

Review on Therapeutic Uses of *Mimosa Pudica* (Touch-me-not) Plant

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ABSTRACT

The prostrate or semi-erect subshrub *Mimosa pudica* L. (Mimosaceae), referred to as touch me not, live and die, shame plant, and humble plant, is indigenous to North and South America as well as Australia. They are delicate soft grey green leaves that fold and droop at night or when handled and chilled, and they are thickly equipped with recurved thorns in India. Its peculiar bending behaviors have given it the nickname "curiosity plant." According to Ayurveda, the root of this plant is bitter, acrid, cooling, vulnerary, and alexipharmic. Leprosy, dysentery, vaginal and uterine complaints, inflammations, burning sensations, asthma, leucoderma, tiredness, and blood disorders are among the conditions it is used to treat. It appears to be a prospective herbal candidate deserving of further research, as shown by its pharmacological profile. Numerous illnesses, including cancer, diabetes, hepatitis, obesity, and urinary infections, are also prevented or treated using *mimosa pudica*. It predominantly contains pharmacological activities that include antibacterial, antivenom, antiterility, anticonvulsant, depressant, aphrodisiac, and others. The plant has been used to treat urogenital issues for ages.

Keywords: Antidepressant, diuretic, *Mimosa pudica*, pulvini, Symbionts

INTRODUCTION

Since ancient times, nature has produced healing agents. Around the world, several medicinal plants have been used for many years to treat disease.[1] The concept that plants contain innate qualities that can enhance health and treat disease forms the basis of herbal therapy.[2-3] The most significant physiologically active plant components include alkaloids, flavonoids, tannins, and phenolic compounds.[4] There are a number of herbs that are frequently used to treat conditions of the liver, heart, central nervous system, and

gastrointestinal tract. Researchers from all around the world are interested in *mimosa pudica* because of its pharmacological effects, which include anti-diabetes, anti-toxin, anti-hepatotoxin, antioxidant, and wound healing. Alkaloid, glycoside, flavonoid, and tania are rumored to be present. It is used to alleviate sexual weakness, coagulate blood, heal wounds, and decrease Kapha and Pitta.[5] All parts of the tree are reported to have therapeutic properties for the treatment of biliousness, leprosy, diarrhea, vaginal and uterine issues, inflammations, burning sensations,

fatigue, asthma, leucoderma, and blood diseases.[6]The pharmacological and phytochemical characteristics of this therapeutic plant will be covered in this article.Mimosa pudica L. is a creeping annual or perennial. It contains anti-asthmatic, aphrodisiac, analgesic, and depressive qualities and is known as lajjalu in Ayurveda. Alopecia, diarrhea, dysentery, sleeplessness, tumors, and other urogenital infections have all been treated with M. pudica in the past. Its effects are calming, emetic, and tonic. Alkaloids, a non-protein amino acid (mimosine),

flavonoids C-glycosides, sterols, terpenoids, tannins, and fatty acids are all components of M. pudica, according to phytochemical investigations.[7]The leaves of the delicate plant M. pudica can alter how they respond to mechanical and electrical stimulation, allowing them to reopen in response to continued stimulation. Stronger stimuli and a wider intertribal gap result from a lengthier adjustment period. Even after becoming used to the effects of mechanical stimulation, leaves can still close in response to electrical stimulation. [8]



Fig. 1: Mimosa Pudica Plant.

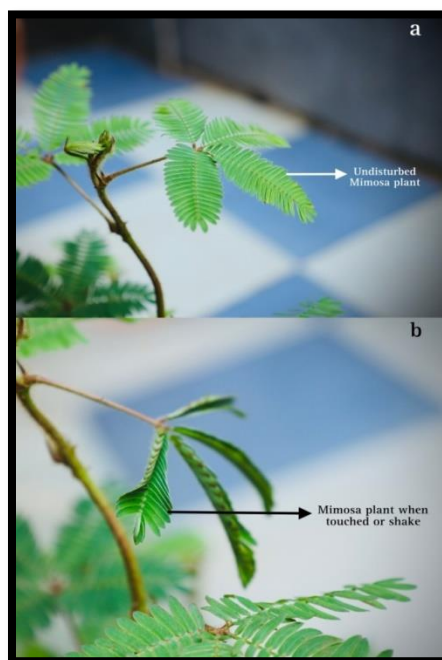


Fig. 2: Leaves of Mimosa Pudica.

