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Phytochemical Profiling and Biological Activities of Different Parts of Mimosa Pudica

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Abstract: *Mimosa pudica, a well-known sensitive plant, has been the subject of extensive phytochemical and pharmacological investigations. This plant boasts a diverse array of chemical constituents, with a prominent presence of alkaloids, flavonoids, tannins, and saponins. The most notable alkaloid in Mimosa pudica is mimosine, recognized for its anti-proliferative and anti-inflammatory properties. Biologically, Mimosa pudica has displayed remarkable activities in various studies. The plant's extracts have exhibited potent antioxidant and free-radical scavenging abilities due to the high flavonoid content. Furthermore, it possesses anti-microbial properties, particularly against bacteria and fungi. Its traditional use in folk medicine for wound healing, pain relief, and as an anti-diarrheal agent is corroborated by its pharmacological effects. Additionally, studies have highlighted the potential neuroprotective effects of Mimosa pudica, which may be attributed to its neuroactive compounds. The investigation into the chemical constituents and biological activities of this remarkable plant continues to reveal its therapeutic potential in modern medicine.a literature study was carried out to determine the effects of this plant.*

Keywords: Antiulcer activity, Mimosine, Phytochemistry, Mimosa pudica, Antidepressant, lajjalu

I. INTRODUCTION

For thousands of years, plants have helped keep people well and improve the quality of their lives by serving as beneficial ingredients in medications, spices, beverages, cosmetics, and colors. The foundation of herbal medicine is the idea that plants have inherent properties that can improve health and treat disease. The world has recently placed more emphasis on plant study, and a wealth of data has accumulated to demonstrate the enormous potential of the therapeutic plants employed in diverse traditional systems. The usage of herbal treatments is attracting a lot of public interest right now[1-2]Furthermore, plant extracts served as the basis for several Western medications. Numerous herbs are mostly utilized to treat cardiovascular disease. Plants have had a significant impact on problems of the liver, neurological system, gastrointestinal tract, and metabolism. They can be used as drugs or supplements in the treatment or management of a variety of disorders due to their potential to have significant therapeutic effects. Herbal remedies or medicinal plants, their extracts, and their isolated compound(s) have shown a range of biological activities and are still utilized as food supplements or folk medicine for a variety of illnesses.Chui mui, Najuk, Lajawanti, and Syn1–5 Plants that are sensitive to touch include Varakranta, Vashini, Lajjabate, Lajak, and Lajjabati.[3,4]

Scientific Classification[5-9]:

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Mimosaceae
Subfamily	Mimosoideae
Genus	Mimosa
Species	M. pudica

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Fig 1. Mimosa Pudica Plant

Botanical Description:

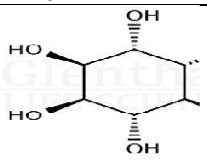
Carl Linnaeus published the first official description of Mimosa pudica in Species Plantarum in 1753. Typically, mimosa is a small, thorny plant with branches that are close to the ground.It can grow up to 0.5 m in height and 0.3 m in widthThe mimosa's stem is upright, slender, thorny, and healthy. branched. Bipinnate fern-like, and pale green leaves are present. in color with the propensity to close when startled. These are 15 to 25 pairs of quadripinnate, frequently reddish leaflets.[10]

Principal Constituents of Mimosa plant:

The M. pudica leaf extract was subjected to a preliminary phytochemical screening, which revealed the presence of bioactive substances like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarins. [11-13]

alkolids found in mimosa pudica have antispasmodic, antimalarial, analgesic, and diuretic properties. Adrenaline-like compounds that are extracted from plant leaves can also be found. Additionally, mimosine contains an alkolid known to have strong antipolifertative and apoptotic properties (Nanoparticles, 2017). When the plant is extracted, crocetin dimethyl Easter is present.

Chemical constituents of Mimosa Pudica

Sr. No	*Parts*	*Chemical Constituent*	*Structure of chemical constituent*
1	Leaves	nor-epinephrine, d-pinitol, bsitosterol, alkaloids- mimosine, terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarins, polyunsaturated fatty acid, sphingosine , adrenalin[14]	 d-pinitol  sphingosine
2	Seed	D-xylose, D-glucoronic acid 4-O- (3, 5-dihydroxybenzoic acid)-b-Dglucoronide,	

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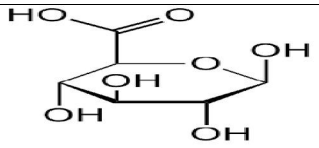
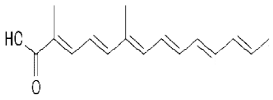
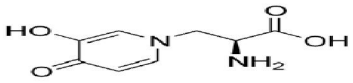
		Tubulin, Cglycosylflavones, phenolic ketone, buffadienolide[14]	 , D-glucuronic acid
3	Root	flavonoids, phytosterol, alkaloids, amino acids, tannins, glycoside, and fatty acids [26],ascorbic acid, crocetin , D-glucoronic acid, linoleic acid,, linolenic acid, palmitic acid, stearic acids , mimosine, D--sitosterols	 Croc etin
4	Stem	m-[N-(3-hydroxypyridone-4)]--aminopropionic acid [27], 5-M DMT [2]	 mimosine

Pharmacological Activities

Wound healing activity:

Both the M. pudica shoot and root methanolic extracts demonstrated excellent wound healing efficacy.

