

## A REVIEW ON SYZYGIUM CUMINI PHYTO CHEMICAL AND PHARMACOLOGICAL SCREENING

K. Preethi<sup>2</sup>, U. Vaishnavi<sup>3</sup>, B. Sri Thanmayee<sup>4</sup> and A. Raja Reddy<sup>1\*</sup>

CMR College of Pharmacy, JNTUH, Hyderabad-501401, Telangana, India.

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\*Corresponding Author

A. Raja Reddy

CMR College of Pharmacy,  
JNTUH, Hyderabad-501401,  
Telangana, India.

### ABSTRACT

A frequent name for *Syzygium cumini*, also known as *Eugenia jambolana* Lam, is "jamun" or "black plum" in some other countries, including some in India. *Syzygium cumini* is a tropical tree that blooms and is a member of the Myrtaceae family. It has long been utilised as a very significant medicinal plant in many traditional medical systems, including the Unani system of medicine. Fruit's edible portion contains gallic acid, cyanidin, anthocyanins, tannins, and vitamin C. The anti-diabetic, antipyretic, anti-inflammatory, hypolipidemic, anti-diarrheal, antioxidant, and antibacterial properties of *Syzygium cumini* seeds demonstrate their efficacy in treating diabetes mellitus, ulcers, diarrhoea, and inflammation, as demonstrated in several preclinical investigations.

**KEYWORDS:** *Syzygium cumini-jamun*, Unani, antineoplastic, chemo preventive, radioprotective properties, Myrtaceae.

### INTRODUCTION

The genus *Syzygium* belongs to the Myrtaceae family of myrtles and is indigenous to tropical regions, including Australia and tropical America. Distribution in the tropical and subtropical climates is quite unequal around the world. Numerous fruits in this family have a long history of usage as edibles and traditional medicines in various ethnobotanical traditions across the tropical and subtropical world<sup>[1]</sup> Plants in this family are known to be high in volatile oils, which are utilised in medicine. The anti-inflammatory, antioxidant, neuropsychopharmacological, anti-bacterial, anti-HIV, and anti-ulcerogenic properties of several components of the *jambolana* have been documented. Around the world, 25% of all prescription medications come from different plant sources. These natural remedies are utilised for a variety of diseases, including the creation of new treatments. According to WHO 80% of the world's population rely on plants to supply their basic medical needs, according to WHO, except for allopathy, plant-based medicines, such as ayurveda, Unani, siddha, homeopathy, and naturopathy, play a significant role in both China and India. In *Syzygium cumini* seed extracts, phytochemical analysis revealed the presence of alkaloids, tannins, saponins, flavonoids, phenols, terpenoids, steroids, and amino acids but not anthraquinone glycosides.<sup>[1]</sup>

**History and Distribution:** *Syzygium cumini*, also known as *S. cumini* (L.) A well-known and popularly grown species is the skel. *Eugenia djouant* Perr., *Calyptanthes jambolana* Willd., *Eugenia jambolana*

Lam., *Myrtus cumini* Linn., *Syzygium jambolana* DC., *Syzygium jambolana* (Lam.) DC., *Eugenia cumini* (Linn.) Druce., and *Eugenia caryophyllifolia* Lam.<sup>[1]</sup> There are several other names for it, including *jambolana*, *black plum*, *jamun*, *java plum*, *Indian blackberry*, *Portuguese plum*, *Malabar plum*, *purple plum*, *Jamaica*, and *damson plum*. For a very long time, it has been known that the tree grows on the Indian subcontinent and many other nearby areas of South Asia, including India, Bangladesh, Burma, Nepal, Pakistan, Sri Lanka, and Indonesia. It arrived in Malaysia many years ago and became a native species. The tree is revered by Buddhists in southern Asia and is frequently planted next to Hindu temples since it is sacred to Krishna the Lord. The plant has also been spread to several places where it is employed as a fruit producer, an ornamental, and for lumber. The plant may be found in the plains of southern India and the Himalayas<sup>[1]</sup>

**Morphology:** Black plum is a tropical evergreen tree that may reach heights of 25–30 metres (80–100 ft). Its lower back is discoloured and its stems are white or grey in colour. Black plum leaves have a turpentine-like aroma, are 5–25 cm long and 5–10 cm broad, and have numerous lateral veins that are tightly parallel. The black plum blossoms are somewhat white-pinkish; they come in clusters that are 4–10 cm long, with blooms about 1–2 cm long, 1.5 cm broad, and with 4–5 joined petals and many stamens.<sup>[1]</sup> The fruits are ovoid, one seeded berries that are between 2 and 4 cm long, dark purple, lustrous crimson, dark brown, or almost black in colour. They are produced in groups of 10 to 50. Most of the time, the flavour of this fruit is astringent.<sup>[6]</sup>



