



## A Review On: Pharmacological Activity and Medicinal Uses of *Cyperus Rotundus*

Dushing Rushikesh Ganpat, Bendugade Sujit Sitaram, Akolkar Suraj Santosh,  
Dalimbe Ashok Yuvraj

*Department Of Pharmacognosy, HSBPVT, Group Of Institutions, Faculty Of Pharmacy, Kashti, Shrigonda,  
Maharashtra, India, 414701.*

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### ABSTRACT:

Pharmacological relevance to ethnology: A traditional home remedy for a number of clinical ailments, including diarrhea, diabetes, pyresis, inflammation, malaria, and stomach and bowel issues, is *Cyperus rotundus* L. (Cyperaceae). It is one of the most pervasive, troublesome, and financially detrimental agronomic weeds at the moment, proliferating wildly in various tropical and subtropical parts of the world. By identifying active components and their modes of action for a given therapeutic activity utilizing cutting-edge technology, the present research synthesizes the information that is currently accessible to assist in the production of future medications.

### Keywords:

Ayurveda; Nutgrass; Pharmacological activity; Secondary metabolites; Traditional medicine

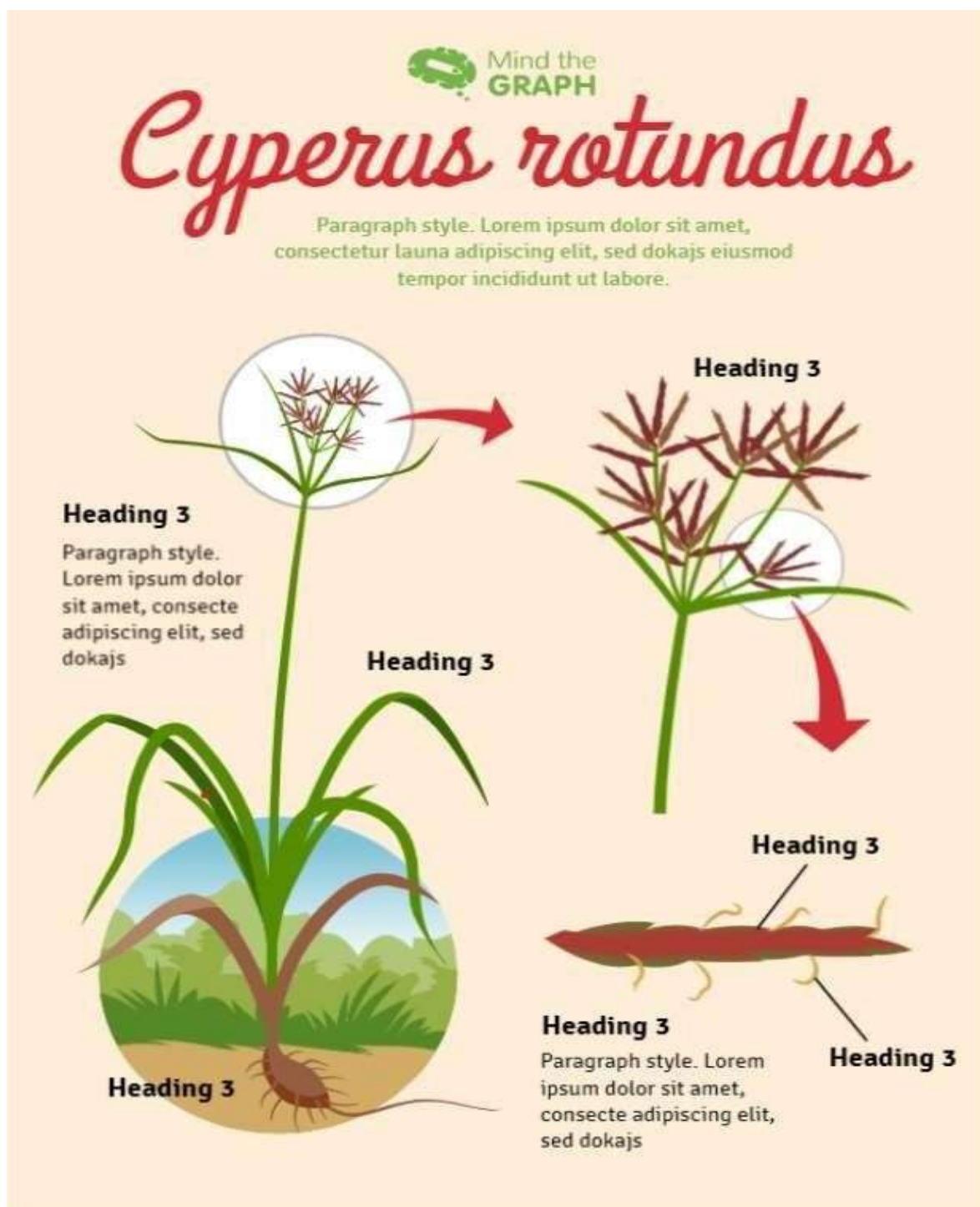
### I. INTRODUCTION:

