



Pharmacognostical and Preliminary phytochemical evaluation of Seed kernel of Chinchasthi (*Tamarindus indica* Linn)

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ABSTRACT: The present study aimed to evaluate the pharmacognostical characters and preliminary phytochemical profile of Chinchasthi (seed kernel of *Tamarindus indica* Linn.) for standardization. The drug was subjected to macroscopic, microscopic, and powder microscopy evaluation, along with preliminary phytochemical screening using standard methods. Microscopy evaluation analysis revealed characteristic features such as polygonal parenchyma cells, starch grains, oil globules and sclerides, while preliminary phytochemical evaluation confirmed the presence of tannins, flavonoids, carbohydrates, proteins, and saponins, with alkaloids and steroids.

KEY WORDS: Pharmacognosy, phytochemistry, *Tamarindus indica* Linn

INTRODUCTION

Standardization of medicinal plants is a fundamental requirement in Ayurveda and pharmacognosy to ensure the authenticity, purity, and efficacy of herbal drugs¹. Among the wide range of plant resources described in Ayurvedic classics, *Tamarindus indica* Linn., commonly known as Chinchasthi (*Tamarindus indica* Linn), holds an important place due to its extensive therapeutic and nutritional applications. While the pulp is well known as a food source, its seeds—particularly the seed kernel referred to as Chinchasthi—have been highlighted in traditional medicine for their utility in gynaecological disorders, digestive ailments, and as a general tonic.

In Ayurveda, the principles of Dravyaguna emphasize that the pharmacological action of a drug is closely linked to its inherent *rasa*, *guna*, *virya*, *vipaka*, and *prabhava*. Chinchasthi (seed kernel of *Tamarindus indica* Linn) with its predominant *kashaya rasa* (astringent taste) and *stambhana guna*.

However, despite its documented uses, comprehensive pharmacognostical and phytochemical profiling of *Chinchasthi* remains limited. Establishing diagnostic characters through macroscopic, microscopic, and powder analysis, along with preliminary phytochemical screening, is essential to distinguish it from possible adulterants and to validate its traditional claims. Such standardization not only bridges the gap between classical Ayurvedic knowledge and modern science but also contributes to the development of safe, reliable, and evidence-based herbal formulations.

Therefore, the present study was undertaken to evaluate the pharmacognostical features and phytochemical constituents of Chinchasthi (Seed kernel of *Tamarindus indica* Linn), thereby laying a scientific foundation for its quality control and therapeutic applications.

MATERIALS AND METHODS

MATERIALS

Collection and Authentication of Plant Material

Mature pods of *Tamarindus indica* were collected from its natural habitat. The seeds were separated from the pulp, thoroughly cleaned, and the outer seed coat was removed to obtain the seed kernel (*Chinchasthi*). The sample was authenticated by Dr. Sandhya, HOD, Department of Botany, NSS College, Pandalam and a voucher was deposited in the departmental herbarium for future reference.

Preparation of Sample

Tamarind fruit was collected. Seeds were separated from it. Then it is fried and the outer brownish part called Testa is removed. Whitish part the seed kernel was taken and ground well to get fine powder and sieved. They were shade-dried at room temperature until a constant weight was obtained. The powder was stored in airtight containers, protected from light and moisture, until further use.

STUDY SETTING

Central laboratory, Mannam Ayurveda Co-operative Medical College Pandalam, Pathanamthitta

METHODS

Macroscopic (Organoleptic) Evaluation, Microscopic Evaluation, Powder Microscopy

Macroscopic (Organoleptic) Evaluation

The raw drug was examined for its external features including size, shape, colour, odour, taste, surface characters, and texture. Observations were recorded and compared with standard pharmacognostical descriptions.

Microscopic Evaluation

Thin transverse sections (TS) of the seed kernel were prepared using free-hand sectioning. The sections were stained by safranin for observation of histochemical localization of cell contents.

Powder Microscopy

The powdered sample was mounted in glycerine and separately treated with the above reagents to identify diagnostic features. Observations included the presence of starch grains, oil globules, protein bodies, fibres, vessels, crystals, and other cellular elements.

Preliminary Phytochemical evaluation

It includes,

- foreign matter
- Total ash
- Acid insoluble ash
- Moisture content
- Volatile oil
- pH
- Extractive values.

