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The Preliminary Phytochemical Analysis of *Syzygium cumini* (L.) Skeels. Seed extract

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Abstract

Syzygium cumini (L.) Skeels. also referred to as jamun, jambolan, Java plum, or black plum, is a popular fruit that grows on an evergreen tropical tree in the Myrtaceae family of flowering plants. It is haphazardly planted in many locations. These countries are its native lands: India, Bangladesh, Sri Lanka, Myanmar, Nepal, China, Australia, Thailand, Kenya, Mexico, Colombia, United States, Zambia, and Zimbabwe. In conventional and folk medicine, the entire plant has been utilised to treat a wide range of illnesses. The edible portion of jamun fruits include components such as cyanidin, petunidin, malvidinglucoside, tannins, gallic acid, and vitamin C. The seeds of *Syzygium cumini* (L.) Skeels. are known to have antibacterial, antipyretic, anti-inflammatory, hypolipidaemic, psychopharmacological, and anti-diabetic properties. All extracts passed a preliminary phytochemical screening that identified the presence of amino acids, alkaloids, tannins, saponins, flavonoids, phenols, terpenoids, and amino acids but not anthraquinone glycosides.

Key words : Phytochemical study, *Syzygium cumini*, Seed, Secondary metabolites.

Herbal remedies have been used for medicinal purposes in various forms by indigenous medical systems such as Ayurveda, Siddha, and Unani since ancient times[3]. Compared to contemporary synthetic drugs, herbal remedies appear to be a safer option with fewer or no side effects[15]. In India's ancient past, the use of medicinal plants in folklore medicine is a well-established fact. Modern synthetic drugs are surpassed by herbal medicines that use fresh or dried plant parts and have negligible or no side effects[15].

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Nearly 80% of people worldwide, according to a World Health Organisation survey, receive their primary healthcare from traditional medicine providers[21]. About 25% of all prescribed medications prescribed worldwide are derived from different plant sources and are used as natural products in drug development as well as in the prevention and control of diseases.

Plants contain phytochemicals, which are recognised for their anticancer, antioxidant, immune-boosting, neuropharmacological, and detoxifying properties. Flavonoids, alkaloids, tannins, glycosides, steroids, saponins, phenolics, terpenes, anthraquinones, and essential oils are the different categories into which the phytochemicals fall[17]. According to earlier research, flavonoids are employed as antioxidants, cytotoxic agents, antimicrobial agents, anti-inflammatory agents, and free radical scavengers[5,17].

The *Syzygium cumini* (L.) Skeels. are large evergreen trees that grow up to 1,800 metres in elevation and are part of the Myrtaceae family (Jayachandra, K., *et al*., 2012). India or the East Indies is where *Syzygium cumini* (L.) Skeels. originated. It is also broadcast in numerous other parts of the globe[7]. The stem bark of *Syzygium cumini* (L.) Skeels. has been the subject of previous research, which has revealed a number of medicinal properties. These include carminative, astringent, refrigerant, digestive, stomachic, anthelmintic, and antidiabetic properties. The stem bark has also been used to treat a variety of conditions, including skin diseases, stranguriy, wounds, leucorrhoea, fever, dysentery, chronic diarrhoea, and menorrhagia[18,19]. The goal of this study was to look into the phytochemical elements from *Syzygium cumini* (L.) Skeels.

Taxonomic Classification :

Kingdom - Plantae
Sub Kingdom- Angiosperms
Class - Dicotyledon
Order - Myrtales
Family - Myrtaceae
Genus - *Syzygium*
Specie - *Cumini*

Morphology :

The black plum, also known as jamun, is a tropical evergreen tree that can reach heights of 25–30 meters (80–100 feet). Its lower bark is coarse and discolored, and its stems are coloured white and grey. The leaves are simple, dark green, opposite, oblong-oval or elliptical, glossy, smooth, leathery to the touch, blunt or tapering at the apex, and they have a distinct turpentine-like smell. The size of the leaves is 5–25 cm long and 5–10 cm wide. When the leaves are mature, the midrib becomes noticeable and turns yellow in colour. There are numerous, nearly parallel lateral veins on the leaf blades. The flowers are white to pink in colour, and they grow in clusters that are 4 to10 cm long. Each flower is 1-2 cm long and 1.5 cm wide, with four to five united petals and numerous stamens. The calyx has a funnel-like appearance. The fruits are ovoid, single-seeded, 2-4 cm long, dark purple, shiny red, dark brown, or almost black in colour, and they grow in clusters of 10–50. The fruit's flavour ranges from sour to fairly sweet, and it's typically astringent and occasionally unpalatable[2].