All traditional medicinal systems, including Siddha, Ayurveda, Homeopathy, Naturopathy, Traditional Chinese Medicine, and Native American medicine, include an important role for herbal therapy. Plant products account for a sizeable share of the worldwide medication market

and are utilized as over-the-counter medicines, pharmaceutical industry raw materials, and home cures in both industrialized and developing nations. *C. rotundus* Linn is an ideal illustration of a medicinal plant recognized with a plethora of medical properties supported by modern science and used since ancient times. Family - With 109 genera and almost 5,500 species, the Cyperaceae is the biggest monocotyledon family [1].

The common perennial plant *C. rotundus* L. (Family: Cyperaceae), often known as purple nutsedge or nutgrass, has slender, scaly spreading rhizomes that are bulbous at the base and emerge singly from the tubers that are between 1-3 cm long. The tubers have a distinctive odor and are outwardly blackish in color and inside reddish white. The linear, dark green leaves have grooves on the upper surface and stems that are around 25 cm tall. Small inflorescences with 2-4 bracts are composed of tiny blooms with a reddish-brown husk. The three-angled, oblongovate, yellow-colored nut turns black when fully ripe.

Though originally from India, *C. rotundus* can today be found in tropical, subtropical, and temperate climates [2].



The herb mainly contains sesquiterpenoids such as patchoulone, isopatchoulone, sugeonyl acetate, sugetriol triacetate and sugebiol, as well as flavonoids such as kaempferol, luteolin and

quercetin<sup>2</sup>. Pharmacological activities of *Cyperusrotundus* L. have been extensively studied.

The rhizomes of *C. rotundus*, which are commonly used as traditional folk medicines in Asian nations to treat inflammatory diseases and

stomach and intestinal issues, [3-5] were looked into. Traditional herbal remedy made from *C. rotundus* extensively used for analgesic, sedative, antispasmodic, and antimalarial purposes To treat diarrhea and treat gastrointestinal diseases [67]. The tube component One of the first known medicinal herbs, *C. rotundus* is utilized for the treatment of dysmenorrhea and irregular menstruation [8-9]. This herb has been infused for use in treating pain, fever, dysentery, diarrhea, emmenagogue, and other intestinal challenges [10]. It is a plant with several uses that is stomach aches can be treated using traditional medicine from around the globe, boils, blisters, and wounds [-14].

a variety of biological and pharmacological effects, including anti-Candida, anti-inflammatory, anti-diabetic, anti-diarrheal, cytoprotective, antimutagenic, antimicrobial, anti-pyretic, cytotoxic, apoptotic, antioxidant, and analgesic Activities at this factory have been documented [15-24]. Earlier phytochemical investigations on *C. rotundus* uncovered the tannins, starch, glycosides, flavonoids, alkaloids, and Numerous novel sesquiterpenoids, including furochromones [25-29].

