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Hemigraphis Colorata An Ornamental Plant with Ethnomedical Significance-An Analytical Review

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ABSTRACT

Hemigraphis colorata an ornamental plant having ethnomedical application in various diseases. This review article provides a comprehensive knowledge of the botanical characteristics, phytochemical constituents, ethnomedicinal applications, and pharmacological activities of *H. colorata*. As a folklore medicines its mainly used for wound healing purpose, also it showing anti-inflammatory, and antimicrobial properties, recent scientific investigations were caried out to reveals its therapeutic actions. Phytochemical analyses have showed the presence of flavonoids, phenolic compounds, saponins, tannins, and terpenoids, which contribute to its wide range of biological activities. Pharmacological studies have demonstrated its antioxidant, antimicrobial, anti-inflammatory, hepatoprotective, and wound-healing properties.

Key word: *Hemigraphis colorata*, Pharmacological action, Phytoconstituent, wound healing

INTRODUCTION

Hemigraphis colorata a member of *Acanthaceae* family commonly known as Red Flame Ivy or Metal Leaf, is a semi-evergreen ground cover plant Native to tropical Asia, particularly the Indian subcontinent and Southeast Asia, *H. colorata* is popularly used as an ornamental plant because of its attractive appearance recognized for its striking foliage, featuring metallic purple undersides and greenish-silver tops its in gardens and terrariums. Beyond its attractive appearance in recent years *H.colorata* getting more attention towards its medicinal potentials for its potential medicinal properties.

In folk medicine various parts of the plant have been used for the management of wounds, inflammation, and skin infections. Scientific studies have revealed that *H. colorata* contains a variety of bioactive compounds which helping to the therapeutic effect including flavonoids, tannins, saponins, and phenolic acids. Moreover, preliminary pharmacological studies have demonstrated antimicrobial, antioxidant, anti-inflammatory, and wound-healing activities, suggesting *H.colorata* as a source of valuable medicinal remedies.

Despite its traditional uses and emerging biomedical interest, comprehensive scientific data on *H. colorata* remains limited and scattered across isolated studies. This review aims to provide a consolidated overview of the botanical characteristics, ethnopharmacological applications, phytochemistry, and pharmacological activities of *Hemigraphis colorata*. By critically examining existing research, this article also highlights gaps in current knowledge and proposes directions for future investigations into this underexplored plant species.

PLANT PROFILE

Scientific classification Kingdom:

Plantae Phylum: *Spermatophytic*

Subphylum: *Angiospermae*

Order: Lamiales

Family: *Acanthaceae*

Genus: *Hemigraphis*

Species: *Colorata*

Synonym: *Hemigraphis alternate*

Figure 1

Figure 2

Phytoconstituent

The phytoconstituents in plants can be used for various medicinal purposes. The phytoconstituents present in *H. colorata* are saponins, flavonoids, terpenoids, coumarins, carbohydrates, carboxylic acids, xanthoproteins, tannins, proteins, alkaloids, steroids and sterol. The phytochemical characteristics of *Hemigraphis colorata* studied using different solvents based on their polarity. The whole plant of H. colorata were extracted using solvents such as hexane, chloroform, acetone and ethanol in the increasing order of their polarity.The ethanolic extract showed maximum average extractive yield.[15]

Ethnobotanical studies

The plant is widely used in wound healing purpose, leaf juice or paste is applied in wounds to stop bleeding. Mannan tribe settled in the selected region of Kovilmala of Idukki district of Kerala state widely used H.*colorata* in their practice .[17] Intake of juice of leaf buds for 4 days act as contraceptive and induce sterility [18.] The *mullu kuruma* tribes in Wayanad district, Kerala also used the leaves juice of *Hemegraphis colorata* wound healing purpose [19]

Antibacterial effect

Study relieved that ethanol, aqueous, chloroform, benzene, acetone and petroleum ether extracts of, *Hemigraphis colorata (H. colorata)* leaves and stem having anti-bacterial activity against the selected pathogens.[1]

In another study which establish the antibacterial activity of hexane extract were analysed using Agar well diffusion method[5] The antimicrobial activity of Ag-ZnO bimetallic nanoparticles synthesised using *Hemigraphis colorata* (blume) over ZnO nanoparticles in free and collagen coated form against wound pathogens was conducted in another study [8] Antimicrobial potential of Non cellulose films after blending with *Hemigraphis colorata* extract was studied .The nanocellulose blended with *Hemigraphis colorata* extract provided effective antimicrobial activity by inhibiting the growth of *Bacillus cereus*, *E. colsi*, *Pseudomonas sp.* and *Saccharomyces cerevisiae*. [10]

