

Pharmacognostic evaluations of callus in *Mimosa pudica* L

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Abstract: *Mimosa pudica* L. is a highly medicinal herb that shows sensation touch. It belongs to family Mimosaceae. In ethnomedicinal practices the traditional healers use the *Mimosa pudica* L. in the treatment of various ailments. Therefore the present work has been undertaken to established the necessary pharmacognostic standards for evaluating the plant material. In our anatomical studies on the callus have been carried out. The aim of study was carried out to provide requisite pharmacognostic of callus in *Mimosa pudica* L. the physico chemical parameter were determined. The results of the present study could be useful for the identification and preparation of a monograph of the plant These observations will also help to distinguish the drug from its adulterations.

Key words: Pharmacognosy, *Mimosa pudica* L., Lajivanti, Callus, Medicinal uses.

I. Introduction

India is one of the major countries, having 40 per cent of the global biodiversity and availability of rare plant species. Medicinal and aromatic plants constitute a major segment of the flora, which provides raw materials for use in the pharmaceuticals and drug industries. The indigenous systems of medicines, developed in India for centuries, make use of many medicinal herbs. These systems include Ayurveda, Siddha, Unani and many other indigenous practices. More than 9,000 native plants have been established and recorded for their curative properties. In one of the studies made by the World Health Organisation,(WHO) it was estimated that 80 per cent of the population of developing countries relies on traditional plant based medicines for their health requirements (WHO, 1998). Even in many of the modern medicines, the basic composition is derived from medicinal plants and these have become acceptable medicines for many reasons that include easy availability, least side effects, low prices, environmental friendliness and lasting curative property

Mimosa pudica Linn. known as sensitive plant, in English and lajvanthi or chuimui in local Hindi language. The plant are tropical weed distributed through out in India in moist locality (Sharma PC etal 2001). It is a creeping annual or perennial herb, often grown for its curiosity value, as the compound leaves fold inward and droop when touched and reopens within minutes. (Vaidyaratnam etal 2011). It belongs to the Fabaceae family. *Mimosa pudica* Linn is native Brazil. The other names given to this plant humple plant, shame plant, touch me not, sleeping grass, and prayer plant etc., (Gibson DM 1966).

Scientific Classification

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Fabales
Family	: Fabaceae
Subfamily	: Mimosoideae
Genus	: Mimosa
Species	: pudica

Pharmacology activities

Pharmacological activities such as antidiabetic, antitoxin, antihypertensive, antioxidant and wound healing activities, antimicrobial, antivenom activity, antiulcer, antifertility, antidiarrhoeal, anticonvulsant, antihelminthic, antimalarial, antiplasmodial, antihepatotoxic activity etc. It is reported to heavy toxic alkaloid contain (Mimosine), and phytochemical like glycoside, flavonoid and tannin etc. It is used in suppresses kpha and pitta (Chauhan etal 2009). *Mimosa pudica* L. has been extensively used in Siddha, Ayurvedic, Unani and Homeopathi medicine and become modern medicine. It is also used in Jaundice, Asthma, Conjunctivitis and glandular swelling liver is considered metabolism detoxification, secretory function, in the body and its disorders are numerous with the no side effective (Aarthi and Murugan 2011)

Traditional uses

M. pudica L. is also used in the treatment of headache, migraine, insomnia, diarrhea, dysendry, fever, piles. Roots in the form of decoction are used to treatment urinary complaints and in diseases arising from corrupt blood and bile (Kirtikar etal 1975). The paste of the leaves is applied to glandular swelling dressing for sinus (Nayagam etal 1999). The ethanobotanical uses of this species also include its use treatment of bronchitis, cholera, cough, dyspepsia, fever, jaundice, smallpox, syphilis, and tuberculosis, (Dr Duke's Phytochemical and Ethanobotanical Databases 2007)

Ayurveda has declared that its root is bitter, acrid, cooling, vulnerary, alexipharmic, and used in the treatment of leprosy, dysendry, vaginal and uterine complaints, inflammations burning sensation, asthma, leukoderma, fatigue and blood diseases. Unani Healthcare system its root is resolvent alternative and useful in the treatment of disease arising from blood impurities and bile bilious fevers, piles, jaundice and leprosy etc. Decoction of root is used with water to gargle to reduce toothache. It is recommended in diarrhea, amoebic, dysentery and bleeding

plies. It is also used in herbal preparations of gynecological disorder. Its extract can cure skin disease. Some herbal doctors recommended it for bronchitis, general weakness and importance. All the part of the plant like roots, stem, leaves, flower and fruits are used as medicine in the traditional uses.

