



## "Review on : *Cyperus rotundus*"

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**Abstract:** *Cyperus rotundus* Linn belong to the family cyperaceae. It is the world Worst weed native to India. It grows in small clump up to 100cm high. It has wide range of medicinal and pharmacological application. According to Ayurveda *C.rotundus* rhizome are considered astringent, diaphoretic, analgesic, aromatic, antispasmodic, carminatives, antibacterial, antimalarial, antioxidant, antiplatelet, Hepatoprotective, diuretic. Many previous studies showed *Cyperus rotundus* contained Flavonoids, tannins, glycoside, furochromones, alkaloids, saponins, monoterpenes, terpenoids, essential oils, starch, carbohydrate, proteins, separated amino acid and many other secondary metabolite. This review was designed to highlight the chemical constituents and pharmacological effect of *rotundus*. This paper provides review on medicinal and various pharmacological properties of *C.rotundus* rhizome. Since time immemorial, humans have identified several herbs to treat various ailments. With the advancement of science and state-of-the-art technologies, different herbal extracts and chemical constituents of herbs identified a therapeutic target. *Cyperus rotundus*, also called *Mustafa*, is one of the most ancient herbs widely distributed in tropical and subtropical regions across the globe. The tuberous and aerial parts of the herb were identified to possess various pharmacological properties. The nut-grass is an erect, perennial glabrous herb 10-75cm long, distributed throughout the plant in India, as a weed in waste lands, gardens and roadsides and sea level 1,800cm elevation. *Musta* is composed of various chemical constituents mainly cyperene-1, cyperene-2, Beta-selinine, cyperenone, Alpha-cyperone, *Rotudome* etc.

**Index Terms -** *Cyperus linn*, nut-grass, *mustafa*, ancient, etc.

## I. INTRODUCTION :

Herbal medicine is a major component in all traditional medical system, and a common element in Siddha, Ayurveda, Homeopathic, Neuropathic Traditional Chinese medicine, and Native American medicine. Plant material are used throughout developed and developing countries as home, remedies, over-the-counter drug product and raw materials for the pharmaceutical industry, and represent a substantial proportional of the global drug market. A perfect example of medicinal plant credited with innumerable medicine qualities validated by modern science and used since ancient time is *C.rotundus* Linn. Family-cyperaceae are the largest family in the monocotyledons consisting of log genera and approximately 5,500 species. [1] Plant generally produce many secondary metabolite which were constituted an important source of many pharmaceutical drug. [2] WHO has estimated that perhaps 80% of the world rely chiefly on traditional medicines for their primary health care needs. In the developed countries, in the USA, for example, 25% of all prescription dispensed from community pharmacies from 1959 to 1980 contained plant extract or active principle prepared from higher plant. [3] Besides, we reviewed the ex-

vivo anti-oxidant and antihemolytic effect of *C.rotundus* using H<sub>2</sub>O<sub>2</sub> induced oxidative stress in White Blood Cell [WBC] and 2,2-azobis [2-amidinopropane ] dihydrochloride [AAPH] - induced hemolysis in WBC. [4] It is perennial sedge with unbelievable inflorescence and fibrous roots reproduce widely through rhizomes and tubers. It is a widespread species under unfavorable condition and is today considered the most troublesome weed in agriculture due to its competitive nature of ground nutrients with herbicide tolerance and high adaptability, which cause large yield losses. [5] *C.rotundus* L., [Family-cyperaceae] also known as purple nutsedge or nutgrass, is a common perennial weed with slender, scaly creeping rhizomes, bulbous at the base and arising singly from the tubers which are about 1-3 cm long. The tubers are externally blackish in colour and reddish white inside, with a characteristic odour. The stems grow to 25cm tall and the leaves are linear, dark green and grooved on the upper surface. Inflorescence are small, with 2-4 and in tropical, subtropical and temperate region. [6]



**Cyperus rotundus**

2. Scientific classification:- [7,8]

- 2.1. Kingdom:- plantae
- 2.2. Subkingdom:- Tracheobionata
- 2.3. Superdivision:-
- 2.4. Division:- Magnoliophyta
- 2.5. Class:- Liliopsida
- 2.6. Subclass:- Commelinidae
- 2.7. Order:- cyperale
- 2.8. Family:- cyperaceae

2.9. Genus:-Cyperus. 2.10. Species:-

Cyperus rotundus L.

2.11. Chemical constituents:- [9,10]

The major chemical constituents of Musta are 4 alpha,5 alpha, oxidoeudesm-11-en- 3 alpha-ol, cyperenone, Alpha-cyperone cyperene-1, cyperene-2. The other chemical constituents include copadiene, Epoxy, Guaiene, Rotundome, cyperenol, Eugenol, sugenol, myristic acid, stearic acid and glycerol.