Determination of Phytochemical constituents

It includes Qualitative analysis of crude drug and Qualitative analysis of Ash value

RESULTS

Sample collection

Tamarindus indica is a common tree throughout tropical India. For the study purpose, fresh tamarind fruit was collected from their natural environment. The seeds were separated from the tamarind fruit. Then it was fried, and the outer brownish part, called Testa, was removed. The whitish part, the seed kernel, was taken. It was ground well to get fine powder and sieved. The powder is kept in an air-tight containers and is used for phytochemical analysis.



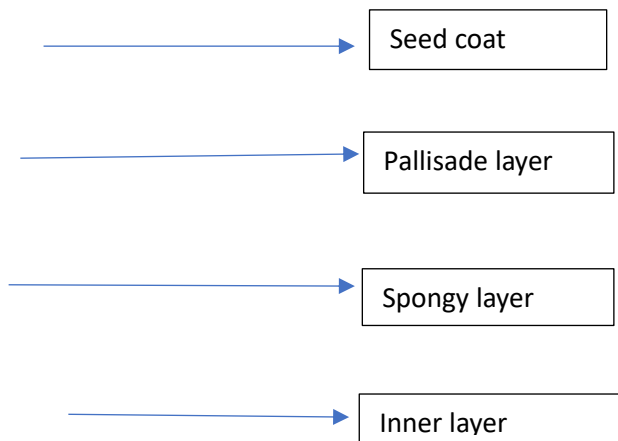
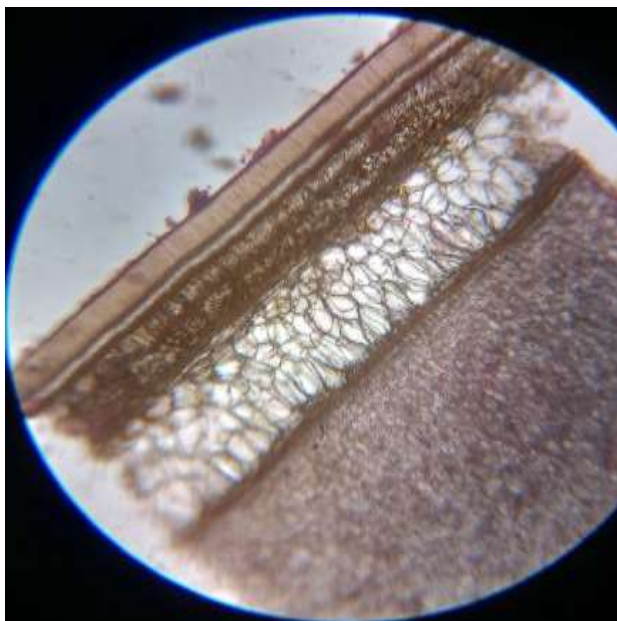
Pharmacognostical analysis

The powder of *Chinchasthi* (seed kernel of *Tamarindus indica* Linn) was analysed under macroscopy for organoleptic evaluation and microscope for tranverse section analysis. The powder characteristics were also analysed for microscopic study.

Table no 1: organoleptic characters of *Chinchasthi* (seed kernel of *Tamarindus indica* Linn)

Type	Dicot
Shape	Flat, more or less rounded
Size	1-1.6cm
Surface	Smooth
Texture	Smooth
Colour	White
Odour	Mild
Taste	Distinguishable

Microscopic analysis



The transverse section of tamarind seed shows that; it is differentiated into the outermost region of sclerotesta and sarcotesta. Outer sclerotesta includes two types of cells; the outermost part is made up of narrowly cylindrical, compact palisade-like macro sclerids. The cell wall is thick and lignified, and the cell lumen is narrow. Inner to the palisade zone is a narrow layer of osteosclerides. The cells of the osteosclerides are narrow in the middle and dilated at the ends, resembling bone. The sarcotesta is homogenous and parenchymatous. The cells are wide, angular thin thin-walled, and compact inner to seedcoat is the cotyledone. There are two cotyledons, which comprise the outer layer of smaller, square-shaped epidermal cells. The ground tissue consists of homogeneous circular, highly thick-walled parenchyma cells. The cells have highly thick walls with numerous small pits.¹



Powder microscopy



Starch grain

Pitted vessels



Sclerides

Oil globules

Phytochemical Evaluation

The test drug, *Chinchasthi* (seed kernel of *Tamarindus indica* Linn), was subjected to preliminary phytochemical tests to establish its purity, identity and genuineness.

