Cyperus Rotundus Linn: A Review of Its Pharmacological Activity And Medical Uses

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ABSTRACT

The world's most repulsive wildflower, Cyperus rotundus Linn (Family: Cyperaceae), is native to India. It grows in a small cluster and reaches a height of 39.37 inches. The capacity of Nutsedge to become used to a broad range of mud types, soil pH, altitudes, temperatures, and wetness (humidity) stages accounts for its wide-spread distribution. As a result, different environments and atmospheres are being cultivated. They provide a wide range of therapeutic and pharmacologic functions. According to the conventional wisdom, java grass rhizomes have a variety of medicinal uses, including those for stomachic, stimulant, diaphoretic, analgesic, antispasmodic, aromatic, emmenagogue, carminative, hepatoprotective, antitussive, diuretic, litholytic, sedative, vermifuge, tonic, and antiseptic purposes. This study analyses the medicinal applications and various pharmacological functions of the rhizomes of java grass (1).
INTRODUCTION:
The Sanskrit words "Ayur" and "Veda," which stand for "life" and "knowledge," were combined to form the phrase "Ayurveda" (17). Ayurveda is the "science of life and longevity" or "knowledge of life" (14).

C. rotundus L., often known as java-grass or nutgrass, is a medicinal plant in the Cyperaceae family. It grows from corms that are approximately 0.39 to 1.18 inches long and have skinny, peeling creep shoots that are rounded on the bottom and rise behind them (3). Through a distinctive fluorescence, the rhizomes continue to be red-white confidential and seemingly black in colour. The greeneries are rectilinear, shaded green, and fluted at the higher surface levels, and the rhizomes grow to a height of about 9.8 inches. Minor flowerings with 2-4 scales per leaf and little amounts of reddish-brown shell are present. The three rectilinear, ovate, and oblong enthusiast are yellowish in hue and turn blackish when placed. C. rotundus is an Indian native, although it currently thrives in humid, subtropical climates. (10)

This plant is the most irritating wildflower known to man, dispersing to a global circulation over humid and temperate regions. C. Due of its extensive invasion of more than 50 crops and identification as a wildflower in more than 100 nations, rotundus has also earned the moniker "the world's vilest wildflower." The plant, like other sedges, usually grows in damp, marshy areas, sand beds, forests, meadows, and wildernesses (9).

This plant produces protruding underground enlarged bulbs and grows yearly, reaching heights of between 7.87 and 15.75 inches. These bulb bases remain dormant beyond the growing season and under conflicting circumstances. They are connected to one another in a constraint by sparse measures of thin rhizomes (12).

The plant C. rotundus has rhizomes that may be utilised for a variety of conditions, including biliousness, malaise, and soreness, as well as for reducing pain, relaxing muscles, and many other conditions (4,6). The primary active compounds found in Cyperus rotundus are cyperone, selinene, cyperene, cyperotundone, patchoulenone, sugeonol, kobusone, and isokobusone, which may be used to comprehensively explain both its traditional and alternative medical applications (6,9).

Java-grass rhizomes have been used in traditional Iranian medicine to treat biliousness, soreness, and convulsions (6). Research has shown the plant's potent flavonoids and unrestricted deep-seated searcher behaviour (8,15).

It is also a form of at-home treatment for gastrointestinal disorders including dyspepsia. The rhizomes are stated to treat a variety of illnesses in the oldest transcripts and are employed in herbal medicine (16).

Geographical Range:
From the ocean to 1800 metres high, amid wastelands all throughout India (13).

Collection and Authentication:
Cyperus Rotundus was authenticated at Naugarh, Siddharta Nagar, UP, India. The plant's rhizomes were dried out at room temperature (20–25 °C) in the dark, then ground into a coarse powder using an electric grinder. Prof. N. K. Dubey was able to identify and certify the plant (FNASC, FNAAS). in Varanasi, UP, India's Banaras Hindu University (BHU), a taxonomy study of plants. where voucher specimen with number CYPERA.2021/5 was sent. (15)
**Botanical Description:** A perennial herb with glabrous leaves, long, lean stolons, solid black fragrant tubers, and triquetrous mid-air stems; spikelets in complex, extended umbels; spikelet liner to lanceolate; glumes imbricated; nut trigonous, roughly obovoid, and greyish black (13). The same plants give birth to roots, rhizomes, and tubers. Purple nutsedge develops cuffs of tubers that grow along the entire rhizome. The tubers are rectangle-shaped, ribbed, and initially white in colour until eventually spinning brown or black.