#### MEDICINAL USES:

According to Ayurveda, the rhizomes of *C. rotundus* are considered Aromatic, carminative, antispasmodic, diuretic, astringent, diaphoretic, antitussive, emmenagogue, litholytic, analgesic, Tonic, vermifuge, stomachic, sedative, stimulant, and antibacterial. In light of these facts, it might be a useful indigestion treatment. components found in it, such as the many enzymes minerals and carbs, which serve as catalysts for a variety of indigestion relief and biological responses. It can also be helpful for Managing metabolic and psychotic illnesses with diet maladies [30].

They are employed to treat nausea, vomiting, dyspepsia, Infertility, cervical cancer, menstrual disorders, colic, flatulence, diarrhoea, dysentery, intestinal parasites, fever, malaria, cough, bronchitis, renal and vesical calculi, urinary tenesmus, skin diseases, wounds, amenorrhoea, dysmenorrhoea, inadequate lactation, memory loss, insect bites, food poisoning, indigestion, nausea, dysuria splash and fragrances [31-35].

#### CHEMICAL CONSTITUENTS:

The world's worst weed, *C. rotundus*, has been shown to contain a number of chemical compounds[36]. some of which are used

medicinally in Latin America. India, China, and other countries [37-39]. several forms of *C. rotundus* Since ancient times, *rotundus* have been utilized in spices, fragrances, and African, Arab, Asian, and Chinese traditional medicine. In addition, an essential component of Ayurvedic nutraceuticals for anti-aging Chyavanprash is [39].

Numerous phytochemical analyses of *C. rotundus* found the presence of fatty acids, sitosterol, alkaloids, flavonoids, tannins, starch, glycosides, furochromones, monoterpenes, and sesquiterpenes.oil containing glycerol, linolenic acid, and a neutral wax the acids myristic and stearic [25, 29, 40, 41]. The principal compounds extracted from *C. rotundus* rhizome extracts and essential oil are Beta-cyperone, Beta-pinene, Alpha-cyperone, Alpha-rotunol, Camphene, Copaene, Beta-rotunol, Betaselinene, Calcium cyclopene, cyclopene, cyclopetrol, and cyclopetroloneCyperotundone Flavonoids, Dcopadiene, Depoxyguaiene, D-fructose, and DglucoseIsocyperol, Kobusone, Isokobusone, Gamma-cymene, Magnesium, manganese, linoleic and linolenic acids, and vitamin C. Oleanolic acid, P-cymol, Patchoulenone, Pectin, Rotunduskone, Rotundene, Rotundenol, Rotundone, Selinatriene, Polyphenols, Stearic acid, Sugeonol, and Sugetriol [42-45]. Sitosterol.

The herb's distinctive flavor and aroma are provided by the essential oil found in *C. rotundus*, which is mostly composed of sesquiterpene hydrocarbons, epoxides, ketones, and monoterpenes. aliphatic alcohols, too. Selinene is one of the sesquiterpenes. The sesquiterpene, isocurcumenol, nootkatone, aristolone, isorotundene, cypera2,4(15)-diene, and norrotundenerotundine alkaloids, A-C. The ketone is among the other components. the monoterpenes cineole, camphene, and cyperadione, limonene. Additionally, *C. rotundus* has been proven to include various triterpenes, such as sitosterol and oleanolic acid, same sugars, minerals, and flavonoids [44-45]

#### PHARMACOLOGICAL ACTIVITIES:

##### Anti-Inflammatory:

The alcohol extract (70%) has anti-inflammatory properties against carrageenan-induced oedema and was also discovered to have helpful in preventing the arthritis that formaldehyde causes in albino rats [46] In a different investigation, the rhizome's petroleum

ether extract anti-inflammatory properties against carrageenan-induced inflammation albino rats exhibit oedema. Triterpenoid produced by separation using chromatography from petroleum ether extract demonstrated a powerful antiinflammatory action. It is a terpenoid. was also discovered to have substantial analgesic and antipyretic properties. identical to those of acetyl salicylic acid. Additionally, *C. rotundus* a protective effect in inflammatory bowel disease.

