

## A REVIEW ON KAMALA (*Nelumbo nucifera* Gaertn): THE NATIONAL FLOWER OF INDIA

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## ABSTRACT

Plants have been an exemplary source of drugs and many of the currently available medicines are directly or indirectly derived from them. The present state of endangered and extinct species necessitates the diversion of attention towards extra pharmacopeial drugs and aquatic habitats. One such perennial aquatic herb is *kamala*- “The foremost symbol of beauty, prosperity and health.” Ample of references related to *kamala* are available in classics ranging from *Veda kala*. One of the most common metaphysical analogies compares the lotus’s rise from instinctive impulses to spiritual liberation. Various indications in the form of *Raktapitta*, *Kushta*, *Madatyaya* are mentioned in *Samhitas*. *Ashtanga Hridayakara* denotes it as ‘*Medhya*’ (Nootropic). *Nelumbo* species have a wide native distribution. It has a long history of being cultivated for its edible and medicinal uses. The present article attempts to review the information on *kamala* in Classical Ayurvedic textbooks, contemporary books and other relevant literature.

**Keywords:** Kamala, *Nelumbo nucifera*, Medhya, Nootropic.

## INTRODUCTION

The science of Ayurveda incorporated has a vast medicinal treasure of herbs as remedies for various diseases. Hence it is rightly quoted by ancient seers as nothing is devoid of medicinal properties.<sup>1</sup> Kamala (*Nelumbo nucifera* Gaertn.) is an emergent perennial aquatic plant, which thrives in shallow ponds, marshes, lakes and rivers which belongs to the family *Nymphaeaceae*.

Innumerable references related to the medicinal properties as well as therapeutic indications of kamala are widely described in various texts of Ayurveda. Apart from its divine & mythological backgrounds, kamala is extensively used as a choice of drug in various diseases like- Kushta (Dermatological disorders), Raktapitta (Bleeding disorders), chaldanta (Dental), mutrakrichra (dysuria), etc and is considered to be the best medhya dravya (Nootropic)<sup>2</sup> and also Varnya in nature.

The derivation of the drug is- '*kama jalati bhushayati iti*'<sup>3</sup>, i.e, which enhances the beauty of pond, similarly, in clinical terms, the drug is meant to enhance one's body and mind.

Hence with all this background, it is planned to conduct a detailed literary review on this drug including its various names, therapeutic uses, chemical constituents, formulations and their benefits. Hope this work

will be a strong base for all researchers, clinicians and others.

### METHODOLOGY:

A literature review is carried out to document the habit, habitat, types, Pharmacognostical aspects & therapeutic utility of kamala. Charaka samhita, Sushruta samhita, Ashtanga hridaya and samgraha, Bhavaprakasha Nighantu, Dhanwantari Nighantu, Kayadeva nighantu, Raja Nighantu and other Nighantus', as well as floras and contemporary textbooks like Indian medicinal plants, Database, Quality standards & API, are explored to review the drug.

### RESULTS:

#### Habit and habitat:

A large, submerged rhizome, occurring throughout warmer parts of India up to an altitude of 1500 m. The stem is slender, elongate, branched, sending out roots at the nodes. Leaves membranous, 30 to 60 cm in diameter, orbicular, concave, erect, peltate, entire, radially nerved and glaucous. Flowers solitary, 10- 25 cm in diameter, white or pink. Petals are 5-12 cm long, elliptic, obtuse, finely veined and concave. Fruit is ovoid and glabrous.<sup>4</sup>

#### Inclusive groups

The drug is mentioned under various virga's & Gana's (cluster of drugs having similar action).

