

ANCIENT AND MODERN PHARMACOLOGICAL REVIEW OF CYPERUS ROTUNDUS
LINN.Dr. Sneha Suresh Mali^{1*}, Dr. Ravindra S. Kharat²¹PG Scholar, Dravyaguna Vigyana Department, Government Ayurved College, Nanded.²Associate professor, Dravyaguna Vigyana Department, Government Ayurved College, Osmanabad.

*Corresponding Author: Dr. Sneha Suresh Mali

PG Scholar, Dravyaguna Vigyana Department, Government Ayurved College, Nanded.

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ABSTRACT

Nowadays there is a lot of interest increase to explore herbal drugs for health benefits to humans as well as animals. Drugs brought from natural sources are pharmacologically potent and have low side effect for use in preventive medicine. Herbal medicines are more popular because of their effectiveness and easy availability. *Musta* (*Cyperus rotundus*) belonging to *Cyperaceae* family is an important medicinal plant used in Indian system of medicine. *Cyperus rotundus* Linn. vernacularly called "Nut Grass" and locally known as "Nagarmotha or Motha". A detail mentioned about this plant has been found in Vedic period to recent time in various Ayurvedic texts and *samhitas*. *Musta* is having some reported activities like antidiabetic, hypolipidemic, hepatoprotective and antimicrobial properties. So, this review article includes various aspects of studies on *Cyperus rotundus*.

KEYWORDS: *Musta*, Phytochemical composition, Pharmacological action.

INTRODUCTION

Cyperus rotundus is also known as *Nagarmotha* belonging to *Cyperaceae* family is widely used in ayurvedic medicine for the treatment of various diseases. The genus name *Cyperus* is a Greek name and the species *Rotundus* is a Latin word which means round and refers to the tuber. *Cyperaceae* family includes over 85 genera and 2600 species.^[1] *Nagarmotha* is a perennial weed with slender, scaly creeping rhizomes, bulbous at the base and arising singly from the tubers which are about 1-3 cm long. Tubers are externally blackish in colour and reddish white inside, with a specific odour.^[2]

Previously done phytochemical studies on *C. rotundus* exhibited the presence of alkaloids, flavonoids, tannins, starch, glycosides and furochromones, and many novel sesquiterpenoids.^[3] *Nagarmotha* shows *sthoulyahara*, *Dipana*, *Pachana*, *Grahi* as well as *Jwaraghna* properties so has been indicated in *Agnimandya*, *Jwara*, *Sangrahani*, *Swasa*, *Stanyavikara*, *Sutikaroga*, *Amavata* etc.

Habitat

It grows in moist areas, rice fields and along water courses. *Anupadeshashth musta* is considered of a superior quality.^[4]

Classification

Samhita	Gana
Charaka ^[5]	Triptighna, Trishna nigrhana, Lekhaniya, Kandughna, Stanyashodhana, Mutravirechaniya, Madhura skandha, Tikta skandhas
Sushruta ^[6]	Mustadi, Vachadi
Astanga Hridaya ^[7]	Mustadi, Vachadi, Rodhradi, Eladi
Bhavaprakasa Nighantu ^[4]	Karpuradi varg
Dhanvantari Nighantu ^[8]	Guducyadi varg
Kaiyadev Nighantu ^[9]	Ausadhivarga
Madanpal Nighantu ^[10]	Abhayadi varg
Priya Nighantu ^[11]	Shatapushpadi varg

Vernacular Names

Hindi - Motha Bangali - Mutha
Marathi - Motha, BimbalGujarati - Motha, Moth, Nagarmoth
Kannada - Konnari Gadde, Tungegadde, Tungahulli,
Badramusti Tamil - Kora, Korai, Korai-Kizhangu

Telugu - Tunga, Tungamustalu, Musta, Bhadramusta^[4]

Taxonomical classification:

Kingdom: *Plantae* Subkingdom: *Tracheobionta* Super division: *Spermatophyta* Division: *Magnoliophyta* Class:

Liliopsida

Subclass: *Commelinidae* Order: *Cyperales* Family: *Cyperaceae*

Genus: *Cyperus* L.

Species: *Cyperus rotundus*^[28]

Synonyms^[4,9,12]

Name	Bhavprakashnighantu	Kaiyadevnighantu	Rajnighantu
Ambhodh		+	+
Ghan		+	+
Kuruvinda	+	+	+
Bhadramusta	+	+	+
Purnakoshtha		+	+
Rajkasheruk		+	
Kasheru			+
Krodkasheruk	+		
Gangeya		+	+
Hima			+
Nirad			+
Varida	+		+
Jimuta			+
Pindamustak		+	
Varahi			+
Varahada		+	
Bhadrakasi			+
Bhadrahansa		+	
Gundra	+		
Gunja			+
Granthi			+

Types of Musta

According to *Bhavprakash* 3 types of *Musta*.

- 1) *Nagarmusta*
- 2) *Musta*
- 3) *Kaivartamusta*^[4]

According to *Raj Nighantu* two varieties-

- 1) *Nagarmusta*
- 2) *Musta Kaseru* according to *Raj Nighantu* is *Kshudramusta*. *Kaseru* is *scirpus kyssor*.^[12]

According to Indian Medicinal Plants (Kirtikar and Basu) second edition vol 4.

