

**PHARMACOLOGICAL POTENTIALS OF AQUEOUS EXTRACT OF  
SYZYGIUM CUMINI: A REVIEW**

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**ABSTRACT**

*Syzygium cumini*, generally bearing small black-purple drupes, is indigenous to Indian subcontinent and has diverse biological activities. It is also known as “jambul” & “kala jamun” in India. It belongs to the family Myrtaceae, the members of which have often antidiabetic, antiinflammatory, anti-pyretic, anti-oxidant, antimicrobial, anticancer, antidyslipidemic, antibacterial activities. *Syzygium cumini* has traditionally been used for its rich nutrition and medicinal value. It has diverse pharmacological actions. Different parts of plant (like bark, leaves, seeds, fruit etc.) have been used medicinally in treatment of various diseases. Seeds of *Syzygium cumini* have showed as antiinflammatory, antioxidant, antibacterial, antidiabetic antifertility, antiplaque, radioprotective, neuropsychopharmacological, and nephroprotective and antidiarrhoeal activities. Leaves of *Syzygium cumini* have been used for their antibacterial & antidysentric actions. Seeds of *Syzygium cumini* have been used as antibacterial, anti- inflammatory, antioxidant, & anticancer. Bark of *Syzygium cumini* has been used as diuretic. The ripe fruits of *Syzygium cumini* were found to have cardiovascular effects like hypotensive, vasorelaxant & antihypertensive in rats. *Syzygium cumini* has been used in diabetes since ages. Apart from this, it has also shown anti-allergic, anti-fungal, antibacterial, anticancer, anticlastogenic, antidiarrhoeal, antifertility, antihyperlipidemic, antihypertensive, radioprotective, chemoprotective, a hepatoprotective effects. This review will provide a platform for future researchers to describe the existing data on the information on traditional and medicinal use of the *Syzygium cumini* plant. The health-beneficial effects of S.

cumini are mainly attributed to various phytoconstituents such as tannins, alkaloids, steroids, flavonoids, terpenoids, fatty acids, phenols, minerals, carbohydrates and vitamins present in the fruit. This review paper presents an overview of experimental evidence for the pharmacological potential of *S. cumini*.

**Keywords-** *Syzygium cumini*, Antiinflammatory, Anti-pyretic, Anti-oxidant, Antimicrobial, Anticancer, Antidyslipidemic and Antibacterial.

## INTRODUCTION

Numerous medicinal plants are present in a collection of herbal preparations of the Indian traditional health care system (Ayurveda) named Rasayana. From the ancient time, plants have been playing a key role for the betterment of mankind presenting as an extraordinary source of natural medicine. The complexity in formulating chemical based drugs as well as their health related side effects and uprising cost has led worldwide researchers to focus on medicinal plant research. Bangladesh has a vast repository of diverse plant species where about five thousand plants species have been claimed as having significant medicinal values. The researched papers on medicinal plants publishing from last few decades mention the activities of different plant bioactive compounds that are used widely in the treatment of various human ailments *Syzygium cumini* belongs to the family Myrtaceae. Commonly it is known as a amblang, Jambul, Jambolan and Kala Jamun in India. *Syzygium cumini* is recommended as a safe drug in various diseases by health organizations in the world [1]. This plant is used for treatment and in prevention of different diseases in Homoeopathy practice from more than one fifty years back in different countries. This plant especially restoration the body weight and inhibits the excessive blood glucose levels, as well as recovery in the activities of antioxidant enzymes like catalyze, peroxidase and super oxide dismutase. Fruits are used in pimples emaciation, prickly heat, diabetes Insipidus, and urinary system to cure number of diseases such as urinary tract infections, cystolithiasis, dysuria. *Syzygium* was an important medicinal plant since long and therefore, scientists are also curious to prove the Pharmacological and phytochemical actions. *Syzygium cumini* plant bark is rough and dark grey colour becoming light grey colour with smoother higher up. The wood of the plant is water proof and leaves have a turpentine, pinkish, dark green with a yellow midrib when mature. The leaves of this plant are used for live stock [2]. The whole plant is having the good nutritional values. This plant starts flowering from February to May, plant flowers are

fragrant and small about six millimeters in diameter. The fruits develop by April to July [3]. *Syzygium Cumini* fruits are oblong dark grey colour and fruits are combination of sweet, sour and stringent in flavor.

