

Exploration of Preliminary Phytochemical Studies of Seed of *Syzygium cumini*

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Abstract: Problem statement: The investigation for possible Preliminary Pharmacognostical and phytochemical activity of seeds of *Syzygium cumini* were performed to lay down the standards which could be useful in future experimental studies. **Approach:** The study includes macroscopy, microscopy, preliminary phytochemical screening and physicochemical evaluation of seeds of *Syzygium cumini*. **Results:** The results were discussed for both the extracts in terms of microscopy, macroscopy, phytochemical analysis. **Conclusion:** The present study provides a scientific rationale for the traditional use of seeds of *Syzygium cumini* in the management of wounds.

Key words: *Syzygium cumini*, jamun, phytochemical investigation

INTRODUCTION

Since ancient times, plants have been an exemplary source of medicine. Ayurveda and other Indian literature mention the use of plants in treatment of various human ailments. Plants have been the major source of drugs in Indian system of medicine and other ancient systems in the world. Earliest description of curative properties of medicinal plants is found in Rig-Veda.

Charaka Samhita and Sushruta Samhita give extensive description on various medicinal herbs. Information on medicinal plants in India has been systematically organized (Mhaskar *et al.*, 1988; Rastogi and Malhotra, 1989; Satyavati *et al.*, 1976). India has an ancient heritage of traditional medicine. The Materia Medica of India provides a great deal of information on the folklore practices and traditional aspects of therapeutically important natural products. Indian traditional medicines based on various systems including Ayurveda, Siddha, Unani and Homeopathy.

The evaluation of these drugs is primarily based on phytochemical, pharmacological and allied approaches including various instrumental techniques such as chromatography, microscopy and others. With the emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different health care systems, the evaluation of the rich heritage of traditional medicine is essential.

Syzygium cumini (L.) is one such traditional medicinal plant of Indian origin, belonging to family

Myrtaceae. It is commonly known as Jamun (Hindi), Naaval (Tamil), Java plum, Black plum, Jambul and Indian Blackberry (Gowri and Vasantha, 2010; Kumar *et al.*, 2007; Kirtikar and Basu, 1995; Nadkarni and Nadkarni, 1955). The species is an evergreen tropical tree, native to India, Pakistan and Indonesia. The tree was introduced to Florida and USA in 1911 by the United States Department of Agriculture (USDA) and is also now commonly planted in the tropics including Nigeria. Although, a tropical tree, it grows easily in subtropical climates. *S. cumini* Linn is a fast growing species; it can reach a height of 30 m and can live for 100 years. Its dense foliage provides shade and is grown just for ornamental value. The flowers are fragrant and small, about 5 mm in diameter, the fruits develop in May/June and are oblong, ovoid, starts green and turns pink to shining crimson black as it matures. The fruit has a combination of sweet, mildly sour and astringent flavor and tend to color the tongue purple (Ugbabe *et al.*, 2010).

Syzygium cumini reported to contain vitamin C, gallic acid, tannins, anthocyanins, includes cyanidin, petunidin, malvidinglucoside and other components (Martinez and Valle, 1981; Wealth of India, 1976). *Syzygium cumini* is a medicinal plant, whose parts were pharmacologically proved to possess hypoglycemic; Ravi *et al.*, 2004), antibacterial (Ubabe *et al.*, 2010), antidiarrhoea effects (Bhuiyan *et al.*, 1996) and anti-inflammatory activity of leaf, seed and barks (Pascuala *et al.*, 2001; Muruganandan *et al.*, 2001). Hence, the present study has been made to investigate the phytochemical screening of the *Syzygium cumini* seed.

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MATERIALS AND METHODS

Collection of plant material: Fruits of *Syzygium cumini* were collected from the herbal garden of P.D.M School of Pharmacy, Karsindhu (Safidon) Jind.

Preparation of the extract: The fruits of *Syzygium cumini* (Jamun) were washed well and pulp was removed. The seeds were washed with distilled water to remove the traces of pulp from the seeds and were dried at room temperature. The seeds were powdered in an electrical grinder and stored until further use. The powdered seeds were extracted in a soxhlet with methanol and water at a temperature of 50°C for 12 h. The resultant extract was filtered. The filtered extract was then concentrated to dryness on a water bath at a temperature of 40°C. The dried mass was stored in a refrigerator and considered as the extract. After extraction, the extracts were concentrated and the extractive values were calculated with reference to the air-dried drug. The dried extracts were subjected to various chemical tests to detect the presence of different phytoconstituents (Table 1 and 2).

Macroscopic study: Seeds are cream colored, coriaceous, covering, smooth, oval or roundish. Each fruit contains a single seed 1-2 cm long or 2-5 seeds compressed together into a mass resembling a single seed. The whole seed enclosed in a cream colored coriaceous covering, smooth oval or roundish.

Microscopy: Transverse section of *Syzygium cumini* seed showed following features:

- Epidermis: Three to four layered epidermis
- Mesophyll: It is composed of isodiametric thin walled parenchymatous cells which are fully packed with simple starch grains
- Few schizogenous cavities are found which contain oil drops and Polygonal cells of testa
- Powder study of the *Syzygium cumini* powder
- Color: Brown in color
- Parenchymatous cell: Oval shape parenchymatous cells are present
- Starch grain: Round starch grains are present
- Fiber Length: 168.19 µm
- Preliminary phytochemicals screening: One gram of the methanolic extracts of *Syzygium cumini* seed were dissolved in 100 mL of its own mother solvents to obtain a stock of concentration 1% (v/v). The extracts thus obtained were subjected to preliminary phytochemical screening following the methodology of Harborne (1988) and Kokate (2010)

Table 1: Physiochemical evaluation

Parameter	Value (%)
Extractive value	
Alcohol soluble extractive	13.7
Water soluble extractive	22.0
Petroleum soluble extractive	8.7
Chloroform soluble extractive	35.0
Loss on drying	4.0
Ash values	
Total ash	4.9
Water soluble ash value	3.0
Acid insoluble ash value	1.8
Swelling factor	16.9

Table 2: Phytochemical screening

Chemical constituents	Test	Result
Carbohydrate	Molisch's Reagent	-
Flavonoids	Shinoda Test	+
Phytosterols	Salkowski's test	+
Glycosides	Legal Test	+
Alkaloid	Dragondroff's Test	+
Tannin and Phenolic	Ferric chloride	+
Amino Acid	Ninhydrin Test	+
Saponin	Foam Test	+
Anthraquinone	Borntrager Test	-

(+) = Present, (-) = absent

RESULTS

The macroscopy and microscopy of the seeds of *Syzygium cumini* showed presence of different constituents. The phytochemical investigation revealed the presence of saponins, tannins and phenolic, amino acid, alkaloids, phytosterols and flavonoids and absence of carbohydrate and anthraquinone in the seed of the species studied. Also the manufacturers can utilize them for identification and selection of the raw material for drug production.

DISCUSSION

The pharmacognostic standards for the seed of *S.cumini* are laid down for the first time in this study. Morphological and anatomical studies of the leaves will enable to identify the crude drug. Ash values, extractive values can be used as reliable aid for detecting adulteration. These simple but reliable standards will be useful to a lay person in using the drug as a home remedy.

CONCLUSION

In the present study, we have found that most of the biologically active phytochemicals were present in the methanol extracts of *Syzygium cumini* seed. The medicinal properties of *Syzygium cumini* seed extract may be due to the presence of above mentioned phytochemicals. Further studies are in progress in our laboratory to isolate the active components.

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