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Review Article

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A BRIEF REVIEW ON HEALTH BENEFITS AND MEDICINAL USES OF HYGROPHILA SPINOSA (T)

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ABSTRACT
Hygrophila spinosa T Ander, belonging to the family Acanthaceae, is a promising medicinal plant with great economic potential. The plant has great medicinal value which has been well recognised and appreciated in the ancient medical literature. The medicinal applicability of the plant, its seeds, roots, leaves and the panchang (Pancha=five & ang=parts, root, flowers, stem, fruits & leaves as ash burnt together) are well scripted in the Ayurveda. It uses in different pathophysiological condition such as jaundice, rheumatism, renal stone, gonorrhoea, hepatic disorder are documented in the Indian system medicine and other standard literatures. It also prevents the anaemia during pregnancy. The plant grows in marshy places in different area of Asia & Africa. However, the regulated information on the different aspects of this species is not available.

INTRODUCTION

Since the early beginning plants are treated as most reliable and time tested source of medicine. Classical literatures like age old *Charaka samhita*, Ayurvedic system of medicine, Chinese medicine system, Sushruta Samhita etc. have nicely scripted the versatile properties and miraculous healing properties of various medicinal plants. *Hygrophila*, most commonly known as swampweeds, is a flower containing plant consisting of 80-100 species among which most of them are aquatic plants. They belongs to the family *Acanthaceae* [1]. It usually grows in wet places and mostly found in marshy regions. The plant mainly found in several areas of India, Sri Lanka, Myanmar, Nepal, Malaysia and African countries [2, 3].

Since long different parts of the plant are used as traditional medicines for treating different kind of disorders includes flatulence, painful micturition, various gastric problems, swelling, hyperdipsia, carcinoma and dropsy from chronic bright disease etc. There are empirical traces of Hygrophila's extensive and varied pharmacological roles that have already proven to be a boon for both diseasing and disorders in the world of medicine [4].

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TAXONOMY:

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade:Asterids

Order: Lamiales

Family: Acanthaceae

Genus: Hygrophila

Species: H. auriculata

Figure 1- *HYGROPHILA SPINOSA* (T) Tree

PHYSIOLOGY OF KULEKHARA

Kulekhara botanically named as Hygrophila spinose T, in English it is called Swampweeds, in Hindi Talimakhana is a flowering plant with medicinal values [5]. It is mentioned in Ayurveda that the plant Kulekhara, is derived from the word Kokilasha, meaning eyes like the Indian cuckoo bird, kokila. This plant is believed to be a native of India and is grown generally in the swamp areas under tropical or subtropical climate [6]. The flowers of this plant are generally purple in colour and are commonly used for medicinal purpose.

Health benefits and medicinal values of *Hygrophila spinosa*:

Since early beginning Hygrophila spinosa plays an important and essential role in management of various diseases [7]. Plant parts like Leaves, Roots & Seeds are commonly used for the treatment. The plant is traditionally used in the treatment of disorders such as Hyperdipsia, Gastric diseases, Jaundice**,** Urinary Infection, Asthma, Menorrhagia, Inflammation, Anasarca, Flatulence, Rheumatism, Gout and Gonorrhoea. Apart from this in few literature the Aphrodisiac effect and anti-bacterial effects of the plant are well acknowledged [8].

Pharmacological effects of *Hygrophila spinosa*:

In this section, the pharmacological effects of *Hygrophila spinosa* has been discussed as follows:

Anti-inflammatory, analgesic and Anti-pyretic action: *Hygrophila spinosa* reported to have potent analgesic, anti-inflammatory and anti-pyretic properties. The ethanol and chloroform extracts of leaves and parts of the root show promising results. It is also reported that at a dose of 400mg/kg the plant extract shows effective analgesic and antipyretic activities [9]

Aphrodisiac Action: The plant *Hygrophila spinosa* shows effective aphrodisiac effects. A recent clinical investigation on 50 infertile male reveal the promising aphrodisiac action of the plant. In the study around 8-10 gm dry plant extract was given to the subject along with milk for three month [10, 11]. After one month sperm viability and sign of improvement in sperm morphology was observed, followed by continuation of the therapy, significant improvement in sperm count & motility was also reported. The treatment increases the rigidity and durability of the penile erection. The concomitant increase in the LH-FSH testosterone levels is also reported [12]

Antineoplastic Effect: A recent study on Ehrlich ascites carcinoma or sarcoma-180 bearing mice states that the petroleum extract of the *Hygrophila spinosa* show antitumor action. Within two weeks of the study the tumor shrink considerably [13, 14]

Hematopoietic Effect: Since long, this plant has been used by the traditional healers for the treatment of low haemoglobin or blood related issues (especially for female health management issues). The aqueous as well as alcoholic extraction of *Hygrophila spinosa's* leaves and stems shows hematopoietic effect that enables an increase in haemoglobin level & RBC's Count [15]

Antibacterial and anthelmintic activity: The *Hygrophila spinosa* is a plant that reported to have potent antibacterial activities.[16] The researches carried out till date on the plant states that aqueous, alcohol and chloroform extract of the plant shows effective growth inhibitory activity against *E. Coli* (NCIN 2341), *Staphylococcus aureus* (NCIM 2654), *Bacillus subtilis* (NCIM 2195) and *Pseudomonas aeruginosa*.

Antidiabetic Effect: The hypoglycaemic effects of *Hygrophila spinosa* on humans are well-known. Glutathione peroxidase, Glutathione, Catalase, and S-transferase levels have also

improved. These studies conclude the importance of antioxidants in the treatment of diabetes [17, 18]

Antioxidant activity: *Hygrophila spinosa* exhibits wonderful antioxidant properties that are very much beneficial for our health. The reported antioxidant activities are shown due to availability of secondary metabolites like tannins, phenolic, flavonoids etc [19]

Major phytochemical constituents of *Hygrophila spinosa*:
The various classes of phytoconstituent available in *Hygrophila spinosa* are Polyphenols, Phytosterols, Proanthocyanins, Alkaloids, Amino acids, Enzymes, Carbohydrates, Terpenoids, Flavonoids, Glycosides, and Vitamins. The availability of phytochemical and their potency usually varies based on source [20, 21]. Apart from this some of the reported secondary metabolites that are present in the plant *Hygrophila spinosa* are listed below.

Botulin: It slows down the tumour growth and acts as an anti-tumour agent inducing apoptosis. Functionally, it reduces the level of lipid in serum and reduces the biosynthesis of cholesterol during the maturation, inhibition and the atherosclerotic plaque. It simultaneously increases the sensitivity to insulin [22]

Stigmasterol: It contributes to the prevention of various carcinogens, such as ovarian, breast, prostate, and colon and also reduces the absorption of cholesterol and acts as strong antioxidants [23]

Lupeol: The component consists of anti-microbial, anti-inflammatory, anti-protozoal, anti-tumour and anti- pathological action. It helps to inhibit prostate and skin cancers effectively [24]

CONCLUSION

The review mainly highlighted different pharmacological activities of *H. Spinosa* & its potential health benefits. As traditional medicine the plant already gained its popularity in treating various ailments. The commercially available medicines prepared from the plant may be considered as an outcome of extensive research work that has been carried out on the plant in recent time. Considering its promising health benefit features of the plant, it may be concluded that the miraculous healing properties of the plant are one kind of blessing on mankind and in future a lot more medicinal values are expected to be explored from the plant.

FINANCIAL ASSISTANCE

Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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