

## Preparation and standardization of Jamun RTS supplemented with Amla Juice and Bael Juice

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### Abstract

Jamun is an excellent source of nutritional antioxidants. Jamun juice was supplemented with amla juice and bael juice to increase its vitamin C and micronutrient levels. Amla juice is an excellent source of vitamin C and bael juice finds extensive reference in Indian system of medicines due to its high micronutrient levels. Jamun juice was supplemented with bael juice and Vitamin C to increase nutritional properties and to design a functional food to replace harmful soft drinks. The prepared drink was tested for vitamin C content and its sensory properties using hedonic scale. Final results showed that jamun drink alone was preferred by the taste panelists. However, jamun RTS fortified with Bael juice and amla juice was accepted by the panelist quite satisfactorily and can be served as nutritional alternative to harmful soft drinks.

**Introduction:** We normally quench our thirst by soft drinks but there soft drinks have bad affects on our health due to their phosphoric acid content. Instead juice / RTS can be used to quench our thirst as well as to supplement nutrition. Jamun is an excellent source of nutritional antioxidants. Jamun juice was supplemented with amla juice and bael juice to increase its vitamin C and micronutrient levels. Amla juice is an excellent source of vitamin C and bael juice finds extensive reference in Indian system of medicines due to its high micronutrient levels. Present study was undertaken to standardize method and recipe of Jamun RTS. Further it was supplemented with bael juice and amle juice to see its effect on Vitamin c content and organoleptic properties.

Present study had following objectives

1. To prepare and standardize recipe of jamun RTS.
2. To see the effect of addition of Amla juice and bael juice on Vitamin C levels.
3. To compare acceptability of jamun juice supplemented with amla juice and bael juice.

### Review of literature

#### Black Plum (Jamun)

Black berry (*Syzgium cumini* Linn.) is always appreciated for the color, flavor and taste of its fruit. It is very large tropical tree that belongs to Myrtaceae family and known by synonyms jambolan or black plum (*Eugenia jambolan* Linn. ).When sucked, it changes the color of the tongue to purple due to its coloring properties.

Besides these properties, its usefulness in treatment of diabetes is also praised by the people and health benefits of the fruit are appreciated by all. Colored jelly is prepared adding a commercial jelling agent with the fruit flash.

**Pharmacological properties:** Extensive work on its pharmacological properties is being carried out in India and elsewhere. Although whole plant is used for medicinal purpose, stem bark and leaves are extensively used plant parts.

Presence of various flavonoides, essential oils and molecules such as gallic acid, oxalic acid, malic acid, betulinic acid and tannins contribute to its medicinal properties and pharmacological activities such as antimalarial, anti-infective, antibacterial and gastroprotective.

**Medicinal properties:**

The extracts of the bark, seeds and leaves are used for the treatment of diabetes.

The leaves have antibacterial properties and used for strengthening teeth and gums.

Oral administration of dried alcoholic extracts of the seeds to diabetic patients was found to reduce the level of blood sugar and glycosuria in trials conducted at CDRI, Lucknow.

The bark of black berry tree is astringent, digestive, diuretic, anthelmintic and is considered useful for throat problems.

**Nutritional properties:**

It is a fairly good source of mineral salts (calcium = 15 mg; potassium = 55 mg; magnesium = 35 mg; phosphorus = 15 mg; sodium = 26.2 mg/100 g fruit) and vitamin C (18 mg/100 g of fruit).

It provides 62 Kcal energy per 100 g of edible fruit

Vinegar made from black berry fruit is administered in cases of enlargement of spleen, chronic diarrhoea and urine retention.

Jamun is believed to be of special use in treatment of diabetes. In Unani and Ayurvedic system, it is used to treat digestive disorders including diarrhoea. Extracts of the bark, seeds and leaves have been found to cause a marked prolonged decrease in blood sugar and glycosuria (sugar in urine). Several studies provide evidence that jamun has hypoglycaemic effects with up to 30 per cent reduction in blood sugar reported in some studies. Seeds are rich in alkaloids which have hypoglycemic effects.

