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## *Kumud* – A review: Explore the hidden value of Herb

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### ABSTRACT:

*Kumud*, a herb listed in *Nighantu* under many names, is one of the herbs beneficial to the *Rakta* and *Pitta Doshas*. It is a well-known *ayurvedic* herb with numerous therapeutic benefits. It is also known as the blue lotus, red and blue aquatic plant, star lotus, or manel flower. Indian Blue Lotus is another name for it. It's native to Asia's southern and eastern regions, and it's also Bangladesh and Sri Lanka's national flower. *Utpala* is its Sanskrit name. It is a well-known herb that is mentioned in Indian classical texts and used in the Siddha therapeutic system. It's often utilized in *pitta* problems because of its bitter taste. It helps to reduce fever and functions as a cooling agent for the body. Along with its traditional applications, many studies have shown it to have hepatoprotective, antioxidant, antidiabetic, DNA-protecting, antibacterial, analgesic, and anti-inflammatory properties. The current review focuses on traditional herb's modern pharmacological activities.

**Keywords:** *Kumud*, Blue lotus, *Nymphaea nouchali*, *Utpala*, *Pitta*.

### INTRODUCTION:

The Indian blue lotus, commonly known as the blue waterlily, is a water lily native to the Indian subcontinent that is not a lotus<sup>[1]</sup>. The flower's petals are blue, while the centre is pale yellow. In *Ayurveda*, it is known as *Nilotpala*. *Nymphaea nouchali* is a well-known medicinal plant that is commonly used in Traditional Indian medicine<sup>[2]</sup> to treat *Prameha*, *Shopha*, *YakritVikara*, *Mutrakricha*, *Pradararoga*, as a *vajikarana* medication, and as a *rasayana*. It is beneficial in all *rakta* and *pittaja* illnesses, as well as *guna* of *agnivardhana*, due to its *Tikta* (Bitter taste) *Rasa*. The usage of Bitter taste herb for the regulation of heat, fever, and *pitta* conditions is recorded in *Ayurveda* classics. The bitter-tasting herbs are the most helpful for calming *pitta*<sup>[3]</sup>, sedating, cleansing the liver, and lowering

internal heat/fever. In addition to increasing *Agni* (digestive heat), *Tikta Rasa* does not worsen *pitta*.

### MATERIAL AND METHODS:

References are searched from various authoritative texts and worldwide accepted scientific databases concerning the taxonomy, morphological description and pharmacological action of *Kumud*.

#### Taxonomy

Kingdom	:	Plantae
Order	:	Nymphaeales
Division	:	Spermatophyta
Family	:	Nymphaeaceae
Phylum	:	Tracheophyta



Genus : Nymphaea  
 Class : Dicotyledons  
 Species : Nouchali

#### Synonyms

English : Blue Lotus, Blue Water Lily, Star Lotus  
 Hindi : *Nilpadma, Neelkamal*  
 Assamese : *Seluk*  
 Bengali : *Shapla, Nilshapla*  
 Gujarati : *Kumud, Nilkamal*  
 Kashmiri : *Kumudapushpam*  
 Punjabi : Nilofar  
 Sanskrit : Indivara  
 Tamil : Karu-netyal

#### Morphological Description <sup>[4],[5]</sup> (Table 1)

Herb is generally found in broken form, consisting of varied sizes of withered blooms and buds that are dark brown in color.

#### Habitat <sup>[6]</sup>

*Utpala* is the dried bloom of *Nymphaea nouchali* (Fam. Nymphaeaceae), an aquatic shrub commonly found in tanks and ponds throughout India, particularly in the Eastern Ghats. It is primarily planted as ornamental surrounding temples in Southeast Asia.

**Name:** Nilotpala

**English Name:** Water lily

**Botanical Name:** *Nymphaea nouchali*

#### Ayurvedic Properties

**Rasa (Taste)** : Sweet (*Madhura*), Astringent (*Tikta*)

**Guna (Property):** Unctuous (*Snigdha*)

**Veerya (Potency):** Cold (*Sheeta*)

**Vipaka (End Result)** : Sweet (*Madhura*)

**Doshagnata (Effect)** : *Kaphapittashamaka*

#### Photochemistry

Solvent extracts of whole plants contain sterols, alkaloids, saponins, tannins, and flavonoids. A novel sterol and lead compound, nymphayol (25,26-dinorcholest-5-en-3b-ol), is extracted from a floral extract using consecutive chloroform <sup>[7]</sup>. Protein, pentosan, mucilage, and tannins are all found in seeds. Astragaloside, corilagin, gallic acid methyl ester, isokaempferide, quercetin-3-methyl ether, quercetin, kaempferol, 2,3,4,6-tetra-o-galloyl dextroglucose, and 3-o-methylquercetin-3'-o-beta dextroxylopyranoside are all found in the flower of the plant <sup>[8]</sup>. The HPTLC method has

been used to determine the quantitative measurement of gallic acid from hydroalcoholic dried flower extract. The proximate analysis showed the following:

1. Dry Matter -8.4%
2. Crude Protein-16.8
3. Ash-18.7
4. Crude Fat-2.8
5. Crude Fiber-26.3
6. Nitrogen Free Extract-35.4
7. Minerals
8. Sodium-1.19
9. Potassium-2.23
10. Calcium-0.52
11. Phosphorus-0.32
12. Calcium / Phosphorus Ratio 1.63.

