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AN OVERVIEW OF PHARMACOLOGICAL STUDIES OF *MIMOSA HAMATA* (Willd.) – A MEDICINAL PLANT

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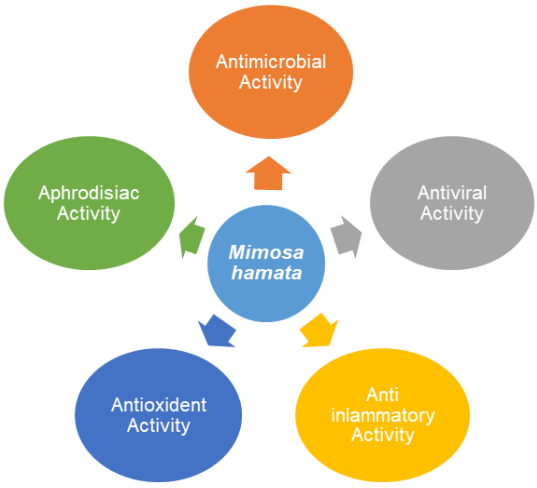
ABSTRACT

Mimosa hamata (Willd.) which belongs to family *Mimosaceae* has significant medicinal values. It is a straggling shrub growing on the ridges in various parts of India. Traditionally the extract of this plant is used against urinary complaints and weakness. Leaves have healing effect for glandular swellings and also useful in sinus, sores and piles in the paste form. Contraceptive efficacy exhibited by roots of this plant, while seeds of *M. hamata* are used as a blood purifier. Appreciable pharmacological activities were observed by survey of the literature of this plant like antimicrobial, antiviral, anti-inflammatory, antioxidant and aphrodisiac activities. Triterpenic saponins isolated from roots of this plant also exhibited appreciable potential against microbes. In view of literature study some bioactive principles of *M. hamata* were thoroughly reviewed and discussed. *M. hamata* is a common medicinal plant used in community but very less is known about phytochemical investigations. This review article summarizes the pharmacological and medicinal properties of *M. hamata.*



KEY WORDS: *Mimosa hamata,* Antimicrobial activity, Antiviral, Antioxidant activity, Traditional medicine.

INTRODUCTION

According to the evaluation of WHO (2003)80% people of the world still depend on old traditional system for primary health care [i,ii]. Researchers are focusing their efforts these days on isolating and identifying the active ingredients from the medicinally important plants [iii]. Mimosa genus belonging to Mimosaceae family contains around 410 species, most of which are tropical shrubs and small trees. About 8 species with medicinal importance are found in our country [iv], while some have ornamental applications. *Mimosa pudica*, the well known plant in the genus is a creeper and commonly known as touch-me-not plant, *M. hamata* also have same property [v]. Useful pharmacological and biological activities are shown by the various plant parts of *Mimosa hamata*. A paste of leaf powder is useful in dressing for sinus, sores, piles, over glandular swelling and also cure burning sensation [vi].

Whole Plant

Twig

Pod

Seeds

Figure: 1 Parts of Mimosa Hamata.

Seeds of *M. Hamata* are used as blood purifier and roots showed contraceptive efficacy [vii].In general weakness and in urinary infection whole plant is used as a tonic

[viii].Various activities like fungicidal activity of leaf extract [ix,x] bactericidal activity of aerial parts, antiviral, aphrodisiac and antioxidant activity of roots and anti-inflammatory activity of stems have been reported [xi-xvi]. This review article is a complied study of pharmacological activities and medicinal uses of *M .hamata,* so it would be helpful for the further research work on *M .hamata.*

Plant profile

***Mimosa hamata* willd. :**

Kingdom – Plantae
Phylum - Tracheophyta
Class - Mangoliopsida
Order- Fabales
Family- Fabaceae
Genus- Mimosa
Species- *Mimosa Hamata Willd.*
Synonym- *Mimosa armata*

Common name- gulabi babul,sagrai mullu, undrakampa, bander ki rakhi.

Mimosa hamata is an arid zone plant mainly distributed in Delhi, Punjab, Rajasthan, Central and South India. It is a medium sized much branched shrub up to 2 meter of height. According to Indian conditions the flowering and fruiting period of *M. hamata* is from August to November and from December to February. Other species of *Mimosa* genus, such as *M. pudica* and *M.himalayana* are botanical variations of this plant [xvii-xxii].

