PHARMACOGNOSTICAL STUDIES ON A TROPICAL PLANT, 
SYZYGIUM CUMINI LINN FROM JODHPUR DISTRICT, RAJASTHAN, 
NORTH WEST INDIA

Anil Kumar Agarwal¹, Pradeep Goyal¹, Lakshminarasimhaiah¹, Praveen Goyal², 
G.K.Singh²

¹Department of Pharmacognosy, Goenka College of Pharmacy, NH-11 Post Office - Khuri 
Bari, Tehsil- Laxmangarh, Dist. Sikar (Rajasthan)-India-332313. 
²Department of Pharmacognosy, Lachoo Memorial College of Science and Technology 
(Pharmacy Wing), Sector - A, Shastri Nagar, Jodhpur (Rajasthan)-India-342001.

ABSTRACT
The developing countries mostly rely on traditional medicines. These 
traditional medicines involve the use of different plant extracts or 
the bioactive constituents. This study such as ethnomedicine keenly 
represents one of the best avenues in searching new economic plants 
for medicine. In keeping this view in mind, the present investigation 
is carried out on Syzygium cumini seeds of Jodhpur District, 
Rajasthan, North-West India. In present investigation, the detailed 
pharmacognostic study of Syzygium cumini seed is carried out to lay 
down the standards which could be useful in future experimental 
studies. The study includes macroscopy, microscopy, preliminary 
phytochemical screening and physicochemical evaluation. 
Morphological and anatomical studies of the seed will enable to 
identify the crude drug. Preliminary phytochemical screening will be 
useful in finding out the genuity of the drug. Ash value, extractive value 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. Also the manufacturers can utilize them 
for identification and selection of the raw material for drug production. These standards 
are of upmost importance not only in finding out genuity, but also in detection of adulterants 
in marketed drug and as well in formulation. The results suggest that the phytochemical 
properties of the seed for curing various ailments.
KEYWORDS: *Syzygium cumini*, Pharmacognostical, Microscopy, Phytochemical, Traditional medicines.

INTRODUCTION

Recently there has been a shift in universal trend from synthetic to herbal medicine, which we can say ‘Return to Nature’. Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention of diseases and ailments\(^\text{[1]}\). Due to side effects of synthetic products, herbal products are gaining popularity in the world market. Herbal medicines are promising choice over modern synthetic drugs. They show minimum side effects and are considered to be safe. Generally herbal formulations involve use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal Product. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained\(^\text{[2, 4]}\). *Syzygium cumini* Linn (family *Myrtaceae*), commonly known as Jamun (Hindi), is a medicinal plant and utilizable species\(^\text{[5, 6]}\). It has been valued in Ayurveda and Unani system of medication for possessing variety of therapeutic properties. Most of the plant parts are used in traditional system of medicine in India. According to Ayurveda, its bark is acrid, sweet, digestive and astringent to the bowels, anthelmintic and in good for sore throat, bronchitis, asthma, thirst, biliousness, dysentery, blood impurities and to cure ulcers\(^\text{[1]}\). In Unani medicine system the ash of leaves is used for strengthen the teeth and the gums, the seeds are astringent, diuretic, stops urinary discharge and remedy for diabetes and the barks showed good wound healing properties\(^\text{[2]}\).

Various extracts of fruit and seeds of *Syzygium cumini* were found to have antidiabetic, antiinflammatory, hepatoprotective, antihyperlipidemic, diuretic and antibacterial activities. These properties of *Syzygium cumini* seed have been attributed to its saponins, tannins and flavonoids\(^\text{[8-10]}\). In literature details of morphology, phytoconstituents, medicinal properties and uses of *Syzygium cumini* is very sparse therefore; in present study pharmacognostic standards of the seeds of *Syzygium cumini* are studied. These standards are of upmost importance not only in finding out genuity, but also in detection of adulterants in marketed drug and as well in formulation.