The Phytochemical evaluation includes Ash values, Moisture content, foreign matter, Volatile oil, pH and extractive values had been done.

Sl. No	Experiments	<i>Chinchasthi</i> (seed kernel of <i>Tamarindus indica</i> Linn)
1	Foreign matter	Nil
2	Total Ash value	2.5%
3	Acid insoluble Ash value	0%

4	Water soluble Ash value	0.821
5	Moisture content	4%
6	Volatile oil	0 %
7	Ph	7.20

Extractive values of powdered *Chinchasthi* (seed kernel of *Tamarindus indica* Linn)

SI No	Type of Extractive	<i>Chinchasthi</i> (seed kernel of <i>Tamarindus indica</i> Linn)
1	Cold Alcohol soluble	4.8%
2	Hot Alcohol soluble	0.4%
3	Cold Water soluble	16.4%
4	Hot Water soluble	10.4%

Results of Phytochemical Analysis

Qualitative analysis of crude drug extract of *churna* of *Chinchasthi* (seed kernel of *Tamarindus indica* Linn).

Sl. No	Analysis Tests	hot alcohol extractive	cold alcohol extractive	hot water extractive	cold water extractive
1	Detection of Alkaloids a) Meyers Test b) Dragendorff's Test	+ +	+ +	+ +	+ +
2	Detection of Phenolic Compounds a) Lead acetate test b) Ferric Chloride test	+ +	+ +	+ +	+ +
3	Detection of Steroid	+	+	+	+
4	Detection of carbohydrates a) Fehling's Test b) Benedict's test	+ +	+ +	+ +	+ +
5	Detection of Saponins	+	+	+	+
6	Detection of Proteins	+	+	+	+
7	Detection of flavonoids	+	+	+	+
8	Detection of tannin Ferric chloride test	+	+	+	+

(+) Denotes Present, (-) Denotes Absent

Results Of Ash Values**Qualitative analysis of ash obtained from *Chinchasthi* (*Tamarindus indica* Linn) *churna***

Sl. No	Test	Ash of <i>Chinchasthi</i> (seed kernel of <i>Tamarindus indica</i> Linn)
1	Test for Carbonates	-
2	Test for Phosphates	+
3	Test for chlorides	-
4	Test for sulphates	-
5	Test for Potassium	+

DISCUSSION

The present study provides a preliminary pharmacognostical and phytochemical evaluation of the seed kernel of *Tamarindus indica* Linn (*Chinchasthi*), aiming to establish its identity and quality control parameters.

The macroscopic and organoleptic evaluation revealed characteristic features such as shape, size, colour, and texture, which serve as primary diagnostic markers for crude drug identification. These parameters are essential in pharmacognosy for distinguishing genuine drugs from adulterants.

Microscopic analysis of the seed kernel showed distinct anatomical features, including thick-walled parenchyma cells, starch grains, oil globules, and sclereids, which are consistent with standard descriptions of *Tamarindus indica* seeds. These features provide reliable criteria for authentication and standardization of the drug in powdered form.

The physicochemical parameters such as ash values, moisture content, pH, and extractive values were determined, which help in assessing the purity, quality, and stability of the crude drug. The obtained values fall within acceptable limits and can be considered as reference standards for future studies.

Preliminary phytochemical screening indicated the presence of important secondary metabolites such as tannins, flavonoids, carbohydrates, proteins, and saponins. These constituents are known to possess various biological activities such as antioxidant and tissue-protective effects, which may contribute to the traditional uses of the drug. However, these findings are based on qualitative tests and require further quantitative and analytical validation.

Overall, the study establishes preliminary pharmacognostical and phytochemical standards for *Chinchasthi*, which may be useful for its identification, authentication, and quality control. Further studies involving advanced analytical techniques and pharmacological validation are recommended to confirm its therapeutic potential.

CONCLUSION

The present study establishes preliminary pharmacognostical and phytochemical standards for the seed kernel of *Tamarindus indica* Linn (*Chinchasthi*). The macroscopic, microscopic, and physicochemical parameters generated in this study can serve as useful reference standards for identification and quality control of the crude drug.

The detection of various phytoconstituents through qualitative analysis suggests the presence of bioactive compounds; however, these findings require further confirmation through advanced analytical techniques. As the study is limited to preliminary evaluation, detailed phytochemical quantification, chromatographic profiling, and pharmacological investigations are necessary to validate the traditional therapeutic claims of *Chinchasthi*.

REFERENCES

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