*N. nouchali* also showed polyphenols total-8.7%, free-5.9%, and bound-2.8% <sup>[9]</sup>.

#### Pharmacological Actions

##### 1. Antimicrobial Activities <sup>[10]-[13]</sup>

A disc diffusion assay was used to assess antimicrobial activity. Mueller Hinton Agar is used to evaluate bacterial susceptibility, while Potato Dextrose Broth is used to assess fungal susceptibility. NHS extract's antibacterial activity varies depending on the concentrations employed and the microorganisms that are examined. The diameter of the inhibitory zone varies between 8 and 25 mm. NHS extract has a high susceptibility to practically all bacteria but at varying doses. Recent research shows that the crude extract has a strong inhibitory effect against *S. aureus*, *P. aeruginosa*, and *V. cholera* even at a low concentration of 62.5g/ml. At 125g/ml of extract, *E. Faecalis* growth was suppressed. The NHS extract reduced *P. aeruginosa* (20 mm) at a concentration of 500g/ml, which was higher than the usual antibiotic streptomycin (17 mm) used as a control. NHS extract has been demonstrated to have antibacterial action against *S.typhi*, *P.aeruginosa*, *E.coli*, and *V. cholerae*. It also had impressive antibacterial properties against *S. aureus* and *B. cereus*. As a result, it can be stated that the NHS extract may successfully suppress both gram-negative and gram-positive bacteria.

##### 2. Antifungal Activity <sup>[10]</sup>

When compared to normal amphotericin B, the NHS extract inhibited fungal growth significantly in all of the tested species. NHS extract is tested against five fungi, with *C. Albicans* displaying the highest fungal suppression with a 19 mm diameter.

### 3. Antihepatotoxic Activity <sup>[14]-[15]</sup>

The extract's antihepatotoxic action could be related to cell membrane stabilization, hepatic cell regeneration, and antioxidative enzyme activation like glutathione reductase, glutathione peroxidase, superoxide dismutase, and catalase. It also protected the CCl<sub>4</sub>-induced increase in liver volume and weight, as well as mortality, by considerably reducing sleeping time. The extract also prevents liver necrosis and promotes liver regeneration. The hepatoprotection against carbon tetrachloride-induced elevations in serum marker enzymes, serum bilirubin, and liver lipid peroxidation was demonstrated in rats given *Nymphaea stellata* wild., flower in varied dosages orally for 10 days. The activity of liver glutathione, liver glutathione peroxidase, glycogen, superoxide dismutase, and catalase is also reduced after this treatment.

### 4. Analgesic And Anti-Inflammatory Activity <sup>[16]</sup>

The extract's considerable analgesic efficacy was demonstrated by aconitine-induced writhing in mice. It also showed an antipyretic effect in rat paw edema caused by carrageenin. Anti-inflammatory activity was comparable to that of hydrocortisone.

### 5. Anti-Diabetic Effects <sup>[17]-[22]</sup>

On oral administration of Nymphayol for 45 days, STZ-diabetic rats demonstrated remarkable restoration of plasma insulin and glucose levels to near-normal levels. Immunocytochemical staining and light microscopy revealed an increased number of insulin-positive cells in Nymphayol-treated diabetic pancreatic. The insulin assay demonstrated that Nymphayol's action of stimulating insulin secretion in  $\beta$ -cells could be attributable to the reversal of damaged endocrine tissue. Because of Nymphayol's antioxidant defense mechanism against reactive oxygen species produced in hyperglycemic situations, pancreatic-cell protection is improved.

### 6. Antiulcer Activity <sup>[23]</sup>

In the rats pretreated with (45 mg/kg)Nymphayol, there were significant increases in antioxidants, gastric mucus, and PGE<sub>2</sub> levels, as well as significant decreases in UI, lipid peroxidation, and MPO levels (NYM). Interleukin-10 (IL-10), an anti-inflammatory cytokine, was found to be reduced in ethanol-induced ulcerated animals, while pro-inflammatory cytokines such as interleukin-6 (IL-6), interleukin-1 (IL-1), tumor necrosis factor (TNF-), and

interferon (IFN-) were significantly increased. Any inequalities found were corrected by NYM pretreatment. NYM administration raised Bcl-2, an anti-apoptotic marker, and lowered pro-apoptotic indicators such as caspase-8, caspase-9, and caspase-3 as compared to the ethanol-induced ulcer group.

