



## A Comprehensive Review on Pharmacological and Medicinal Properties of Mimosa Pudica Linn Plant (Touch Me Not)

*Varsha Y. Kapgate<sup>1</sup>, Pallavi P. Taram<sup>2</sup>, Kajal P. Shende<sup>3</sup>, Pravin Shahare<sup>4</sup>*

Chhatrapati Shivaji College of Pharmacy Deori, Gondia (441901)

Email ID: [varshakapgate80@gmail.com](mailto:varshakapgate80@gmail.com)

### ABSTRACT

Mimosa pudica linn is a commonly used herb in ayurvedic medicine. Mimosa pudica is short-lived evergreen shrub commonly known as the “touch-me-not” Plant, Chui Mui, Shame plant. Its various parts have therapeutic value. Mimosa pudica (Family: Mimosaceae) is used as an ornamental plant due to its Thigmonastic and nyctinastic movements. The plant is rich source of flavonoids, plant hormones, glycosides, amino acid, tannin etc. A wide array of pharmacological properties like antioxidant, antifungal, antibacterial, antidepressant and etc... Have been attributed to different parts of M. pudica. The whole plant of mimosa pudica is very useful for various pharmacological and biological activities. The herb has been used traditionally for ages, in the treatment of urogenital disorders, piles, dysentery, sinus, and also applied on wounds. It is commonly distributed in open-spaces, especially road side, cultivated land and waste area. It has prickly stems and small, fluffy, ball-shaped pink flowers in summer. It is the most important plant origin has tremendous future for research. This review gives a brief compilation of its phytochemical and pharmacological activities.

**KEYWORDS:** Mimosa Pudica, Leaflet Movement, Mimosine, Anti-inflammatory, Touch me not, Pharmacological Action, Medicinal plant, Phytochemistry, Scientific Classification

### INTRODUCTION

Mimosa pudica is short-lived evergreen shrub commonly known as the “touch-me-not” Plant, Chui Mui, Shame plant. Its various parts have therapeutic value. The roots of Mimosa pudica are bitter, astringent, acrid and cooling. They are used in the treatment of ulcers, inflammations, asthma, diarrhea, urinary complaints and fistulas.<sup>[1]</sup> It has been identified as lajjalu in Ayurveda and has been found to have antiasthmatic, aphrodisiac, analgesic, and antidepressant properties. M. pudica is known to possess sedative, emetic, and tonic properties, and has been used traditionally in the treatment of various ailments including alopecia, diarrhea, dysentery, insomnia, tumour, and various urogenital infections. Phytochemical studies on M. pudica have revealed the presence of alkaloids, non-protein amino acid (mimosine), flavonoids C-glycosides, sterols, terpenoids, tannins, and fatty acids.<sup>[2]</sup> movement observed by this plant leaves after external physical disturbances or contact. It undergoes changes in leaf orientation at night called as Nyctinastic movement, which is controlled by a biological clock. It is often grown for its curiosity value. The compound leaves fold inward and droop when touched or shaken, defending themselves from harm, and re-open a few minutes later called as seismonastic movement.<sup>[1]</sup> The movement occurs when specific regions of cells lose turgor pressure, which is the force that is applied onto the cell wall by water within the cell vacuole and other cell contents. When the plant is disturbed, specific regions on the stems are stimulated to release chemicals including potassium ions which force water out of the cell vacuoles and the water diffuses out of the cells, producing a loss of cell pressure and cell collapse; this differential turgidity between different regions of cells results in the closing of the leaflets and the collapse of the leaf petiole.<sup>[4]</sup> The duration of response depends on the intensity of the stimulus. Usually, Mimosa is a short prickly plant branch with its growing close to the ground. It spreads up to 0.3 and height up to 0.5 m. Mimosa stem was erect, well branched, prickly, and slender.<sup>[3]</sup>

### SYNONYMS

#### SCIENTIFIC CLASSIFICATION: -

Table 1:<sup>[5]</sup>

Kingdom	:	Plantae
Division	:	Magnoliophyta

Class	:	Magnoliopsida
Order	:	Fabales
Family	:	Fabaceae/ Mimosaceae
Sub – family	:	Mimosoideae
Genus	:	Mimosa Species

### CHEMICAL CONSTITUENTS

It contains flavonoid C- glycosides, alkaloid mimosine tannins, mucilage, sterols, terpenoids, non- protein amino acid (mimosin), tannins and fatty acids, Triterpenoid-glycoside. [3]

### MORPHOLOGY

#### Root

The cylindrical roots of *M. pudica* taper to secondary and tertiary branches, which can vary in length and thickness up to 2 cm. Its surface is longitudinally wrinkled and varies in color from grayish brown to brown, with hard, woody fractures.