**Table 1**

Varga (Group)	Literature
Mutravirajaniya Varga <sup>5</sup>	Charaka samhita
Utpaladi Gana <sup>6</sup>	Sushruta samhita
Pushpavarga <sup>7</sup>	Bhavaprakasha Nighantu
Karaveeradi varga <sup>8,9</sup>	Dhanwantari Nighantu, Raja Nighantu, Shodala Nighantu
Oshadhi varga <sup>10</sup>	Kayadeva Nighantu
Shatapushpaadi varga	Priya Nighantu
Karpuradi varga	Madanaphala Nighantu
Utpaladi varga	Saraswata Nighantu
Kakolyadi gana and Anjanadi gana	Sushruta Nighantu

Synonyms are ancient parameters to identify plants. They are based on structure, source, habitat, season, properties, actions and also customs, historical importance and sensory perception. Likewise, there are

innumerable synonyms of kamala mentioned in classics based on morphology, properties and actions. A few of them are:

**Table 2**

<i>Nalinam</i>	Plant with hollow stalk	D.N, R.N, B.N, K. N
<i>Aravindam</i>	Grows quickly	R.N, B. N
<i>Mahotpalam</i>	Large flower	R.N, B. N
<i>Sahastrapatram</i>	Multiple petals present in the flower	R.N, B.N, K. N
<i>Shatapatram</i>	Multiple petals	R.N, B. N
<i>Taamrasam</i>	Abides in water	R.N, B.N, K. N
<i>Pushkaram</i>	Nutritious	D.N
<i>Amburohini</i>	Water dwelling plant	D.N
<i>Padmini</i>	Entire plant	D.N
<i>Kumudanti</i>	Flexible stalk	D.N
<i>Palaashini</i>	Covered with foliage	D.N
<i>Padmavati</i>	Auspicious and lucky	D.N
<i>Vanakhanda</i>	Long stalk	D.N
<i>Saroruha</i>	Grows in ponds	D.N, R. N
<i>Padmaaksha</i>	Seed of lotus	D.N
<i>Bisam</i>	Fibers of lotus	D.N
<i>Mrunali</i>	Fibres attached to lotus stalk	D.N, R. N
<i>Tandulam</i>	A vermifuge plant	D.N
<i>Kinjalakam</i>	inflorescence	D.N, A.H, R. N
<i>Makarandha</i>	Filament of lotus	D.N, R.N, K. N
<i>Kaachanakam</i>	The flower appears like trumpet	D.N, R. N
<i>Skalam</i>	Static in water	D.N, R. N
<i>Shaalnam</i>	Enters micro channels of body	D.N, R. N
<i>Nabha</i>	Strong fibres	R. N
<i>Ambuja</i>	Aquatic plant	R. N
<i>Kutapa</i>	Used for sacrifice	R. N
<i>Pushkara</i>	Seeds are nutritious	R. N
<i>Vaariruha</i>	dwells in water	R. N
<i>Rajeeva</i>	Numerous stamens	R. N
<i>Pundarika</i>	White lotus appears similar to umbrella	R. N
<i>Jalaja</i>	Aquatic plant	R. N
<i>Shetabeeja</i>	Cold potency	R. N
<i>Harinetra</i>	Resemblance of seed	R. N
<i>Shaaramadam</i>	Holy	R. N
<i>Kokanadam</i>	Redwater Lilly	R. N
<i>Shivapriya</i>	Auspicious	R. N
<i>Shashipushpa</i>	Used for offerings	K. N
<i>Saroja</i>	Water dwelling plant	K. N
<i>Nalaka</i>	Deep rhizome	K. N

(B.N- Bhavapraksha Nighantu, D.N- Dhanwantari Nighantu, K.N -Kayadeva nighantu, R.N- Raja Nighantu)

Various types of kamala are mentioned based on color and Therapeutic actions.

White variety as- *tikta*, *kashaya*, *madhura rasa*, *varnya* and indicated in *raktapita*, *visphota*, *daha* &

*trishna*. *Rakta kamala* is *katu*, *tikta* and *madhura rasa*, it is *tridosha shamaka* and *vrishtya*. Similarly, *Neela kamala* is *pittahara*, *Ruchya* and *rasayana* & *Keshya* in properties.