**PHYTOCHEMICAL STUDIES:**

**Chemical Constituents:** Alpha-cyperone (C15H22O), Alpha-rotunol (C10H16), Beta-cyperone (C15H22O), Beta-rotunol (C15H24), Beta-pinene (C10H16), Beta-rotunol (C15H24), Calcium, Camphene (C10H16), Copaene (C15H24), Cyperene, Cyperenone, Cyperol, Cyperolone, D-fructose, D-glucose, D-epoxyguaiei, D-copadiene, Flavonoids, Gamma-cymene, Kobusone, Isocyperol, Isokobusone, Limonene, the fatty acids linoleic and linolenic, Calcium, manganese, I. C.

**Taxonomic classification:**

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subkingdom</td>
<td>Virdiplantea</td>
</tr>
<tr>
<td>Infrakingdom</td>
<td>Streptophyta</td>
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<td>Supervision</td>
<td>Embryophytae, Tracheophyta</td>
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<td>Class</td>
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<td>Superorder</td>
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<td>Order</td>
<td>Poales</td>
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<tr>
<td>Family</td>
<td>Cyperaceae</td>
</tr>
<tr>
<td>Genus</td>
<td>Cyperus L.</td>
</tr>
<tr>
<td>Species</td>
<td>Cyperus rotundus</td>
</tr>
</tbody>
</table>

Rotundskone, Oleanolic acid, oleanolic acid-3-oneohesperidoside, and oleic acid P-cymol, Selinatriene, Patchoulenone, Pectin, Polyphenols, Rotundene, Rotundenol, Rotundone, Sitosterol, Stearic Acid, and Sugetriol. (5) The plant includes a significant amount of oil that contributes to the plant's distinctive fluorescence and sensitivity. This oil often contains epoxides, monoterpenes, ketones, sesquiterpene hydrocarbons, and aliphatic alcohols. Hisorotundene (C15H24), Cypera 2,4(15)-diene (C15H22), Norrotundene (C14H22), Selinene, Isocurcumenol (C15H22O2), Nootkatone/Aristolone (C15H22O), and the sesquiterpene alkaloid Rotundines A-COO are all examples of sesquiterpenes (C21H25NO4). The monoterpenes cineole, ketone Cyperadione(C15H24O2), camphene, and limonene are other components. These plants also include sugars, flavonoids, reserves, sitosterol, oleanolic acid, and other triterpenoids, according to research. (1,11,12-13)
Fig: 1 Cyperus rotundus plant

![Cyperus rotundus plant]

Camphene

Cyperol

Fig: 2 Plant Authentication

![Plant Authentication Image]
### Worldwide Uses Of Cyperus rotundus Linn

<table>
<thead>
<tr>
<th>Country</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>Bowel, stomach, tumour (abdominal), vermifuge, astringent Anenorrhea, Headache, Stomachache, Analgesic, Aphrodisiacal</td>
</tr>
<tr>
<td>China</td>
<td>Disinfectant, Mobbing Deobstruent, Bladder, Cervical, Rib cage, Motion Dyspepsia, Emmenagogueue, Emery, Gastralgia, and Depression Endometritis, menozenia, lactogogue, hemicrania, and metro xenia Lateral, Stimulating, Shocking, Masculinity, and Healthy (8)</td>
</tr>
<tr>
<td>Egypt's</td>
<td>medicinal plants include astringents, diuretics, diaphoretics, antiscorpion, and Emmenagogues,Fever, stomachache, ulcer, and vermifuge (8)</td>
</tr>
<tr>
<td>Japan</td>
<td>Anodyne, Emmenagogue, and Wound from (8)</td>
</tr>
<tr>
<td>Java</td>
<td>Edema, Felon, Gravel, Leucorrhea, Sore, Stone, Whitlow, Diuretic</td>
</tr>
<tr>
<td>Sudan</td>
<td>Fever, Dyspepsia, Astringent, and Diaphoretic. (8)</td>
</tr>
</tbody>
</table>