### 7. DNA - Protective Activities <sup>[24]</sup>

The *Nymphaea nouchali* flower (NNF) extract has scavenging potential for a large number of free radicles. While quenching cellular reactive oxygen species (ROS) formation generated by tert-Butyl hydroperoxide, NNF extract prevents DNA damage and shows no signs of toxicity (t-BHP). NNF extract increases the expression of both primary and phase II detoxifying enzymes, which helps to battle oxidative stress. This decreases cellular ROS production and protects cells from death.

### Traditional Uses <sup>[25]-[28]</sup>

It can be used as a single medicine or in combination with other pharmaceuticals for therapeutic purposes. The dried flowers of *N.nouchalli*, also known as *Utpala* in Sanskrit, are employed in ayurvedic formulations such as *Asokarista*, *Kanaka Taila*, *Arvindasava*, *Usirasava*, *Candanasava*, *KalyanakaGhrta*, *SamangadiCurna*, *Manjeshthadi Taila*, *Jatyadi Taila*, and *Tungadrumadi Taila*. It's also used in polyherbal preparations for anti-aging, regeneration, and menstrual irregularities. *N.nouchalli* roots and rhizomes are high in nutrients and can be consumed raw or roasted. **This plant's rhizomes are used in medicine, while its blossoms and flower stalks are used as vegetables, green manure, and animal feed, and its flowers are used in temples.**

### Therapeutic Uses <sup>[29]-[36]</sup>

Its applications, according to Plant Parts, are as follows:

**1. Whole Plant:** It's used to treat liver problems. Infertility, diabetes, heart disease, dysentery, and indigestion are all treated with their roots, leaves, and blossoms. It has aphrodisiac, diuretic, stimulant, and cardiogenic properties.  
**2. Flower:** *Pipasa Daha* (Burning Thirst), *Raktapitta* (Bile-Blood), *Chardi* (Vomiting), *Murchha* (Fainting), *Hradroga* (Heart Disease), *Mutra Krichha* (Painful Micturition), *Jvaratisara* (Diarrhoea with fever), Diabetes Mellitus are all treated with 3-gm of medication (*Madhumeha*).

A decoction of flower can be used to treat heart palpitation and can also be used as a narcotic; the syrup is useful in cases of high fever, apoplexy, and inflammatory sickness.

The Filaments have astringent and cooling properties in cases of body burning, Bleeding Piles, and Menorrhagia.

**3. Rootstock:** Dyspepsia, Diarrhoea, and Piles are all treated with powder of rootstock.

**4. Root:** The roots are used to treat menorrhagia, urinary tract infections, infertility, and diabetes.

**5. Rhizome and Stem:** Blenorrhagia, Menstrual Problems, and UTIs are all treated with this herb.

**6. Flower and Rhizome:** They're astringent, antibacterial, and mildly sedative, and they're used as a douche in leucorrhoea and vaginitis, as well as a gargle for sore throats.

**7. Leaf:** In eruptive fever, the leaves are crushed and administered as a lotion.

**8. Seed:** Diabetes Mellitus is treated using seeds.

**9. Petiole:** Petiole is crushed to produce a paste, which is then mixed with common salt, seed powder (*Cuminum cyminum*), butter, and a few drops of honey and given to women who have a lot of menstrual flow. It's also used to stop bleeding while pregnant.

## DISCUSSION

*Nymphaea nouchalli* is a well-known medicinal plant used in the *Ayurveda* and *Siddha* systems of medicine to treat *Madhumeha* (diabetes), *shopha* (inflammation), *yakritgata vikara* (liver illnesses), *Mutrakriccha* (urinary disorders), *pradara* (menorrhagia), blenorrhagia, menstruation problems, and act as an *vajikarana* (aphrodisiac). It is well known medicinal herbs with multidimensional effects such as hepatoprotective, anti-inflammatory, and especially antidiabetic action proved by many researches. Nymphayol, a steroid extracted from the flowers, has been scientifically proven to be responsible for the traditionally stated antidiabetic effect; it restores damaged endocrine tissue and increases insulin secretion in  $\beta$ -cells. However, when compared to the extent of its traditional applications, the number of research undertaken is still insignificant.

## CONCLUSION

*N. nouchalli* is a traditional Indian plant having numerous therapeutic properties including antioxidant, hepatoprotective, anti-diabetic, anti-inflammatory, analgesic, and DNA protection. It is quite useful in the treatment of bleeding disorders. It's great for gynecological issues like menorrhagia, metrorrhagia, and a variety of other menstruation issues.

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**Table 1 MORPHOLOGICAL DESCRIPTION<sup>4,5</sup>**

Pedicel	0.5-1.0 cm long
Sepals	5–6 cm in length, 1.5–2.0 cm in width. Free, injoin to the base of the disc, oblong, lanceolate, tip sharp or subacute
Petals	3.5-4.5 cm length, 2.0-2.5 cm wide; yellowish-brown, linear and oblong or lance-shaped head
Stamen	Count varies from 6 to indeterminate, filaments dilated at base, free, connect to meaty thalamus
Anther	lingual appendages, introrse, dithecous
Gynoecium	The thalamus surrounds the gynoecium, which ranges from three to indefinite.
Style	Short
Ovary	Unilocular