They have been enlisted below according to Nighantu and Samhita's

**Table 3**

C.S	B.N & R. N	D.N
<i>Padma</i>	<i>Shweta</i>	<i>Saugandhika</i>
<i>Utpala</i>	<i>Rakta</i>	<i>Pundarika</i>
<i>Kumuda</i>	<i>Nila</i>	<i>Raktapadma</i>
<i>Nalina</i>		<i>Kumuda</i>
<i>Saugandhika</i>		<i>Kshudrotpala</i>
<i>Pundarika</i>		<i>Padmini</i>
<i>Shatapatra</i>		

(C.S-Charaka samhita, S.S- Sushruta samhita, A.H Ashtanga hridaya, B.N- Bhavapraksha Nighantu, D.N-Dhanwantari Nighantu, K.N -Kayadeva nigahntu, R.N- Raja Nighantu)

Various species and subspecies of kamala are botanically approved. Some of them are:

**Table 4**

1) <i>Nelumbo lutea</i> - American lotus
2) <i>Nelumbo speciosum</i>
3) <i>Nelumbo alba</i>
4) <i>Nymphae</i> spp.
5) <i>Nymphae rubra</i>

Kamala is also an ingredient of various Yoga's (formulations)<sup>11</sup> like-

**Table 5**

FORMULATION	INDICATION
<i>Aravindasava</i>	<i>Balya, Agnivardhana, Sarvarogaghna, Balaroga</i>
<i>Shatavaryadi Ghrita</i>	<i>Vata Vikara</i>
<i>Lakshadya Taila</i>	<i>Chaladanta, Aruchi</i>
<i>Pancharavinda Ghrita</i>	<i>Linga Dosha</i>
<i>Madhukadya Avalehya</i>	<i>Pradara, Daha</i>
<i>Puga Khanda</i>	<i>Amlapitta, Amavata, Asmari</i>
<i>Lavangadi Churna</i>	<i>Grahani, Atisara, Shotha</i>
<i>Ashwagandha Taila</i>	<i>Asrigdhara, Vataroga, Raktapitta</i>
<i>Vyaagri Taila</i>	<i>Jwara, Kasa, Twagdosha</i>
<i>Utpalaadi Ghrita</i>	<i>Bala &amp; Medha.</i>

The lotus plant is an edible drug used for 7000 years, which has been a quintessential part of Indian as well as several Asian cuisines. All parts of kamala have been used for medicinal purposes for several ailments. It is also used as an antidote for mushroom poisoning.

**Pharmacodynamics:**

*Rasa-* *Kashaya, Madhura, Tikta*

*Guna-* *Laghu, Snigdha, Picchila*

*Vipaka-* *Madhura*

*Virya-* *Sheeta*

*Prabhava-* *Medhya*

*Karma-* *Dahaprashamana, varnya* (Cosmetic), *Sthambaka* (Stomachic), *Shonithasthapana* (Haemetenic), *Mutravirajaniya* (Urine normalizers), *Balya* (Tonic), *Vishaghna* (Antidote), *Medhya* (Nootropic) *Chaksushya* (ophthalmic disorders), *mutravirechaniya* (Diuretic).

## Phytochemistry

The major chemical constituents are- Quercetin, luteolin and their glycosides, kaempferol glycosides, Nuciferin- 'Neuroleptic', nelumbine, metarbine, Alkaloid, Carbohydrate, Tannin, Flavanoids, Coumarins, Resins.<sup>12,13</sup>

## Pharmacological actions

Astringent, Neuroleptic, haemostatic, Diuretic, Antipyretic, Hypoglycaemic, & Anticonvulsant<sup>14,15</sup>

## Therapeutic Dose<sup>16</sup>

**Table 6**

Part	Dosage
Dried flower	12-24 gm
Rhizome	5-10 g
Juice of flower	10-20 ml
Seed powder	12 to 24 gm