Cyperus rotundus Rhizome

### 3.Pharmacological Activities:-

- 3.1. Anti-inflammatory activity
- 3.2. Antidiarrhoeal activity
- 3.3. Antimicrobial activity
- 3.4. Antidiabetic activity
- 3.5. Antiplatelet activity
- 3.6. Antipyretic activity
- 3.7. Wound healing activity
- 3.8. Antioxidant activity
- 3.9. Analgesic activity
- 3.10. Antimalarial activity
- 3.11. Hepatoprotective activity
- 3.12. Anticancer activity
- 3.13. Gastroprotective activity
- 3.14. Coronary Vasodilator activity
- 3.15. Antiulcer activity

3.1. Anti-inflammatory activity:- The alcohol extract [75%] of *Cyperus rotundus* exhibit anti-inflammatory activity against cartagena induced edema and has been successful in treating arthritis brought on by formaldehyde in albino rats. When carrageenan induced edema in albino rats was induced, the trapezoid that was isolated through chromatographic separation from the ethyl acetate extract of the rhizome exhibited anti-inflammatory activity. *Cyperus rotundus* rhizome might be used to create an anti-inflammatory new drug for such treatment of inflammatory illnesses caused by free radicals.[11] Another study on alcoholic extract of *Cyperus rotundus* showed highly significant [ $p < 0.001$ ] anti-inflammatory activity against the exudative and proliferative phase of inflammation in two animal model [carrageenan induced oedema and formaldehyde induced arthritis in rats]. Its anti-inflammatory relative effect was higher than that of hydrocortisone [75.9% viruses 47.3% in

carrageenan induced oedema model. 55.1% viruses 35.6% in formaldehyde induced arthritis model.[12]

3.2. Antidiarrhoeal activity:- The methanol extract of *Cyperus rotundus* Rhizome, given orally at the doses of 250 and 500mg/kg showed significant antidiarrhoeal activity in castor oil induced diarrhea in mice. Among the fraction, tested at 250mg/kg, the petroleum ether fraction and residual methanol fraction were found to retain the activity, the latter being more active as compared to control. The ethyl acetate fraction did not show any antidiarrhoeal activity. [13]

3.3. Antimicrobial effect:- *Cyperus rotundus* Rhizome petroleum ether, chloroform, ethanol and water extract were evaluated against Sox important pathogenic microbes [staphylococcus epidermis, Bacillus cereus, pseudomonas aeruginosa, Echerichia coli, Aspergillus Niger and candida]. The antibacterial and antifungal activities were performed by both agar well diffusion and serial dilution methods. The ethanolic extract exhibited high activity against tested bacteria. The inhibitory effect is very similar and comparable with that of standard drug.[14]

3.4. Antidiabetic activity:- In light of the traditional claim of *Cyperus rotundus* in the treatment of diabetes, investigational were carried out to evaluate its effect on allowance induced hyperglycemia in rats. Oral daily administration of 500mg/kg of the extract [once a day for seven consecutive days] significantly lowered the blood glucose level. This antihyperglycemic activity can

be attributed to its antioxidant activity as it showed the strong DPPH radical scavenging action in vitro.[15]

3.5. Antiplatelet activity:- The clumping of platelets in the blood leads to blood clots and coagulation which is commonly seen in injury and critical for hemostatic plug formation and thrombosis. However platelets aggregation is also seen in cardiovascular disease described the antiplatelet activity of *Cyperus rotundus* ethanolic extract [CRE] and its active compound nootkatone in an in vitro model of rat platelet aggregation and ex vivo mice tail bleeding model. CRE extract inhibited the platelet aggregation challenged by collagen, thrombosis and arachidonic acid. Nootkatone at 300mg/mL inhibited isolated rat platelet aggregation and increased bleeding time up to 3 fold suggesting the potential application of the extract in arterial thrombosis. [16]

3.6. Antipyretic activity:- The alcoholic extract of *Cyperus rotundus* showed highly significant [ $p < 0.001$ ] antipyretic activity against pyrexia produced in albino rat by the subcutaneous injection of suspension dried Brewer's yeast in gum acacia in normal saline. A specific fraction obtained by chromatographic method from the petroleum ether extract was found to possess a significant antipyretic effect similar to acetyl salicylic acid when used on the same animal model. [17]