The presence of phenol components in the methanolic extract may have contributed to its effective wound healing properties [15,16]

Anthelmintic activity:

Ascaridia galli is parasitic roundworm belonging to phylum nematode which pathogenic and causes helminthiasis infection. The alkaloid compound found in ethanolic extract of mimosa pudica which causes the paralysis of A. Galli which result in make parasite body weaken and lead to death of parasite. Alkaloid present in mimosa pudica are act like piperazine the chemical compound which used to treat the helminthiasis. Flavonoid and tannin assumed to be cause of A galli mortality. Flavonoid in mimosa pudica makes worm body weaker until death by disturbing the energy consumption.[17]

Antimicrobial Activity

At varied doses of 50, 100, and 200 g/disc, the methanolic extract of Mimosa was tested for its antibacterial efficacy against Aspergillus fumigatus, Citrobacter divergens, and Klebsiella pneumonia. Bioactive components such terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarin were said to be responsible for the antibacterial activity[18]

Antioxidant 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. The methanolic extract of M. pudica's aerial component demonstrated moderate antioxidant activity (IC50 296.92 g/ml) when compared to ascorbic acid (IC50 131.29 g/ml), indicating the existence of physiologically active ingredients[19]

Anti-diabetic activity:

Menosroi ett al [ ] evaluated the hypoglycaemic efficacy of M.pudica on alloxan induced diabetes mellitus. In the study mice treated with single dose of injection 75mg/kg alloxan monohydrate to induce the diabetes in mice. Animal followed by treatment with 100,200,400 mg/kg aq leaf extract of m. pudica .200 mg/kg leaf extract of M.pudica significantly reduce the fasting blood glucose and antidiabetic efficacy of M. Pudica.

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Oral administration of 400 mg/kg M. pudica extract for 21 days significantly decreased serum glucose levels in rats with diabetes induced by streptozotocin (STZ), according to Singarapriyavardhanan et al. [].

Antiulcer activity:

Mimosa pudica leaf aqueous extract was examined orally in stomach ulcers models created by pylorus ligation, aspirin, and alcohol at doses of 200 and 400 mg/kg. Both the cytoprotection and antisecretory hypotheses were examined. At doses of 200 and 400 mg/kg, the aqueous extract greatly reduced the development of ulcers. All three models produced a significantly lower ulcerative lesion index in rats compared to the control group (P 0.01) in a dose-dependent manner [20]

Anti-hepatotoxic activity:

In Wistar albino rats, the ethanol extract of M. pudica leaves was tested for its ability to hepatoprotective against carbon tetrachloride (CCl4)-induced liver injury. The experimental rats received ethanol extract of M. pudica (Mimosaceae) leaves orally for 14 days at a dose of 200 mg/kg body weight. Several blood biochemical markers, including glutamate oxaloacetate transaminase (SGOT), glutamate pyruvate transaminase (SGPT), alkaline phosphatase (ALP), bilirubin, and total proteins, were used to evaluate the hepatoprotective efficacy. To clarify the potential mechanism of activity, the levels of malondialdehyde, superoxide dismutase, reduced glutathione, and catalase were measured. When M. pudica (Mimosaceae) was administered in a dose, the significantly raised serum levels of SGOT, SGPT, ALP, and total bilirubin caused by CCl4 treatment were returned to values close to normal. [21]

Anti-depressant:

Aqueous preparations of dried Mimosa pudica leaves are used in Mexico to treat depression. The behavioral effects of M. pudica aqueous extracts at various doses were examined in this study. The forced swimming test and the test for differential reinforcement of low rates of response at 72 sec (DRL-72s) were administered to rats that had received saline (0.9%; 0.30 ml; J.P.), clomipramine, desipramine, or multiple dosages of aqueous extracts from M. pudica over the course of 30 days.[22]

II. CONCLUSION

The whole plant of Mimosa pudica is very useful for various pharmacological and biological activities. Mostly Root and leaves of Mimosa pudica are showed maximum pharmacological activity. This overview helps to new researchers.

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