Additionally, in a dose- and time-dependent manner, the extract reduced O<sub>2</sub>-production when phorbol ester activated RAW 264.7 cells. Collectively, these findings imply that *C. rotundus* rhizome methanol extract may be created. as a potential antiinflammatory therapy option for inflammatory illnesses caused by excessive NO and O<sub>2</sub> production [47].

#### **antidiabetic action:**

When used to treat pyrexia brought on by albino mice, the alcoholic extract of *C. rotundus* demonstrated highly substantial (P0.001) antipyretic efficacy. rats are injected subcutaneously with a slurry of dry Brewer's yeast in ordinary saline with acacia gum. an explicit fraction produced from the using a chromatographic technique When applied topically, petroleum ether extract was discovered to have a sizable antipyretic effect comparable to acetyl salicylic acid. same animal model (48).

#### **Anticonvulsant properties:**

*C. rotundus* ethanolic extract as a pretreatment significantly reduced the amount of damage that strychnine and leptazolinduced seizures in mice [49].

A reduction in stomach motilityThe cytoprotective properties of the rhizome of *C. rotundus* Linn. against ethanol-induced stomach injury were evaluated. Rats were administered oralRhizomaCyperide decoctions for 30 minutes. prior to the administration of ethanol. The research's findings suggest a connection between *C. rotundus* Linn's defensive properties due to its endogenous and restriction of gastric motility Prostaglandins might be significant. [50]

#### **Gastrointestinal protection:**

Rats exposed to ischemia and reperfusion-induced stomach mucosal damage were prevented by *C. rotundus* extract. a nasty ulcer.Rats given 200 and 100 mg/kg of *C. rotundus* had higher indices.

markedly lower than that of the control. The behaviors of Malondialdehyde and glutathione-peroxidase were considerably influenced by *C. rotundus* therapy [64]. cytoprotective outcomes.Several cases of *C. rotundus* have been described as well. rats with gastrointestinal injury. RhizomaCyperide Decoctions were administered orally to rats for 30 minutes (1.25, 2.5, and 4.0 g of crude drug/kg). preceding ethanol's dose-dependent ulcerinhibiting impact. depending fashion. Rats were given indomethacin as a pretreatment (5 mg/kg) greatly decreased C's ability to protect the stomach. rotundus.[50] liver-protective:

The rhizomes of *Cyperusrotundus* (*C. rotundus*) were extracted with ethyl acetate and split into two crude fractions: solvent ether and ethyl acetate. assessed in rats for hepatoprotective potential by inducing liver harm caused by tetrachlorocarbon. The extract of ethyl acetate at an 100 mg/kg given orally showed a strong protective effect. By reducing serum glutamic oxaloacetic transaminase levels, Alkaline phosphatase, glutamic pyruvic transaminase, and total bilirubin. These biochemical findings were further supported by liver section histopathological examination. In Silymarin utilized as a positive control [51] wound healing:

Three different types of ointments containing an alcoholic extract of the tuber sections of the *C. rotundus* were tested for their ability to treat wounds. of three types of rat wound models: excision, incision, and death wound model in space. The extract ointments demonstrated significant varying responses in each of the aforementioned wound models as similar to characteristics of a common medication, nitrofurazone ointment In terms of wound contracting ability, (0.2% w/w NFZ) Tensile strength and closure time [52].

#### **Activity of Antioxidants:**

Amrita Bindu is a concoction of herbs (*Cyperusrotundus* Linn. and *Plumbago zeylanica*), spices (*Piper nigrum*, *Piper longum*, and *Zingiberofficinale*), and salts. The goal of the study was to assess each element in Amrita Bindu's antioxidant capacity against the free radical 2,2'-azinobis-(3-ethylbenzothiazoline-6sulphonic acid)(ABTS). The components' potential as antioxidants was shown by the analysis in the following order: *Zingiberofficinale*, *Plumbago zeylanica*, *Cyperusrotundus*, *Piper nigrum*, and *Piper longum*. These findings demonstrate the

possible antioxidant activity of Amrita Bindu, a salt, spice, and herbal blend comprising *C. rotundus* Linn., against oxidative damage caused by free radicals [53].

