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Phytochemistry and Pharmacological Review of *syzygium cumini*

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Abstract: *Syzygium Cumini* of family Myrtaceae, It is commonly present in America and Australia and is distributed all over worldwide. *S. Cumini* used in Traditionally and Medicinal values in diabetics. The present studies is to attempted the review of *S. Cumini* on Phytochemistry and Pharmacological action on Anti diabetic, Anti-cancer, wound healing, Anti-ulcer. etc from sources of Pub Med, Scopus and other Data base collected for the studies

Key words: *S. Cumini*, Anti diabetic Flavonoids, and Anti-cancer.

Introduction

Syzygium Cumini belongs to the family of Myrtaceae. It is commonly present in America and Australia. It is distributed all over worldwide. It has a worldwide, although highly unevenly, distributed in tropical regions and The genus comprises of 1 to 100 species and has a local range that extends from Madagascar to Africa throughout the southern East Asia and around the Pacific. Its high level of diversities occur from Malaysia, to north-eastern Australia. Plants of this family commonly contain volatile oils which are used as medicine. (1) Many fruits of this genera are safer to eat and act as a traditional medicine in different ethnobotanical practices through the tropical and subtropical regions. (2)

synonyms of *S.c* are *Eugenia jambolana* Lam., *Myrtus cumini* Linn., *S.jambolana* DC., *S. jambolanum* (Lam.) DC., *Eugenia djouant* Perr., *Calyptanthus jambolana* Willd., *Eugenia cumini* (Linn.) Druce. And *Eugenia Caryophyllifolia* Lam.

It is commonly called as jambolan, jamun, black plum, java plum, damson plum, Indian blackberry, Malabar plum, purple plum, Portuguese plum, Jamaica. (3)

Common names and scientific classification of *syzygium cumini*:- (4,5)

Sansk. : Mahajambu, Ksudrajambu

Assam. : Jam

Bengali.: Jaam , Kalajam

English. : Jambul tree

Gujrati: Gambu, Jamun

Hindi : Jamuna

Mar. : Jambul

Mal. : Njaval

Ori. : Jamu

Punjabi. : Jaamun

Tamil. : Naval

Urdu. : Jamun

Kingdom : Plantae

Unranked : Angiosperms

Unranked : Eudicots

Unranked : Rosids

Order : Myrtales

Family : Myrtaceae

Genus : *Syzygium*

Species : *Cumini*

Binomial name : *Syzygium cumini* (L) Skeels.



Photograph: showing the *Syzygium cumini* (L.) Skeels

ORIGIN AND DISTRIBUTION

Syzygium cumini Skeels as the best Known plant and it is very oftenly cultivated. The species is grown and haeversted in the Indian sub-continent region , and Many other places of South east Asia such as (india, Bangladesh, Burma, Nepal, Pakistan, Sri Lanka and Indonesia)it was long being introduced and became native in Malaysia. The plant is cultivatedin many different regions where it has been used as a fruit producer, ornamental and also for its timber purpose. In India, the plant is present throughout the pasture from the Himalayas to south India. (3)

Botanical description of the *Syzygium cumini*: 6,7

Leaves: have a turpentine smell, and are opposite, 5-25 cm long, 2.5-10 cm wide, oblong-oval or elliptic, blunt or tapering to a point at the apex; pinkish when young, becoming leathery, glossy, dark-green above, lighter beneath, with a conspicuous, yellowish midrib when mature.

Bark: is rough, cracked, flaking and Discoloured on the lower part of the trunk, Becoming smooth and light-grey higher up.