## Therapeutic use as per Ayurveda:

In Caraka Samhita<sup>17</sup> Kamala is mentioned under *mutavirajaniya gana*. It is explained as an ingredient in *shirashoolahara lepa* & *prapoundarikadi lepa*. Qualities of kamala are mentioned as *kashaya, tikta rasa and sheeta virya*. *Utpala* is mentioned under the context of *raktapitta*. *Mrinala* is also mentioned under treatment of *raktapitta*. *Utpalanalakshara* with *anupana as madhu* and *sarpi* is useful in *Pittakaphaja vikara's* In Sushruta samhita<sup>18</sup> Kamala is mentioned under *Utpalaadi gana* Properties of *bisa* (stalk of kamala) are explained as *madhura rasa, vatakara*, restores normalcy of *raktapitta doshas, vibandha kara* and difficult to digest. In the case of *Chaladanta, Amala naala* in the form of *ksheera paka* needs to be consumed. According to Ashtanga hridaya<sup>19</sup>, Kamala is meant to possess medhya action. Five parts of kamala are explained – stalk, rhizome, stamens, leaf and seeds. The concept of *chatuskavalaya* and *pancharavinda* is specified and the same is correlated to medhya activity in *rasayana vidhir adhyaya*. *Utpala* is also mentioned under *rasayana adhyaya*. A verse is quoted which says: Kamala in appropriate *matra* enhances the medhya activity of animals (cow), definitely its medhya profile on humans is unquestionable. Similarly, Ashtanga Sangraha<sup>20</sup> names *Kamala* as *Kinjalakam* and its uses in *Arshachikitsa* and *Madaadyaya* is mentioned. A detailed description of synonyms and types of kamala is mentioned in *Nighantus*. Various parts of kamala

in the form of stalk, rhizome, stamens, leaf and seed and their specific therapeutic utility are mentioned- *padmakanda* is therapeutically useful in bleeding disorders. Similarly, *padmakesara* alleviates *pitta dosha, daha, trishna*, & is used in *pandu*. Stalk of *kamala* acts as galactagogue & aphrodisiac. *Padmakesara* is *grahi* and *kantivardhaka*. *Padmabeeja* is *balakaraka*.

## Cultivation and collection:<sup>21</sup>

The plants are propagated by rhizomes and may also be propagated by seeds. Rhizomes cut into small pieces are planted with buds above the soil surface. The plant flowers profusely during rainy seasons and seeds ripen towards the end of rains and are harvested in October.

## Substitutes and adulterants<sup>22</sup>

*Nymphaea alba* Linn. and *Nelumbo nucifera* possess similar medicinal properties and hence can be used in place of each other. Flowers of *Nymphaea* spp. are sometimes adulterated with *N. Nucifera*.

## DISCUSSION

After reviewing the literature, it can be inferred that kamala (*Nelumbo nucifera* Gaertn.) belonging to the family *Nyctambonaceae* is mentioned in classics right from the Vedic period for its spiritual entities and samhita's explain the properties and various indications of kamala as an *ekamoolika* (Single drug therapy) and also in the form of classical preparations like *Aravindasava, Utpala ghrita, shatavari ghrita* etc. Innumerable synonyms (>30) are mentioned in *Nighan-*

tus along with their indications. The 3 major types Neela, Shweta and rakta kamala are seen in the present days too. Studies have also proven the antidiabetic and antioxidant properties of the Aqueous extract of kamala. Hypolipidemic and antimicrobial properties of pink and white lotus are documented. The Madhura rasa of the drug is responsible for actions like- balya, Ojovardhaka, rasayana thereby acting as a Tonic and rejuvenator. The tikta rasa acts by clearing the microchannels (Srotoshodhaka). Shita virya has specific importance in skin disorders as well as Mutravaha sroto vikaras which mainly pacifies pitta. The chemical constituents in the form of Flavanoids and tannins help regulate cellular activity and being rich in carbohydrates, it matches the energy requirement of the brain and enhances cognitive abilities. The chemical Nuciferin present in kamala, acts as the best 'Neuroleptic'. Provided, the plant is easily propagated by rhizomes and can be procured from the natural habitats of shallow ponds, marshes, lakes and rivers. There are market samples of lotus both in the form of wet samples (Which can be further cultivated) and dry samples (Stem, seeds, petals) which contain vast medicinal and edible uses.

## CONCLUSION

Kamala (*Nelumbo nucifera*) is a perennial aquatic basal eudicot. It is an important plant, with its uses ranging from ornamental, nutritional to medicinal values, and has been widely used, especially in Southeast Asia. Recently, the drug has obtained a lot of attention from the scientific community. An increasing number of research papers focusing on it have been published, which have shed light on the mysteries of this species. This review highlights the compilation of classical information as well as contemporary information of kamala. The clinical utility of the drug is demonstrated. This needs to be explored further through clinical studies to provide evidence-based therapeutics.

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