### Pharmacological Activities Of Cyperus rotundus Linn: (21)

#### An anti-inflammatory effect
In contrast to the oedema caused by carrageenan and the swelling brought on by formaldehyde in white albino rats, the fermented extract (which contains 80% alcohol) inhibited both actions. Further research revealed that the petroleum ether extract of the shoots has anti-inflammatory properties in contrast to carrageenan-induced edoema in white wispy rats. An effective anti-inflammatory action was revealed by the triterpenes obtained by chromatographical departure on petroleum ether extract. These terpenoids were also shown to possess potent febrifuge and analgesic properties similar to acetyl salicylic acid. Similar evidence of the defensive in provocative intestinal disease has been shown by Java-grass. (17-18)

#### antidiabetic action
In contrast to the injectable injection of interruption of dried Brewer's mushroom in acacia gum in conventional saline-shaped pyrexia in wister albino rats, the fermented extract of nut-grass shown extraordinarily significant antipyretic action. When employed on the same animal model, a specific piece obtained by chromatographic technology following the petroleum ether excerpt was discovered to contain a significant antipyretic effect similar to acetyl salicylic acid. (1,18)

#### Painkiller action
Both the C. rotundus essential oil and petroleum ether extract have been shown to haveanalgesic effects. (19)

#### Calming activities

#### Tranquillizing agent
In multiple studies, the ethanolic extract of C. rotundus shown efficient tranquilizing motion: it condensed spontaneous motor motion, potentiated pentobarbital narcosis, unbalanced the motor organisation, and eliminated the animals' conditioned avoidance response. (18)

#### Anticonvulsant properties
Using an ethanolic extract of C. for pretreatment In opposition to the tremors that strychnineand leptazol-induced in rats, rotundus sparked a crucial resistance. (20)

#### emetic prevention
The C. extract in ethanol A dosage of 128.1–11.6 mg/kg of rotundus was developed to protect 50% of dogs against apomorphine-induced illness. (18)

#### antispasmodic movement
A direct relaxant effect on the smooth muscle was demonstrated by the ethanolic extract of C.rotundus on rabbit ileum reduction and spasmylytic outcome in opposition to reductions induced by acetylcholine, barium chloride, and 5-hydroxitriptamine. (18)

#### A reduction in stomach motility
The cytoprotective properties of the rhizome of C. rotundus Linn. were assessed in oppositionto ethanol-induced digestive impairment. Rats were verbally given
Rhizoma Cyperi decoctions 30 minutes before ethanol was administered. The findings of this study suggest that endogenous prostaglandins may play a crucial role in explaining how C. rotundus Linn. is able to defend itself against attack by linking it to its reserve of stomach motility.

**gastrointestinal protection**
In contrast to the digestive mucosal damage caused by ischemia and reperfusion in rats, C. rotundus extract is threatened. Rats with unkind ulcers maintained with 200 and 100 mg/kg. C. Rotundus were significantly worse than regulator. Malondialdehyde and glutathione-peroxidase events were significantly pretentious due to C's behaviour. rotundus. (21) The cytoprotective properties of C. rotundus have been reported in the context of ethanol-induced stomach injury in rats. Rats were given oral decoctions of Rhizoma Cyperi (1.25, 2.5, and 4.0g crude drug/kg) 30 min before ethanol showed an ulcer-repressive effect at a dose-dependent level. Indomethacin (5 mg/kg) pre-treatment of rats significantly reduced C's stomach defence success. rotundus. The authors of the book speculate that C. rotundus's capacity for gastroprotection is linked to its stockpile of stomach motility and endogenous prostaglandins.(22)

**anti-diarrheal properties**
When taken orally at doses of 250 and 500 mg/kg, the methanol extract of the C. rotundus rhizome demonstrated significant antidiarrheal activity in castor oil-induced diarrhoea in mice. (23) The petroleum ether component and remaining portion of the methanol, both validated at 250 mg/kg, were used to recall the movement, with the latter being more energetic than the control. No antidiarrheal action was seen in the ethyl acetate component. movement that is hemodynamic (hypotensive) The blood pressure was steadily and persistently reduced by the alcoholic extract of C. rotundus, and the breathing was stimulated. The extract had no effect on the blood pressure responses of acetylcholine or epinephrine, however it did partially congest the histamine response.

