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Review Article

## Unani Perspective and New Researches of Sa'ad ku'fi (*Cyperus rotundus*): A Review

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### ABSTRACT

*Cyperus rotundus L.* (cyperaceae) is an important medicinal plant which is used in traditional medicine particularly in Unani system of medicine. It is commonly known as *motha* which is a lawn grass and grows easily in tropical, subtropical and temperate regions. Major Chemical constituents enclosed with this herb are flavonoids, tannins, glycosides, furochromones, monoterpenes, sesquiterpenes, sitosterol, alkaloids, saponins, terpenoids, essential oils, starch, carbohydrates, protein, separated amino acids and many other secondary metabolites. Different parts of *cyperus rotundus* have been reported to possess multiple pharmacological actions like antibacterial, anticancerous, anticonvulsant, antidiabetic, antidiarrheal, antigenotoxic, anti-inflammatory, antilipidemic, antimalarial, antimutagenic, antioesity, antioxidant, anti-uropathogenic, hepatoprotective, cardioprotective, neuroprotective, and nootropic agent.

**Keywords:** Unani, sa'ad, flavonoids, sesquiterpenes, antibacterial, antilipidemic.

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### INTRODUCTION

*Cyperus rotundus* is a hugely versatile medicinal plant having potential pharmacological actions used world widely not only to treat various ailments but also as a preventive remedy. *Cyperus rotundus* belongs to family cyperaceae which is the largest family of monocotyledons. It is a pestiferous perennial weed found commonly growing in paddy fields in temperate and tropical region. Since ancient times many tribal communities in central and southern parts of India have recognized the curative capabilities of *cyperus* weed and used it to treat ailments such as gastrointestinal ailments, joint pains and wound healing. Many previous studies done on *cyperus rotundus* explains its pharmacological effects such as an antibacterial, antioxidant, improve impaired memory, One such study showed that administration of *cyperus* improved scopolamine induced learning and memory deficit in mice. Plant parts of *cyperus* used for different medicinal purposes are its rhizomes, tubers, basal bulbs and fibrous roots. Vividly, tuber part is used for dysmenorrhea and menstrual irregularities. Infusion of this herb has been used in treatment of fever, pain, diarrhea, dysentery and other intestinal problems.<sup>1,2,3,4,5,6</sup>

### Taxonomical classification<sup>7</sup>

- Kingdom: Plantae
- Subkingdom: Tracheobionta
- Super division: Spermatophyta
- Division: Magnoliophyta
- Class: Liliopsida
- Subclass: Commelinidae
- Order: Poales (Cyperales)
- Family: Cyperaceae
- Genus: Cyperus
- Species: Rotundus

### Vernacular Names

Arabic: Saad, Soadekufi; Bangali: Nagarmotha; Burma: Vomoni; English: Nut grass; Gujarat: Nagaramothaya; Hindi: Nagarmotha; Malaya: Mushkezamin; Persian: Mushkenezamin; Sanskrit: Chakranksha, Charukesara; Urdu: Saad kufi.<sup>8</sup>

## Distribution

*Cyperus rotundus* is a cosmopolitan weed found in tropical, subtropical and temperate regions and grows well in continents like Asia, Africa, Europe and America. It is indigenous to India and grows at an elevation of 1800m. It is an invasive weed hence it is also known as "World's Worst Weed" which grows easily in moist and fertile soils. *Cyperus* weed produces 40,000 kg/hectares of its underground plant material and fills the soil with its tangles of rhizomes and roots.<sup>4,9,10,11,12</sup>

## Description

*Cyperus rotundus* grows throughout the year and spreads through fibrous root system.

- Aerial part: stems are about 25cm long, hollow and overlapping with the leaves. Leaves are 5-20cm long linear, dark green and grooved on upper surface.
- Seed: These are in the form of trigonous nuts hence are three angled, oblong-ovate and yellow in color.
- Tubers: 1-3cm long and give rise to rhizomes, externally blackish in color and reddish white inside. It has a characteristic odor.
- Rhizomes: Scaly, creeping and bulbous at the base. These arise singly from the tubers.<sup>4,13,14,15</sup>

