A Perspective Overview on Hygrophila auriculata

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ABSTRACT

Hygrophila auriculata, belonging to the family Acanthaceae, is a promising medicinal plant with great economic potential. The medicinal value of H. auriculata has been appreciated in the ancient medical literature. The plant contains terpenoids, alkaloids, flavonoids, and is traditionally known as an aphrodisiac, renal tonic, and for its health-promoting properties. The plant is cultivated throughout India. However, systematic information on the different aspects of this species is not available. In this review, an attempt has been made to present this information.

Key words: Hygrophila auriculata, Phytochemistry, Pharmacological activity.

INTRODUCTION

Hygrophila auriculata (Schumach.) Heine belongs to family Acanthaceae found in India. It is distributed in tropical and subtropical region in India in literature. The plant is used in cancer and tubercular fistula (Root and seeds used as tonic, for asthma and dysentery). The leaf, root and seed of this plant are traditionally used for the treatment of inflammation, jaundice, hepatic obstruction, urinary infection, oedema, gout, diabetes, bacterial infection etc.

VERNACULAR NAME

Marathi: Kolshinda, Talimkhana, Sanskrit: Kokilaka, Bengali: Kuliakhara,Gujarati: EkharoHindi: Talmakhana Kannada: Kolavali, Telugu: Talmakhana

DESCRIPTION

Herbs, 40-100 cm tall with unbranched, subquadrangular stems with numerous fasciculate, swollen node, hispid with long hairs. Leaves sessile, lanceolate, 6-15×1.5-3 cm, acute, hairy, in whorls of 6 at each node, the two outer one smuch larger than the four inner ones. Thorns from the axils of leaves sharp, 2-3 cm long, yellowish-brown. Flowers in axillary clusters of eight at each node in 4 pairs. Bracteolaceous, hairy and ciliate, like the leaves, bracteoleslinear-lanceolate, 1.5-2 cm long, with hyaline margins in the lowerpart, hairy and ciliate with long white hairs. Calyx 4 parted; upper sepals broader unequal, longer than the other three; all linear lanceolate, 1.2-2.2 cm long, with hairy on the back and hyaline ciliate margin. Corolla purple-blue, 2-3 cm long, bilipped; tube 11-13 mm long, swollen at top; stamens didynamous 4; filaments glabrous. Ovary 2 celled with 4 ovule, capsuleslinear-oblong, 4 seeded 5-7 mm long, pointed. Seeds, ovate, compressed, hairy, hygroscopic, black.

PHYSICOCHEMISTRY

Phytochemically, the whole plant contains phytosterols, tannins, carbohydrates, flavonoids, terpenoids, and sterols. Phalnikar et al, analyzed the oil from the seeds and reported the presence of ursic, palmitic, stearic, oleic, and linoleic acids. Apigenin-7-O-glucuronide and apigenin-7-0-glucoside were isolated from the flowers and lupeol, betulin, and stigmasterol were isolated from the plant. Alkaloids, steroids, tannins, proteins, flavonoids, carbohydrates, fats, and oils were isolated from the roots. Moreover, the leaves show the presence of alkaloids, carbohydrates, proteins, steroids, glycosides, flavonoids, tannins, phenolic compounds, fats, and oils.

The high-performance thin layer chromatography analysis revealed the presence of phytosterols, namely, β-sitosterol and lupeol. Maximum content of lupeol was found in the roots (0.25%), whereas the maximum content of β-sitosterol was found in the leaves (0.069%) of Asteracantha longifolia. Other isolated chemical constituents include betulin, 25-oxo-hentriacontanol acetate, and methyl-α-hexyltetraacosenoate.

CONCLUSION

In this systematic review, the pharmacologic studies conducted on H. auriculata indicate the immense potential of this plant in the treatment of conditions, such as diarrhea; inflammatory ailments, including liver and kidney disorders, as well as microbial and bacterial infections; cancer, and others. Regarding the plant, the studies indicate that this has an important antioxidant activity due to the presence of water-soluble compounds with potent free radical-scavenging effects, such as flavonoids, terpenoids, alkaloids, steroids, tannins that may be associated with the lower incidence and lower mortality rates of degenerative diseases in human. In spite of all these activities, a major work has been carried out on the chemical, biochemical, pharmacuetic,
Figure 1: Entire Plant of *Hygrophila auriculata* (Schumach.).

Figure 2: Phytochemical present in *Hygrophila auriculata* (Schumach.).

**Table 1: Pharmacognostical Study.**

| S.No | Title | Journal Name | Vol / Issue / Year | Author | Conclusion |
|------|-------|--------------|------------------|--------|------------|
| 1.   | Preliminary Phytochemical and Pharmacognostical Screening of the Ayurvedic Drug *Hygrophila auriculata* (K. Schum) Heine | Pharmacognosy Journal | Vol 3, Issue 23, 2013 | Mohammed Safaraj et al | Physico-chemical studies revealed alcohol soluble extractive (5.12% w/w), water soluble extractive (24.96%), total ash (9.90%), acid insoluble ash (1.48%), water soluble ash (8.35% w/w), loss on drying (6.30% w/w), swelling index (2.0% w/w), foreign matter (1.10% w/w) |

**Table 2: Phytochemical investigation study.** The phytochemical investigation of *Hygrophila auriculata* review strengthen the review of the article. The phytochemical investigation are listed below:

| S.No | Title | Journal Name | Vol / Issue / Year | Author | Conclusion |
|------|-------|--------------|------------------|--------|------------|
| 2.   | Ethnomedicinal, phytochemical and pharmacological updates on *Hygrophila auriculata* (Schum.) Hiene: an overview | Journal of Integrative medicine | Vol 16, Issue 5, 2012 | Neeraj et al | The plant contain flavonoids (apigenin, luteolin, ellagic acid, gallic acid and quercitin), alkaloids (asteracanthine and asteracanthine), triterpenes (lupeol, lupenone, hentricontane and betulin), sterols |
| 3.   | Neuroprotective and antioxidant potential of terpenoid fraction from *Hygrophila auriculata* against transient global cerebral ischemia in rats | Pharmaceutical Biology | Vol 51, Issue 3, 2013 | Rupesh Kanhere et al | *Hygrophila auriculata* shows neuroprotective potential against tGCI induced oxidative stress. The powerful antibacterial effect is attributed to the greater amount of tannin compound in the acetone leaf extract of *Hygrophila auriculata* |
| 4.   | Studies on phytochemical screening, tannin content and their antibacterial activity of *Hygrophila auriculata* leaf extracts | International Journal of Current Science | 19 (4), 2016 | Prasanna M et al | |
and pharmacologic aspects of the plant and hence, an extensive investigation, especially on its clinical efficacy is needed to exploit its therapeutic utility to combat diseases. As the global interest toward traditional medicines over the conventional treatment is increasing, due to safe and well-tolerated remedies provided by them for the chronic illness with lesser side effects, this review targets H. spinosa as a potentially safe and effective plant that has important medicinal values and benefits.

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GRAPHICAL ABSTRACT

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