Seed :Shows cotyledons consisting of single layered epidermis. Mesophyll composed of isodiametric thin-walled, parenchymatous Cells fully packed with simple starch grains, Oval , rounded measuring 7-28 μ in diameter a few schizogenous Cavities are also found.⁷

Fruit: appear in clusters of just a few or 10-40, are round or oblong, often curved, 1.25-5cm long, turning from green to light-magenta, then black, although a white-fruited form has been reported in Indonesia. The skin is thin, smooth, glossy, and adherent. The pulp is Purple or white, very juicy and normally encloses a single, oblong, green or brown seed, upto 4cm Long though some fruits have 2-5 seeds tightly compressed

Flowers: are fragrant and appear in clusters 2.5-10 cm long, each being 1.25 cm wide and 2.5 Cm long, with a funnel-shaped calyx and 4-5 united Petals, white at first, becoming rose-pink, shedding Rapidly to leave only the numerous stamens



Figure 1: Botanical description of the *Syzygium cumini*

- LEAVES**
- Infusions or decoctions of leaves of jambolana is used for diabetes.
 - The juice of leaves is given orally as antidote in opium poisoning and in centipede bite.
 - Leaves are used in the treatment of diabetes and renal problems.
 - The leaves are used to help in strengthening the teeth and gums.

- FRUITS**
- Fruit is given orally to treat diabetes.
 - The juice of ripe fruits is stored for 3 days and then is given orally for gastric problems.
 - Fruit are used in the treatment of diabetes, dysentery, increases appetite and to relieve from headache.



- FLOWERS**
- Flowers are used in treating diabetes.
 - Flowers with other ingredients is used to treat throat cancer.
 - Flowers powder is used to stop bleeding from wound.

- SEEDS**
- Dried seeds are used in the treatment of diabetes.
 - seed powder decoction are used in diarrhea, dysentery, diabetes, and inflammatory activity and to treat Juice obtained from the
 - seeds is applied externally on sores and ulcers.
 - Seeds with sugar is used in the treatment of dysentery.
 - Seeds are used in treatment of menstrual disorders, vaginal disorders.

- STEM BARK**
- stem bark are used in the treatment of diabetes, dysentery, increases appetite and to relieve from headache.
 - bark is given orally for the treatment of women with a history of repeated abortion.
 - Stem bark is used in treat constipation.
 - The juice of stem bark is used to o stop blood discharge in the faeces.
 - to treat women suffering from leucorrhoea and urine bleeding.