## Parts used

Roots and rhizomes<sup>16,17,18,19</sup>

## Temperament

Hot<sup>3</sup> and Dry<sup>3</sup>.<sup>16,17,18,19</sup>

## Taste

Bitter, sharp.<sup>16,17,18,19</sup>

## Colour

Blackish externally and whitish internally.<sup>16,17,18,19</sup>

## Odour

Fragrance odour.<sup>16,17,18,19</sup>

## Actions

*Muqawwi e Dimagh* (brain tonic)<sup>16,17,18,19</sup>

*Muqawwi e qalb* (cardio tonic)<sup>16,17,18,19</sup>

*Muqawwi e Aasab* (neuro tonic)<sup>16,17,18,19</sup>

*Muqawwi e maida* (gastric tonic)<sup>16,17,18,19</sup>

*Kasir Riyah* (carminative)<sup>16,17,18,19</sup>

*Mudirre Baul wa Tams* (diuretic and emmenagogue)<sup>16,17,18,19</sup>

*Qatil e kirme shikam* (vermicide)<sup>16,17,18,19</sup>

*Mujaffif* (desiccative)<sup>16,17,18,19</sup>

*Musakkin* (analgesic)<sup>16,17,18,19</sup>

*Mufatteh* (deobstruent)<sup>16,17,18,19</sup>

*Mudammil* (cicatrizant)<sup>16,17,18,19</sup>

*Mushtahi* (appetizer)<sup>16,17,18,19</sup>

*Dafa e atash*<sup>16,17,18,19</sup>

*Dafa e humma* (antipyretic)<sup>16,17,18,19</sup>

*Qabiz* (astringent)<sup>16,17,18,19</sup>

*Muarriq* (diaphoretic)<sup>16,17,18,19</sup>

*Mufatteh* (vasodilator)<sup>16,17,18,19</sup>

*Muqavvi hafizah* (memory enhancer).<sup>16,17,18,19</sup>

## Main actions

Gastric mucus, spasm, nausea, epilepsy.<sup>16,17,18,19</sup>

## Uses

*Muh ki badboo* (halitosis)<sup>16,17,18,19</sup>

*Zofe Meda* (gastric weakness)<sup>16,17,18,19</sup>

*Zofe Asab*(neural weakness)<sup>16,17,18,19</sup>

*Zofe Dimagh* (weakness of brain)<sup>16,17,18,19</sup>

*Yarqan*(jaundice)<sup>16,17,18,19</sup>

*dard e sar* (headache)<sup>16,17,18,19</sup>

*bawaseer* (piles)<sup>16,17,18,19</sup>

*khafkaan* (palpitation)<sup>16,17,18,19</sup>

*Bichchu ka zeher* (scorpion sting)<sup>16,17,18,19</sup>

*Nafakh e shikam*(flatulence)<sup>16,17,18,19</sup>

*Taqteer ul baul* (dripping of urine).<sup>16,17,18,19</sup>

## Dose

3.5 to 4.5gm.<sup>19</sup>

1-3 gm.<sup>18</sup>

## Toxicity

Throat and lungs.<sup>16,17,18,19</sup>

## Correctives

Shakar(sugar), Sirka(vinegar), sandal(*Santalum album*), anisoon(*Pimpinella Anisum*).<sup>17</sup>

## Substitutes

Sumbul ut teeb humwazan (*Nardostachys jatamansi* equal in weight)

Murmuki nisf wazan (*Commiphora Myrrha* half in weight)

Darchini chauthai wazan (*Cinnamomum zeylanicum* one fourth in weight).<sup>19</sup>

## Compound formulations

Anqaruya Sagheer, Jawarish Jalinoos, Dawa e Bawaseer.

## Phytochemistry

Major chemical components found in *Cyperus rotundus* are fat, gum resins, carbohydrates, essential oils, flavonoids, saponins, terpenoids, mono-and sesquiterpenes, albuminous matters, fibers and ash. The plant contains the following essential oil, 1,8 cineole, 4a, 5  $\alpha$ -oxidoeudesm-1 l-en-3a-ol, Alkaloids,  $\alpha$ -cyperone,  $\beta$ -cyperone,  $\alpha$ -pinene,  $\beta$ -pinene,  $\beta$ -rotunol,  $\alpha$ -Selinene,  $\beta$ -selincne, camphcne, cyprotene, acopaene, cyperene, aselinene, rotundene, valencene, cyperol, gurjunene, trans-calamenene, dcadinene, gcalacorene, cadalene, amuurolene, gmuurolene, cyperotundone, mustakone, isocyperol, acyperone, 4,11-selinnadien-3-one and 1,8-cineole, valerenal, myrtenol and sesquiterpene hydrocarbons (*Caryophyllene*). Flavonoids,  $\gamma$ -cymene, isocyperol, isokobusone, kobusone, limoncnc, linolcic-acid, linolenic-acid, mustakonc, a new saponin, myrislic acid and oleanolic-acid, Oleanolic-acid- 3-O-neohesperidoside ,

oleic-acid, p-cymol, patchouienone, pectin. Polyphenols, rotundene, rolundenol, Rotundone, selinatriene, sitosterol, stearic-acid, sugeonol, sugetriol are present in the plant. 3,20,21,22,23,24,25,26

