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Review Article

A comprehensive review on medicinal and ecological values of *Mimosa pudica* L. (Fabaceae)

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Abstract: *Mimosa pudica* L. (Fabaceae) is a tropical plant with a rich history of traditional medicinal use. This review aims to provide a comprehensive overview of the medicinal and ecological values of this species. The plant's morphology, ethnomedicinal uses, pharmacological properties and secondary metabolites are discussed. The results highlight the potential of *M. pudica* as a source of bioactive compounds with antimicrobial, anti-inflammatory, and antioxidant activities. Ecological functions like nitrogen fixation and phytoremediation are beneficial to the environment and improve soil fertility by enhancing nutrient availability and reducing pollution. This review provides a scientific basis for the traditional use of *M. pudica* and emphasize its potential as a valuable resource for medicinal and ecological applications.

Keywords: Fabaceae, traditional medicine, ethnomedicinal uses, pharmacological properties, secondary metabolites, ecological values

Introduction

Mimosa pudica L., commonly known as the sensitive plant or touch-me-not, is a tropical plant species belonging to the family Fabaceae. Native to South and Central America, *M. pudica* has been naturalized in many parts of the world, including Asia, Africa, and the Pacific Islands (Ahmad et al., 2012). This plant has been used in traditional medicine for centuries, particularly in Ayurveda and Unani systems, to treat various ailments, including fever, diabetes, and skin disorders (Joseph et al., 2013). The plant's

unique characteristic of folding its leaves when touched or disturbed has fascinated scientists and researchers, leading to extensive studies on its morphology, anatomy, and physiology (Hafsa et al., 2012). In recent years, *M. pudica* (Figure 1) has gained attention for its potential medicinal properties, including antimicrobial, anti-inflammatory, and antioxidant activities. This review aims to provide a comprehensive overview of the medicinal and ecological values of *M. pudica*, highlighting its traditional uses, pharmacological properties, secondary metabolites, and ecological importance.

Figure 1: Leaves and flowers of *Mimosa pudica* in wild

Morphology

M. pudica is a small prostrate herb with glabrescent stems (Figure 2). The leaves are long petioled, spreading about 2.5-5.8 cm long and the leaflets are sessile, subacute, glabrous above. The base of the margin is truncate and stipules are ciliate. Flowers are bisexual about 0.72-0.75 mm long with 4-lobed petals. The fruits are flat, clustered, slightly undulate (Figure 3). Seeds are ovoid, compressed about 2-3 mm (Saxena and Brahmam, 1994; Figure 1-3).

Ethnomedicinal uses

In ethnomedicine, *M. pudica* (Lajjalu, Lajwanti, Chui-mui) is used to treat various ailments, including fever, diabetes, constipation, ulcers, biliousness, dyspepsia, and urogenital infections, with roots and leaves used for specific conditions. *M. pudica* is a part of traditional medicine systems like Ayurveda and Unani in India (Kumar et al., 2021). The plant parts are used in traditional medicines to treat health problems like fever, diabetes, constipation, ulcers, biliousness, dyspepsia, urogenital disorders, piles,

dysentery, sinus, wounds, alopecia, diarrhea, leprosy, insomnia, tumors, blood disorders, headache, migraine, dysentery, insomnia, epilepsy, smallpox, ulcers, asthma, jaundice, hemorrhoids, vaginal, uterine infections, skin, venereal diseases, edema, inflamed sores, excessive urination and gallstones (Ahmad et al., 2012; Muhammad et al., 2016; Patro et al., 2016; Majeed et al., 2021; Tripathi et al., 2022; Pandian et al., 2024).

Figure 2: Habit and habitat of *Mimosa pudica*

Pharmacological uses

The plant parts of *M. pudica* have been reported to possess antidiabetic, anti-inflammatory, anti-hepatotoxic, anticonvulsant, antidepressant, aphrodisiac, antimalarial, antifungal, antibacterial, antivenom, antifertility, antinociceptive, antidiarrheal, hypolipidemic activities, wound healing, diuretic, anticancer, antispasmolytic, antigout, antihistamic, antioxidant, antimalarial, antiparasitic, antifungal, antibacterial, antivenom, antifertility, anticonvulsant, antidepressant and aphrodisiac properties (Kokane et al., 2009; Sutar et al., 2009; Mohan et al., 2011; Hafsa et al., 2012; Tamilarasi and Ananthi, 2012; Joseph et al., 2013; Joseph et al., 2013; Muhammad et al., 2016; Mapala and Pattabi, 2017).

Secondary metabolites

The plant parts of *M. pudica* are reported as rich with secondary metabolites. Important detected compounds are alkaloids, flavonoids, glycosides, sterols, tannins, fatty acids and mimosine (Ghosh et al., 1998; Yuan et al., 2007; Arokiyaraj et al., 2012; Johnson et al., 2014; Sanaye et al., 2015; Oogai et al., 2019; Havaldar et al., 2022).

Ecological values

M. pudica, or the touch-me-not plant, has several ecological values, including nitrogen fixation through its root nodules, phytoremediation of heavy metals, and serving as a food source and ground cover in certain regions. *M. pudica* can extract heavy metals like copper, lead, tin, and zinc from polluted soils. In some areas, *M. pudica* is used as a green manure or pasture for livestock. It is also food of many wildlife. *M. pudica* is one of the many creeping plants that the elephants prefer to eat (Ashraf et al., 2011; Ashraf et al., 2011; Mohapatra et al., 2013; Marchetti et al., 2014; Panda and Behera, 2022).

Figure 3: Fruits of *Mimosa pudica* in the wild

Future aspects

M. pudica is a tropical plant species with a rich history of traditional medicinal use. The plant's unique morphology, pharmacological properties, and secondary metabolites makes it, a valuable resource for medicinal and ecological applications. The present review highlights the potential of *M. pudica* as a source of bioactive compounds with antimicrobial, anti-inflammatory, and antioxidant activities. Despite the potential of *M. pudica*, further research is needed to fully explore its medicinal and ecological values. Some potential areas for future research include:

1. **Isolation and characterization of bioactive compounds**: Further studies are needed to isolate and characterize the bioactive compounds present in *M. pudica,* including their structure, function, and potential medicinal applications.

2. **Pharmacological and toxicological evaluations**: Systematic pharmacological and toxicological evaluations are necessary to fully understand the safety and efficacy of *M. pudica* extracts and bioactive compounds.

3. **Clinical trials**: Clinical trials are needed to evaluate the potential of *M. pudica* extracts and bioactive compounds in the prevention and treatment of various diseases.

4. **Ecological and environmental studies**: Further research is needed to fully understand the ecological and environmental importance of *M. pudica*, including its role in nitrogen fixation, phytoremediation, and as a food source for various animals.

5. **Conservation and sustainable use**: Efforts are needed to conserve and sustainably use *M. pudica* populations, including the development of sustainable harvesting practices and the establishment of conservation programs.

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