. The fresh seeds are most effective in diabetes as they quickly reduce sugar in urine (Zaman and Shariq, 1995). Jamun fruit is used for the prevention of diarrhea, stomachache, astringent, diuresis and diabetes. The fresh jamun juice is mixed with goat's milk and then given to children in diarrhea (Zaman and Shariq, 1995). It is also used for enlarged spleen, chronic diarrhea and urine retention. Water diluted juice is used as a gargle for sore throat and as a lotion for ringworm of the scalp. The extract of jamun seed lowers blood pressure more than 30 per cent and this action is attributed to the ellagic acid content of the extract (Morton

Table 1 : Nutrients and phytochemicals in Jamun

Sr. No	Particular	Value	Sr. No	Particulars	Value
1	Energy	251 kJ (60 kcal)	10	Vitamin B_6	0.038 mg (3%)
2	Carbohydrates	15.56 g	11	Vitamin C	14.3 mg (17%)
3	Fat	0.23 g	12	Calcium	19 mg (2%)
4	Protein	0.72 g	13	Iron	0.19 mg (1%)
5	Water	83.13 g	14	Magnesium	15 mg (4%)
6	Vitamin A	3 IU	15	Phosphorus	17 mg (2%)
7	Thiamine (vit. B_1)	0.006 mg (1%)	16	Potassium	79 mg (2%)
8	Riboflavin (vit. B_2)	0.012 mg (1%)	17	Sodium	14 mg (1%
9	Niacin (vit. B_3)	0.260 mg (2%)	18	Pantothenic acid (B_5)	0.160 mg (3%)

(USDA Nutrient Database)

and Miami, 1987). Different parts of the jambolan were also reported for its antioxidant, anti-inflammatory, neuropsycho-pharmacological, anti-microbial, anti-bacterial, anti-HIV, antileishmanial and antifugal , nitric oxide scavenging, free radical scavenging, anti-diarrheal, antifertility, anorexigenic, gastroprotective and anti-ulcerogenic and redioprotective activities (Sagrawat *et al.,* 2006). It is stomachache, carminative and diuretic, apart from having cooling and digestive properties (Thaper, 1958). Table 1 shows nutrients and phytochemicals in Jamun.

Jamun processing:

Fig. 1 shows some value added product from Jamun.

Fig. 1 : Value added jamun products

Jamun powder:

Jamun powder is prepared by extracting the seed from jamun fruit and dried in tray dryer for 60-70 ^{0}C. The dried jamun seeds grinded in pulverizer for small size particle and powder packed in pet poly pack for 12 month safe storage. Jamun powder is a rich source of calcium and vitamins. Having antioxidant properties, the jamun powder detoxifies harmful toxins from the body. Jamun powder is made from natural Jamun, which is effective for diabetes, colon and urinary disorders. The seed of the jamun is also used in various alternative healing systems like chinese medicines and unani and also good for sugar control in diabetes.

Jamun vinegar:

The jamun fruit has more varied uses than any other part of the tree and jamun vinegar has similar properties as the fruit. The vinegar is a good source of iron, used as an effective medicine against diabetes, heart and liver trouble. It has properties which prevent excessive urination or sweating and it is also a thirst-retardant and blood-purifier. The juice of the ripe fruit or a decoction of the fruit or jambolan vinegar can be administered in cases of enlarged spleen, chronic diarrhoea and urine retention. Apart from containing oxalic and tannic acids and certain alkaloids, jamun is also rich in carbohydrates, minerals and vitamins.

Jamun karela juice:

Jamun and bitter gourd is a herbs that regulate blood sugar levels and keeps body functions operating normally. Its principle constituents are lectins, charantin and momordicine. It has known result in diabetes mellitus. It stimulates pancreas to work and secrete all the secretions properly. It helps in easier digestion of food as it promotes secretion of digestive enzymes. It is extensively used in chronic cough as it has expectorant properties and helps in releasing the sputum accumulated in respiratory tract and lungs. Asthmatic patients are believed to have a very good relief if it is regularly taken.

Jamun wine:

Jamun fruits was cleaned by washing in tap water and immersed for two days in 5 per cent salt (NaCl) solution to reduce the tannin content (Mohanty *et al.*, 2006) after which the lone seed was manually removed from the pulp. The pulp was then crushed with water (1:1 w/v ratio) in a mixer-cum-grinder and the juice was extracted by using a juice squeezer. Approximately 400 ml juice was extracted from one kilogram

pulp after subtracting the amount of water added. The juice (must) filtered through cheese cotton cloth had 12^0 Brix and was treated with sodium metabisulphite (SMS) (100 ìg.ml-1) to inhibit the growth of undesirable microorganisms such as acetic acid bacteria, wild yeasts and moulds. Then, cane sugar and tartaric acid were added into the juice (amelioration) to attain 16.5^o Brix and pH 4.5, respectively. The ameliorated must was inoculated with 2 per cent (v/ v) starter culture (prepared with grape juice) of *S. cerevisiae* var. *bayanus* and fermentation was carried out at room temperature of 32 ± 2^o C for six days. Racking of wine was carried out when total soluble sugars (TSS) reached 2-3^o Brix. Two or three more rackings were done at 15 days interval to remove any sediment deposited in the wine. The wine after racking was clarified with the addition of 0.04 per cent bentonite and analyzed. Sodium metabisulphite (100 ìg.ml-1) was added as preservative before bottling. The wine after being made has dark purple colour and a distinct jamun flavour. The wine takes 4 to 6 months to be completely fit for consumption but if required one can have it after 2/3 months. This wine complements Indian food very well and also Indo-Chinese cuisine.

Jamun chips:

Jamun chips were prepared from jamun dried pulp and fried in edible oil. Jamun chips are natural strips made of sun-dried Jamun-fruit pulp. It is 100 per cent natural. It does not contain any artificial color, essence, sugar or salt. It is good for diabetic patients. It is also helpful in other disease due to Jamun's provan medicinal values. Jamun chips are perfect healthy alternate of chocolates.

Although extensive work has been done on the various aspects of Jamun processing and value addition, concerted efforts are required. The future lines for research are suggested below.

– Developments of products from Jamun need to be explored with special reference to nutraceuticals.

– Setting up a Jamun mission in the state

– Top priority should be given to creating farmer-friendly supply chain and making Jamun available for ready use and consumer-friendly.

Conclusion:

Jamun falls in underutilizing fruit species which is neither cultivated in an organized farming system nor processed by established commercial processing methods. There is a great scope for the processed products not only because of their exotic flavour but also due to their nutra ceutical impotence and therapeutic values.Therefore, development, standardization and popularization of value-added products from jamun fruit are essential.

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