- 1) *Nagarmusta*- *Cyperus scariosus* Br.
- 2) *Bhadramusta*- *Cyperus rotundus* Linn.
- 3) *Kshudramusta*- *Cyperus esculentus* Linn^[13]

Ayurvedic Properties

- *Rasa: Tikta, Katu, Kashaya*
- *Guna: Laghu, Ruksha*
- *Veerya: Sita*
- *Vipaka: Katu*
- *Doshakarma: Pittakaphahara, Shleshmaraktajit*^[14]

CHEMICAL CONSTITUENT

The study exhibit that these are the major chemical constituent in the extract of *Cyperus rotundus* rhizomes – terpenoids, flavonoids, sesquiterpenes, monoterpenes,

sitosterol and β -selinene, calcium, cyperene, cyperenon, cyperol, cyperolon selinene, cyperotundone, D-copadiene, linolenic acid, linoleic acid, oleic acid, rotundene, rotundenol, rotundone, polyphenols, pectin, stearic acid, camphene, sugeonol, sugetrio.^[15]

PHARMACOLOGICAL ACTIONS

Antibacterial Activity

The shows oil of *C. rotundus* have a remarkable activity against gram-positive bacteria *Staphylococcus aureus* and *Enterococcus faecalis*.^[16,17]

A study exhibit that a marked inhibitory effect of *C. rotundus* was observed against *Salmonella enteritidis*, *Staphylococcus aureus* and *Enterococcus faecalis* with oligomers flavonoids (TOFs) and ethyl acetate extracts^[18,19]

Antidiarrhoeal Activity

Orally given methanol extract of *C. rotundus* rhizome, at the doses of 250 and 500 mg/kg showed antidiarrhoeal activity in castor oil induced diarrhoea in mice. Among the fractions, tested at 250 mg/kg, the petroleum ether fraction and residual methanol fraction were found to retain the activity, the latter being more active as compared to the control.^[20]

Anti-inflammatory Activity

The study reveals alcoholic extract (70% alcohol) possessed anti-inflammatory activity against carrageenan induced oedema and against formaldehyde induced arthritis in albino rats.^[21]

Study observed that the effects of oils in anti-inflammatory activity in rats. On the basis of that experiment, it can be noted that essential oil possess a good anti-inflammatory due to the presence of beta-Sitosterol and flavonoids in *C. rotundus* rhizomes.^[22]

Anti-diabetic activity

In a study antidiabetic effect of *Cyperus rotundus* was evaluated on alloxan induced hyperglycemia in rats. Daily oral administration of 500 mg/kg of the extract once a day for seven consecutive days, significantly lowered the blood glucose levels.^[23]

An experiment observed that *Cyperus rotundus* (2.5 ml/kg, orally of 10% of the aqueous decoction of tuber parts) significantly decreased fasting serum glucose level in alloxan induced diabetic and normoglycemic rabbits. Hypoglycemic effects were appeared from the first week of the treatment, and tended to be increased with the continuation of the treatment.^[24]

Antimalarial Activity

In a study in-vitro investigation of sesquiterpenes *C. rotundus* rhizomes showed antimalarial activity against *Plasmodium falciparum*.^[25]

Analgesic activity

Study reveals the petroleum ether extract and essential oil of *C. rotundus* are reported to show analgesic activity.^[26]

Haemodynamic (hypotensive) activity

Study shows that alcoholic extract of *C. rotundus* produced gradual and persistent fall in blood pressure and triggers the respiration. The responses of epinephrine and acetylcholine on blood pressure were not altered by the extract, but that of histamine was partially blocked.^[27]

Anti-emetic activity

The study shows ethanolic extract of *C. rotundus* in the dose of 128.1 ± 11.6 mg/kg was effective to protect 50% dogs against apomorphine induced vomiting.^[29]

Antispastic activity

The Ethanolic extract of *C. rotundus* shows relaxation of rabbit ileum and spasmolytic action against contractions induced by acetylcholine, barium chloride and 5-hydroxytryptamine, showing a direct relaxant effect on the smooth muscle.^[29]

Anti-obesity activity

An experiment shows *C. rotundus* preparations like powder in fine suspension, aqueous and alcoholic extracts exhibited a lipolytic action and mobilized fat

from the adipose tissues in rats, thus helping to reduce the obesity.^[30]

DISCUSSION

C. rotundus is a perennial plant and is one of the invasive weeds known, having spread out to a world-wide distribution in tropical and temperate regions. *C. rotundus* contains many chemical constituents like alkaloids, cyperol, flavonoids, linolenic acid, terpenoids. This plant is mentioned in the ayurvedic literature Charaka Samhita. Ayurvedic physicians uses the plant, known as musta or musta moola churna, for treating jwar (fever), Atisara (diarrhea), used as Balya, Dahanashini, Dipana, Garbhashayasanakochaka, Grahi, Jwaraghna, Kantiprada, Kaphaghna, Krimighna, Lekhana, Medhya, Mootrala. Modern medicine recommends using the plant to treat nausea, fever and inflammation; for pain reduction; for muscle relaxation and many other disorders.

CONCLUSION

This review gives information about different bioactive components along with scientifically claimed medicinal use of *Cyperus rotundus*. The plant possesses various pharmacological action like Anti-bacterial activity, anti-obesity activity, anti-malarial, anti-spastic, analgesic activity. Therefore, there is need for investigation and quantification of different phytoconstituents present and its pharmacological profile.

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