Antifungal Activity

Anti mycotic activity of *H.corolata* relives that presence of flavonoids was mainly responsible for antimycotic (antifungal) activity exhibited by the *H. colorata* leaves which were selective among the fungal strains.[16]

Wound healing

The wound healing property of *H. colorata* leaf paste (topical application) or suspension (p.o., 1g/kg) was studied using excision wound which was inflicted by cutting away 500 mm^2 of the skin on the anterio-dorsal side of mouse.[2]

Anti inflammatory

The anti- inflammatory activity of the leaf was evaluated using carrageenan induced paw oedema model in mice. administration of the leaf suspension (1g/kg) as well as topical application of the leaf paste were devoid of anti-inflammatory activity in the carrageenan induced acute inflammation in mice.[2] The in vitro anti-inflammatory assay was carried out by HRBC membrane stabilization method. The ethanolic extract showed good percentage of membrane stabilisation when compare to hexane, acetone, and chloroform extracts.[3]Anti inflammatory activity was also assessed with Methanolic extract

using carrageenan induced paw oedema model.[4]Green aqueous extract of *Hemigraphis colorata* leaf showed a significant corrosion inhibition activity in 1 M HCl in a study [7]

Also, the anti-inflammatory property was evaluated both in vitro and in vivo method. The chloroform fraction possesses highest amount of flavonoid, 6.66 µg/100 µg sample. In the in vitro experiment acetone fraction possess maximum activity. In the in vivo experiment, acetone extract showed 43% and 48% of inhibition at 250 & 500 mg/kg b.wt. respectively against carrageenan induced paw oedema [6]

Anti-oxidant activity

The free radical scavenging capacity of the *Hemigraphis colorta* whole plant extract was determined using DPPH according to the method of Blois with slight modifications [3]

Anti-Diabetic

Ethanol extract and n-hexane extract was evaluated for its hypoglycaemic and anti-diabetic properties using rats. Glucose lowering effect and anti-diabetes activity were studied using glucose tolerance test in normal rats and alloxan diabetic rats respectively [9]

Homeostatic Activity

Invitro homeostatic activity was conducted with methanol extract of *Hemegraphis colorata* , The blood clotting time was evaluated using the Prothrombin Test (PT).

Anthelmintic

The Invitro evaluation of Anthelmintic activity on different extract of *Hemegraphis colorata* was done. The study was carried out on Indian earthworms (*Pheretima posthuma).* Juice extract, ethanolic extract and aqueous extract of the leaves were used for the study.[13]

Hepatoprotective

Hepatoprotective activity of whole plant of *Hemigraphis colorata* against paracetamol-induced liver toxicity in Wistar albino rats. Powdered mixture materials were extracted with Ethanol using the Soxhlet apparatus.[14]

DISCUSSION

Hemigraphis colorata a member of the *Acanthaceae* family getting more attention due to its wide spectrum of ethnomedicinal and pharmacological properties. Traditionally used in Southeast Asian countries, particularly India and Indonesia, it has been used for wound healing, as blood purifier, and for reducing infections. Phytochemical investigations showed the presence of chemical compounds such as saponin,flavonoids,phenolic,terpenoids,and glycosides. Antioxidant and anti-inflammatory activities contributed by the presence of flavonoids and phenolic compounds. These compounds are respond for their free radical scavenging capabilities, responsible for its wound-healing and hepatoprotective effects. Additionally, the antimicrobial properties observed in different extracts like methanolic and ethanolic, can be attributed to a synergistic interaction among secondary metabolites, including alkaloids and tannins. While *H. colorata* has demonstrated promising activities in vitro and in vivo including antibacterial, antifungal, antioxidant, and cytoprotective effects

CONCLUSION

Hemigraphis colorata is not only valued for its ornamental appeal but also holds significant medicinal potential. Numerous studies have highlighted its antimicrobial, antioxidant, anti-inflammatory, and wound-healing properties, largely attributed to the presence of bioactive compounds such as flavonoids, tannins, and phenolics. Its traditional use in folk medicine is increasingly supported by modern scientific investigations. However, while preliminary findings are promising, more in-depth pharmacological and clinical studies are needed to fully validate and reveals its therapeutic applications. Future research should focus on isolation of specific active constituents, standardization of extracts, and assessment of toxicity to facilitate its integration into modern medicine. Overall, *Hemigraphis colorata* presents itself as a valuable plant with both aesthetic and medicinal relevance.

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