

REVIEW ARTICLE

Ethanopharmacological Consequence of Splendid *Syzgium cumini* LINN. (SKEELS)

Santosh Kumar Verma

Department of Chemistry, Govt Girls College, Neemkathana, Sikar, Rajasthan

ABSTRACT

Extensive work on jamun's pharmacological properties, is being carried out in India and elsewhere. Presence of various flavonoides, essential oils and molecules such as gallic acid, oxalic acid, malic acid, betulic acid, phytosterols, resins and tannins contribute to its medicinal properties and pharmacological activities such as antimalarial, anti-infective, antibacterial and gastroprotective. The fruit's renowned for its ability to help people with diabetes in naturally regulating the blood sugar levels. Jams, jellies, squashes, vinegar, juices, beverages, pickles and wine are made from the jamun fruits, industrially. . The ripe fruit contains Glucose & Fructose are the major forms of sugar. It also contains Vitamins C & A, riboflavin, nicotinic acid, choline, folic acid, malic acid, Na, K, Ca, P, Mn, Zn & Fe. Anthocyanins are present in appreciable quantities and are the reason for the antioxidant activity of the fruit. The seed contains the glycoside, jamboline, gallic acid and essential oils. The leaves have been found to contain essential oils. The flower contains terpenoids and found to be rich in nectar yielding high quality honey when apiculture is done close by. In Unani and Ayurvedic system, it's 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 glycouria (sugar in urine). Seeds are rich in alkaloids which have hypoglycemic effects. The antibiotic activity of black berry extract has been widely studied and found useful against a number of microbial agents. The fruit's also considered to be stomachic, carminative, anti scorbutic and diuretic. Vinegar made from black berry fruit's administered in cases of enlargement of spleen, chronic diarrhea and urine retention. For ringworm treatment, water diluted juice is used as lotion. A decoction of bark is used in cases of asthma and bronchitis and are gargled or used as mouthwash for the astringent effect on mouth ulcerations, spongy gums, and stomatitis. Present manuscript delineates amazing potential of jamun fruit (skeel) attributable to therapeutic importance, culinary uses & cosmetic applicability precisely.

Keywords: Anthocyanins; Gallic acid; Tannins;; Anti-oxidants; Hypoglycemic effects; Astringent

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INTRODUCTION

The jamun tree (is an evergreen tropical tree in the flowering plant family Myrtaceae), native to India, thrives easily in hardy tropical regions and is found in all parts of our subcontinent as well as countries of Southeast Asia and Eastern Africa. In India, this large evergreen tree, is grown widely in the Gangetic plains, and the Cauvery delta in Tamil Nadu. The tree bears fruit for 60 to 70 years and the fruits ripen in June to July. It's known by several local names such as *jambas, jamun, jambul, jambolan, rajaman, kala jamun, neredu, naval, nerale, jamali, java plum, black plum and black berry*. This purple tropical berry [the purple summer fruit of India] has a unique taste, colour and flavour [1].

The most commonly found variety of luscious, glistening royal purple jamun is often oblong and has a deep purple to bluish colour. The pulp of the fruit's grey or pink and has a seed in the centre. Another common variety is seedless. The fruit's acidic and astringent in nature, with a sweet taste. Due to its acidic nature, it's usually eaten with a sprinkling of salt.

CONSTITUENTS AND THERAPEUTIC SIGNIFICANCE OF *SYZGIUM CUMINI* LINN. SKEELS

Children are fond of this fruit as it colours the tongue purple due to anthocyanin, a plant pigment. Jamun is 70 % edible. Glucose and fructose are major sugars found in a ripe jamun. The fruit's 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's also rich in protein carbohydrates and traces of

calcium. It's also a source of Fe, providing 1-2 mg/ 100 grams and also vitamin C, providing 18 mg/ 100 grams (~40 mg – daily adult requirement). It provides folate and vitamin B, carotene, phytochemicals (anti-oxidants), Mg, K and fibre. Jamun is believed to be of special use in treatment of diabetes. In Unani and Ayurvedic system, it's 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 glycuria [6-10]. Jamun is rich in anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol and myricetin. The seeds are claimed to contain alkaloid, jambosine, and glycoside jambolin or antimellin, which halts the diastatic conversion of starch into sugar and seed extract has lowered blood pressure by 34.6% and this action is attributed to the ellagic acid content [11-15].

