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Review Article

JAMBU (*Syzygium cumini*) - A FRUIT OF GODS

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Abstract

Many Hindus regard Jambu as a 'fruit of the gods. Plants of this family are known to be rich in volatile oils which are reported for their uses in medicine and many fruits of the family have a rich history of uses both as edible and as traditional medicine. The fruits, 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. Beside, the Jambu fruit is an effective food remedy for bleeding piles and correcting liver disorders. Although the *S. cumini* fruit proves to be a great nutraceutical due to its medicinal properties there is still need to have more scientific basis to use these products to cure diseases. Most of the studies are done *in vitro* or on animal models. The *in vivo* absorption of the same extract might vary in humans when consumed for the purpose of curing a health problem. There is still much research needed and there should be clinical trials along with the *in vitro* models to study the effect of these phytochemicals on human beings.

Key words: Jambu; *Syzygium cumini.*

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INTRODUCTION

Jambu (*Syzgium cumini* L.) is an evergreen tropical tree in the flowering plant family Myrtaceae, native to India and Indonesia. It is also grown in other areas of Southeast Asia including Malaysia, Myanmar, Pakistan and Afghanistan.[1] Jambu, a fairly fast growing species, can reach heights of up to 30m and can live for more than 100 years.[2] Plants of this family are known to be rich in volatile oils[3] which are reported for their uses in medicine and many fruits of the family have a rich history of uses both as edible and as traditional medicine. Flowering starts in March or April and followed by fruiting (a berry) in May-June.[4] The berry is oblong, ovoid and shinning crimson black (rich in anthocyanin pigment, an anti-oxidant) when fully ripe. Fruits of the grafted variety are large and deliciously sweet but slightly sour. Jamun fruits are universally accepted to be very good for medicinal purposes especially for curing diabetes because of its effect on the pancreas. The fruit and 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. Besides, the jamun fruit is an effective food remedy for bleeding piles and correcting liver disorders. The fruit or fruit juice should be taken with salt every morning for two or three months in season.[5]

Mythology

Rama subsisted on the fruit in the forest for 14 years during his exile from Ayodhya. Culturally, beautiful eyes are compared to this fruit. In the great epic of India Mahabharatha Sri Krishnas' [Lord Vishnu] body color is compared to this fruit as well. Because of this, many Hindus regard Jambu as a 'fruit of the gods,' especially in Gujarat, where it is known locally as jamboon. Jambudweep Island has got the name as it is surrounded by Java plum plants. [6]

In Maharashtra culture

In Maharashtra, Jambul leaves are used in marriage pandal decorations. There is famous Marathi song "Jambhul pikalya zada khali...". The seeds are used in tisanes (herbal tea) for diabetics. It is proved to being the sugar level down. [7]

Ancient Tamil culture

According to Tamil legend, Auvaiyar, a female poet ethicist and political activist of the Sangam period was resting under a naaval pazam tree (Jambu tree, considering her life's work complete, when Lord Murugan, a guardian deity of the Tamil language, came to her in disguise. After a test of wits he revealed his identity and inspired her to further learning and writing. Her works for children are still widely read in schools in Tamil Nadu, over a millennium after they were written.

In Telugu culture

This tree is called Neredu in Telugu. Besides the fruits, wood from Neredu tree is used in Andhra Pradesh to make bullock cart wheels and other agricultural equipment.

Scientific classification

Kingdom : Plantae- Plants
Subkingdom : Tracheobionta–Vascular plants
Super division : Spermatophyta- Seed plants
Division : Magnoliophyta–Flowering plants
Class : Magnoliopsida – Dicotyledons
Subclass : Rosidae
Order : Myrtales
Family : Myrtaceae – Myrtle family
Genus : *Syzygium* P. Br. Ex Gaertn.
Species : *Syzygium cumini* (L.) [8]

Classical names

Jambu, Mahaphala, Phalendra, Surabhipatra, Raj jambu, Mahajambu. [9]

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Vernacular names

Eng.: Jaman, Jambolan, Black plum.
Hindi: Jamun, Jambhal, Jaman, Bada jamun, Jam.
Bengali: Jam, Kalajam.
Gujarati: Jambu, Jamli.
Kannada: Nerale, Jambuva.
Malayalam: Naval, Perinnaral.
Marathi: Jaman, Jambul.
Tamil: Naval, Kottainaval, Neredam, Sambal.
Telgu: Neredu.
Assam: Jamu.
Burma: Thabyebyu.
Oriya: Jamo, Jamkuli, Bhotojam, Chuajamo, Jamo.
Urudu: Jaman, Phalenda.[10]