Phytochemicals

All the plant parts of *Mimosa hamata* were investigated for the isolation of phytochemicals separately. 4-Ethylgallic acid (Fig.2) extracted from the fresh flowers [xv] barks contain tannin [xxxii] hydroxy and polyhydroxy benzoic acid were isolated from seeds [xxxiii].A new triterpenic saponin
A (3-O-D-Glucosyl-L-rhamnosyl morolic acid) (Fig.3) Mimonoside A,B,C (Fig.4) and saponin B (3-O-L-Arabinosyl-D-glucosyl morolic acid) (Fig.5) were extracted from the roots of *M.* hamata [xi,xiii,xiv].

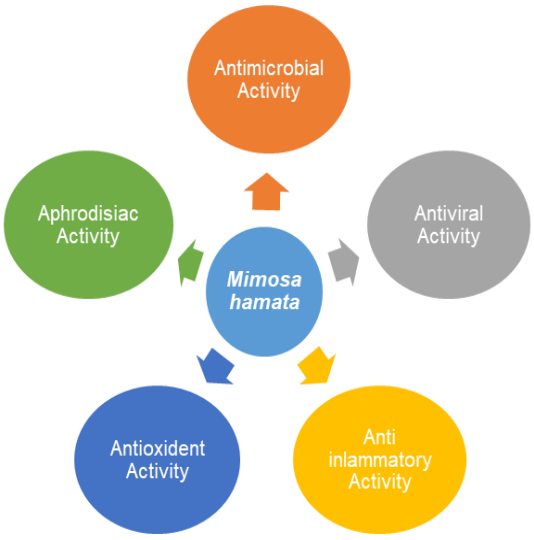
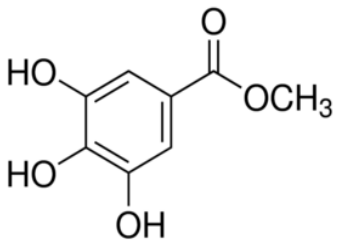
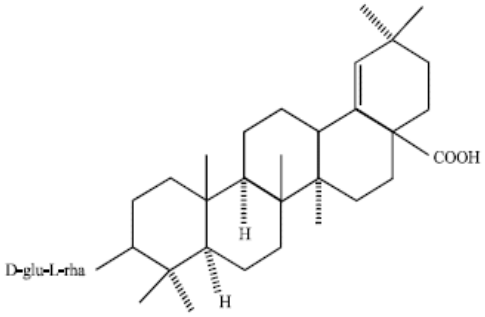


Table 1: Medicinal applications of *M. hamata*

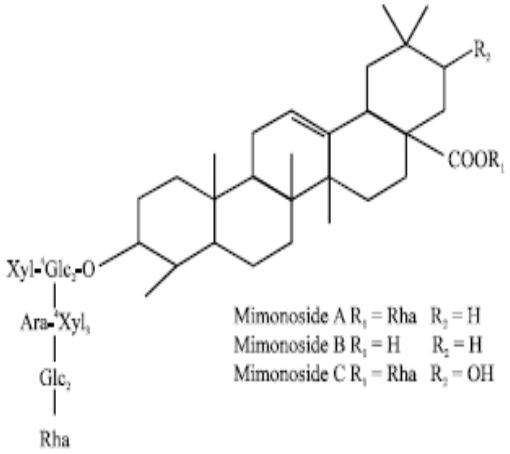
Plant part used	Medicinal uses	Mode of administration	References
Seeds	As a blood purifier, to heal sexual weakness in males, powdered seeds are dissolved in boiling milk and consumed for seven days.	External	[viii],[xvii],[xxiii-xxvi]
Stem	.Extract of fresh stem is useful in treatment of snake bite.	Oral	[xxvii]
Leaf	Leaf extract is useful for chronic cough and Pharyngitis, Paste of leaves administered for headache, diarrhea and dysentery.	External	[viii], [xiii],[xxiv], [xxviii]
Root	Lotion of powdered roots with oil and gugul have contraceptive efficacy, also used in leucorrhea, menorrhagia, stomach pain and in diarrhea, roots are also used for the treatment of jaundice.	External	[xxix-xxxi]
Flower	Used in menorrhagia, leucorrhoea, stomach pain and in diarrhea	External	[xxix]