## Pharmacological Actions

### • Anti-Hyperlipidemic

Chandratre RS (2011) stated that Hypolipidaemic activity of *Cyperus rotundus* rhizomes was evaluated in high fat diet induced hyperlipidaemic rats. The results demonstrated statically significant reduction in serum lipid profile. Treatment with different doses of extract exerted statistically significant reduction in serum total cholesterol, LDL, TG levels at the end of 15 days of intervention. 27,28,29

### • Anticytotoxic

Kilani et.al (2008) reported that the ethyl acetate extracts of *Cyperus rotundus* suppreses growth and proliferation of L1210 cells derived from murine lymphoblastic leukaemia by MTT assay. Hemanth Kumar et al.(2014) also reported the cytotoxic activities of *C. rotundus* extracts in cell culture SH-SY5Y cells. Kilani et al. suggested that *Cyperus rotundus* essential oil from Tunisia was very effective against L1210 leukaemia cells line by MTT assay. 30,31

### • Improved impaired memory function

Mehdi Mehdizadeh, et.al. (2017) study findings showed that *C. Rotundus* could improve the learning impairment, following the amyloid  $\beta$  treatment, and it may lead to an improvement of Alzheimer Disease-induced cognitive dysfunction. 32,33,34

### • Antibacterial

The Antibacterial activity of *Cyperus* oil was studied for various microorganisms (S. aureus, Klebsiella pneumoniae, Proteus vulgaris, Streptococcus pyogenes, E. coli and P. aeruginosa) using inhibition zone method (Aromatogram). The oil of *C. rotundus* was shown a remarkable activity against Gram-positive bacteria, less antibacterial activity was found against Gram-negative bacteria and no activity were observed with the oil against P. aeruginosa and P. vulgaris. 30,35,36,37

The hydrodistilled oil of *C. rotundus* was found to be effective against various bacterial and fungal strains viz. *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* in different concentrations. 3,9,20,38,39,40

### • Ovicidal and Larvicidal activity

The ovicidal and larvicidal effect of essential oils extracted from the tubers of *C. rotundus* was studied on eggs and fourth instar larvae of *Aedes albopictus*. The eggs and

larvae were exposed to serial concentration of the oils ranging from 5 to 150 ppm and kept under observation for 24 h. Both the oils showed remarkable ovicidal and larvicidal activities. The results obtained suggested that the essential oils of these *Cyperus* species can serve as a potential source of natural mosquitocidal agents. 9,41

### • Insect repellency activity

Hexane extract of tuber of plant *C. rotundus* was screened under laboratory conditions for repellent activity against mosquito vector *Anopheles culicifacies*, *Anopheles stephensi* and *Culex quinquefasciatus*. The *C. rotundus* tuber extract was used to determine their effect on mosquito vector and comparison with the N, N-diethyl-3-methylbenzamide. Result obtained from the laboratory experiment showed that the tuber extracts are more effective for repellency of the entire mosquito vector even at a low dose. 13,42,43

### • Antidiabetic activity

Pradeep singh, Ratan Lkhosa et.al. (2015) study showed that the ethanolic extract of *cyperus rotundus* at dose levels of 250 and 500 mg/kg body weight revealed significant antidiabetic activity, improvement in body weight, and reduction in elevated biochemical parameters such as SGPT, SGOT, cholesterol, and triglyceride levels. 25,44,45,46

### • Antioxidant activity

In vitro antioxidant activity of Nagulendran stated that the extract of *cyperus rotundus* was effective in preventing mitochondrial lipid peroxidation induced by FeSO4 ascorbate in concentration dependent manner. The results obtained in the present study indicate that *C. rotundus* rhizomes extract can be a potential source of natural antioxidant. 30,47,48

### • Wound healing activity

To evaluate the wound healing activity of extract of tuber parts of *Cyperus rotundus*. An alcoholic extract of tuber parts of *Cyperus rotundus* was examined for wound healing activity in the form of ointment in three types of wound models on rats: the excision, the incision and dead space wound model. The extract ointments showed considerable difference in response in all the above said wound models as comparable to those of a standard drug nitrofurazone ointment (0.2 % w/w NFZ) in terms of wound contracting ability, wound closure time and tensile strength. 25,37,40

### • Hepatoprotective activity

The hexane fraction of *Cyperus rotundus* might be a remedy for fatty liver disease through the selective inhibition of the lipogenic pathway. 13

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