II. Materials and Methods

a) Induction of callus

The explants of field grown *M.pudica* shoot tip, leaf and nodal explants were washed with tap water and Teepol solution and sterilized by 0.1 percent mercuric chloride. After sterilization explants were inoculation in MS medium used for the induction of callus and they were inoculated in MS-B5 media with different concentrations of growth hormones. The callus induction was tested on various concentrations of BAP and KIN (1.0 and 1.5 mg/l) with NAA and 2-4D (0.5 to 2.5 mg/l) each. After 7 days growth of callus was observed.

b) Anatomical studies of the plant

a) Collection of specimens

The plant specimens for proposed study were collected from A V V M Sri Pushpam College (Autonomous) Plant tissue culture laboratory Poondi. Care was taken to select healthy callus and normal organs. The required samples of different organs were cut and removed from the plant and fixed in FAA (Formalin in 5ml + Acetic acid 5ml + 70% Ethyl alcohol 90ml). After 24 hrs of fixing the specimens were dehydrated with graded series of tertiary - Butyl alcohol as per as the schedule given by (Sass., 1940) was followed. Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-60 C) until TBA solution attained super Saturation . The specimens were cast into paraffin blocks.

b) Sectioning

The paraffin embedded specimens were sectioned with the help of Rotary Microtome. The thickness of the sections was 10-12 m in size. Dewaxing of the sections was performed by customary procedure (Johansen 1940). The sections were stained with Toluidine blue as per the method published by the O' Brien et al., (1964). Since Toluidine blue is a polychromatic reactions were also obtained. The dye rendered pink colour to the cellulose walls blue to the lignified cells dark green to suberin violet to the mucilage blue to the protein bodies etc. Wherever necessary, the sections were also stained with saffranin and Fast-green IKI (for starch).

c) Photomicrographs

Microscopic descriptions of tissues are supplemented with micrographs wherever necessary. Photographs of different magnifications were taken with Nikon Labphoto 2 microscopic Unit. For normal observations bright field was used. For the study of crystals starch grains and lignified cells polarized light was employed. Since these structures have birefringent property under polarized light they appear bright against dark background. Magnifications of the figures are indicated by the scale -bars. Descriptive terms of the anatomical features are as given in the standard Anatomy books (Easu 1964).

III. Results and Discussion

In plant tissue culture these organized tissues are diverted into an unorganized proliferative mass of cells under controlled condition on a nutrient medium. Callus is an unorganized proliferative mass of cells tissues or organs when grown under in vitro conditions on a nutrient medium containing growth regulators. Soft callus is friable and is made of heterogenous mass of loosely arranged cells. The colour of the callus tissue is generally cremish yellow or white colour. Callus grown in the light become green due to development of chloroplast. Yellow nature of the callus is possibly due to synthesis of carotenoid pigments; brown colour due to the excretion of phenolic substances and purple due to accumulation.