The seeds have been reported to be rich in flavonoids, a well-known antioxidant, which accounts for the scavenging of free radicals and protective effect on antioxidant enzymes [2, 3, 4, 9, 17, 19] and also found to have high total phenolics with significant antioxidant activity [23] and are fairly rich in protein and calcium. Java plums are rich in sugar, mineral salts, vitamins C, PP which fortifies the beneficial effects of vitamin C, anthocyanins and flavonoids [4]. The leaves are rich in acylated flavonol glycosides, quercetin, myricetin, myricitin, myricetin 3-O-4-acetyl-L-rhamnopyranoside, triterpenoids esterase, galloyl carboxylase, and tannin. The stem bark is rich in betulinic acid, friedelin, epi-friedelanol, β -sitosterol, eugenin and fatty acid ester of epi-friedelanol, β -sitosterol, quercetin kaempferol, myricetin, gallic acid and ellagic acid, bergensins, flavonoids and tannins [8, 20-25].

The presence of gallo- and ellagi-tannins may be responsible for the astringent property of stem bark. The flowers are rich in kaempferol, quercetin, myricetin, isoquercetin (quercetin-3-glucoside), myricetin-3-L-arabinoside, quercetin-3-D-galactoside, dihydromyricetin, oleanolic acid, acetyl oleanolic acid, eugenol-triterpenoid A and eugenol-triterpenoid B. The roots are rich in flavonoid glycosides and isorhamnetin 3-O-rutinoside. The fruits are rich in raffinose, glucose, fructose, citric acid, mallic acid, gallic acid, anthocyanins; delphinidin-3-gentiobioside, malvidin-3-laminaribioside, petunidin-3-gentiobioside cyanidin diglycoside, petunidin and malvidin. The sourness of fruits may be due to presence of gallic acid. The color of the fruits might be due to the presence of anthocyanins. The fruit contains 83.70–85.80 g moisture, 0.70–0.13 g protein, 0.15–0.30 g fat, 0.30–0.90 g crude fiber, 14.00 g carbohydrate, 0.32–0.40 g ash, 8.30–15.00 mg, Ca, 35.00 mg, Mg, 15.00–16.20 mg, P 1.20–1.62 mg, Fe 26.20 mg, Na, 55.00 mg, K 0.23 mg, Cu 13.00 mg, S 8.00 mg, Cl 80 IU, vitamin A 0.01–0.03 mg, thiamine 0.009–0.01 mg, riboflavin 0.20–0.29 mg, niacin 5.70–18.00 mg, ascorbic acid 7.00 mg, choline and 3.00 mcg folic acid/ 100 g of edible portion [20, 29, 30, 31]. One of the variety of Jamun found in the Brazil possesses malvidin-3-glucoside and petunidin-3-glucoside. The essential oils isolated from the freshly collected leaf (accounting for 82% of the oil, stem, seed, fruits contain α -Pinene, camphene, β -Pinene, myrcene, limonene, cis-Ocimene, trans-Ocimene, γ -Terpinene, terpinolene, bornyl acetate, α -Copaene, β -Caryophyllene, α -Humulene, γ -Cadinene and δ -Cadinene, trans-ocimene, cis-ocimene, β -myrcene, α -terpineol, dihydrocarvyl acetate, geranyl butyrate, terpinyl valerate, α -terpineol, β -caryophyllene, α -humulene, β -selinene, calacorene, α -muurolol, α -santalol, cis-farnesol: lauric, myristic, palmitic, stearic, oleic, linoleic, malvalic, sterculic and vernolic acids. Unsaponifiable matter of the seed fat was also chemically investigated [12-19, 50-54].