USES:-

Figure 2:- Uses of *syzygium cumini*

PHYTOCHEMICAL CONSTITUENTS:-

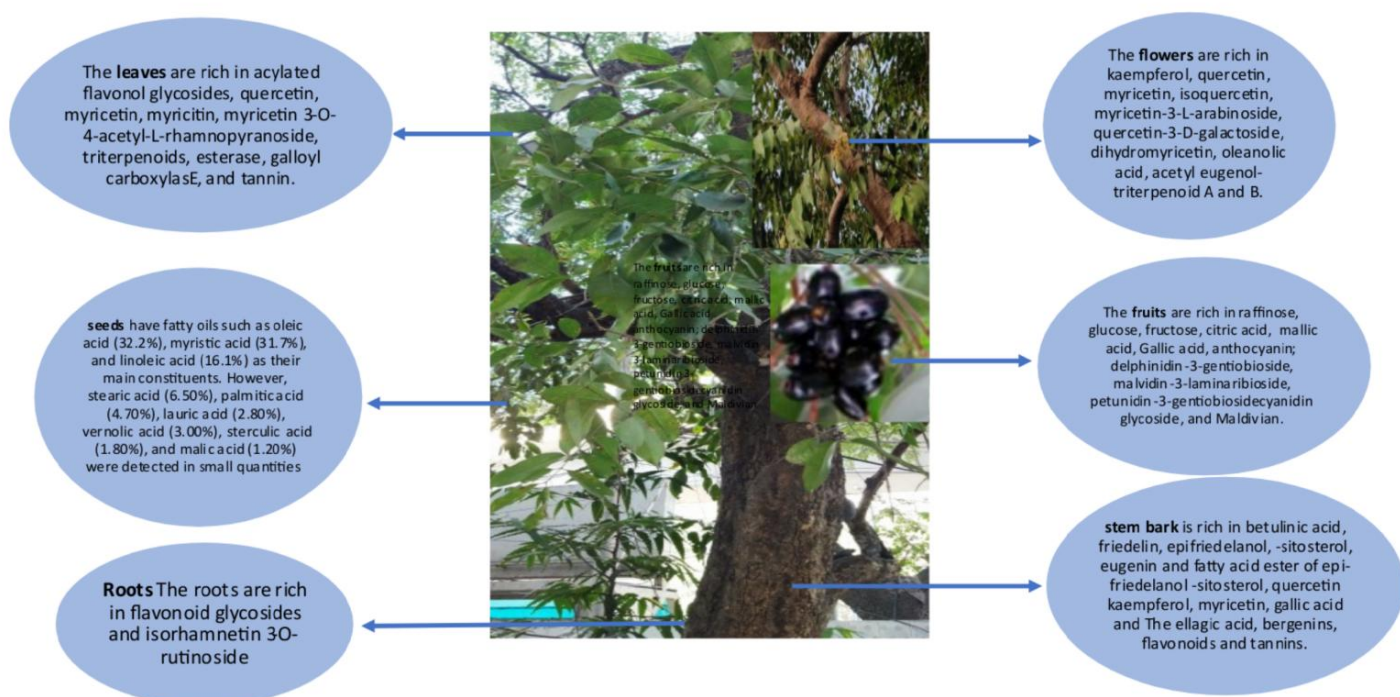


Figure 3:- phytochemical constituents of *syzygium cumini*

PHARMACOLOGICAL ACTIONS :-

ANTIOXIDANT ACTIVITY:-

Syzygium cumini acetone:water extract are identified the poly phenols by MALDI-TOF MS analysis , HPLC and carried out in vitro anti oxidant activity by DPPH and FRAP methods

The tannins which are extracted from S.C. fruits indicates a very good α -diphenyl- β -picrylhydrazyl(DPPH), Ferric reducing ability of plasma(FRAP) anti-oxidant activity. Thus *syzygium cumini* fruit shows a significant anti-oxidant activity. (26)

The methanol leaf extract of S.C. was estimated for anti-oxidant action. It is determined that leaves contain large amount of phenolics and flavonoids as compared to pulp and seeds. Hence leaves have more anti-oxidant activity. (27)

The methanol leaf extract and its fractions with water, chloroform, ethyl acetate and n-hexane were prepared and estimated for antioxidant activity by DPPH, FRAP methods. The result

shows that ethyl acetate extract had higher anti-oxidant activity than other fractions. (28)

The methanolic and aqueous leaf extract was subjected under DPPH, NOS, hydroxyl scavenging and ferric reducing power (FRAP) methods for evaluation of antioxidant property. In all these methods methanolic leaf extract showed higher anti-oxidant potential as methanolic leaf extract contain more amount of phenolics and flavonoids. (29)

The average antioxidant capacity of the fruits of the jambolao was 505.6 $\mu\text{mol/g TE}$. (30)

ANTIDIABETIC ACTIVITY:-

From the seed extract of *S.C.* mycaminose compound was isolated. This compound mycaminose (50 g/kg), ethyl acetate and methanolic extracted compound of *S. C.* seed (200 & 400 g/kg) was taken to determine the anti-diabetic activity against streptozotocin (STZ)-induced diabetic rats. The result showed that mycaminose posses anti-diabetic activity. (31)

S.C. aqueous seed extract was evaluated for hypoglycemia activity at the dose level of 1mg, 2mg, 4mg, 6mg. The result was found that 4mg/kg dose have high hypoglycemic action. (32)

S.C. seed was evaluated and the phytochemical screening indicated that the seed extract contains steroids and flavonoids. Result showed that the flavonoids in *S.C.* seed plays an important role for anti-diabetic activity. (33)

The study evaluated the effect ethanolic extract of *S.C.* seeds (1.25g/ kg) for twenty one days. The result showed that the administering of *S.C.* seed powder to diabetic induced rats reduces the glucose level. (34)

WOUND HEALING ACTIVITY:-

The alcohol extraction of *S.C.* leaf is administered to wound induced rats and the result found the healing of wound, and decrease in glucose level. (35)

Diabetic patients are impaired with wound healing. So the present study evaluated that jamun honey have the efficacy for diabetic wound healing in vivo and in vitro models. (36)

Bark extraction of *syzygium cumini* was taken and investigated to have wound healing activity. The ointment formulated of *S.C.* bark extract was applied tropical on the wound. (37)

