REVIEW ARTICLE

NYMPHAEA STELLATA: A POTENTIAL HERB AND ITS MEDICINAL IMPORTANCE

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ABSTRACT

Nymphaea stellata is a perennial aquatic herb belongs to family Nymphaeaceae is an important and well-known medicinal plant, widlely used in Ayurveda and Sidhha system of medicines for the treatment of diabetes, inflammation, liver disorders,urinary disorders, menorrhagia, blenorrhagia, menstruation problem, as an aphrodisiac, and as a bitter tonic. There seems to be an agreement between the traditional use and experimental observations, such as anti-inflammatory and particularly antidiabetic activity. Flower of *N. stellata* contain a lead compound Nymphayol (25, 26- dinorcholest-5-en-3β–ol) The structure was determined on the basis of X-ray crystallography and spectral data.The flowers of plant contain flavonoids, gallic acid, astrgalin, quercetin, and kaempferol. Recently, *Nymphaea stellata* flowers have been reported to have hepatoprotective activity against CCl_4-induced hepatic damage. This review is an attempt to provide the pharmaceutical prospectus of *Nymphaea stellata*

Key Words: *Nymphaea stellata*, Phytochemical constituents, Hepatoprotective activity

PLANT PROFILE

Nymphaea stellata is a perennial aquatic herb, with a short ovoid and acute root stock. It is found in ponds, lakes and ditches throughout Bangladesh, Africa and warmer part of India. Commonly referred to as "Water Lilies", these plants have adapted to living in total water environment[1]

BOTANICAL CLASSIFICATION

Kingdom: Plantae **Order:** Nymphaeales

Division: Spermatophyta **Family**: Nymphaeaceae

Phylum: Tracheophyta **Genus**: Nymphaea

Class: Dicotyledones **Species**: Stellata-Willd

VERNACULAR NAME[2]

English: Waterlily Blue lotus **Tamil:** Karuneythal,

Hindi: Nilkamal, Nilpadma **Marathi:** Krishnakamal,

Bengali: Nilshapla, Nilpadma **Malayalam:** Sitambel

Gujrati: Nilkamal **Tamil:** Karuneythal,

Telgu: Nillakalava **Punjabi:** Bambher,

Leaves

Flowers

MORPHOLOGICAL DESCRIPTION OF FLOWER

The arrangement of the floral organs is in a transitional stage between the ancient spiral phyllotaxy and a whorled condition, although superficially the carpels and, in some species, the appendicular organs appear to be in whorls. Ovules are laminar and are attached between the dorsal and ventral carpellary veins. They have not been observed attached to the ventral limits of the locules. Rarely, they are attached to the median dorsal region. The pendicules typically has a large central vascular strand, a peripheral circle of large vascular strands which alternate with smaller ones and an intermediate ring found in the septa between the principal air canals[3]

MORPHOLOGICAL DESCRIPTION OF OTHER PARTS

Leaves peltate, 12.5-20 cm. diameter, or entire with a narrow sinus 5-7.5 cm. deep, glabrous on both surface, often blotched with a purple beneath; petioles long, slender, submerged. **Rootstock** ovoid, short, acute (Kirtikar and Basu, 1999). **Herb** perennial or rarely annual, aquatic. **Stem rhizomatous**; rhizomes erect or repent, branched or unbranched. **Fruit** berrylike, many seeded, irregularly dehiscent. **Seeds** mostly arillate; endosperm little, perisperm abundant; embryo small; cotyledons 2 fleshy.[4]

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MACROSCOPIC DESCRIPTION

Macroscopic drugs occurs mostly in broken form of varying sizes of dried pieces of flowers and buds, dark brown, attached with a pedicel of 0.5-1.0cm long when present; sepals 5-6cm long, 1.5-2.0cm wide, oblong, lanceolate, tip acute or subacute, free adnate to base of disk; petals 3.5-4.5cm long 2.0-2.5cm wide, linear-oblong or lanceolate, yellowish-brown; stamen- 6- indefinite, free, adenate to fleshy thalamus; filament-dilated at base; anther- with lingual appendages, introse, dithecous gynoecium 3 to indefinite, enclosed by thalamus; style short; ovary unilocular.[5]