The fruit is acidic and astringent in nature, with a sweet taste. Due to its acidic nature, it is usually eaten with a sprinkling of salt. Children are fond of this fruit as it colours the tongue purple due to anthocyanin, a plant pigment.

Jamun is 70 per cent edible. Glucose and fructose are major sugars found in a ripe jamun. The fruit is laden with a large number of minerals and provides fewer calories compared to other fruits. A medium-sized jamun provides about 3-4 calories. The seed of the fruit is also rich in protein carbohydrates and traces of calcium. It is also a source of iron, providing 1-2 mg per 100 grams and also vitamin C, providing 18 mg per 100 grams (the daily adult requirement of this vitamin is 40 mg). It provides folate and vitamin B, carotene, phytochemicals (anti-oxidants), magnesium, potassium and fibre.

**Bael (Wood Apple)**

Bael is commonly called as Bengal quince, wood apple, golden apple, elephant apple, bilwa, monkey fruit, stone apple, bili and scientifically known as *Aegle marmelos*. It was

first originated in India however, presently found throughout the Southeast Asia. It is widely cultivated in Thailand, Sri Lanka and other regions of the southern Asia. It is the most sacred fruit in India traditionally used as a medicine, home remedy, ritual purposes and etc in India since 2000 BC. Every parts of this fruit means tree, root, leaves, seeds are usable for medicinal purposes because of its high level of nutritional values.

### **Bael Juice Benefits:**

#### **1. Heart diseases:**

Mix the juice of ripe bael fruit with some ghee. Include this mixture in your daily diet to prevent heart related diseases like heart strokes and attacks. This can reduce blood glucose levels by nearly 54%.

#### **2. Gastro protection properties:**

This magical juice can cure gastric ulcers that are caused due to the imbalance of mucosa levels or oxidative stress in gastric tract. The phenolic compounds present in this juice are filled with antioxidants to reduce gastric ulcers.

#### **3. Cholesterol control:**

Bael juice helps in cholesterol control and also reduces blood cholesterol levels. Bael juice controls triglycerides, serum and tissue lipid profiles.

#### **4. Antimicrobial properties:**

Bael juice has antimicrobial properties. The extracted juice is used to control fungal and viral infections. They have antimicrobial properties since the juice contains cuminaldehyde and eugenol in it.

#### **5. Anti-inflammatory properties:**

Bael juice contains anti-inflammatory properties that are used to reduce histamine induced contractions. This also gives positive results to relax and sooth inflamed organs.

#### **6. Constipation:**

Bael fruit juice is best consumed remedy to reduce constipation and stomach pain. This contains laxative properties to clean and tone the intestines. Drinking this regularly for 2-3 months will reduce sub-chronic constipation. You can mix this with sugar and drink twice a day to ease stomach pain for kids. Add some black pepper and salt to the juice to remove toxins from the intestines.

#### **7. Dysentery and diarrhoea:**

In ayurveda, this is said to cure diarrhoea and dysentery without fever. You can also mix it with jaggery or sugar.

#### **8. Cooler:**

Drink bael fruit juice with honey to cure acidity. You can also apply this on your tongue to cure mouth ulcers. Drink bael juice before lunch or dinner to reduce heat and thirst from body. This can be the best drink during the scorching summers!

### **9. Skin rash:**

Mix 30ml of bay leaf juice, cumin with bael juice and drink it twice a day to cure urticaria. This can also be beneficial for skin rash and its symptoms like pale red, raised, itchy bumps.

### **10. Breast milk:**

Wood apple juice can be consumed with dry ginger powder and jaggery by the infant mothers. This helps to produce more milk for the infants.

### **11. Cancer:**

Consume this juice regularly to prevent or cure breast cancer.

### **12. Blood purifier:**

Mix 50 gms pulp juice with some warm water and sufficient honey. This drink will help you to purify your blood.

### **13. Haemorrhoids:**

Tannin in the bael fruit juice is useful to cure diarrhoea, cholera, haemorrhoids and vitiligo. This is also helpful in the anaemia, ear and eye disorders treatment. In ayurveda, the juice is mixed with turmeric and ghee and spread on fractured bones to treat fracture.

