Development of Quality Standards of *Terminalia catappa* Leaves

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ABSTRACT

Sophisticated modern research tools for evaluation of the plant drugs are available today but microscopic method is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials. The leaves of *Terminalia catappa* (Combretaceae) are reported to have good medicinal values in traditional system of medicines. But the pharmacognostic and Phytochemical standardization of the leaves were not validated till date. With the aim of drawing the pharmacopoeial standards for this species, the present study deals with pharmacognostical parameters for the leaves of *Terminalia catappa* which mainly consists of Macroscopical and microscopical characters, physio-chemical constants, quantitative microscopy parameters and Preliminary phytochemical screening. This information will be of used for further pharmacological and instrumental evaluation of the species and will assist in standardization for quality, purity and sample identification.

Key words: Pharmacopoeial standards, Quality Standards, Standardization, *Terminalia catappa*.

INTRODUCTION

The usage of herbs to treat a variety of different ailments is universal, and exists in every human culture on Earth. Despite this, the largest use of medical herbs still occurs in societies which are not fully industrialized. Because of the high costs involved with manufacturing modern medicines, many people living in developing nations simply do not have the financial resources to pay for them, and as a result, they use natural herbs as an affordable alternative. There are a number of herbal systems that dominate the world today, and these systems are Ayurvedic medicine, Chinese herbs, Roman and Greek herbs and Shamanic herbs. The WHO has indicated that as many as 80% of all people living in the world make use of herbal medicine as their main source of healthcare [5]. It is no wonder that the world's one-fourth population i.e. 1.42 billion people, are dependent on traditional medicines for the treatment of various ailments [8]. 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 [12] .However a key obstacle, which has hindered the acceptance of the alternative medicines in the developed countries, is the lack of documentation and stringent quality control. There is a need for documentation of research work carried out on traditional medicines. With this backdrop, it becomes extremely important to make an effort towards standardization of the plant material to be used as a medicine. The process of standardization can be achieved by stepwise pharmacognostic and Phytochemical studies. These studies help in identification and standardization of the plant material. Correct identification and quality assurance of the starting materials is an essential prerequisite to ensure reproducible quality of herbal medicine which will contribute to its safety and efficacy [16] .The leaves of *Terminalia catappa belonging to family* Combretaceae reported to posse's wide range of ethanomedical applications. In Suriname, a tea made from the leaves is prescribed against dysentery and diarrhea. It is also thought that the leaves contain agents for prevention of cancers and antioxidant as well as anticlastogenic characteristics and in Taiwan fallen leaves are used as a herb to treat liver diseases[4]. But the pharmacopoeial standards of the leaves were not produced till date.The current article describe some pharmacognostical, physicochemical and Phytochemical characteristics studied. The main objective of this study is to supplement some information with regards to its identification, Characterization and standardization of leaves of *Terminalia catappa* .

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MATERIALS AND METHODS

Collection of sample

Terminalia catappa was collected from local area in Pune. Their identity and Authentication was confirmed by Department of Pharmacognosy Marathwada Mitra Mandal's College of Pharmacy Pune by correlating their morphological and microscopical characters with those given in literatures. The remaining leaf samples were dried in shade. Coarse powder (60 #) of dried leaves of plants was stored for their microscopical study and phytochemical investigations.

Macrmorphology

The organoleptic characters of the fresh leaves and dried leaf powder like colour, odour and taste and the macroscopic characters viz, size, shape, surface, venation, apex, margin, base, texture were evaluated as per standard WHO guidelines[2,10,17,18].

Cytomorphology

The transverse section of fresh leaves and through the lamina and the midrib were cleared, mounted in glycerine water and observed under Digital microscope (MOTIC-B1). Microscopy of dried leaf powder was studied for evaluation of various parts present in given drug powder, [6,7,9,,14] the detail cytomorphological characters were observed and reported.

Quantitative Analytical Microscopy

Quantitative microscopy of leaf sample was performed as per WHO guidelines to determine various leaf constants[9,10,11,15,18].

Physicochemical Evaluation

Analysis of Physicochemical Constants of the ingredient has been done to evaluate the quality and purity of the powder drug. In physical evaluation, ash value viz., total ash, acid insoluble ash, water soluble ash, were evaluated. The ash value indicates the presence of inorganic salts present in the drug.The water soluble and alcohol soluble extractive values were determined[9,13] .The information collected from these test was useful for standardization and obtaining the quality standards. Determination of these physicochemical constants were done as per procedures mentioned in accordance with WHO guidelines[1,9,18].

Preliminary Phytochemical Investigations

The qualitative chemical tests carried out for the identification of the nature of phyto-constituents present in the powered crude drug [3,9].

RESULT AND DISCUSSION

Macrmorphologcal Description

Tropical-Almond is a 30 to 55-foot-tall, deciduous tree. The leaves of the plant are arranged alternatively with prominent veins, midrib and oil glands. The organoleptic evaluation of the leaf and leaf powder revealed that the leaf powder is pale green in color, with characteristics cynogenetic odour and taste. The results of macromorphology were mentioned in Table 1.

Cytomorphological Description

Fig 1 reveals the transverse section of the leaf through the lamina and the midrib region which shows the presence of dorsiventral type of cellular arrangement with a thick prominent midrib and thin lamina, the upper epidermis and lower epidermis was a made up of single layer of compactly arrange thin cell walled rectangular parenchyma cells. Mesophyll shows the cuboidal compactly arrange upper palisade parenchyma layer which was restricted and shows the presence of thick walled collenchymas cells and these are also present in a layer pattern above the lower epidermis, between these two layers a loosely arranged spongy parenchyma was observed. The midrib shows the vascular bundles arrangement which was similar to bicollateral type, major part of the vascular bundle was made up of lignified cell wall. The unicellular covering type epidermal trichomes were observed throughout the lamina and surface while the upper leaf surface shows the presence of paracytic epidermal stomata. Fig 2 shows the presence of upper epidermis and Mesophyll. Fig 3 and Fig 4 shows the presence of epidermal paracytic type of stomata and epidermal covering type of trichomes

Table 1: Macrmorphologcal Description

Sr. No.	Characters	Observation
Organoleptic characters		
1.	Colour	Dark Green
2.	Odour	Characteristic
3.	Taste	Astringent
Quantitative Macromorphology		
4.	Size	15–25 cm long and 10–14 cm broad
5.	Blade length	8-12 inch
Macroscopical features		
7.	Shape	Obovate
8.	Type	Simple
9.	Texture	Leathery
10.	Apex	Round and blunt
11.	Margine	Entire
12.	Base	Narrowly subcordate
13.	Venation	Pinnate