### **BOTANICAL DESCRIPTION AND TAXONOMY**

*Syzygium cumini* is an evergreen tree that grows up to 25 meters (80 feet) tall, with grayish white stems and coarse and discolored lower bark. The leaves are simple, opposite, elliptic to oblong, smooth, glossy, and somewhat leathery. The midrib of the leaves is prominent and yellowish. Also, the leaves are 5 to 15 centimeters long and 2 to 8 centimeters broad. The base is cuneate or round; apex is short, rounded, or obtuse; edges are toothed; stalk is slender and light yellow; veins are fine, close together, parallel, and gland dotted. The flowers are white to pinkish, about 1 centimeter (0.5 inch) across with four petals and many stamens. The calyx is cup-like, about 4 millimeters long, and toothed. The petals adhere and fall together as a small disk. The stamens are many and almost the same length as calyx. The fruits are ovoid, 1-seeded berry, with a length of 2 centimeters (0.8 inch), dark purple red, shiny, with white to lavender flesh. The Philippine description of the fruit's shape is from oval to elliptic, length from 1.5 to 3.5 centimeters, and color from dark purple to black. The fruit has a combination of sweet, mildly sour, and astringent flavor, and it tends to color the tongue purple. Also, because of the dark violet color of the fruit, it gives the impression of the olive tree fruit, both in shape and weight.



Fig.- *Syzygium cumini* (L) Skeels.

**Scientific classification [6]**

Kingdom: Plantae

Unranked: Angiosperms

Unranked: Eudicots

Unranked: Rosids

Order: Myrtales

Family: Myrtaceae,

Genus: Syzygium

Species: Cumini

Binomial name: Syzygium cumini (L) Skeels.

**Origin of Jamun and Its Distribution**

- Being native to India, Ceylon and Burma and also to the Andaman Islands, it is available throughout Indian plains up to 1300 m of height.
- It is grown as a wild and semi-wild tree In different states of India including Uttar Pradesh, Punjab, Haryana, Gujarat, Maharashtra, Madhya Pradesh, Chhattisgarh, Bihar, Karnataka, Jharkhand, Andhra Pradesh and Tamil Nadu.
- In addition to S. cumini other major species of Jamun in India is S.jumbos known as rose apple or safed jamun which is found in South India, Assam and West Bengal.
- Other various species of minor importance include S.javanica (water apple), S.fruticosum, S. densiflora and S. Uniflora.

**Floral Biology of Jamun**

*Syzygium cumini* (Jamun tree botanical name) is generally seen that inflorescence in Jamun is borne in the axils of its leaves on the branch let and the flowering starts in the first week of March and can last upon the first week of April. Jamun flowers are light yellow in colour and are hermaphrodite (that have complete or partial reproductive organs and can produce gametes associated with both male and female sexes). According to studies, the maximum anthesis i.e. 18.71 percent to 43.08 percent and dehiscence were seen between 10 am and 12 noon. Also, the maximum receptivity of stigma was observed one day after a thesis.

Flowers are seen regular, bisexual having 5 free sepals and petals with 8 stamens and a simple style.

It is known that anthesis starts at about 8 am and takes 10 hours to complete. The maximum numbers of flowers open between 5 pm to 6 pm. In some flowers, anthesis could be seen between 5 am to 6 am in the morning. Jamun is a cross-pollinated crop and the pollination is performed by houseflies, honey bees and wind. It is seen that only 12-15 percent flowers reach the maturity stage and the flower and fruit drop are present in 3 stages.

### **Propagation of Jamun**

Propagation of Jamun can be done through seeds which are highly recalcitrant in nature. The freshly extracted seeds are generally sown for raising seedlings. The seeds germinate within two weeks and these can then be transplanted during monsoon season in the field. Also other methods of propagation such as budding methods are known to be successful and patch budding can be performed in the months of March in semiarid areas. In addition, soft wood grafting is adopted mostly in Karnataka and Gujarat in the months of June and August, respectively.

Using Biotechnology, the nodal segments, epicotyls segments and shoot apices of the plant have been used as the explants for micro propagation. The regenerated plantlets are then acclimatized and transferred to the soil successively.

### **Breeding Objective of *Syzygium Cumini* (Jamun Tree Botanical Name)**

- It is performed to achieve a high yielding variety of the plant.
- For attaining early maturing varieties.
- It also improves physico-chemical properties such as fruit weight, pulp content, acidity, TSS, etc.
- To achieve resistance against flower and fruit drop.

### **Selection**

- Today, there are numerous seedling strains of Jamun available in India that provides a great scope for selection of better cultivars.
- An important criterion for selection is the oval/oblong fruit shape, deep purple or bluish black colour, more pulp, larger size, small stone, earliness, sweetness and juiciness.