#### Stem

The stem has a light brown exterior and a grey interior. It is cylindrical, branching, and measures up to 1.5 m in length and 2.5 cm in diameter. It also has longitudinal grooves. When a plant is young, its stem is upright; as it ages, it becomes creeping.

#### Leaf

The plant has five petiolate, stipulate, linear lanceolate main leaves that are bipinnate and compound and sessile. The secondary leaflets are 0.6 to 1.2 cm long and 0.3 to 0.4 cm broad, and there are 10 to 20 pairs of them. It is known as a sensitive tree because of its symmetrical leaf arrangement and its tendency to close upon contact.



Fig: 1 Leaves and Flower of Mimosa Pudica [6]

#### Flower

In midsummer, pink, spherical flowers with a globose head emerge from the leaf axils. The flowers measure 8 to 10 mm in diameter and 0.5 mm in height. It has a four-lobed structure, radial symmetry, four stamens, a sessile ovary, and many ovules. When it rains, it develops bloom. Pollen is produced by wind and insects and has globose to ovoid heads with a diameter of around 8 microns.

#### Fruit

Fruits are simple, dry, and leguminous, and measure between one and one and a half and two and five centimeters in length and width. They are made up of clusters of two to eight pods, each of which has thorny edges. The pale brown, 2.5 mm, long seeds inside the pods split into two to five pieces.

## Seed

The compressed, ovaelliptic, brown to gray seeds have a color range of gray. The seeds are 2.5 mm in width and 0.3 cm in length. The stiff seed coverings on the seeds prevent them from germinating.

**Odour:** Distinct

**Taste:** Astringent, bitter, pungent

**Part of plant used:** Whole plant or roots

## Verities

The growth pattern of *Mimosa diplotricha* and *pigra* is upright. Throughout its life, *M. pudica*, which has a spreading growth pattern, stays flat and lies on the ground. While *M. pigra* and *M. diplotricha* var. *diplotricha* each have 6 to 16 and 49 pairs of branches, respectively, *M. pudica* only has 1-2 pairs.<sup>[1]</sup>

## GEOGRAPHICAL DISTRIBUTION

Originating in South and Central America, *Mimosa pudica* is a natural plant. In Tanzania, South Asia, South East Asia, and numerous Pacific Islands, it is considered an invasive species.<sup>[7]</sup> In the Northern Territory, it has been deemed a weed. Control is recommended in Queensland. In addition, it has been brought to Nigeria, the Seychelles, Mauritius, and East Asia, where it is not thought to be invasive.<sup>[7]</sup>

## MECHANISM OF PLANT MOVEMENTS

Plants are stationary because their roots are in one location. A plant moves in response to environmental cues such as light, gravity, and mechanical disruptions, which cause tropisms and nastic motions.

### Tropisms

The direction of an ecological stimulus solidifies it. Positive tropism is movement in the stimulus' direction; negative tropism is movement in the opposite direction.

### Nastic Movements

Plants respond in a unidirectional manner to environmental cues such as temperature, humidity, and light irradiance; the movement may be brought on by modifications in growth or turgor.

**Table 2: Types of stimulus triggering the Movements**

Types of stimulus triggering the Movements	Designation
Shaking	Seismonastic
Touching	Thigmonastic
Wounding	Traumonastick
Light	Photonastic
Heat	Thermonastic
Downward – bending	Epinastic
Movement at night or in the dark	Nyctinastic
Response to chemicals and nutrients	Chemonastic
Response to Water	Hydronastic
Response to gravity	Geonastic
Response to Contact	Haptonastic

### Nyctinastic Movements

Nyctinastic motions are controlled by the majority of leguminous plants. The astronomer de Mairan noted that the pinnules of *Mimosa pudica* closed and opened at their regular times in 1729. Hallberg then used this observation to create the phrase "circadian rhythm" (circa = about, diem = day; ther before circadian). A circadian rhythm, symbolized by nyctinasty, states that leaves close at night and open throughout the day.