Common Name of *Mimosa Pudica*

When touched, *Mimosa pudica*, also known as chuimui or lajwanti in Hindi, has the peculiar tendency to droop or collapse before quickly reopening. Other names for it include Betguen Sosa in Guam, Memege in Niue, Mechiuaiu in Palau, Limemeihr in Pohnpei, and Ra Kau Pikikaa in the Cook Islands. This plant is referred to as "shyness grass" in Chinese. Nidikumba is its Sinhala name, where "nidi" is the term for sleep. Its name in Tamil is Thottal Sinungi, where "Thottal" means "touched" and "Sinungi" means "little cry." Another pair of well-liked non-English names are Makahiya (Philippines) and Mori Vivi (West Indies), where maka- stands for "quite" or "tendency to be" and -hiya for "shy" or "shyness". Chui-Mui is the name for it in Urdu. The timid virgin is called as Loj in Bengali.

Scientific Classification

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Fabales
Family : Fabaceae
Subfamily : Mimosoideae
Genus : *Mimosa*
Species : *M. Pudica*

Distribution

Mimosa pudica is a plant native to South and Central America. In Tanzania, South

Asia, South East Asia, and numerous Pacific Islands, it is recognized as an invasive species. In the Northern Territory, it is regarded as a weed.[9]

BIOLOGICAL SOURCE [10]

Mimosa pudica L. is a diffuse prickly undershrub belonging to family Mimosaceae .

Part Used

Whole plant, leaves, and roots

Synonym

Laajvanti, Touch me not and Chhui-mui

ORIGIN AND GEOGRAPHICAL DISTRIBUTION

The plant is native to tropical America and has spread throughout India's tropical and subtropical regions.

HABITAT

Commonly found in open areas, particularly along roads, in farmed areas, and in waste areas.

PROPAGATION

Through seedlings and vegetative techniques.

DESCRIPTION

Up to 0.5-m tall semi-prostrate, prickly course plant or subshrub

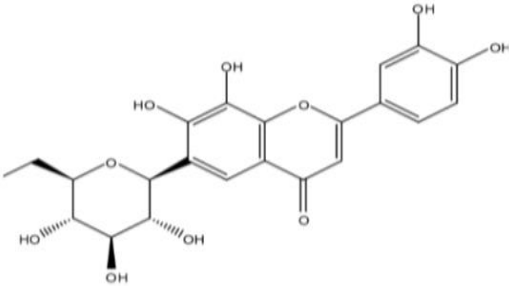
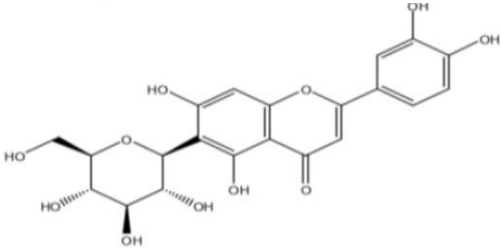


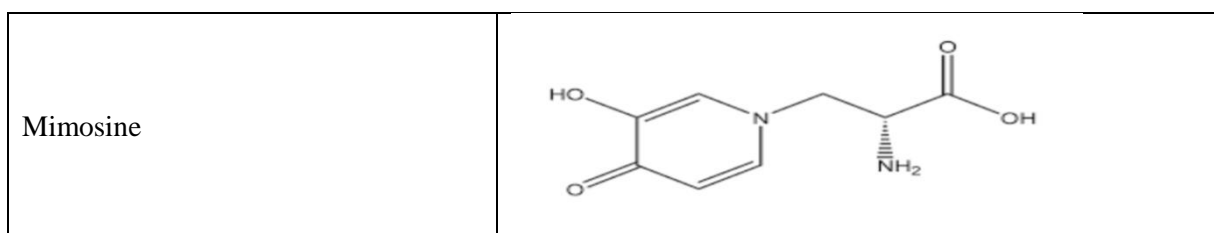
Fig. 3: *Mimosa pudica* flower head.