MICROSCOPIC DESCRIPTION

Microscopic Sepal- Single layered epidermis on either side, unicellular hairs present on upper epidermis; both epidermis followed by 4-6 layers of collenchymatous cells with angular thickening; central region occupied by 4-5 layers of elongated, thin-walled, spongy parenchymatous cells, large stellate air canals and vascular tissues present in this region; tanninferous content present in collenchymatous cells.[4]

CULTIVATION AND COLLECTION

Nymphaea is an important genus of ornamental plants, with numerous cultivators or wild form grown in water garden.

Soil may range from sand to clay; covering soil with small stones will reduce mud in pond.

Culture Space 4-6' apart in still water, avoiding fountains, waterfalls, and other moving water. Plant at recommended depth or plants may not flower. Propagate by washing off the soil and detaching a piece of rhizome with a vigorous growing point, potting it separately.

Temperature

Topical water lilies require a minimum water temperature of 70 degree F., though established plants can tolerate a bit lower water temperature.

Sun light: Full sunlight.

P^H Minimum P^H - 6.1

MaximumP^H - 7.5

Hardiness zone

All lotuses are good for any geographical areas as long as it is planted and started in warm water. They will not start to develop until the water reaches 70 degrees. Once they start to get growing, they are very invasive and the roots will branch out all over if not contained in a large pot. Don't bury directly in pond gravel or bottom[6]

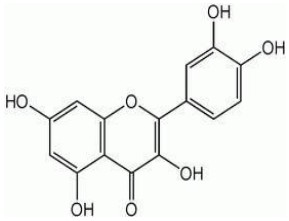
LITERATURE REVIEW

Literature records the isolation of phytoconstituents and pharmacological activities of a number of isolated chemical constituents and also some quantitative standards. The details are given as under-

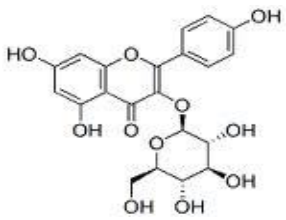
SOME ISOLATED PHYTOCONSTITUENTS

Flower of *Nymphaea stellata* contain a lead compound Nymphayol (25, 26- dinorcholest-5-en-3β–ol) The structure was determined on the basis of X-ray crystallography and spectral data.[7] The flowers of plant contain flavonoids, gallic acid, astrgalin, quercetin, and kaempferol. Phenolic constituents were also found in flower of *N.stellata*[8], Coclaurine and β-sitostorol from the arial part.[9] *N. stellata* also contain Vitamin E.[10] Starch isolated from rhizomes.[11] Dried tubers contain moisture 4.2%, fat 0.25%, protein 14.56%, carbohydrate 67.49%, fibers 5.45%, 3.95% ash and reducing sugar, Na, K, P, Ca, Fe,[12] Protien, pentason, and tannins, mucilage were reported to present in seeds. Seed oil of *Nyphaea stellata* also contains 2.13% of ricinoleic acid as triglyceride constituent mixture of eicosenoic, linolenic, linoleic, oleic and saturated acid. linolenic and oleic were found in major amount 18.8 and 48.21% respectively[13]