#### Antimicrobial Intensity:

*Staphylococcus aureus* and *Enterococcus faecalis*, two gram-positive bacteria, were significantly inhibited by *C. rotundus* oil [73,78]. According to a different study, *C. rotundus* significantly reduced the growth of *Salmonella enteritidis*, *Staphylococcus aureus*, and *Enterococcus faecalis* when combined with total oligomers flavonoids (TOFs) and ethyl acetate extracts [54,55].

#### Toxicological Research:

Ten rats each, five of them male and five of them female, were split into two groups. Rats were given a single dosage of ethanol extract (2,500 mg/ml in 10% dimethylsulfoxide, DMSO) orally at a body weight of 5,000 mg. The control group was given only vehicle.

Over the course of 14 days, the animals were watched for any indications of toxicity.

Necropsies were done on the animals who passed away during this time. On the fourteenth day after administration, all the rats were weighed and slaughtered. Lastly, a gross examination was performed on the vital organs, which included the brain, livers, kidneys, spleen, adrenal glands, heart, and sex organs.

All rats did not show any symptoms of toxicity or mortality following a single oral treatment of 95% ethanol extract from the rhizomes of *C. rotundus* in the acute toxicity test at a dose of 5,000 mg/kg. Subacute toxicity results demonstrated that ethanol extract from *C. rotundus* rhizomes administered at a dose of 1,000 mg/kg daily for 14 days did not result in behavioral abnormalities or death [56].

In a different study, bred wistar strain rats (250–300 g) of both sexes were chosen for the test. The animals were kept in clean, naturally occurring light/dark cycles in six-rat polypropylene cages. The animals had unrestricted access to water and a conventional pellet diet. The OECD/OCDE 423 OECD Guideline for testing of substances - Acute Oral Toxicity - Acute Toxic Class Method Adopted: December 17, 2001) was followed in conducting the acute toxicity study. As a result, the oral acute toxicity tests showed that the *C. rotundus* rhizome extract was safe up to a level of 2000 mg/kg.

Up to 2000 mg/kg body weight, no mortality or morbidity was seen in Wistar rats in another acute toxicological study. A subchronic toxicity investigation found that there were no appreciable differences in the animals' food, drink, or body weight. However, an increase in hemoglobin level and WBC count was seen in the haematological parameters. Even after prolonged exposure, the liver and renal functions remained unchanged. \* [57]

## II. CONCLUSION :

There are reports on the ethnobotanical usage of *C. rotundus* in conditions like genotoxicity, hirsutism, nociception, cancer, cystitis, epilepsy, apoptosis, atherosclerosis, and apoptosis. *C. rotundus*'s phytochemical and pharmacological properties have supported both its historical and potential uses as a beneficial Ayurvedic plant. Previous studies have concentrated on the phytochemistry, biological characteristics, and clinical applications of *C. rotundus*'s rhizomes and tubers. These investigations on the various components of this crucial plant for medicine still need to be done, though. Prior to using this plant to produce a new medicinal drug in humans, future research should aim to confirm its clinical activity and safety.

## III. RESULTS:

Phytochemical and pharmacological studies revealed the significance of *C. rotundus* as an

Anti Inflammatory, Anti Diabetic, Anti Convulsant, Gastrointestinal, Liverprotective, Wound Healing, Anti Oxidant, and Anti Microbial. This is the most investigated plant worldwide due to the higher concentration of active ingredients in the form of essential oils, phenolic acids, ascorbic acids, and flavonoids in the tuber and rhizomes. Unfortunately, this significant plant species has not been assessed under improved cultivation conditions with the aim of conservation in natural habitats and high quality.

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