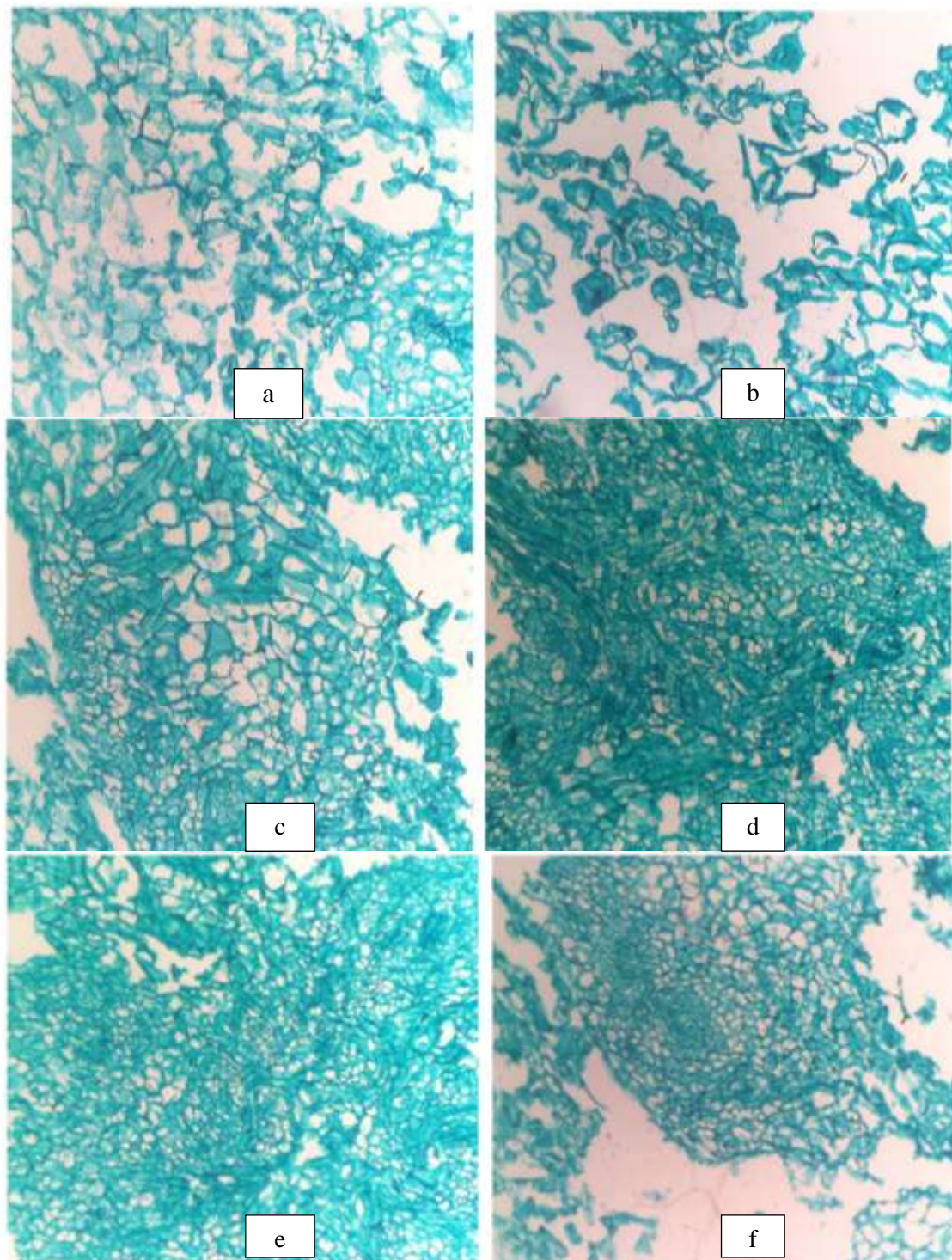


Fig. I. Microscopic evolution of different stage of Callus
 a, b & c . Induction of callus sectioning of 7 days culture
 d & e. Development of callus two weak callus
 f. Mature callus 3 weak culture.

Microscopic evolution

Microscopic evaluation is an indispensable tool for identification of medicinal drugs and is one of the essential parameters in modern monographs. Transverse sections of callus are characterized by the presence of thick uniform shape appearing parenchymatous cells. The callus tissue is extremely heterogeneous in nature. Cellular components ranging from small cells with dense cytoplasm to larger cells with vacuolated cytoplasm. The cells are also different in shape, i.e., spherical and elongated. Elongated cells may differentiate into xylem tracheids or phloem-like cells. Formation of xylem and phloem within the callus tissue is known as cytodifferentiation. It has been observed that some groups of meristematic cells in the form of small nests (nodules or growth centres) are scattered throughout the callus tissue (Fig-I).

The vascular system is complex and occupies major portion of the callus. The entire vascular system of circular strands as well as adaxial strands is encircled by thick continuous sclerenchyma cylinder. Calcium oxalate druses are abundant in the ground tissue of the callus. The physico chemical evaluation of the drug is an important parameter in detecting adulteration.(Ozarkar 2005). These studies help in identification and authentication the plant materials. Correct identification and quality assurance of the starting materials is an essential of herbal medicine (Musa etal 2006).

IV. Conclusion

This is the first report *M.pudica* showing remarkable wide spectrum of various activity the presence of large amount of phytochemical compounds and drugs. It is a potential plant for treating various dreadful disease. Studies on qualitative microscopical feature and physicochemical constants of powder can serve as a valuable source of information and provide suitable standards to determine the quality of plant material in feature investigation and applications. In conclusion the present study *Mimosa pudica L.* is non-controversial easy available cheaper drug. The standard monogram prepared conclude that these could be useful for medicine.

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