World Journal of Pharmaceutical Science and Research
www.wjpsronline.com
Research Article
ISSN: 2583-6579
SJIF Impact Factor: 6.916
Year - 2026
Volume: 5; Issue: 6
Page: 170-177

COMPREHENSIVE REVIEW PAPER MIMOSA PUDICA IN THE TREATMENT OF MIGRAINE

Gaikwad Akanksha Navnath*[1], Chavan Rutuja Sunil[2], Ghadigaonkar Darshana Suresh[1], Giri Datta Balaji[1], Panmad Priyanka Kashinath[1]

[1]Student of Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra.

[2]Assistant Professor, Department of Quality Assurance Technique, Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra.

Article Received: 09 April 2026 | | ***Article Revised: 30 April 2026*** | | ***Article Accepted: 20 May 2026***

***Corresponding Author: Gaikwad Akanksha Navnath**
Student of Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra.
DOI: https://doi.org/10.5281/zenodo.20443643

How to cite this Article: Gaikwad Akanksha Navnath, Chavan Rutuja Sunil, Ghadigaonkar Darshana Suresh, Giri Datta Balaji, Panmad Priyanka Kashinath (2026) COMPREHENSIVE REVIEW PAPER MIMOSA PUDICA IN THE TREATMENT OF MIGRAINE. World Journal of Pharmaceutical Science and Research, 5(6), 170-177.

ABSTRACT

Migraine is a chronic neurological disorder characterized by recurrent episodes of severe headache associated with nausea, vomiting, photophobia, and phonophobia. Despite the availability of several synthetic anti-migraine drugs, their long-term use may lead to adverse effects such as gastric irritation, cardiovascular complications, dependency, and medication-overuse headaches. Therefore, there is increasing interest in herbal medicines with safer therapeutic profiles.Mimosa pudica, commonly known as the “touch-me-not” or “sensitive plant,” is a medicinal herb widely used in Ayurveda, Siddha, and folk medicine systems. The plant possesses various pharmacological activities including anti-inflammatory, analgesic, antioxidant, anxiolytic, neuroprotective, and anticonvulsant properties, which may contribute to its potential effectiveness in migraine management. The bioactive constituents such as alkaloids, flavonoids, tannins, glycosides, terpenoids, and mimosine are believed to modulate inflammatory mediators and oxidative stress involved in migraine pathophysiology.This review summarizes the botanical description, phytochemical constituents, pharmacological activities, possible mechanism of action against migraine, marketed formulations used for migraine therapy, traditional medicinal uses, and future research perspectives of Mimosa pudica. The review also highlights the need for clinical investigations to validate its efficacy and safety as an alternative herbal remedy for migraine treatment.

KEYWORDS: Migraine, Mimosa pudica, Herbal medicine, Neuroprotection, Anti-inflammatory activity, Antioxidant activity, Analgesic activity, Phytochemicals, Traditional medicine, Neurological disorders, Herbal formulation, Oxidative stress, Serotonin modulation, Medicinal plants, Natural therapy.

INTRODUCTION

Migraine is a debilitating neurological disorder affecting millions of people worldwide. It is characterized by recurrent unilateral throbbing headaches that may persist for 4–72 hours. Migraine attacks are commonly associated with nausea, vomiting, dizziness, visual disturbances, and sensitivity to light and sound. The World Health Organization recognizes migraine as one of the leading causes of disability globally.The pathophysiology of migraine involves neurovascular dysfunction, cortical spreading depression, release of inflammatory mediators, serotonin imbalance, oxidative stress, and trigeminal nerve activation. Conventional anti-migraine therapies include analgesics, triptans, ergot alkaloids, beta-blockers, antidepressants, and anticonvulsants. Although effective, these medications may produce adverse effects such as sedation, gastrointestinal irritation, hypertension, and cardiovascular complications.Medicinal plants have gained significant attention due to their therapeutic potential and lower side effects. Among various medicinal herbs, Mimosa pudica has emerged as a promising plant because of its broad spectrum of pharmacological activities. The plant belongs to the family Fabaceae and is widely distributed in tropical and subtropical regions.Traditionally, Mimosa pudica has been used for the treatment of anxiety, insomnia, inflammation, wounds, epilepsy, diarrhea, urinary disorders, and nervous system disorders. Several experimental studies suggest that the plant possesses antioxidant, anti-inflammatory, analgesic, and neuroprotective activities, which may help reduce migraine frequency and severity.The increasing demand for herbal medicines and the search for safer anti-migraine agents have encouraged researchers to explore the medicinal value of Mimosa pudica in migraine therapy.