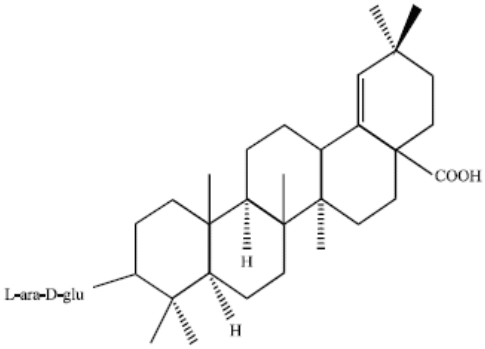
4-Ethylgallic acid
Figure: 2



3-O-D-Glucosyl-L-rhamnosyl morolic acid
Figure: 3



Mimonoside A, B, C
Figure: 4



3-O-L- Arabinosyl-D-glucosyl morolic acid
Figure: 5

PHARMACOLOGICAL ACTIVITY

***Antimicrobial Activity*:** A crude ethanolic extract of aerial parts and deproteinized leaf extract of *M. hamata* exhibited inhibitory effect against test microorganisms like bacteria and fungi [ix, xxxii, xxxiv]. Similarly methanolic extract of roots of *M hamata* showed significant antibacterial and antifungal efficacy [xiv] and seed callus also demonstrated antimicrobial activity [xii].
Saponins isolated from roots of this plant also exhibited pronounced activity against Gram-ive bacteria [xxxv].

***Antiviral Activity*:** Methanolic extract of roots was active against test viruses like *Measles, Semliki forest, Herpes simplex* and *Vesicular stomatitis* [xi, xiv]. Ethanolic extract of whole plant was also active against same test viruses but pet.ether and chloroform extracts were inhibit the growth of *V. stomatities* and *H. simplex* only [xiii].

***Anti-inflammatory Activity*:** Ethanolic extract of stem of *M. Hamata* exhibited significant efficacy against acute and chronic inflammation. 200mg/kg and 400mg/kg doses were investigated using carrageenan induced paw edema and cotton pellet granuloma technique in albino rats [xvi].

***Antioxidant Activity*:** Plant products with antioxidant activity have therapeutic potential as they do not cause any harmful effect that are quite often in case of synthetic antioxidants [iii, xi, xix].
Different plant parts (leaves, stem and roots) of *M. hamata* were investigated for antioxidant activity. Free radical scavenging activity was done by using 2,2 – diphenyl – 1-picrylhydrazyl (DPPH) method and compared with the standard antioxidants (quercetin and ascorbic acid). It was observed that the extract of in vitro roots is a good scavenger of DPPH radicals (RC_{50} 5 µg/ml) as compared to in vivo extract (RC_{50} 9 µg/ml). Appreciable antioxidant potential was also demonstrated by isolated saponins. Methanol (RC_{50} 6.5 µg/ml) and dichloromethane (RC_{50} 9 µg/ml) extract also possess good antioxidant activity [xii, xiv].

Table 2: Pharmacological properties of *M. hamata*

Activity	Plant Part	Extract	Microorganisms	Result	References
Antibacterial	Aerial part, leaves, roots	Ethanolic, Methanolic, Benzene and Aqueous	*Escherichia coli*, *Klebsiella aerogenes*, *Proteus vulgaris*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*	Positive	[xi,xiv,xxxi]
Antifungal	Aerial part, leaves, roots	Ethanolic, Methanolic, Benzene and Aqueous	*Aspergillus niger*, *Fusarium moniliforme* *Rhizoctonia bataticola*, *Aspergillus flavus*	Positive	[xi,xiv,xxxi]
Antiviral	Whole plant, roots	Ethanolic, Methanolic, Pet.ether and Chloroform	*Herpes simplex*, *Poliomyelitis*, *Vesicular stomatitis*	Positive	[xi,xiii,xiv]
Anti-inflammatory	Stem	Ethanolic	Albino wistar rats	Positive	[xvi]
Antioxident	Roots, stem, leaves	Ethanolic, Methanolic, and dicholromethane		Positive	[iii,xi,xix]
Aphrodisiac	Seeds	Crude extract		Positive	[xxxv]

***Aphrodisiac Activity*:** Male fertility adversely affected by the modern life style and various environmental exposures in almost every part of the world. The responsible factors produce different types of disorders that directly or indirectly lead to sexual dysfunctions. While modern medicine does provide physiological, nutritional and psychopharmacological treatments, but quite a few of them have a negative impact on physiological processes. Herbal aphrodisiac, on the other hand, provides a more secure means of addressing the issues linked with male infertility. *M. hamata* is also utilized for sexual dysfunction, according to traditional applications. Although the seeds of this plant are used as a herbal aphrodisiac to treat sexual problems, *Mimosa hamata* has yet to be clinically investigated for its aphrodisiac properties [xxxvi].

CONCLUSION

As embellished, *M. hamata* has been employed as a therapeutic agent in ethnomedicine for many diseases. Mostly roots and leaves are used for many human health problems. This study provides the information about the medicinal values of this plant which can be used as preliminary information. The importance of this plant gets established on the basis of the distribution, various medicinal applications, chemical constituents and many pharmacological activities. Further research is needed to identify the bioactive principles so that its full potential in the disciplines of medicinal and pharmaceutical sciences can be realized for unique and successful applications.

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