**Table1. Pharmacological actions of *Syzygium cumini***

S.No	Parts of the Plant	Fractions	Pharmacological Action
1.	Stem	Aqueous	Hypoglycemic, hypolipidemic, antidiarrheal.
2.	Bark	Methanolic	
3.	Leaves	Aqueous methanolic, ethanolic, butanolic and essential oil	Action on local inflammations, anthelmintic, antiseptic buccal, astringent, increases in the number of erythrocytes, and T lymphocytes.  Modulation of purinergic system in DM 2, in erythrocytes submitted to hyperglycemia, acute ethanol intoxication, anti-inflammatory, digestive, astringent, protection against toxicity caused by carbon tetrachloride in vivo and <sup>a</sup> hypoglycemic activity in vitro.
4.	Fruits	Aqueous	Decreased urinary volume, urinary albumin, renal hypertrophy, and glucose.  Gastrointestinal, hypoglycemic, antipyretic and cardioprotective treatment.  In vivo: increases insulin levels in control and diabetic

5.	Seeds	<p>Methanolic, ethanolic</p> <p>Aqueous</p> <p>Hydroalcoholic, ethanolic, Chloroformic, petroleum ether, and methanolic</p>	<p>rabbits.</p> <p>In vitro: it stimulates the insulin secretion of the islets of Langerhans and inhibits the insulinase activity.</p> <p>Cardio protector in pesticide-induced toxicity, protector against isopreterenol-induced myocardial damage.</p> <p>They are considered the most effective in hydroalcoholic, experimental DM models developed in vivo, attenuating/reversing several parameters affected by this disease even in short treatment periods.</p>
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## CONCLUSION

*Syzygium cumini* is widely used by the traditional healers for the treatment of various diseases. In recent years, ethno medicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin which needs evaluation on modern scientific lines such as phytochemical analysis, pharmacological screening and clinical trials 89. In the present review, the literature about botanical, pharmacognistical, phytochemical and pharmacological activities have been given comprehensively.

The plant is having antidiabetic, antioxidant, antiviral, neuropsychological, antifertility, anti-inflammatory, antidiarrhoeal activity, hepatoprotective, anti-allergic activity, and gastroprotective activity. A literature survey also pin points the fact that although the number of diseases for which *S. cumini* finds use as a medicine is fairly large its therapeutic efficacy has been assessed only in few cases with few models. Therefore, it is imperative that more clinical and pharmacological studies should be conducted to investigate the unexploited potential of this plasma.

## REFERENCES

1. Jadhav V.M., Kamble S.S. and Kadam V.J. Herbal medicine, *Syzygium cumini* a review. Res J. Pharmacy, 2009; 2(8): 1212-1219.
2. Janick Jules and Paull sd fb Robert E. (2008). The Encyclopedia of Fruit & Nuts. CABI International, United Kingdom, 1-160. ISBN: 978-0-85199-638-7.
3. Chen Jie and Craven Lyn A. (2017). *Syzygium* in Wu, Zhengyi; Raven, Peter H. & Hong, Deyuan, Flora of China (online), eFloras.org, retrieved 2015-08-13.
4. Patel Soncharan, Shanmugarajan T.S., Somasundaram. and Maity Niladri, Protective effect of *Syzygium cumini* seeds against doxorubicin induced cardio toxicity in rats International Journal Of Pharmacy & Life .2010;1(2):23
5. Oliver.B, 1880, Oral hypoglycemic plants in west Africa, J.Ethnopharmacol,2:119-127.
6. Bhanumathy, M., Shivaprasad, H.N., Manohar, D., and Nargund, L.V.G. Anti-fatigue Activity of Extracts of *Syzygium cumini* Leaves. *International Journal forPharmaceutical Research Scholars*, **2013**; 2 (1):24-29
7. Modi DC, Patel JK, Shah BN and Nayak BS: Pharmacognostic Studies of the Seed of *Syzygium Cumini* Linn; Pharma Science Monitor. An International Journal of Pharmaceutical Sciences 2010; 1(1): 20-26.
8. The Ayurvedic Pharmacopoeia of India. New Delhi: Ministry of Health and Family Welfare 1999; 54-59.
9. Patel D, Gidwani B, Sarwa K and Kaur CD: Shri Rawatpura Sarkar Institute of Pharmacy Kumhari, Durg (C.G.). A comprehensive review on the Anti-diabetic Activity of *Momordica Charantia* and *Syzygium Cumini* Seeds.
10. Jadhav VM, Kamble SS and Kadam VJ: Herbal medicine: *Syzygium cumini*: a review. Journal of Pharmacy Research 2009; 2(8): 1212-1219.