

Phytochemical and pharmacological Review of *Cyperus rotundus* linn

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Abstract

A perennial herb native to India, *Cyperus rotundus* Linn. is regarded as one of the worst weeds in the world. It is a member of the Cyperaceae family. It has several therapeutic and pharmacological uses and can grow in tiny clusters up to 100 cm high. The rhizomes of *C. rotundus* are said to have astringent, diaphoretic, analgesic, aromatic, antispasmodic, carminative, antibacterial, antimalarial, antioxidant, antiplatelet, hepatoprotective, and diuretic qualities in Ayurveda. According to earlier research, *Cyperus rotundus* includes a variety of bioactive substances, such as proteins, amino acids, starch, carbohydrates, flavonoids, tannins, glycosides, furochromones, alkaloids, saponins, monoterpenes, and terpenoids. By giving a summary of *C. rotundus*'s pharmacological and therapeutic qualities, this review seeks to emphasise the plant's chemical components and effects.

Keywords: *Cyperus rotundus*; Phytochemical Screening; Methanol Extract.

1. Introduction

L., commonly known as nut grass, is a herbaceous monocotyledonous plant belonging *Cyperus rotundus* to the Cyperaceae family. Its extensive distribution is attributed to its adaptability to various environments, spreading primarily through its rhizomes, which can extend upward, downward, or horizontally. This plant is widely used as a herbal medicine, valued for its analgesic, sedative, and antispasmodic properties. It is also employed to treat stomach disorders, diarrhea, dysentery, bronchitis, amenorrhea, and blood disorder. Phytochemical analysis of nut grass rhizomes has revealed the presence of alkaloids, tannins, flavonoids, glycosides, saponins, sesquiterpenoids, and essential oils. Given the growing issue of microbial resistance and the need for safe, effective treatments, the use of plant-derived drugs has gained attention. Nut grass, in particular, has been used as a home remedy for stomach disorders, such as dysentery, in some regions of Indonesia. Its potential antimicrobial properties, likely due to the presence of polyphenols, make it a promising candidate for further exploration in addressing infections and related health issues.

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Figure 1 *Cyperus rotundus* Linn.

1.1. Vernacular Name

- English: Nut grass, Purple nutsedge
- Hindi: Nagarmotha
- Sanskrit: Musta, Mustika
- Tamil: Koraikkizhangu
- Telugu: Tunga-mustalu
- Kannada: Bhadramustha
- Marathi: Nagarmotha
- Bengali: Mutha

1.2. Chemical Constituents

Cyperenone, α -cyperone, β -selinene, cyperene-1, cyperene-2, and oxidoeudesm-11-en-3 α -ol are the main constituents. Moreover, it contains a number of other substances, including copadiene, epoxyguaiene, rotundone, cyperenol, cyperolone, eugenol, cyperol, isocyperol, α - and β -rotunol, copaene, mustakone, kobusone, isokobusone, cyperotundone, patchoulone, sugetriol triacetate, rotundenol, rotundene, isopatchoula-3,5-diene, β -sitosterol, pinene, and isocyperol. Glycerol and fatty acids such as oleic, myristic, stearic, linolenic, and linoleic acids are also present in musta.

1.3. Pharmacological Activities

Pharmacological Activities of *Cyperus rotundus*

- Anti-inflammatory action
- Antidiarrheal action
- Antimicrobial action
- Antidiabetic action
- Antiplatelet action
- Antipyretic action
- Wound healing action
- Antioxidant action
- Analgesic action
- Antimalarial action

1.4. Phytochemical Screening

1.4.1. Test for Tannins

A few drops of 0.1% ferric chloride were added after 0.5 grammes of extract had been cooked in 10 millilitres of water and filtered to start the tannin test. A brownish-green or blue-black colouring indicated the presence of tannins.

1.4.2. Saponin Test

To create a stable froth, five millilitres of distilled water and half a gramme of extract were mixed together and shaken vigorously. After adding three drops of olive oil and shaking the liquid, an emulsion formed, signifying the presence of saponins.

1.4.3. Steroid Test

10 millilitres of chloroform were used to dissolve 1 millilitre of extract, and then an equivalent volume of sulphuric acid was added. Green fluorescence in the sulphuric acid layer and a red hue in the top layer suggested the presence of steroids.

1.4.4. Check for Flavonoids

The aqueous extract was mixed with a few drops of 1% HCl.
The presence of flavonoids was indicated by a yellow tint.

1.4.5. Carbohydrate Test

After adding two to three drops of Molisch's reagent to two millilitres of extract solution, one millilitre of strong sulphuric acid was added gradually. A rich violet hue suggested the presence of carbohydrates.

1.4.6. Test of Phytochemistry

The Liebermann-Burchard's Test for Phytosterols: Two millilitres of concentrated sulphuric acid, two millilitres of acetic anhydride, and two millilitres of chloroform were combined with two millilitres of plant extract. The presence of phytosterols was indicated by a translucent green colour.

1.4.7. Test for Alkaloids

When two milliliters of plant extract and two milliliters of reagent were combined, a reddish-brown precipitate formed, which suggested the presence of alkaloids.

2. Material and methods

2.1. Maceration Extraction

250ml of ethanol or distilled water was combined with 25g of flower powder. For 48 hours, the combination was kept in a dark environment on a shaker.

-The extracts were filtered using a Buchner funnel and Whatman No. 1 filter paper. -After three days of drying at 50°C in an oven, the solvents were eliminated.

2.2. Ultrasonic Extraction

Ethanol or distilled water was combined with 25g of floral powder. For 15 or 30 minutes, the mixture was exposed to direct ultrasonic waves (20 KHz, 25°C). - The extracts were filtered using a Buchner funnel and Whatman No. 1 filter paper.

After three days of drying at 50°C in an oven, the solvents were eliminated. After being weighed, the dry extracts were kept in dark containers.

3. Results and Discussion

Cyperus rotundus's methanol extract indicated the presence of carbohydrates, tannins, alkaloids, and phytosterols. Demonstrated the lack of flavonoids, steroids, and saponins. The biological and therapeutic properties of these phytochemical substances are well established. Although they are produced by plants for self-defense, studies have revealed that they also provide protection against human illnesses. Notably, alkaloids, phenolics, and tannins support plants' antioxidant properties and are useful in the management of several ailments, including as cancer, cardiac issues, and infectious diseases.

4. Conclusion

This study compiles existing knowledge on *Cyperus rotundus*, focusing on recent research. Ayurveda and traditional medicine have made considerable use of the rhizome and its preparations for a variety of therapeutic uses. As a prominent Ayurvedic medicine, *Cyperus rotundus* has been documented to possess multifaceted therapeutic properties. Scientific validation is necessary to authenticate its traditional claims. Given its importance in traditional Indian medicine, further research is warranted to explore its therapeutic potential using modern techniques and parameters. By doing so, we can unlock the full benefits of this herb for humanity.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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