CHEMICAL CONSTITUENTS OF MIMOSA PUDICA [11]

Numerous investigations into the phytochemical elements of *M. pudica* and the plant's antibacterial activities have been carried out. Higher plants create a wide range of chemical compounds with various biological activities. The antibacterial, antifungal, and insecticidal properties of several higher plants' plant extracts are being investigated in laboratories. Plant-derived antimicrobials have less adverse effects and are effective against infectious disease. Recently, when searching for new plant-derived biomolecules and assessing them for

antibacterial properties, it resulted in the development of eco-friendly management of human infectious diseases. Non-nutritive phytochemicals derived from plants contain properties such as disease prevention and antibacterial activity; nevertheless, structural variances in them result in changes in their mode of action (Linn, 2012). Plant extracts' antibacterial activity is mediated by disruption of bacterial membrane potential permeabilization and leakage of cellular contents. Several studies are currently being conducted to investigate the antibacterial properties of plants.

Chemical name	Structure
7,8,3'',4''-tetrahydroxyl-6-C-beta-D-glucopyrano-syl	
5,7,3',4' tetrahydroxyl-6-C-beta-D glucopyranosyl flavones	



MICROSCOPY[12]

Root

It's easy to see how the roots have developed. Secondary phloem is made up of sieve elements, fibers, and phloem parenchyma that is traversed by phloem rays; crystal fibers are thick-walled, 3-25 chambered, and tangentially elongated cells. Secondary cortex is composed of 6-10 layered, thin-walled, tangentially elongated cells. The components of secondary xylem include the typical substances passed through by xylem rays, vessels scattered throughout with bordered pits and reticulate thickenings, and crystal fibers with one or, sporadically, two to four prismatic calcium-oxalate crystals in each chamber. The usual elements crossed by xylem rays, vessels spread throughout with bordered pits and reticulate thickenings, and secondary xylem is made up of crystal fibers that contain one to four prismatic calcium-oxalate crystals.

Steam

The secondary cortex is big and composed of parenchymatous cells with somewhat thick walls that are tangentially elongated to oval and filled with reddish brown material. Calcium oxalate prismatic crystals can be found in a few cells, and there are a few lignified fibers dotted around as well.

The mature stem has four to eight exfoliated layers of cork that are made up of cells with radially elongated shapes and reddish brown interiors. Each chamber of the elongated, thick-walled crystal fibers houses a single calcium oxalate crystal.

The radially long and thick-walled phloem rays. The secondary xylem is drum-shaped with spiral thickening and is made up of the typical components that xylem rays pass through.

Leaf

The petiole is made up of two pericycles, four primary vascular bundles, two minor lateral vascular bundles, one in each wing, and a single layer of epidermis covered by a thin cuticle. The cortex is made up of four to seven layers of thin-walled parenchymatous cells.

Midrib

The upper epidermis is followed by a single-layered palisade, the spongy parenchyma is single-layered, the pericycle is the same as in the petiole, and the vascular bundle is solitary.

Fruit

The endocarp is composed of thick-walled lignified cells followed by single-layered thin-walled, parenchymatous cells. The epidermis is single-layered and has a few nonglandular, branched, shaggy hairs. The mesocarp is composed of five to six layers of thin-walled, parenchymatous cells.

Seed

Cotyledons are made up of thin-walled cells with a few cells holding rosette-shaped calcium oxalate crystals; the embryo is straight with a short and thick radical. The endosperm is made up of angular or elongated cells, with a few cells bearing prismatic crystals of calcium oxalate.

Powder

Reddish brown in color with two to three components, single and compound starch grains measuring 6 to 25 mm in diameter, reticulate, pitted vessels, fibers, crystal fibers, prismatic and rosette calcium oxalate crystals, fibers, and palisade cells.

TRADITIONAL USED

The touch-me-not plant has long been used as a remedy for snake and scorpion bites. The plant's root is chewed, and the root paste is then put as a poultice to the area that has been bitten. In addition to applying paste made from the entire plant, scorpion bites are treated using steam and leaves [13]

EXTRACTION PROCEDURE [14]**Materials and Methods****Collection of plant material****Leaves**

The *Mimosa Pudica* Linn bushes were first harvested for their fresh leaves. These leaves were properly washed in running tap water for ten to fifteen minutes, followed by sterile water. They were ground up and utilized for extraction after being shade-dried.

Preparation of solvent extractions

The extract was created by dissolving 20gm of powdered *Mimosa Pudica* leaves in 100cc of 50% methanol. Extraction was done using the Soxhlet Apparatus.