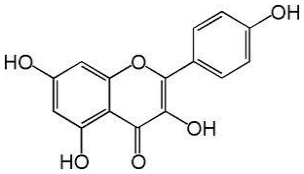
STRUCTURES OF SOME REPORTED PHYTOCONSTITUENTS OF *NYMPHAEA STELLATA*



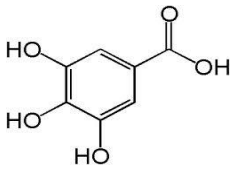
Quercetin



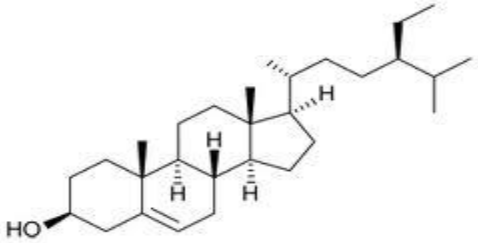
Astragalin



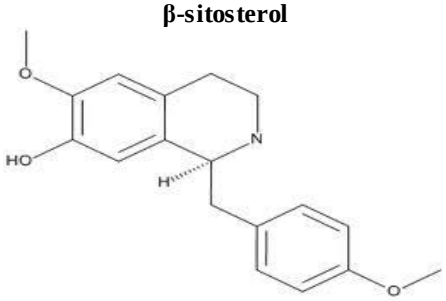
Kaempferol



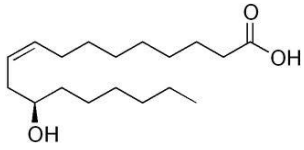
Gallic Acid



β-sitosterol



Coclaurine



Ricinolic Acid

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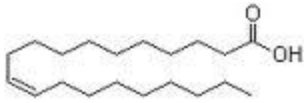
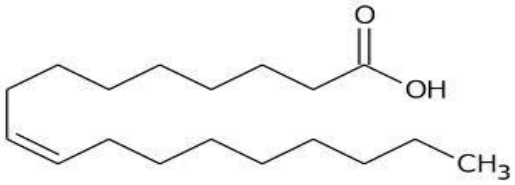
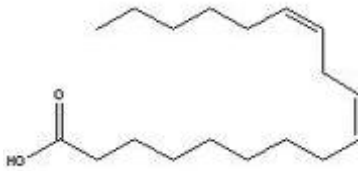


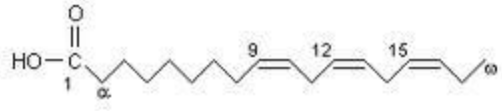
Eicosonoic Acid



Oleic Acid



Linoleic Acid



Linolenic Acid

PHARMACOLOGICAL ACTIVITIES

The activity has been reported to be antihyperlipidaemic[14] and antihepatotoxic Recently, *Nyphaeae stellata* flowers have been reported to have hepatoprotective activity against CCl_4–induced hepatic damage.[15] The powder of rootstock is given to treat dyspepsia, diarrhoea, and piles. An infusion of the rhizome and stem is considered to be an emollient, diuretic, and used for treatment of blennorrhagia and disease of the urinary tract. The flower has an acrid, bitter-sweet taste, removes impurities from blood, cools, and cough, is used for biliousness, for vomiting, giddiness, worm infestation, and burning of the skin. The decoction of flower is used in palpitation of the heart and as a narcotic; syrup of the flower is used in apoplexy, inflammatory disease of the brain, and also in dysuria. The filament of plant is used as an astringent and a cooling agent in burning sensation of the body, and menorrhagia. Leaves are applied topically in erysipelas. The seeds are used as stomachic, restorative.[16] The seeds are also prescribed as diabetes mellitus in the Ayruvedic system of medicine.[17] The ethanolic extract was found to be inactive as an anti bacterial, antifungal, antiprotozoal, anti viral, diuretic, and with no effect on cardiovascular system and CNS.[18] The plant's antihyperglycemic action may be by potentiation of pancreatic secretion of insulin.