MATERIALS AND METHODS

**Plant Materials:** The fully mature *Syzygium cumini* seeds were collected in June-July 2011 from Shastri nagar District of Jodhpur (Raj.), India from a single tree. The seed was identified...
and authenticated by Botanical survey of India, Jodhpur. The seeds were sepearated from the Syzygium cumini fruits. The seeds were dried in shade and stored at 25°C. It was powdered, passed through 40# and stored in air tight bottles. An exhaustive Pharmacognosy was carried out using standard methodology. [11-20]

**Preparation of Extract:** The *Syzygium cumini* fruits were first washed well and pulp was removed from the seeds. Seeds were washed several times with distilled water to remove the traces of pulp from the seeds. The seeds were dried at room temperature and coarsely powdered. The powder was extracted with hexane to remove lipids. It was then filtered and the filtrate was discarded. The residue was extracted with methanol using hot percolation (soxhlet method) method. The percentage yield was 8.68 % in methanol.

**Macroscopic Study**[^11]

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

![Fig. 1: Dried seeds of Syzygium cumini](image1)

![Fig. 2: Fruits of Syzygium cumini](image2)

**Microscopic Study**[^11,12]

**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 Seed powder

Colour : Brown in color
Parenchymetous cell: Oval shape parenchymatous cells are present
Starch grain : Round starch grains are present
Powder Microscopy of *Syzygium cumini* seeds

Fig. 8 Endosperm  

Fig. 9 Testa

**Physicochemical Evaluations**[19]:  
The authenticated powdered drug was subjected to standardization with different parameters such as physical tests, ash values, extractive values, L.O.D. etc. as per WHO guidelines. The results of standardization of powdered drugs of plant are given below in Table 1.

**Table 1 Physicochemical Evaluations**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Observed Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.O.D</td>
<td>5.73% W/W</td>
</tr>
<tr>
<td><strong>Extractive Value</strong></td>
<td></td>
</tr>
<tr>
<td>Alcohol soluble extractive</td>
<td>7.43 %W/W</td>
</tr>
<tr>
<td>Water soluble extractive</td>
<td>12.36 %W/W</td>
</tr>
<tr>
<td><strong>Ash Values</strong></td>
<td></td>
</tr>
<tr>
<td>Total ash</td>
<td>5.69 %W/W</td>
</tr>
<tr>
<td>Water soluble ash value</td>
<td>3.25% W/W</td>
</tr>
<tr>
<td>Acid-insoluble ash value</td>
<td>2.23 %W/W</td>
</tr>
</tbody>
</table>

**Preliminary Phytochemicals Screening**[3,11,12]:  
One gram of the methanol extracts of *Syzygium cumini* seed was dissolved in 100 ml of its own mother solvents to obtain a stock of concentration 1% (v/v). The extract thus obtained was subjected to preliminary phytochemical screening following the methodology of Harborne (1998) and Kokate (2001).
Table 2. Preliminary Phytochemical Screening

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Phytochemical Nature</th>
<th>Syzygium cumini seed extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Proteins &amp; Amino acids</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Carbohydrates</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Flavonoids</td>
<td>++</td>
</tr>
<tr>
<td>5</td>
<td>Phenolic compounds</td>
<td>++</td>
</tr>
<tr>
<td>6</td>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Tannins</td>
<td>++</td>
</tr>
<tr>
<td>9</td>
<td>Steroids</td>
<td>+</td>
</tr>
<tr>
<td>10</td>
<td>Triterpenoids</td>
<td>+</td>
</tr>
<tr>
<td>11</td>
<td>Fixed oils &amp; Fats</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Anthraquinones</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Phytosterols</td>
<td>+</td>
</tr>
</tbody>
</table>

(+)= Present, (++)= Present in more quantity, (-)= Absent

RESULT AND DISCUSSION

The pharmacognostic standards for the seeds of Syzygium cumini of Jodhpur region are laid down for the first time in this study. Morphological and anatomical studies of the seed will enable to identify the crude drug. The information obtained from preliminary phytochemical screening will be useful in finding out the genuity of the 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. Also the manufacturers can utilize them for identification and selection of the raw material for drug production. Methanol extract of the seeds of Syzygium cumini showed the presence of alkaloids, amino acids, flavonoids, glycosides, phytosterols, saponins, steroids, tannins and triterpenoids. Further, methanol extract of the seeds showed the absence of Anthraquinones.

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. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. For example, Phytochemicals such as saponins, terpenoids, flavonoids, tannins, steroids and alkaloids have anti-inflammatory effects. Glycosides, flavonoids, tannins and alkaloids have hypoglycemic activities.
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REFERENCES