The peel powder of Jamun can be employed as a colorant for foods and pharmaceuticals and anthocyanin. Pigments from fruit peels were studied for their antioxidant efficacy stability as extract and in formulations. Several studies provide evidence that jamun has hypoglycemic effects with up to 30 % reduction in blood sugar reported in some studies. Seeds are rich in alkaloids which have hypoglycemic effects. With the onset of rains, come the much loved jamuns. This Indian blackberry has a unique astringent taste. Popularly known as the black plum, the fruit has several beauty benefits to offer. Also, the fruit has medicinal properties, which can treat several ailments. From curing acne and dark spots to indigestion, it does it all. So, take a look at a few beauty and health benefits of this super fruit¹⁶⁻¹⁹. In 1911, this tree was introduced in Florida by the USDA (United States Drug Authored). In the wild however, it grows all over India. It's a large and hardy evergreen tree and lives for over a hundred years. It starts flowering in the month of March and continues till May. Thereafter, with the onset of monsoon in June it starts bearing fruit. The flowers are white and have a sweet fragrance. Fruits resemble the grapes and are oblong or ovoid in shape. They have a single seed and a soft dark purple colored almost black skin and a lighter purple flesh. When eaten, the fruits coat the mouth and the tongue a deep purple color that stays for a few hours. The fruit's sweet and tart and leaves a slight astringent action in the mouth [30-38, 44-49, 53].

The flowers are rich in nectar and yield high quality honey when apiculture is done close by. Industrially, fruits can be made into Jams, jellies, squashes, vinegar, juices, beverages, pickles, puddings and wine. The

seeds of Jamun are extensively used in India for treatment of diabetes and other ailments. Besides its sweet, sometimes astringent, edible fruit, the seed (Fig. 5) is also used in various alternative healing systems like Ayurveda (to control diabetes), Unani and Chinese medicine for digestive ailments. The leaves and bark are used for controlling blood pressure and gingivitis. Wine and vinegar are also made from the fruit. Precautions to be adopted: Never eat Jamun on empty stomach. Never drink milk after consuming jamun.

Don't eat them in excess as it may cause body aches and fevers. The jamun has been included among a number of herbal medicines found in different parts of the world, such as the bilberry which all have the unique ability to lower elevated blood sugar levels in the body especially in diabetics and hyperglycemic individuals [36, 39, 45, 50, 52, 54]. Herbalists typically recommend remedies made from the jamun to counteract the deleterious effects of long term diabetes, in this common disease, the islet cells in the pancreas do not produce enough insulin - this enzyme helps glucose enter cells and is thus responsible for the regulation and control of glucose levels in the body.

In middle age, many people in the modern world become susceptible to type II diabetes, this lifestyle disease is increasingly prevalent throughout much of the world as lifestyles and dietary habits change. Herbal treatment with jamun remedy is effective during the early and mild stages of the disease, when it's also accompanied by a strict dietary regimen by the affected person. The strong carminative properties of the jamun remedy are also a very effective treatment for dealing with the symptoms of indigestion and other digestive complaints such as excessive gas. Remedies made from the jamun help soothe chronic stomach-ache and ease abdominal cramps and aid in dispersing excess gas in the abdomen [48-54].

ETHNICITY OF JAMUN TREE IN INDIAN CONTEXT

In Indian mythology, Lord Rama is believed to have subsisted on the fruits of the jamun tree during his 14 year exile in the forests. Jamun is therefore also considered as "fruit of the God" Lord Krishna's skin color was shyam (purple) and is compared to the fruit's color in the Indian Sanskrit epic "Mahabharata". The leaves are used to decorate marriage pandals (A pandal is a temporary fabricated structure to hold occasions like weddings, prayers, meetings, etc). Down South in India, in the Telegu culture.

SOME HEALTH BENEFITS OF JAMUN FRUIT IN GENERAL

It's digestive and activates the liver and spleen. It's a good remedy for urinary diseases. Regulates heartbeat. Purifies blood, cures anaemia and stops skin eruptions. Stops diarrhoea and dysentery. Relieves throat affections and other respiratory diseases. Removes worms. Vinegar made from the fruit gives relief in colitis, indigestion, stomach diseases. It relieves gas and improves digestive power. It breaks renal stones. Jamun leaves have anti-bacterial properties and are used for making medicines for strengthening of the teeth and gums.

In fact, the ash of its leaves is one of the essential ingredients in tooth powders (manjan) and is effective in treating spongy gums [45-54]. Ash of jamun leaves (powder obtained after drying and burning them) mixed with an equal amount of ash of hard almond shell makes an excellent manjan. Its regular use strengthens teeth by checking gum infection and bleeding. A little peppermint added to this manjan can cure bad breath as well. The K content in jamuns is high, with a 100g serving containing 55 mg of K. People who eat unhealthy diets may face deficiency of this vital ingredient, and that may lead to heart disease, high blood pressure and stroke among other things [11-29, 38-44].