The Indian system of medicines, particularly Ayurveda and Siddha uses *Nymphaea stellata* as a single drug or in combination with other drugs. It is ingredients of many ayurvedic formulations like Asokarista, Arvindaasava, Usirasava, Candanadi Lauha,Tungadrumadi Taila, Kalyanaka ghrta, Samangadi curna, Kanaka Taila, jatyadi taila, Manjesthadi Taila and Triphala Ghrta. It is also an ingredient of many polyhebral formulations for anti-aging, rejuvenation and menstrual irregularities.[19] Flowers are used in temples, rhizomes are considered to be nutritious as vegetables, green manure and fooder. N. Stellata is considered as one of the ten most common noxious aquatic weeds in india,

TRADITIONAL USE OF DIFFERENT PARTS OF NYMPHAEA STELLATA

Whole plant: Used for the treatment of liver disorders in Ayurveda. Leaves, roots and flowers are used for diabetes, bolled disorders, antifertility, heart troubles, dysentery, eruptive fevers, indigestion ans as a cardiotonic, emollient, diuretic, narcotics, stimulant, and aphrodisiac.

The flowers and roots have mild sedative properties, used for mind-altering purposes.

The whole plant is used as anti-periodic and cardiac stimulant in Kashmir.

Flower: 3-6 gm of the drug is used in Pipasa daha (burning thurst), Raktapitta (bile-blood), Chardi (vomiting), Murchha (fainting), Hrdraoga (heart disease), Mutra kechhra (painful discharge of urine affections), Jvaratisara (diarrhea with fever). The flowers are used in treatment of diabetes mellitus (Madhumeha) and liver disorders in the ayurveda and Sidhha system of medicines. The flowers has an acrid, bitter-sweet taste removes impurities from the blodd, cools and alleviates cough, is used for biliousness as an aphrodisiac, for vomiting, giddiness, worm infestation, and burning of the skin. The decoction of the flower is used in palpitation of the heart and as a narcotic, the syrup of the flower is used in case of high fever, apoplexy, inflammatory disease of the brain, and also in dysuria. The filaments of the plants are used as astringent, and a cooling agent in burning sensation of the body, bleeding piles and menorrhagia.

Rootstock: Powder is used to treat dyspepsia, diarrhea and piles

Root: The roots are used as emollient, diuretics, and treat diabetes, blenorrhagia, infections of the urinary passage and infertility.

Leaf and flower: The tender leaves and flower peduncles are used as curries in Ceylon.

Rhizome and stem: An infusion is considered to be an emollient, diuretic, and used for treatment of blennorrhagia and disease of urinary tract.

Flower and rhizome: Flower and rhizomes are astringent, demulcent, mild sedative, spasmolytic, antiseptic, used in infusion internally for chronic diarrhea, as a douche for leucorrhea and vaginitis, as a gargle for sore throat, also given internally for prostate problems.

Leaf: Leaves are applied topically in erysipelas, whereas the macerated leaves are used as a lotion in eruptive fever.

Seed: The seeds are said to be stomachic and restorative. Seeds are prescribed as a diet for diabetes mellitus, in the Aurvedic system of medicine.

Rhizome: It is often eaten after roasting in hot embers. Rhizome paste is used to treat menstruation problem. The rhizomes are used to treat gastrointestinal disturbances.

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Petiole: Petioles paste along with little common salt, seed powder *Cuminum cyminum*, butter and few drop of honey is taken against excessive menstrual discharge. Stripes along with roots of *Pinus longifolia* are taken against fever, dysentery, nausea, cough, vertigo, pain, and bleeding during pregnancy

CONCLUSION

Nymphaea stellata uses as single drug or in combination with other drug, It is considered as one of the ten most common noxious aquatic weeds in India, found in ponds, lakes and ditches throughout Bangladesh, Africa and warmer part of India. Commonly referred to as "Water Lilies". It has hepatoprotective, anti-inflammatory,and particularly antidiabetic activity. Nymphayol, an isolated steroid reverse the damaged endocrine tissue and stimulate secretion of insulin. Future phytochemical investigation may be focus on identifying bioactive moieties, Part of the future pharmacological investigation should centre their focus on exhaustive study on unexplored claims like aphrodisiac and their effectiveness in urinary disorders, menorrhagia, blenorrhagia and menstrutuion problems. It is expected that many novelties will rapidly enlarge the current knowledge about *N. Stellata*, their constituents, and corresponding pharmacological effects.

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