Fig: Mimosa Pudica.

BOTANICAL DESCRIPTION

Mimosa pudica is a creeping annual or perennial herb with thorny stems and bipinnate leaves. The plant exhibits rapid leaf-folding movement upon touch due to changes in turgor pressure. It bears pink or purple globose flowers and small pods containing seeds. The roots, leaves, stems, and seeds are used medicinally.

Fig: Biological Pic of Mimosa Pudica.

PHYTOCHEMICAL CONSTITUENTS

Mimosa pudica contains numerous bioactive compounds responsible for its medicinal activities.

Major Phytochemicals

- Alkaloids
- Flavonoids
- Tannins
- Terpenoids
- Glycosides
- Steroids
- Saponins
- Phenolic compounds
- Mimosine

These compounds exhibit antioxidant and anti-inflammatory properties that may contribute to migraine relief.

Pathophysiology of Migraine

Migraine is a complex neurovascular disorder involving the interaction between the nervous system, blood vessels, neurotransmitters, and inflammatory mediators. The exact mechanism is not completely understood, but several theories explain the development of migraine attacks.

1. Cortical Spreading Depression (CSD)

Cortical spreading depression is a wave of neuronal depolarization followed by suppression of brain activity that spreads across the cerebral cortex.

- Causes release of inflammatory mediators
- Leads to changes in cerebral blood flow
- Responsible for migraine aura symptoms such as visual disturbances, flashing lights, and numbness

2. Trigeminovascular System Activation

The trigeminal nerve plays a major role in migraine pain.

- **Activation of trigeminal nerve fibers releases neuropeptides such as:**
- Calcitonin Gene-Related Peptide (CGRP)
- Substance P
- Neurokinin A

- **These mediators produce:**
- Vasodilation of cerebral blood vessels
- Neurogenic inflammation
- Transmission of pain signals

3. Serotonin (5-HT) Imbalance

Serotonin is an important neurotransmitter involved in migraine.

- Decreased serotonin levels during migraine attacks lead to:
  - Vasodilation
  - Increased pain sensitivity
- Many anti-migraine drugs such as triptans act on serotonin receptors to relieve migraine symptoms.

4. Neurogenic Inflammation

Inflammatory mediators released from nerve endings cause:

- Plasma protein leakage
- Blood vessel dilation
- Sensitization of pain receptors
- Persistent headache pain

This inflammation contributes significantly to migraine progression.

5. Role of CGRP

Calcitonin Gene-Related Peptide (CGRP) is one of the most important mediators in migraine pathogenesis.

- Causes strong vasodilation
- Increases inflammation
- Enhances pain transmission

Modern anti-migraine therapies target CGRP pathways.

6. Oxidative Stress

Oxidative stress results from excess free radical production.

- Damages neuronal tissues
- Enhances inflammation
- Increases migraine severity

Antioxidants may help reduce migraine frequency and intensity.

7. Genetic Factors

Migraine often runs in families.

- Genetic mutations affecting ion channels and neurotransmitter regulation may increase susceptibility to migraine.