Botanical description

Morphology

Stem bark - Drug occurs in slightly curved or flat pieces, 0.5-2.5 cm thick, younger bark mostly channelled; external surface more or less rough and rugged due to exfoliation and vertical cracks, light grey to ash colored; internal surface fibrous, rough and reddish brown; fracture short and splintery; taste astringent. Microscopically mature bark shows a wide zone of cork differentiated in to upper and lower cork zones, forming a rhytidoma; cork consisting of tangentially elongated rectangular cells, upper few layers thick, stratified and reddish-brown, having groups of 2-4 stone cells and crushed elements of phloem; lower cork thin and colorless; cork cambium not distinct; secondary phloem composed of sieve elements, and phloem rays; phloem parenchyma thin-walled and polyhedral in shape; stone cells oval to angular, elongated; fibres aseptate; both, stone cells and fibres single or in groups, present throughout this region; phloem rays 1-4 cells wide; reddish-brown content, rosette crystals of calcium oxalate and simple, round to oval starch grains present.

Seed - 2-5 seeds, compressed together into a mass resembling a single seed, the whole seed enclosed in a cream colored, coriaceous covering, smooth, oval or roundish, 1 cm long, 1 cm wide, brownish-black; taste astringent. Microscopically seed shows cotyledons consisting of single layered epidermis, mesophyll composed of isodiametric, thin-walled, parenchymatous cells fully packed with simple starch grains, oval, rounded; a few schizogenous cavities are also found.
Seed powder - Brown colored; shows a few parenchymatous cells and numerous oval, rounded starch grains. [11][12]

Distribution

Common throughout Upper Gangetic Plain, Bihar, Orissa, especially in moist localities, planted in West Bengal, Deccan and Konkan region, and all forest districts of South India, both in the plains and in the hills up to 1800 m., usually along river banks, coast ghats. [13]

Parts used

Bark, fruit, seed, leaf [14]

Physical constants

Stem bark - Foreign matter- Not more than 2%; Total ash- Not more than 11%; Acid insoluble ash - Not more than 1%; Alcohol soluble extractive- Not less than 9%; Water soluble extractive- Not less than 11%.

Seed - Foreign matter- Not more than 1%; Total ash- Not more than 5%; Acid insoluble ash - Not more than 1%; Alcohol soluble extractive- Not less than 6%; Water soluble extractive- Not less than 15%.[15]

Chemical constituents

Betulinic acid, friedelin, friedelinol, kaempferol and its 3-0-glucoside, quercetin, sitosterol and its glucoside and sucrose, tannins, gallic acid, ellagic acid, (**stem bark**); hepatocosane, nonacosane, triacontane, hentriacontane, octacosanol, triacosanol, dotriacosanol, betulinic acid and crotegolic acid **(leaves)**; myricetin-3-L-

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arabinoside, dihydromyricetin, quercetin- 3-D-galactoside, oleanolic acid, three triterpenoids, acetyl oleanolic acid, eugenia- triterpenoid A and B, ellagic acid, isoquercertin, kaempferol (**flowers**); two anthocyanins- delphinidin-3-gentiobioside and malvidin-3-laminaribioside; petunidin-3-gentiobioside, malic acid, oxalic acid, tannins, cyanidindiglycosides, waxy component, triterpenhydroxy acid and oleanolic acid (**fruits**); gallic and ellagic acids, corilagin and related ellagitannis, 3, 6- hexahydroxydiphenoyl glucose and its isomer 4,6-hexahydroxydiphenoyl glucose, 1- galloylglucose, 3-galloylglucose, quercetin, 3,3′,4′-tri-0-methylellagic, 3,4′-di-0-methylellagic, caffeic, ferulic, guaiacol, resorcinol dimethyl ether, veratrole, lignanglucoside, medioresinol 4''-0-beta-glucoside, (+)-pinoresinol-0-beta- glucoside, (+)- syringaresinol 0-beta-glucoside, dihydrodehydrodiconiferyl alcohol 4′-0- beta- glucoside and 5-(hydroxymethyl) furfural (**seeds**); methylxanthoxyline and 2, 6 dihydroxy 4-methoxyacetophenone (unsaponifiable fraction); bornyl acetate, α- pinene and β- pinene (**essential oil from leaves, stems and fruits**). [16]