**Composition of Fruit:** The fruits are abundant in raffinose, glucose, and fructose as well as anthocyanins, delphinidin-3-gentiobioside, malvidin-3-laminaribioside, petunidin-3-gentiobioside, cyanidin diglycoside, and petunidin. Gallic acid, which is present in the fruits, may be the cause of the sourness of the fruit. The fruit's colour may be explained by the presence of anthocyanins<sup>[6]</sup> The fruit includes 14.00 g of carbohydrates, 0.32-0.40 g of ash, 0.70-0.13 g of protein, 0.15-0.30 g of fat, 0.30-0.90 g of crude fibre, and 83.70–85.80 g of moisture. One variety of jambolana contains 8.30–1.00 mg of calcium, 15–16.20 mg of phosphorus, 1.20–1.62 mg of iron, 26.20 mg of sodium, 55.00 mg of potassium, 0.23 mg of copper, 13.00 mg of sulphur, 8.00 mg of chlorine, 80 I.U. of vitamin A, 0.01-0.03 mg of thiamine, 0.009–0.01 mg of riboflavin, 0.20-0.29 mg of niacin 5.70-18.00 mg ascorbic acid, 7.00 mg choline, and 3.00 mcg folic acid per one variety of jambolanaincludes petunidin-3-glucoside and malvidin-3-glucoside and may be found in Brazil<sup>[1]</sup> Additionally, jambolana peel powder may be utilised as a culinary and pharmaceutical colouring agent. Research has also been done on the antioxidant activity and stability of anthocyanin pigments from fruit peels when used as extracts and in formulations.<sup>[8]</sup>

**Taxonomical Classification: Botanical classification according to USD database<sup>[2]</sup>**

<b>Kingdom</b>	<b>Plantae</b>
<b>Sub-kingdom</b>	Tracheobionta
<b>Class</b>	Magnoliopsida
<b>Sub-class</b>	Rosidae
<b>Order</b>	Myrtales
<b>Family</b>	Myrtaceae
<b>Genus</b>	Eugenia
<b>Species</b>	Jambolana

### Phytochemical Constituents

The anthocyanins, glucosides, ellagic acid, isoquercetin, kaemferol, and mycetin content of jambolana is very high<sup>[2]</sup> The alkaloid jambosine and the glycoside jambolin or antimellin, which are allegedly present in the seeds and halt the diastatic conversion of starch into sugar, are also believed to drop blood pressure by 34.6 percent when added to seed extract.<sup>[2]</sup> The scavenging of free radicals and the protective impact on antioxidant enzymes are attributed to the seed's high concentration of flavonoids, a well-known antioxidant. In addition to being relatively high in protein and calcium, they have also been discovered to have a high total phenolic content with strong antioxidant activity. Java plums are rich in sugar, vitamin C, and mineral salts.<sup>[3]</sup>

### Medicinal Uses

1. Diabetes is healed by eating jamun fruit. It works wonders to cure hypoglycaemia.
2. Due to its high iron content and ability to guarantee a correct flow of oxygenated blood throughout the body, this fruit acts as a natural blood cleanser<sup>[3]</sup>
3. It has a number of chemical components, including gallic acid and oxalic acid, which enable it to combat bacterial and fungal illnesses, including malaria.
4. Asthma, bronchitis, and other lung diseases are also treated with it
5. This fruit is used to cure digestive issues like gas, discomfort in the abdomen, and Dysentery<sup>[4]</sup>
6. This plant, which has aphrodisiac properties, is used as a tonic to heal anaemia and strengthen poor sexual function.
7. Females with leucorrhoea can benefit greatly from jamun bark.
8. Congestion is treated with jamun, which is particularly helpful for conditions involving the pancreas, when mixed with other herbs<sup>[4]</sup>
9. It is also helpful for problems of the neurological system such as depression, tiredness, and others.
10. Teeth and gums are strengthened by the leaf ash, throat pain and mouth ulcers.
11. It calms down the kappa and pitta doshas while aggravating the vata dosha.<sup>[1]</sup>

### Various Extraction Process

**Collection of plant materials;** In the second week of July, *Syzygium Cumini* fresh fruits are harvested from the surrounding area in Bhadrawati, Maharashtra, India. The fruits were gathered, rinsed under running water to eliminate any pollutants or dust, divided into fruit pulp and cleaned properly, dried at room temperature for one to two weeks, and then ground into powder using an electric grinder.