8. Environmental and Triggering Factors

Common migraine triggers include:

- Stress
- Lack of sleep
- Hormonal changes
- Bright light
- Loud sounds
- Certain foods
- Alcohol and smoking

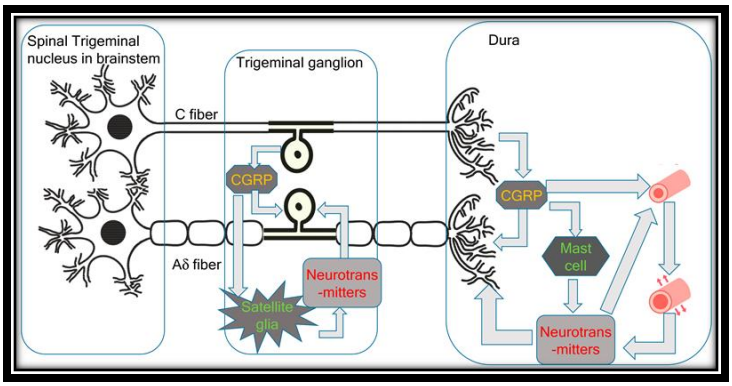

Fig: Pathophysicology of migarian.

Traditional Uses of Mimosa pudica

Mimosa pudica has been widely used in traditional systems of medicine such as Ayurveda, Siddha, Unani, and folk medicine for the treatment of various diseases and disorders. Different parts of the plant including leaves, roots, stems, and seeds possess medicinal properties and are traditionally utilized for therapeutic purposes. The plant is commonly used for the treatment of headache, migraine, anxiety, stress, insomnia, epilepsy, and other nervous disorders due to its calming and neuroprotective effects. It is also traditionally employed as an anti-inflammatory, analgesic, antimicrobial, and wound-healing agent.In folk medicine, Mimosa pudica is used for the management of diarrhea, dysentery, piles, urinary tract infections, skin diseases, cough, bronchitis, fever, and gastric disorders. The astringent property of the plant helps control bleeding and promotes wound healing. Traditional practitioners also use the plant in gynecological disorders, snake bites, and insect bites. In Ayurveda, Mimosa pudica is considered cooling in nature and is believed to balance Pitta and Kapha doshas.The traditional use of Mimosa pudica in neurological conditions such as stress, convulsions, sleep disturbances, headache, and migraine suggests its potential importance in the management of neurological disorders. These medicinal applications are mainly attributed to the presence of bioactive phytochemicals possessing antioxidant, anti-inflammatory, and neuroprotective activities.

Pharmacological Activities of Mimosa pudica Related to Migraine

Mimosa pudica possesses several pharmacological activities that may contribute to its potential role in the management of migraine. The plant contains various bioactive constituents such as flavonoids, alkaloids, tannins, terpenoids, glycosides, and phenolic compounds, which are responsible for its therapeutic effects.One of the major pharmacological properties of Mimosa pudica is its anti-inflammatory activity. Migraine is associated with neurogenic inflammation and the release of inflammatory mediators in the trigeminal nerve pathway. The plant helps reduce inflammation by inhibiting inflammatory substances, thereby potentially decreasing migraine severity and frequency.

Mimosa pudica also exhibits significant analgesic activity. Experimental studies have shown that plant extracts can reduce pain sensation and may help relieve the intense throbbing headache associated with migraine attacks. The analgesic effect may be due to the modulation of pain pathways and suppression of inflammatory pain mediators.

Another important activity is antioxidant action. Oxidative stress plays a major role in migraine pathophysiology by causing neuronal damage and increasing inflammation. The flavonoids and phenolic compounds present in Mimosa pudica neutralize free radicals and protect neuronal tissues from oxidative damage. This antioxidant effect may help

prevent migraine progression.The plant additionally demonstrates neuroprotective activity, which is beneficial in neurological disorders including migraine. It helps protect nerve cells from damage and may stabilize neurotransmitter function in the central nervous system. Neuroprotection may reduce hypersensitivity of trigeminal nerves involved in migraine pain transmission.

Mimosa pudica also possesses anxiolytic and sedative properties. Stress, anxiety, and sleep disturbances are common triggering factors for migraine attacks. The calming effect of the plant may help reduce stress-related migraine episodes and improve relaxation.Furthermore, anticonvulsant activity reported in various studies indicates its action on the central nervous system. This suggests that the plant may influence neuronal excitability and neurotransmitter balance associated with migraine development.Overall, the anti-inflammatory, analgesic, antioxidant, neuroprotective, anxiolytic, and anticonvulsant activities of Mimosa pudica support its potential therapeutic role in migraine management and justify further scientific and clinical investigations.