Plant material :

The plant material was collected in the month of May and June from 23.6990° N and 72.5393° E from Visnagar, Gujarat. The plant specimen is identified as *Syzygium cumini* (L.) Skeels. it belongs to the family Myrtaceae by the help of flora of Gujarat.

Preparation of Plant extracts :

After a thorough washing, the *S. cumini* plant's seeds were dried at 37°C. The seeds were dehydrated and then grind into a fine powder. Using Soxhlet's apparatus, 25 grammes of powdered seed were percolated gradually with organic solvents such as methanol, petroleum ether, and ethanol (70% w/v), in that order. The extracts were taken and stored for later research.

Screening for Phytochemical Compounds:

Using standard procedures, the presence of phytoconstituents such as alkaloids, tannins, saponins, flavonoids, phenols, terpenoids, steroids, amino acids, and anthraquinone glycosides was examined in the *Syzygium cumini* (L.) Skeels. seed extracts[4].

Test for alkaloids [Mayer's Test] :

5gm of potassium iodide were dissolved in 10ml of distilled water, and 1.36 gm of mercury chloride were dissolved in 60ml. With distilled water, these two solvents were combined and diluted to a volume of 100 ml. A few drops of reagent were added to 1 ml of the samples' acidic aqueous solution. Alkaloids are present when white or pale precipitates form.

Test for Tannins :

- Ferric Chloride Test: The 50 mg of extract is dissolved in 5 ml of purified water. A small amount of 5% neutral ferric chloride solution is added to this. Precipitates that are either black or dark green in colour indicate the presence of tannins.
- Lead acetate Test: A few drops of a 1% lead acetate solution were added to a test tube that held roughly 5 ml of sample extract. A large white precipitate's formation suggests tannins are present.

Test for Saponins :

A single droplet of sodium bicarbonate was introduced into the test tube holding 50 ml of the sample extract. For two minutes, the mixture was shaken ferociously. Saponins were evident in the form of a froth that resembled honey comb.

Test for Flavonoids :

5 to 10 drops of diluted hydrochloric acid, a small amount of magnesium or zinc, and 0.5 ml of the sample's alcoholic extract were added to a test tube. The mixture was then boiled for a few minutes. The presence of flavonoids is indicated by a dirty brown or reddish pink appearance.

Test for Phenols :

A few drops of the 10% aqueous ferric chloride solution were added to 1 ml of the sample's alcoholic solution, which was then mixed with 2 ml of distilled water. Phenols are present when a blue or deep green colour develops.

Test for Terpenoids :

1 mg of extract, 2 ml of chloroform, and 5–10 drops of concentrated H2SO4 were added to a test tube. The extract was then checked for the presence of terpenoids, which was indicated by a reddish-brown colour.

Test for Amino acids :

A solution of 1-2 drops of ninhydrin reagent was added to 2 ml of extract sample. The presence of amino acids is indicated by the appearance of violet or purple colour.

The findings derived from the current investigation (Table-1) unequivocally demonstrate that the water, methanol, and ethanol extracts of the seeds of Syzygium cumini contain alkaloids, amino acids, flavonoids, saponins, steroids, phenol, tannins, and terpenoids.

Table-1. Phytochemical screening test of *Syzygium cumini* (L.) Skeels. seed extracts

Phytochemical	Solvent		
	Water	Methanol	Ethanol
Alkaloid	+	+	+
Tannin	+	+	+
Saponin	+	+	+
Flavonoid	+	+	+
Phenol	+	+	+
Terpenoid	+	+	+
Steroid	+	+	+
Amino Acid	+	+	+