It's important that you eat foods like jamun and tomatoes which are rich in this ingredient, as such foods often contain many other nutrients also that are beneficial for your health. Leaves of the jamun tree are great for your digestive system and oral health. The leaves have been traditionally used in Ayurvedic medicine to treat diarrhoea and ulcers. They also have anti-bacterial properties which makes them an ingredient in many medicines for treating oral health problems. The fruit's known to cure menstrual problems as well. Jamun fruit and leaves are most useful for women during menopause or sterility. Jamun leaves have the power of fertility for females and can be taken with honey at any time of the day on a daily basis for at least a month. An infusion of the fresh tender leaves of jamun fruit prepared by pouring 250 ml of boiling water over 20 gm. of fresh jamun leaves, and allowing it to steep for two hours, is an excellent remedy for sterility or miscarriage due to an ovarian or endometrium functional disorder. The infusion may be taken with either two teaspoons of honey or 200 ml of buttermilk. To get relief from vomiting one can take extracts of Jamun leaves mixed in honey two times a day [50, 49, 54].

It's so because the iron content makes up for the blood loss, thus keeping women healthy. A decoction of the bark and powdered seeds is believed to be very useful in the treatment of diarrhea, dysentery and dyspepsia. The fruits can be processed for squashes, sherbets, syrups, jams, jellies, wines, vinegar and

juices. The juice cools the body in the heat of summer and quenches thirst. It also helps in the proper functioning of the digestive system due to its extremely soothing and cooling effect. Regular use of Jamun juice helps in managing blood sugar and cholesterol levels, prevents the onset of Alzheimer's disease, boosts the immune system and helps in slowing down ageing and cartilage deterioration in osteoarthritis [30-39].

COSMETIC APPLICABILITY OF JAMUN

Jamun seeds are the best remedy to treat acne. For this, grind some dry *jamun* seeds and add some cow milk to it. Mix it well. Apply this paste on your pimples before going to bed. Wash it off the next morning. Remember, your pimples cannot be treated overnight; results will only show over a period of time. So, make sure you apply it regularly for better results. Alternatively, you can prepare another concoction of jamun seed powder, orange powder, a few drops of almond oil, red lentil powder (masoor dal) and rose water. Apply this paste on your entire face. Rinse with cold water after 15 minutes. Jamun can also work wonders for people with oily skin, because of its astringent properties. Prepare a face mask using jamun pulp, barley flour, aonla juice and rose water. Apply this pack evenly on your face and rinse it off once it dries off. A regular application of it will control your skin's oil secretion levels. Have you stopped stepping out of your house due to dark spots and pigmented skin? Well, no more! Take a look at another jamun pack that will treat your ugly marks. For this, mix jamun seed powder, lemon powder and gram flour (besan). Add a few drops of almond oil and rose water to this dry mixture. Make a paste out of it. Apply it on your face, and let it stay till it dries off completely. Wash it off with cold water. Follow this routine for at least a month, and you will surely see promising results.

CONCLUSION

This purple fruit has a special mention in traditional streams of medicines, namely Ayurveda and Unani. It's used to treat digestive disorders, including diarrhoea, dysentery and dyspepsia. Undoubtedly jamun is one of the best fruits for diabetic patients. Jamun seeds (dried and powdered) contain a glucose called jamboline, which has the ability to control the conversion of starch into sugar. It's also helps in reducing the quantity of sugar in urine. Besides jamun, one can eat these foods to improve immunity without spending too much. The present review has been primed to describe the existing data on the information on phytochemical constituents, traditional uses and pharmacological actions of *S. cumini* (L.) Skeels. The plant is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol and myricetin. The seeds are claimed to contain alkaloid, jambosine, and glycoside jambolin or antimellin, which halts the diastatic conversion of starch into sugar. The vast number of literatures found in the database revealed that the extracts of different parts of jambolan showed significant pharmacological actions. It's suggested that there is a need for further investigation to isolate active principles which confer the pharmacological action. Hence identification of such active compounds is useful for producing safer drugs in the treatment of various ailments including diabetes.

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