### **14. Scurvy:**

Scurvy is a disease that occurs due to the deficiency of vitamin c. This has harmful effects on the blood vessels. Bael juice is a good source of vitamins and cures this disease.

### **15. Respiratory problems:**

The juice of bael fruit can cure respiratory problems such as asthma or cold. This also gives resistance to cold.

### **16. Control diabetes:**

Bael juice contains laxatives that are helpful to control the blood sugar levels. It stimulates the pancreas and helps them in enough production of insulin that controls sugar level in the blood.

### **Amla(Gooseberry)**

Amla or *Gooseberry* is a vibrant green colour fruit recognized by its succulent, sour and bitter taste. It is often consumed raw or used as an ingredient in various pickles, juices and sweets. Amla or Indian Gooseberry is a great and amazing natural fruit which is available in India in very sufficient amount in the winter season. One can use it or store it for his regular uses in all the seasons. It is the important fruits of the Ayurveda as most of the Ayurvedic preparations have amla. Amla is also known as the Indian gooseberry which is packed with the lot of nutrients, Polyphenols, vitamins, minerals iron and etc. It helps everyone to have a longer and healthier life. It keeps the person at bay from several diseases.

Daily Requirement of Vitamin C (which can be fulfilled by Amla) for Different Groups:

- Infants below 1 year of age require around 30 to 35 mg.
- Children of age 1 to 14 years require around 40 to 50 mg.
- Adolescent between 15 to 18 years of age require around 65 to 75 mg.
- Adult Man over 18 years of age requires around 90 mg.
- Adult Woman over 18 years of age requires 75 mg.

### **Health Benefits Of Amla Juice**

Amla juice is a great drink to recharge your energy for the rest of the day. Being a storehouse of vitamin C and minerals like iron, it can prevent various diseases and improves your health. Regular intake of this juice provides you the following health benefits.

#### **1. Relieves Asthma And Bronchitis:**

Drinking amla juice with honey twice daily can relieve asthma and bronchitis complications. It also reduces the incidence of chronic cough, allergic asthma and tuberculosis.

#### **2. Burns Fat:**

Amla juice can cure obesity by increasing protein levels which in turn helps in reducing unwanted fat. It has the ability to create a positive nitrogen balance. It reduces the cholesterol levels, thus minimizing the risk of heart attacks.

#### **3. Relieves Constipation And Piles:**

Amla juice helps in relieving constipation caused due to piles. It also regulates the bowel movements and cures chronic constipation.

#### **4. Treatment of Gastric Disorders:**

Amla juice is great treatment for gastric disorders and hyperchlorhydria (burning sensation in abdomen). It is a good remedy for diarrhoea and dysentery. Besides piles and constipation, it helps maintain healthy liver functions. Amla juice is effective in treating peptic ulcers and acidity. If you have acidity problems, you can take amla juice with pure ghee everyday twice a day.

#### **5. Blood Purifier:**

Amla juice acts as a blood purifier by flushing out toxins from the body. Regular intake of this juice purifies your blood as well as helps increase hemoglobin and red blood cell counts.

#### **6. Eye Health:**

Regular intake of amla juice helps in improving eyesight and nearsightedness as well as controls the onset of cataracts. It also minimizes intraocular tension. It counters problems like reddening, itching and watering of eyes.

#### **7. Beneficial For Heart:**

Amla juice is considered a great remedy for heart problems as it makes the heart muscles strong, thus enabling the heart to pump blood easily.

### **8. Controls Diabetes:**

Amla juice taken with turmeric powder and honey helps in controlling diabetes.

### **9. Cooling Agent:**

Amla juice contains 20 times more vitamin C than orange juice. This vitamin improves the tannins that are required to shield heat and light. During summer season, this juice keeps your skin cool by sorting out heat from the body. It also acts as a shield against radiation by protecting you against the harmful UV rays.

### **10. Soothes Inflammation:**

The anti-inflammatory properties in amla juice help in reducing the swelling in the joints caused by arthritis. By reducing inflammation, it also protects and eases the tissues of the digestive tract.

### **11. Oral Health:**

Daily intake of amla juice wards off bad breath and strengthens teeth. Gargling with a mixture of water and amla juice can provide relief from painful mouth ulcers.