**Fig: 2 Nyctinastic Movement of Mimosa Pudica Thigmonastic Movements**

(The Greek word for touch is thigma.) Touch stimulation causes the tiny leaflets that make up the doubly complex leaves to fold up extremely quickly. It's amazing that the touch response can spread to all of the leaves, nearby leaflets rather than just the stimulated leaflet. Plants and animals have epidermal cells that can respond to a complicated electrical signal. These cells are also capable of perceiving mechanical touch, which is necessary for an organ to operate. Sensitivity is increased by sensory hairs present on surface extensions, such as the lower portion of *Mimosa pudica* leaf joints or sensory papillae.<sup>[8]</sup>

## PHARMACOLOGICAL ACTIVITIES

### Wound healing activity

Damage in living tissue caused by a cut, blow, or other impacts is termed as a wound. Healing of wound is a biological process that is initiated by trauma and often terminated by scar formation. Wound healing activity was studied in three types of model in rat's viz. excision, incision, and estimation of Biochemical parameters. *M. Pudica* chloroform extract possesses wound healing activity at a dose of 200mg/kg in 5% ointment of the leaf extracts. The *M. pudica* shoot methanolic extract, *M. pudica* root methanolic extract showed very good wound healing activity. The methanolic and total aqueous extracts, were analyzed for total phenols content equivalent to Gallic acid. The content of total phenols was 11% (w/w) and 17% (w/w) in methanolic and total aqueous extract respectively. The methanolic extract exhibited good wound healing activity probably due to presence of phenols constituents.

### Anti-convulsant Activity

The decoction of *M. pudica* leaves were given intraperitoneally at dose of 1000-4000 mg/kg which protected mice against pentylenetetrazol and strychnine-induced seizures.

*M. pudica* had no effect against picrotoxin-induced seizures. It also antagonized N-methyl-D-aspartate-induced turning behavior.

### Anti-microbial activity

The antimicrobial activity of the methanolic extract of *Mimosa* was tested against *Aspergillus fumigatus*, *Citrobacter divergens*, and *Klebsiella pneumoniae* at different concentrations of 50, 100, and 200 µg/disc. The antimicrobial activity was related to the presence of bioactive constituents like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarin.

### Analgesic and Anti-inflammatory Activity

The anti-inflammatory and analgesic properties of *M. pudica* leaf ethanolic extract were evaluated at

200 and 400 mg/kg. Paw oedema caused by carrageenan was significantly and dose dependently inhibited by the extract. Compared to the tail flick paradigm, the acetic acid induced writhing model showed greater analgesic effect. It's possible that the ethanolic extract's flavonoid content contributes to its analgesic and anti-inflammatory properties.

### Anti-Oxidant Activity

The 1, 1-diphenyl-2-picrylhydrazyl hydrate (DPPH) free radical scavenging experiment was used to test the antioxidant activity of the methanol crude extract of the aerial portion of *M. pudica* in vitro. Compared to ascorbic acid (IC<sub>50</sub> 131.29 µg/ml), the methanol crude extract of the aerial component

demonstrated moderate antioxidant activity (IC<sub>50</sub> 296.92µg/ml), demonstrating the existence of physiologically active ingredients in the methanolic extract of *M. pudica*.

#### Anti-ulcer Activity

The antiulcer potential of *M. pudica* leaf ethanolic extract was assessed using aspirin, pylorus ligati on, and ethanol, induced ulcer models. Oral administration of the ethanolic extract of *M. pudica* leaves at a dose of 100 mg/kg b.w. In a pylorus, ligated ulcer model, the ethanolic extract of *M. pudica* reduces the overall acidity and ulcer index and increases the pH of gastric juice in a dose dependent manner. [7]

#### Anti-viral Activity

Against *Vibrio cholerae*, four of the seven medicinal plants that were evaluated showed antibacterial activity. *Ficus capensis*, *Mitragyna stipulosa*, *Entada Africana*, *Terminalia avicennoides*, *M. pudica*, and *Lannea acid* are the seven plants in question. *M. pudica* exhibited antibacterial properties. It is necessary to determine these plants' potential for cholera control. [2]

#### Anti-Oestrogenic Activity

Using immature female rats, the oestrogenic and antioestrogenic properties of *M. pudica* root powder were investigated. The uterotrophic activity was used to measure the oestrogenic effect, and the ability of the substance to prevent the uterotrophic activity induced by estradiol monobenzoate was used to measure the antioestrogenic activity. Since the root powder did not enhance the uterine weight of immature female rats, it was determined that it lacked oestrogenic activity. When estradiol monobenzoate was administered, the increase in uterine weight that resulted. This is how *M. pudica* root powder demonstrated anti-oestrogenic efficacy. [9]