A diverse array of herbs and herbal extracts encompasses various phytochemicals that exhibit significant biological activity, thereby offering a substantial therapeutic index. The considerable protective benefits attributed to fruits and vegetables are primarily due to phytochemicals, which are classified as non-nutrient plant compounds. Numerous phytochemicals have been identified to demonstrate a broad spectrum of activities that may confer protection against chronic diseases. For instance, phytochemicals including saponins, terpenoids, flavonoids, tannins, steroids, and alkaloids have demonstrated notable anti-inflammatory effects[1,6,10,11,14]. Glycosides, flavonoids, tannins, and alkaloids exhibit hypoglycemic activities[16]. Additionally, terpenoids have been evidenced to lower blood glucose levels in animal studies[12]. Furthermore, steroids and triterpenoids have been shown to possess analgesic properties[13,20]. The phytochemical screening conducted on the water, methanol, and ethanol extracts of *Syzygium cumini* seeds utilized in this study has definitively revealed that the crude extracts contain alkaloids, amino acids, flavonoids, saponins, steroids, phenols, tannins, and terpenoids (Table-1). *Syzygium cumini* seeds are also established to possess various medicinal properties, including anti-inflammatory, anti-diabetic, and analgesic activities, as well as effects on the central nervous system. Although this investigation represents merely a preliminary study of *Syzygium cumini* seeds, a comprehensive study will furnish a robust foundation elucidating all the aforementioned functions of phytochemicals.

This research unequivocally indicates that the extract of *Syzygium cumini* (L.) Skeels. seed, when prepared in various organic solvents, demonstrates a significant presence of polyphenols, tannins, flavonoids, terpenoids,

and other phytochemicals that contribute to the esteemed medicinal properties of *S. cumini* seed. Additionally, comprehensive investigations are currently underway in our laboratory to meticulously isolate the active constituents.

References :

1. Akindele, A.J., and O.O. Adeyemi, (2007). *Fitoterapia*: *78*(1): 25-28.
2. Ayyanar, M., and P. Subash-Babu, (2012). *Asian Pacific journal of tropical biomedicine*: *2*(3): 240-246.
3. Dubey, N. K., R. Kumar, and P. Tripathi, (2004). *Current science*: *86*(1): 37-41.
4. Harborne, J. B. (1998). *Phytochemical methods: a guide to modern techniques of plant analysis*.
5. Hartati, R., A. G. Suganda, I. Fidrianny, and T. M. Ginting, (2014). *International Journal of Pharmacy and Pharmaceutical Science*: *6*(7): 142-4.
6. Ilkay Orhan, I., E. Küpeli, B. Şener, and E. Yesilada, (2007): *Journal of ethnopharmacology*: *109*(1): 146-150.
7. Jadhav, V. M., S. S. Kamble, and V. J. Kadam, (2009): *Journal of Pharmacy Research*: *2*(8): 1212-1219.
8. Jayachandra, K., A. Maheswaran, and M. Murali, (2012): *International journal of pharmaceutical sciences and research*: *3*(2): 615-619.
9. Kusumoto, I. T., T. Nakabayashi, H. Kida, H. Miyashiro, M. Hattori, T. Namba, and K. Shimotohno, (1995): *Phytotherapy Research*: *9*(3): 180-184.
10. Latha, R.M., T. Geetha and P. Varalakshmi (1998): *General Pharmacology*: *31*(4): 601-606.
11. Liu, R.H. (2003): *The American journal of clinical nutrition: 78*(3): 517-520.
12. Luo, J., J. Cheung, E. M. Yevich, J. P. Clark, J. Tsai, P. Lapresca, ... and G. M. Reaven (1999). *Journal of Pharmacology and Experimental Therapeutics*: *288*(2): 529-534.
13. Malairajan, P., Geetha Gopalakrishnan, S. Narasimhan and K. Jessi Kala Veni (2006). *Journal of Ethnopharmacolohy*: *19:* 425-428.
14. Manach, C., F. Regerat and O. Texier. (1996): *Nutrition Research*: *16*(3): 517-544.
15. Modi, D. C., J. K. Patel, B. N. Shah, and B. S. Nayak, (2010): *Pharma Science Monitor*: *1*(1): 20-26.
16. Bever, B. O. (1980): *Journal of Ethnopharmacology*: *2*(2): 119-127.
17. Saxena, M., J. Saxena, R. Nema, D. Singh, and A. Gupta, (2013): *Journal of pharmacognosy and phytochemistry*: *1*(6): 168-182.
18. Saravanan, G., and L. Pari (2008). *Journal of Pharmacology and Toxicology*: *3*(1): 1-10.
19. Salim, K. P., P. Padmaa, and M. Paarakh, (2009): *Pharmacologyonline*: *2:* 101-22.
20. Sayyah, M., N. Hadidi and M. Kamalinejad. (2004). *Journal of Ethnopharmacology*: *92*(2-3): 325-9.
21. WHO OMS. (2002).