**Preparation of Plant Extract;** Using a Soxhlet device, the powdered sample is percolated with organic solvents such as methanol, petroleum ether, and ethanol (70% w/v) in turn. The extracts were extracted and saved for future research.

**Screening for Phytochemical Compounds;** The presence of phytoconstituents such as alkaloids, tannins, saponins, flavonoids, phenols, terpenoids, steroids, amino acids, and anthraquinone glycosides are analyzed in the seed extracts of *Syzygium Cumini* using the accepted procedures.<sup>[15]</sup>

**Mayer's Test/ test for alkaloids;** Consider mercuric chloride 1.36 gm in 60 ml and potassium iodide 5 gm in 10 ml of pure water, respectively. The 100 cc of distilled water is used to combine and dilute these two solvents. Add a few drops of reagent to 1 ml of the sample's acidic aqueous solution. Alkaloids are present when white or pale precipitates form.<sup>[1]</sup>

**Ferric Chloride Test / Test for Tannins;** When you extract 50 mg, mix it with distilled water, and then add a few drops of neutral 5% ferric solution, the presence of tannins will show up as dark green precipitates.<sup>[16]</sup>

**Lead acetate test;** Take a test tube with 5 ml of sample in it and add a few drops of lead acetate 1% solution to it. Bulky white precipitates that form show that tannins are present.<sup>[1]</sup>

**Test for saponins;** In the test tube holding 50 ml of the sample's extract, a drop of sodium bicarbonate was added. After two minutes of vigorous shaking, the mixture produces a structure like a honeycomb, which indicates the presence of saponins.<sup>[17]</sup>

**Test for flavonoids;** 5–10 drops of diluted hydrochloric acid, together with a little quantity of Mg or Zn, were added to a test tube holding about 0.5 ml of the alcoholic extract of the sample. The solution was then heated for a few minutes. Flavonoids are present when reddish pink or filthy brown colour is present.<sup>[17]</sup>

**Test for phenols;** A 10% ferric chloride aqueous solution and a few drops of distilled water were added to 1 ml of the sample's alcoholic solution. Phenols can be detected by the formation of blue or dark green colour.<sup>[1]</sup>

**Test for terpenoids;** 1 mg of the extract was placed in a test tube with 2 ml of chloroform and 5–10 drops of concentrated H<sub>2</sub>SO<sub>4</sub>, and the colour of the solution was checked for the presence of brown terpenoids.<sup>[1]</sup>

**Test for steroids/ Salkowski's test;** A dry extract of the material weighing about 100 mg was diluted in 2 ml of CHCl<sub>3</sub>. Carefully incorporating H<sub>2</sub>SO<sub>4</sub> created a lower layer. The interface had a reddish-brown colour that was a sign of a steroidal ring.<sup>[1]</sup>

**Test for amino acids;** Take 2 ml of the extract sample, then add 1-2 drops of the ninhydrin reagent to it. The presence of amino acids indicates the appearance of violet or purple colour.<sup>[1]</sup>

**Test for anthraquinone glycoside/Bontrager's Test:** The Bontrager Test involved adding 2 ml of diluted H<sub>2</sub>SO<sub>4</sub> to a test tube holding 5 ml of extract, boiling for 5 minutes, then filtering. Equal amounts of CHCl<sub>3</sub> were added and well mixed with the filtrates. After separating the organic layer, 10% ammonia solution was added to it. The ammonia layer's appearance in brick pink proved the existence of anthraquinone glycosides.<sup>[1,2]</sup>

## RESULT AND DISCUSSION

### Phytochemical screening test of *Syzygium Cumini* seed extracts.

Phytoconstituents	Organic solvent		
	Methanolic extract	Petroleum ether extract	Ethanol extract
Alkaloids	+	+	+
Tannins	+	–	+
Saponins	+	+	+
Flavonoids	+	+	+
Phenols	+	+	–
Terpenoids	+	–	+
Steroids	–	+	+
Amino acids	+	+	+
Anthraquinone glycosides	–	–	–

+ 'Presence of phytoconstituents'

– 'Absence of phytoconstituents'

## CONCLUSION

Methanol, petroleum ether, and ethanol extracts of the collected seeds of *Syzygium cumini* were used in the current investigation to screen for phytochemicals. *Syzygium cumini* seeds were found to be abundant in alkaloids, tannins, saponins, flavonoids, phenols, terpenoids, steroids, and amino acids according to the findings of phytochemical screening investigations, as indicated in the above table.

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