**Hyperlipidemic Behavior**
When Cyperus rotundus extract was administered, the age-related shift in blood lipids (LDL, HDL, total, triglycerides, and VLDL triglyceride levels) was returned to the level of young control rats. Treatment with Cyperus rotundus dramatically raised the amount of HDL cholesterol in young rats. (24)

**liver-protective behaviour**
The rhizomes of C. elegans were extracted in ethyl acetate and two unpolished parts were used: solvent ether and ethyl acetate. By convincing rat livers to sustain carbon tetrachloride liver wounds, rotundus (Cyperaceae) was evaluated for its hepatoprotective properties. A 100mg/kg oral dosage of the ethyl acetate extract had a significant protective effect by lowering the blood levels of glutamic pyruvic transaminase, glutamic oxaloacetic transaminase, alkaline phosphatase, and total bilirubin. The histological examination of different liver segments complemented these biological hypotheses. Silymarin served as an enthused control. Na ++/K+ -ATPase in the brain is suppressed The rat brain's Na+/K+-ATPase enzyme was highly effectively suppressed by an extract of C. rotundus.

**Anti-obesity measures**
Rats treated with C. rotundus preparations (powder in acceptable suspension, aqueous, and alcoholic extracts) showed lipolytic success and had their adipose tissues' fat reduced, which helped to reduce their weight. Using the ground tuber of the C. rotundus plant for 90 days, 30 overweight participants in a pilot trial showed a discount in weight together with a decrease in blood cholesterol and triglycerides. (25)

**Diabetic prevention**
In rats with alloxan-induced diabetes, oral daily administration of 500 mg/kg of the extract (once daily for seven consecutive days) significantly decreased the blood glucose levels. (26) The study's findings that C. rotundus demonstrated a robust 1,1-diphenyl-2-picrylhydrazyl (DPPH) fundamental foraging effect in vitro led the researchers to conclude that this antihyperglycemic action can be attributed to its antioxidant action. In a model of fructose-mediated protein glycoxidation, these effects are converging, making it likely that C. rotundus will outweigh the production of AGE and protein oxidation. (27) Researchers came to the conclusion that C. rotundus would be a candidate for treating diabetic issues since non-enzymatic glycation has been linked to the severity
of diabetes and associated challenges.

**anti-microbiological action**

For both aqueous and ethanolic extracts, in-vitro antimicrobial activity was evaluated using the agar disc dispersion and agar healthy dispersal techniques. In contrast to all of the tested bacterial straining, the ethanolic extract was active, whereas the aqueous extract remained dormant. In a separate investigation, extracts made from acetone and ethanol demonstrated impressively wide-ranging sterile activity in the disc dispersal technique.

On gram-negative and gram-positive human disease bacteria as well as ungi, namely C. albicans and A. niger, antimicrobial activity tests were authorised to be conducted. Contrary to K. pneumoniae, the highest proportion of reserve was experienced (133.33 percent). As a hopeful control, amoxicillin (20 g/ml) and ethanol (as a fungicide) were discarded. In the cases of A. niger and S. aureus, reasonable reserve was based on experience (90 and 70 percent correspondingly). Acintobacter and Candida were not present in any protected area.

**Antimicrobial Action**

When used in opposition to the gram-positive bacteria Staphylococcus aureus and Enterococcus faecalis, the oil of C. rotundus had an outstanding effect. Additional research revealed that a prominent suppressive effect of C. In contrast to Salmonella enteritidis, Staphylococcus aureus, and Enterococcus faecalis, rotundus was experiential in ethyl acetateextracts and total oligomers flavonoids (TOFs). (28)

**Malaria Prevention**

Action-focused analysis of sesquiterpene-rich C. rotundus rhizomes revealed antimalarial activity in vitro that was at odds with Plasmodium falciparum. Using the multidrug resistant K1 strain of Plasmodium falciparum, certain Tanzanian medicinal herbs were extracted and tested for in vitro antimalarial activity. Out of the 49 plants that were analysed, three extracts were found to have an IC50 between 5 and 10 mg/ml; 18 additional extracts had an IC50 between 10 and 50 mg/ml; the rest were less potent. (29) C. tubers were used to make the three extracts that were the most vibrant. rotating Linn. Hoslundia opposita Vahl's root bark, and the Lantana camara L. root bark. About 0.5–1 percent of the subversive components of certain weak classes, such as the fresh tubers of C, are made up of essential oils. Rotundus isa plant that mostly contains terpenoids or sesquiterpenoids, such as cyperone, cyperol, cyperolone, cyperene, copadiene, rotundone, patchoulenone (cyperotundon), kobusone, sugretiol, oxido-eudesmenol, and "BETA"-selinene. When Tanzanian medicinal plants were divided up, C. In a test for in vitro antimalarial effect, rotundus demonstrated activity.