The study of *syzygium cumini* methanolic leaf extract with the combination with clarified butter ghee on albino wistar rats was applied and found to have wound healing activity. (38)

Ethanollic dried fruit extract of *syzygium cumini* was investigated on spague dowley rats and found that it is very much effective for diabetic induced wound healing activity.(39)

ANTI DIARRHOEAL ACTIVITY:-

The methanolic leaf extract with the fraction of petroleum ether and chloroform with the dosage level of (200 & 400 mg/kg) b.w administered to experimental mice and found to have anti-diarrheal activity.(40)

ANALGESIC ACTIVITY:-

The methanolic leaf extract with the fraction of petroleum ether and chloroform with the dosage of (200&400mg/kg) b.w. administered to the experimental mice and found to have analgesic activity. (40)

ANTI INFLAMMATORY ACTIVITY:-

Ethanollic extract of *S.cumini* used for anti inflammatory activity on formaldehyde and carrageenin induced oedema ,the rate of dose is about 125mg significantly the extract shows anti inflammatory activity . (41)

Methanolic extract and ethyl acetate of *syzygium cumini* leaves provides anti inflammatory activity.

Activity in the paw oedema of wister rat induced with carrageenan ,at 200 dose level the expimental study of *s.cumini* leaves shows anti inflammatory activity. (42)

The methanolic extract and ethyl acetate of *syzygium cumini* leaves provides anti inflammatory Activity in paw oedema of wister rat induced with carrageenan ,at 200 and 400mg/kg dose level administrated orally the experimental study of *s.cumini* seed shows anti inflammatory activity. (43)

ANTI ALLERGIC ACTIVITY:-

S.cumini aqueous extract of leaf is Orally administered to Swissmice shows inhibition of paw edema ,the treatment of SC inhibits the edema caused by histamine .The findings shows anti allergic effect of *syzygium cumini*. (44)

ANTI HYPERLIPIDIMIC ACTIVITY:-

The *syzygium cumini* ethanolic extract exhibits anti hyperlipidemic activity in rats induced with triton X-100 induced hyperlipidemia in rats.the active constituents of the plant like triterpenoids, tannins, flavanoids are responsible for antihyperlipidimic activity these have the ability to decrease total triglyceride level,total cholesterol level in rats. Atorvastatin(10mg/kg) is used as standard drug. (45)

when the rat of high cholesterol diet is treated with SC extract it significantly decreases triglycerides, serum cholesterol, atherogenic index, low density lipoproteins, very low density lipoprotein, it increases ratio of high density lipoproteins in hyperlipidemic rats. (46)

Coronary heart disease is majorly caused by disorder like hyperlipidemia. *syzygium cumini* acts as antihyperlipidimic drug prevent atherosclerosis induced disorders.

Entire plant is used as medicinal purpose, the chief constituents of plant like glucoside,ellagic acid, kaempferol, myricetin, and anthocyanin these active constituents plays a major role in pharmacological activities which may include anti diabetic, anticancer, anti hyperlipidimic, antioxidant, antibacterial, anti fungal and anti diarrheal activity. (47)

ANTI MICROBIAL ACTIVITY:-

The *s.cumini* extract of leave is used in antimicrobial activity. The hydroalcoholic extract was against *Klebsiella pneumoniae*, multi-resistant strains *psedomons aeruginosa*, *Staphylococcus aureus* ,The methods used in anti microbial activity is microdilution broth method ,disk diffusion method ,multi-resistant strains . (48)

The *S.cumini* methanolic seed extract was carried on *bacillus subtilis* by agar diffusion. The control shows no zone of inhibition when compared to *Bacillus subtilis* its zone of inhibition was estimated as 20.06mm. 0.3mg/ml is found to be MIC of *S. cumini*. membrane permeabilization in bacterial cell by Flow cytometric kinetic data analysis shows presence of

antimicrobial potential in the seed extract. (49)

Syzygium cumini were extracted by petroleum ether ,methanol and water by using different concentration .*Syzygium cumini* leaves of petroleum extract shows activity against E.coli only. (50)

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