Pharmacological activities

The seed powder has been used in diabetes as it reduces the sugar in urine and ameliorates the unquenchable thirst. A glucoside jamboline, ellagic acid, tannin, gallic acid, chlorophyll, fatty oil, resin, sugar and traces of essential oil are also present.[17]

Anorexigenic, hypoglycaemic, antidiarrhoeal, antiviral, neuropsychological, antifertility, anti-inflammatory, antipyretic.

Actions and uses

The bark is astringent, sweet, sour, acrid, refrigerant, carminative, diuretic, digestive, anthelmintic, ferbrifuge, constipating, stomachic and antibacterial. It is useful in diabetes, leucorrhoea, intrinsic haemorrhage, gastric disorders, strangury, fever, skin diseases and wounds. Leaves are antibacterial and are used for vomiting. The ash of leaves is used for strengthening the teeth and gums. The fruits and seeds are sweet, acrid, sour, liver tonic, haematinic and cooling. They are used in diabetes, diarrhoea, pharyngitis, spleenopathy, urinary disorders, and ringworm and to strengthen teeth and gums. Suspensions of seed kernel of S. cumin 4g / dose level was found to show maximum antidiabetic effect (42.64%) in rabbits 3h after medication.[18]

Ayurvedic properties

Rasa of the Jambu is Kashaya, Madhura, Amla; guna is Laghu, Ruksha; Sheeta Veerya; Katu Vipaka; and the doshaghnata is Pittashamaka.

Rogaghnata

Raktasrava, Vrana, Daha, Sannipatajwara, Jwaropadrava, Charmaroga, Agnimandya, Ajeerna, Shoola, Pravahika, Grahani, Jeerna atisara, Chhardi, Raktapitta, Raktapradra, Raktatisara, Madhumeha, Udakameha, Prameha, Phiranga, Upadansha

Karma

Stambhana, Twagdoshahara, Dahaprashamana, Deepana, Pachana, Yakriduttejaka, Chhardinigrahana, Raktastambhana, Mootrasangrahaneeya.[19]

Uses in Ayurveda

- Prameha:
  Due to kashaya rasa and kledaghnata of jambu, it is useful in Bahu mutrata and Aavilmutrata. It also reduces level of Raktagata and mutragata Sarkara

- Chhardi:
  Due to kashaya rasa, shamana of Kleda (Amasaya gata), kapha & pitta is occurring which is chhardi nigrahana. Jambu patra kwath with honey is given in chhardi.

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- Atisara-Pravahika:
  Jambu phala majja churna is used in Atisara and Pravahika, due to Stambhana guna.

- Raktavikar-Raktapitta-Rakta pradar:
  Patra swarasas used for Raktapitta and Beej churna is used for Rakta pradara and Raktatisara.

- Vrana ropana:
  Phalamajja churna is used for mukha dushika.

- Mukha paka:
  Jambu patra kwatha is given for Gandusha and kavala in Mukhapaka.[20]

Dose

Swarasa: 10-20 ml
Churna: 3-6 gm

Important formulation

Madhumehari yoga, Jambuphalasava, Pusyanuga churna, Nyagrodhadi churna, Jambadhya taila, Panchvalkala yoga.

CONCLUSION

Jambu is widely used by the traditional healers for the treatment of various diseases especially diabetes and related complication. It has immense nutritional and medicinal properties known to rural folk since time immemorial. The plant has many important compounds which confer the most of the characteristics of the plant.

Although the *S. cumini* fruit proves to be a great nutraceutical due to its medicinal properties there is still need to have more scientific basis to use these products to cure diseases. Most of the studies are done *in vitro* or on animal models. The *in vivo* absorption of the same extract might vary in humans when consumed for the purpose of curing a health problem. There is still much research needed and there should be clinical trials along with the *in vitro* models to study the effect of these phytochemicals on human beings.

Based on these facts, these review high-lights the role of Jambu in various treatments and recommend that further phytochemical and clinical re-search should be done on this traditional medicinal plant for the discovery of safer drugs**.**

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