**Larvicidal and ovicidal behaviours**

The efficacy of the essential oils extracted from Cyperus giganteus and Cyperus rotundus Linn's rhizomes, was conducted on Aedes albopictus eggs and fourth larval stage grubs. The eggs and grubs were exposed unprotected to oil concentrations ranging from 5 to 150 ppm inisers for 24 hours.

**action against the candida**

For anti-Candida albicans activity, indispensable (essential) oils and alcoholic extracts from the greeneries and/or origins of 35 medicinal plants commonly used in Brazil were divided. Aloysia triphylla, Cymbopogon martini, Cyperus articulatus, Cyperus rotundus Linn., Lippia alba, Mentha arvensis, Mikania glomerata, Mentha sp., Stachys byzantina, and Solidago chilensis were among the 13 plants that have essential oils that had anti-Candida effect. Someof the validated absorptions did not use the ethanol extract in its entirety. Biochemical investigations revealed the presence of complexes with known antimicrobial activity, including linalool, menthol, germacrene-D, and 1,8-cineole. (30)

**cytoprotective outcomes**

a portion of C. The cytoprotective properties of rotundus were assessed in contrast to ethanol-induced digestive impairment. Rats were vocally administered Rhizoma Cyperi decoctions (1.25, 2.5, and 4.0 g of crude drug/kg) 30 min before being given ethanol (40 percent v/v, 10 mL/kg). The mixture demonstrated a boil-suppressing effect in a dose dependent on methods. Additionally, the effect was seen when the decoction was applied topically (0.3–0.6 g/kg), indicating that the basil had a general beneficial effect in defending the abdomen. When compared to controls, the ethanol-treated rats' gastrointestinal motility was significantly
delayed by further oral (2.5–4.0 g/kg) or hypodermic (0.3 g/kg) administration of the decoction. Pests were effectively pretreated with indomethacin (5 mg/kg) to reduce their ability to defend themselves through digestion. rotundus.

CONCLUSION:
Rotundus C. Plants have a big impact on preserving human health and raising standard of living. They benefit humans by being important ingredients in food, such as spices and drinks, as well as in cosmetics, colours, and medicines. Plants' phytochemical components have led to consideration for their use as food, medicine, greasepaints, and other things due to their various phytochemical, physical, and biological actions. Numerous plant extracts have really been shown to have biological function in vitro and in vivo, accepting the therapeutic potential of ethnomedicine. Therefore, it is essential to research previous health maintenance plans. It is expected that drug-resistant bacterial infections will be actively fought off by plant complexes screening board locations other than those currently employed by antibiotics. However, many plants have been identified as a valuable source of natural antioxidants like tocopherols, vitamin C, carotenoids, and phenolic compounds that are important for maintaining health, assisting the body in reducing oxidative damage, and providing protection from coronary heart disease, cancer, and other diseases. Since the discovery of plant chemicals, great emphasis has been given to investigating the therapeutic potential of all plants. Additionally, there is a significant hunt for natural antioxidants that are safe and efficient from edible plants, particularly spices and herbs. Polyphenolic chemicals generated from plants have antibacterial, antioxidant, anticancer, and apoptosis-inducing effects. The role of plant-derived polyphenols in the chemoprevention of cancer has emerged as an exciting research area.

Hepatotoxicity may be of the utmost importance to patients as well as to medical professionals, researchers, and drug development organisations. However, scientists have discovered a wide range of processes and co-affecting variables that may be used to identify and diagnose liver disease. It is abundantly obvious from this research that medicinal herbal plants have a significant impact on the treatment of many liver illnesses. In animal simulations, several herbal herbs and plant extracts exhibit strong hepatoprotective effects (models). An emerging role for herbal treatments in hepatoprotection. They can be used to treat both drug- and alcohol-induced liver cirrhosis.

REFERENCE
Medical Uses


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