Pharmacological Activities**Wound healing activity**

M. pudica's shoot and root methanolic extracts both showed outstanding wound healing effectiveness. The presence of phenol components in the methanolic extract is likely what caused it to have good wound healing properties. [15-17]

Anti-Microbial activity

At varied doses of 50, 100, and 200ug/disc, the methanolic extract of

Mimosa was examined for its antibacterial efficacy against *Aspergillus fumigatus*, *Citrobacter divergens*, and *Klebsiella pneumoniae*. Bioactive components such as terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarin were said to be responsible for the antibacterial activity. [18]

Analgesic and anti-inflammatory activity

At doses of 200 and 400 mg/kg, the ethanolic extract of *M. pudica* leaves was tested for its anti-inflammatory and analgesic properties. The extract effectively and dose-dependently reduced the paw edema brought on by carrageenan. The analgesic impact was shown to be more significant on the acetic acid-induced writhing paradigm than the tail flick model. The presence of flavonoids in the ethanolic extract may contribute to its analgesic and anti-inflammatory effects. [19]

Anti-convulsant

When *M. pudica* leaf decoction was given intraperitoneally at doses of 1000–4000 mg/kg, mice were protected from pentylenetetrazol and strychnine-induced convulsions. *M. pudica* had no impact on seizures brought on by picrotoxin. It also counteracted the turning behavior brought on by N-methyl-D-aspartate. [20]

Anti-diarrhoeal activity

You have diarrhea if you have three or more loose or watery bowel motions per day. Several experimental models in Wistar albino rats have been used to assess the antidiarrheal activity of *M. pudica* leaf ethanolic extract. The ethanolic extract decreased gastrointestinal motility following the injection of charcoal meal and suppressed castor oil-induced diarrhea and PGE. It also promoted enteropooling in mice. At 200 and 400 mg/kg, the

ethanolic extract considerably reduced diarrhea. The tannin and flavonoids included in the extract may be responsible for the anti-diarrheal effect.[21]

Anti-fertility activity

M. pudica root extract, when provided orally at a dose of 300 mg/kg body weight/day, significantly increased the duration of the diestrous phase and reduced the number of litters in albino rats. During the posttreatment period, the number of litters was enhanced. The examination of the main hormones involved in the control of the estrous cycle (Luteinizing hormone, Follicle-stimulating hormone, prolactin, estradiol, and progesterone) revealed that the root extract affected gonadotropin release and estradiol secretion.[22]

Anti-oxidant activity

The antioxidant activity of a methanol crude extract of the aerial portion of *M. pudica* was tested in vitro using the 1, 1-diphenyl-2-picrylhydrazyl-hydrate (DPPH) free radical scavenging assay. When compared to ascorbic acid (IC₅₀ 131.29pg/ml), the methanol crude extract of *M. pudica* demonstrated moderate antioxidant activity (IC₅₀ 296.92pg/ml). This suggests the presence of physiologically active ingredients in the methanolic extract of *M. pudica*.[23]

Anti-malarial activity

An ethanolic extract of *M. pudica* leaves was tested for its ability to prevent *Plasmodium berghei* infections in mice. The extracted substances of *P. niruri* and *M. pudica* leaf showed significant antiplasmodial activity in all three antimalarial assessment models. The existence of antiplasmodial compounds such as terpenoids, flavonoids, and alkaloids was discovered using phytochemical screening. *P. niruri* and *M.*

pudica leaf extracts have antimalarial action.

CONCLUSIONS

The writers gathered and evaluated the published data since the plant is frequently cited in the literature of "Ayurveda," the traditional Indian medical system. This is a sincere but rather inexperienced attempt at putting together a botanical monograph. The anticarcinogenic properties of mimosine and its isolation on a commercial scale for therapeutic uses in people need to be further explored.

The article provided a quick introduction to *M. pudica*, a plant that almost every Indian child connects with fond childhood memories (chhui-mui). According to the literature, this herb has enormous therapeutic potential, and furthermore, commercializing it would be in accordance with WHO guidelines (developing countries need to place more emphasis on the exploration of their natural resources, such as medicinal plants), which are highly desirable for the good of humanity. Given that it is economically viable, easily accessible, and a source of potent medical characteristics, it raises the possibility of larger advantages

ACKNOWLEDGEMENT

We would like to express our heartfelt gratitude to my guide Mr Azam Z Shaikh (Assistant professor) for her unwavering support and guidance throughout the process. His knowledge, perspective, and support were really helpful to us in getting this work done. We also want to thank our colleagues at our college for their helpful feedback and support. In particular, we would like to thank Dr S P Pawar, Principle, P.S.G.V.P.Ms Collage of pharmacy shahada.

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