### **12. Treatment of Insomnia:**

Amla juice is effective in curing insomnia. All you need to do is take fresh amla juice with a mixture of coarse powder of nutmeg; and experience a sound and peaceful sleep.

### **13. Prevents Cancer:**

Amla juice is rich in antioxidants, particularly superoxide dismutase (SOD), which protect against the formation of free radicals. Thus, regular intake of this juice helps in preventing cancer.

### **14. Bone Health:**

Regular consumption of amla juice lowers the osteoclasts, the cells that are responsible for breaking down the bones.

### **15. Other Benefits:**

Amla juice comprises of many minerals and vitamins such as carotene, phosphorus, calcium, iron and vitamin B complex; and hence, is a powerful antioxidant. It protects against oxidative stress by eliminating free radicals. It fortifies our liver, strengthens your lung, nourishes your brain, improves muscle tone, improves your urinary system and balances stomach acids. In fact, according to Ayurveda, regular consumption of amla juice promotes longevity.

#### *Benefits Of Amla Juice For Skin:*

Amla juice works wonders for your skin as it is loaded with vitamin C and other antioxidants. Some of the benefits of amla juice for skin are as follows.

### **16. Lightens Complexion:**

The antioxidants and vitamin C present in amla juice brighten your skin and impart a natural glow to it. Drinking amla juice with the addition of honey or applying it as a face

pack is great for making your complexion lighter and brighter. It also keeps your skin free from blemishes.

### **17. Anti-ageing Benefits:**

Amla juice helps to maintain the youthful look of your skin as it contains a lot of antioxidants. Vitamin C, in particular, acts to keep your skin young for a longer time. Thus, regular intake of amla juice delays the effects of premature ageing such as fine lines and wrinkles, dark spots etc.

### **18. Treatment of Pigmentation:**

One of the benefits of drinking amla juice regularly is that it provides you with a glowing and flawless skin. It brightens your skin and reduces pigmentation. You can also apply amla juice on your face with a cotton wool and rinse off after a few minutes. Keep your eyes shut while doing so. Doing this regularly will lighten the marks and pigmentation.

### **19. Tones and Tightens Skin:**

Decrease in the skin collagen causes your skin tissue to lose its firmness and softness, resulting in sagging skin. As stated earlier, amla juice is rich in vitamin C which boosts the production of collagen cells in the skin, thus making your skin soft, supple and youthful as well as tones and tightens your skin.

### **20. Treatment of Acne and Pimples:**

Amla juice is perfect for the treatment of acne and pimple scars. Applying a paste made from amla for 10 to 15 minutes will heal the spots as well as decrease the acne and pimples. Moreover, since it is a natural blood purifier, it fights the microorganisms in the skin, thus keeping skin infections as well as acne and pimples at bay. Hence, drinking amla juice on a regular basis helps to keep your skin clear and flawless.

### **21. Exfoliates And Cleanses Skin:**

Amla juice is an excellent cleanser whether ingested or applied topically. Being a mild exfoliant, it helps in removing the dead skin cells. If your skin is sensitive, you can dilute it with some water before applying.

### **22. Repairs Damaged Tissues:**

Amla juice has good healing properties due to the presence of vitamin C and other antioxidants which can speed up the damaged tissue repair, thus providing you with a healthy and clear skin. It also combats the problem of dry and scaly skin.

*Amla Juice Benefits For Hair:* Amla has been considered as a hair tonic and so amla juice also plays an important role in making your hair healthier and stronger. It is an effective natural remedy for several hair problems. Some of its benefits in hair care are as follows.

### **23. Strengthens Hair:**

Amla juice strengthens your hair follicles, thus encouraging hair growth. You can apply a mixture of amla and lemon juice on your scalp and leave it for 20 to 30 minutes. Rinse off with warm water. This will strengthen your hair from roots and make it shinier.

#### **24. Prevents Premature Graying:**

Amla juice is very beneficial for those suffering from premature graying of hair. This is because it is rich in antioxidants and vitamin C which prevent premature graying of hair.