3.7. Wound healing activity:- An alcoholic extract of tubers part of *Cyperus rotundus* was examined for Wound healing activity in the form ointment in

three types of wound models on rat: The excision, the incision and dead space wound models. The extract ointment showed considerable difference in response in all the above said wound model as comparable to those of standard drug nitrofurazone ointment [0.2%w/w NFZ] in terms of wound contracting ability. Wound closure time and tensile strength. [18]

3.8. Antioxidant activity:- When given to mice by stomach intubation at such a dose 1.6g/kg, the dehydrated rhizome of the methanol extract *rotundus* has no effect on the liver lipid peroxidation caused by ethanol. The rhizome of *Cyperus rotundus* was extracted crudely, and it was found to have significant antioxidant activity. The rhizome extract from *Cyperus rotundus* in acetone displayed exceptional activity. [19]

3.9. Analgesic activity:- The analgesic activity of the raw extract of *Cyperus rotundus* was assessed using the tail flick method on mice however the ethanol extract and hot water extract *rotundus* at 500mg/kg and 12.7g/kg was inert in the hot plate technique and acetic acid test additional to being non analgesic. The crude extract is given orally at dose of 300mg/kg body weight. Highly considerable analgesic action was demonstrated when [dispersed in 0.9% saline solution]. [20]

3.10. Antimalarial activity:- It was investigated that the crude hexane extract of the air-dried tubers of *Cyperus rotundus* is having high potency in the in vitro test against *plasmodium falciparum*. [ $EC_{50} = 0.66 \mu\text{g ml}^{-1}$ ]; the result showed

the significant antimalarial activity of *Cyperus rotundus*. [21]

3.11. Hepatoprotective activity:- Kumar et.al investigated that , ethyl acetate extract and two crude fractions solvent ether and ethyl acetate of the rhizome of *Cyperus rotundus* were evaluated as hepatoprotective activity in rats by inducing liver damage by carbon tetrachloride.[22]

3.12. Anticancer activity:- Brine shrimp bioassay was used to investigate the toxic action of *Cyperus rotundus*, ethanolic extract in comparison to etoposide standard. *Cyperus rotundus* ethanolic extract showed non toxic significant effect at 10,100,1000 ug/mL concentration .[23]

3.13. Gastroprotective action :- Gastroprotective agent protect the stomach and gastric system from various forms of ulcer and gastric tissue damage. Reported the gastroprotective effect of methanolic extract of *Cyperus rotundus* rhizome in a model of an ischemia- reperfusion induced stomach injury. The administration of the extract effectively restored the antioxidant status measured by glutathione and lipid peroxidation product and also protected the micro villas architecture of the stomach with the ischemic model but to a lesser extent in the ischemia- reperfusion model, explaining potential gastroprotective effect of the extract. [24]

3.14. Coronary Vasodilator activity:- When administered intravenous, an aqueous extract of a rhizome of *Cyperus rotundus* provides good outcomes in cats, rabbits and frogs.[25]

3.15. Antiulcer activity: The rhizome powder of *Cyperus rotundus* exhibited ulcerpreventive properties. Two distinct animal model were used for the investigation. Histamine [50mg base I.p] was used to cause gastric ulcer in albino rats. The *Cyperus rotundus* Rhizome powder was administered orally 45 min before the histamine and one hour before the aspirin. In both situations *Cyperus rotundus* significantly reduced the ulcer index and had result that were equivalent to those of the reference drug ranitidine.The strong antioxidant activity of *Cyperus rotundus* is what cause is to have antiulcer properties.[26]

4.Conclusion :- This study make an effort to compile all of the information that has been published about *Cyperus rotundus*, with a particular emphasis on recently released research. The rhizome of *Cyperus rotundus* and its extract have been widely employed in traditional medicines and Ayurveda for a variety of therapeutic purpose.It is of the top medicine in Ayurveda.The morphological, macroscopic and pharmacological properties of *C.rotundus* are covered in the current review.The safety and effectiveness of medicinal plant in the prevention and treatment of many chronic diseases has led to a significant growth in their usage in the modern Era.The medicinal properties of *C.rotundus* include anti-inflammatory,analgesic, antipyretic,wound healing,antimicrobial, antiviral, antifungal, antimalarial, Gastroprotective, antidiarrhoeal,antiulcer, antiemetic ,anti allergic

and antioxidant activity. The above collected information suggest that *Cyperus rotundus* has limited activity against different forms of infectious diarrhea due to its selectively activity against diarrhoeal pathogens. This review discuss the

chemical constituents, pharmacological and therapeutic effects of *Cyperus rotundus* as promising herbal drug because of its safety and effectiveness.

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