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### MEDICINAL USES OF *M. PUDICA* IN TRADITIONAL SYSTEM

Its root is bitter, acrid, cooling, vulnerary, and alexipharmic, according to Ayurveda, which also states that it can be used to treat leprosy, dysentery, vaginal and uterine complaints, inflammations, burning sensations, asthma, leucoderma, weariness, and blood disorders. The Unani Healthcare System's foundation is resolvent, alternative, and helpful in treating conditions including leprosy, piles, jaundice, fevers caused by blood impurities and bile, and bilious fevers. Toothache relief is achieved by gargling with a decoction of the root. It is particularly helpful for urinary infections, bleeding piles, diarrhoea (athisaara), and amoebic dysentery (raktaatisaara). It arrests bleeding and fastens the wound healing process. It is widely utilized in herbal remedies for gynecological conditions. It is claimed to have therapeutic qualities that can treat skin conditions. [10]

It is also used to cure skin diseases, bronchitis, and general weakness. It is used to relax the mind, and relieve depression, mental distress, irritability, severe palpitations and amnesia. It is a mood enhancer and improves circulation of the blood.

*Mimosa pudica* root is employed in the treatment of bilious fevers, piles, jaundice, leprosy, dysentery, vaginal and uterine complaints, inflammations, burning sensations, exhaustion, asthma, leucoderma, and blood disorders in Ayurvedic and Unani medicine. *Mimosa* root is used to treat diarrhea, menorrhagia, hemorrhoids, sleeplessness, irritability, and premenstrual syndrome (PMS) in Western medicine. In addition, *Mimosa* is used to treat fevers and whooping cough in children. Some research also indicates that it may be useful in treating rheumatoid arthritis symptoms. If ingested directly, all components of the mimosa plant are said to be hazardous. [2]

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### CONCLUSION

From above discussion we can conclude that the *Mimosa pudica* plant shows various pharmacological and biological activities with different aspect of treating the diseases and disorders with help of herbal therapy using above plant also indicating the least adverse reactions as the benefit of natural therapy. Herbal therapies applied worldwide to reduce adverse drug reaction, improve patient compliance, improve quality of life, and also enables its use in future research for treating different medical conditions. *M. pudica* is traditionally very important herb having many important pharmacological activities like analgesic, antidiabetic, and anti-inflammatory hypolipidemic activity, and antimicrobial, hepatoprotective activity, and antiasthmatic, anti-ulcer and antioxidant property. Many important phytoconstituents responsible for the activity were isolated. This proves therapeutic importance of the plant. Such type of systematic information about the plant is useful for the researchers. This review of *M. pudica* is hopeful induce the advance research about the benefit of this plant for human life.

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### REFERENCES

1. Havaladar VD, Mali SS, Mali KK, Shinde SS, Jadhav NY, AA S. International Journal of Modern Pharmaceutical Research. Hormones.;11:13.
2. Ahmad H, Sehgal S, Mishra A, Gupta R. *Mimosa pudica* L. (Laajvanti): an overview. Pharmacognosy reviews. 2012 Jul;6(12):115.
3. Saraswat N, Wal P, Pal RS, Wal A, Pal Y, Pandey A. Pharmacognostic Evaluation and Standardization of the leaves of *Mimosa pudica*, leaves of *Murraya koenigii* and root of *Asparagus racemosus*. Research Journal of Pharmacy and Technology. 2020;13(12):5743-8.
4. Shaikh Z, Roy SP, Patel P, Gohil K. Medicinal value of *Mimosa pudica* as an anxiolytic and antidepressant: A comprehensive review. World journal of pharmacy and pharmaceutical sciences. 2016 Jan 13;5(3):420-32.

5. Johnson K, Narasimhan G, Krishnan C. *Mimosa pudica* Linn-a shyness princess: A review of its plant movement, active constituents, uses and pharmacological activity. *Int J Pharm Sci Res.* 2014 Dec 1;5(12):5104-18.
6. Ueda M, Sugimoto T, Yamamura S, Chemical studies on plant leaf movement controlled by a biological clock.
7. Joseph B, George J, Mohan J. Pharmacology and traditional uses of *Mimosa pudica*. *International journal of pharmaceutical sciences and drug research.* 2013 Apr 1;5(2):41-4.
8. Lubana A. Pharmacological and biological overview on *M.pudica*; *Int J Pharm life science*, 2011; 2(11): 1226-1234.
9. Sheshrao D. Sr. No Name of Author Name of the Abstract Page no. Policy. 2020:34.
10. Azmi L, Singh MK, Akhtar AK. Pharmacological and biological overview on *Mimosa pudica* Linn. *International journal of pharmacy & life sciences.* 2011 Nov 1;2(11).