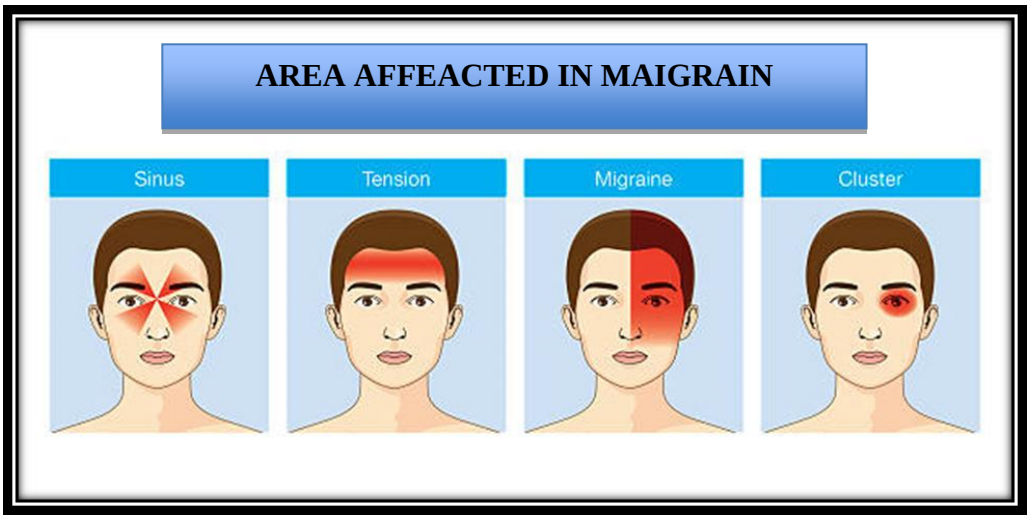

Fig: Area affected in maigrain.

RESULTS

The reviewed literature indicates that Mimosa pudica possesses significant pharmacological activities that may be beneficial in the management of migraine. Various phytochemical investigations have confirmed the presence of flavonoids, alkaloids, tannins, terpenoids, glycosides, phenolic compounds, and mimosine, which contribute to its therapeutic potential. Experimental studies demonstrated notable anti-inflammatory, analgesic, antioxidant, neuroprotective, anxiolytic, and anticonvulsant activities of the plant extracts.The antioxidant properties of Mimosa pudica help reduce oxidative stress and free radical damage associated with migraine pathophysiology. Its anti-inflammatory effects may suppress neurogenic inflammation and inflammatory mediator release involved in trigeminal nerve activation. Analgesic activity of the plant may contribute to reduction in headache intensity, while anxiolytic and sedative properties may help control stress-induced migraine attacks. The available evidence suggests that Mimosa pudica has promising potential as a natural therapeutic agent for migraine management.

DISCUSSION

Migraine is a multifactorial neurological disorder involving oxidative stress, neurogenic inflammation, neurotransmitter imbalance, and trigeminovascular activation. Conventional anti-migraine drugs are effective but are often associated

with adverse effects and long-term complications. Therefore, herbal medicines with safer pharmacological profiles are gaining increasing attention in migraine therapy.Mimosa pudica has been traditionally used for various nervous system disorders including headache, anxiety, epilepsy, and insomnia. The pharmacological activities reported in scientific studies support many of these traditional claims. The anti-inflammatory activity of the plant may help inhibit inflammatory mediators responsible for migraine pain and vascular changes. Similarly, antioxidant constituents present in the plant may protect neuronal tissues from oxidative damage and reduce progression of migraine episodes.The analgesic and neuroprotective properties of Mimosa pudica suggest its possible role in reducing pain transmission and stabilizing neuronal function. Moreover, stress and anxiety are important triggering factors for migraine attacks, and the anxiolytic activity of the plant may contribute to symptomatic relief and prevention of migraine recurrence.Although preclinical studies demonstrate promising pharmacological effects, there is still limited clinical evidence regarding its direct efficacy in migraine patients. Standardization of plant extracts, dose optimization, toxicity evaluation, and large-scale clinical studies are necessary before therapeutic application in humans. Despite these limitations, Mimosa pudica represents a potential source for the development of safer herbal anti-migraine formulations.