#### **25. Treatment of Dandruff:**

Dandruff is a common problem these days and having amla juice is an effective way of getting rid of it. Regular consumption of this juice prevents accumulation of dandruff on your scalp.

#### **26. Improves Pigmentation:**

Amla juice helps to improve pigmentation and color of hair and makes it darker and thicker. It is used as an effective ingredient in hair dyes and other hair care products. It is great for the treatment of hair discoloration and graying hair.

#### **27. Good Conditioner:**

Amla juice acts as a great conditioner for dry and rough hair. You can mix some amla juice with henna and apply it on your hair. This will counteract the drying nature of henna, thus providing you with healthy and conditioned hair. You can also use it as a hair wash to add extra shine and bounce.

#### **28. Scalp Cleanser:**

You can mix amla juice with an egg, beat it and massage your hair with it. Amla juice will mask the smell of eggs and provide you with shiny, silky and squeaky clean nourished scalp.

#### **29. Prevents Hair Problems:**

Besides strengthening your hair, regular consumption of amla juice helps to deal with several hair problems like hair loss, split ends and frizzy hair.

Amla juice offers countless benefits for your skin, hair and health by enriching your body with vital nutrients. It deserves to be incorporated in your diet and can be a healthy alternative for various dietary supplements sans the negative effects.

#### **Materials and methods**

Fresh mature jamun were procured from market and were destined to get pulp. Pulp was heated with water and sugar to get desired concentration (15<sup>0</sup>B, FPO Standards). Citric acid was added to adjust its acidity to 0.6% and sodium benzoate was added @ 300 ppm as preservative.

Finally jamun RTS was filled in glass bottles and capped before being sterilized at 15 psi pressure for 15 minutes.

Amla juice and Bael juice were procured from local market and added to jamun RTS for its effect on taste and nutritional status.

Taste of various combinations was tested using 9-point hedonic scale (Performa for hedonic testing attached in appendix).

Ascorbic acid of samples was tested using titration method using 2,4-Dichlorophenol indophenol dye.

The results were statistically treated using two way analysis of variance according to Steel and Torrie (1960). All the results were inferred on 5% level basis

### Results and Discussions

Jamun RTS had a very pleasing taste and overall acceptability. It was liked a lot by taste panel. Jamun RTS is highly prized because of its high antioxidant levels. it had significant level of Vitamin C (56mg/100g of sample).

Amla juice was added to jamun RTS @ 2%, 5%, 10%, 20% and 40% to see its effect on sensory properties. It was found that amla juice at 5% was best on the basis of sensory testing.

Bael juice was also tested @ 5%, 10%, 20% and 40% levels and it was found that bael juice was best at 10% levels.

Further jamun RTS was tested by sensory panel along with best combinations of Jamun RTS, bael juice and amla juice. When best combinations from these samples were tested along with fresh juice, fresh juice was found to be best by sensory panel. Although amla juice increased Vitamin C level of jamun juice from 56 mg/100g to 67 mg/100g (at 5% addition ), but amla juice presented a slightly harsh odours to otherwise smooth and delicate flavours of Jamun RTS. Bael juice was found to be too satiating by panelists.

Following results were obtained from testing of jamun RTS supplemented with amla juice and Bael juice.

When the results were treated statistically (ANOVA), differences were found to be significant at 5% significance levels.

**ANOVA TABLE**

Source of variations	F <sub>calculated</sub>	F <sub>observed</sub>
Sample	5.98	2.16
Panelists	4.46	2.92
Error	-----	-----

### Conclusion

Addition of amla juice and bael juice significantly improved its functional and nutritional value. Vitamin C content of jamun juice was increased from 27 mg/100g to 256 mg / 100 g (on highest addition of amla juice). Although present study indicates that jamun RTS was most preferred by panelist, yet Jamun RTS supplemented with amla juice and Bael juice can be studied further to improve their acceptability as they have higher Vitamin C level and were accepted satisfactorily as they scored nearly 6.5 points out of 9, on an average. Jamun RTS had high acceptability among taste panel. So it can be further studied to develop a new product for market because of its excellent taste and high polyphenol levels. The RTS can be further carbonated to see its sensory qualities and effect of CO<sub>2</sub> on various nutrients.

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