CONCLUSION

Mimosa pudica is an important medicinal plant with multiple pharmacological activities that may be useful in the management of migraine. Its anti-inflammatory, antioxidant, analgesic, neuroprotective, anxiolytic, and anticonvulsant properties support its therapeutic potential in neurological disorders. Traditional medicinal systems have extensively utilized the plant for headache, stress, insomnia, and nervous disorders, which further strengthens its relevance in migraine treatment.The phytochemical constituents present in Mimosa pudica play an important role in reducing oxidative stress, inflammation, and neuronal damage associated with migraine pathophysiology. Although experimental studies indicate promising results, sufficient clinical research is still lacking.

REFERENCES

1. Indian Medicinal Plants Kirtikar KR, Basu BD. *Indian Medicinal Plants*. 2nd ed. Dehradun: International Book Distributors, 2005.
2. Trease and Evans Pharmacognosy Evans WC. *Trease and Evans Pharmacognosy*. 16th ed. London: Saunders Elsevier, 2009.
3. Practical Pharmacognosy Kokate CK, Purohit AP, Gokhale SB. *Practical Pharmacognosy*. Pune: Nirali Prakashan, 2014.
4. World Health Organization. Headache disorders and migraine reports. Geneva: WHO, 2023.
5. Rajendran R, Krishnakumar E. Phytochemical and pharmacological properties of Mimosa pudica Linn: A review. *International Journal of Pharmaceutical Sciences Review and Research*, 2010; 5(1): 1–8.
6. Joseph B, George J, Mohan J. Pharmacology and traditional uses of Mimosa pudica. *International Journal of Pharmaceutical Sciences and Drug Research*, 2013; 5(2): 41–44.
7. Bum EN, Dawack DL, Schmutz M, et al. Anticonvulsant activity of Mimosa pudica decoction. *Journal of Ethnopharmacology*, 2004; 95(1): 113–117.
8. Genestra M. Oxyl radicals, redox-sensitive signalling cascades and antioxidants. *Cellular Signalling*, 2007; 19(9): 1807–1819.
9. Goadsby PJ, Lipton RB, Ferrari MD. Migraine: Current understanding and treatment. *New England Journal of Medicine*, 2002; 346(4): 257–270.

10. Silberstein SD. Migraine pathophysiology and treatment. *Cephalalgia*, 2004; 24(Suppl 2): 2–7.
11. Pietrobon D, Moskowitz MA. Pathophysiology of migraine. *Annual Review of Physiology*, 2013; 75: 365–391.
12. Gupta RK, Patel AK. Anti-inflammatory activity of Mimosa pudica extracts. *Asian Journal of Pharmaceutical and Clinical Research*, 2012; 5(4): 89–91.
13. Kumar V, Abbas AK, Aster JC. *Robbins Basic Pathology*. 10th ed. Philadelphia: Elsevier, 2017.
14. Harborne JB. *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. 3rd ed. London: Chapman and Hall, 1998.
15. Sofowora A. *Medicinal Plants and Traditional Medicine in Africa*. 2nd ed. Nigeria: Spectrum Books Ltd; 2008.
16. Nadkarni KM. *Indian Materia Medica*. Mumbai: Popular Prakashan, 2007.
17. Rang HP, Dale MM, Ritter JM, Flower RJ. *Rang and Dale's Pharmacology*. 8th ed. London: Elsevier Churchill Livingstone, 2016.
18. Sharma PV. *Dravyaguna Vijnana*. Varanasi: Chaukhambha Bharati Academy, 2006.
19. Tripathi KD. *Essentials of Medical Pharmacology*. 8th ed. New Delhi: Jaypee Brothers Medical Publishers, 2019.
20. Pandey MM, Rastogi S, Rawat AKS. Indian traditional Ayurvedic system of medicine and nutritional supplementation. *Evidence-Based Complementary and Alternative Medicine*, 2013; 2013: 376327.