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Nut grass: A plant with significant medicinal values

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Abstract

Plants are the most prolific and significant sources of medicine. Plants are used as a traditional medicine around the globe from the beginning of civilization. Researchers are always trying to find out potential medicine or lead compound from the plants. Data regarding the traditional uses with isolated phytochemicals and pharmacological activities is helpful to evaluate potentiality in medicinal sector for a plant. Therefore, my objectives of this study is to compile all the significant data of *Cyperus rotundus* plant which is very useful plant in folklore medicine of Asian countries. To complete the article, I have searched information based on published article related to *C. rotundus* plants. Articles were collected from Google scholar, Pubmed, Springer, Science direct and many other renowned websites. I hope this article will be helpful to researchers to know the significance of *C. rotundus* plants in medicinal sector.

Keywords: *Cyperus rotundus*, pharmacological, phytochemistry, traditional, medicinal

Introduction

Medicinal Plants have eminent qualities for producing new drugs of massive advantage to humankind. There are manifold ways to the exploration for newly biological effective principles in higher plants^[1]. Many secondary metabolites are generally produced from plants that comprise an important source of many pharmaceutical drugs^[2]. Many attempts have been made to find out newer hypnotic and sedative drugs from different kinds of plants. Sedative and hypnotics are the drugs that can alleviate anxiety and generate a calming effect by initiating the commencement of sleep and preserving sleeping duration^[3]. At present, these drugs are broadly applied in the treatment of several psychiatric disorders comprise in insomnia and anxiety^[4]. Insomnia termed as static inconvenience in falling or staying a sleep which influences function can conduce important physical and psychological disorder^[5].

Cyperus rotundus L. (Nutgrass, family Cyperaceae) is extensively distributed in numerous tropical and subtropical territory of the world^[8]. In Bangladesh *Cyperus rotundus* mostly known as “motha” or “bada”. The term *Cyperus* is derived from *Cypeiros*, which was the ancient Greek name for the genus, *rotundus* is Latin word for round and refers to the tuber^[9]. It is an erect, smooth and perennial medicinal plant having scaled, wiry, creeping, slender, tenebrous and persistent rhizomes^[10]. Its tubers are used to treat excess bleeding, loss of appetite, boils, blisters, diarrhea, cough, fevers, lacteal disorders, inflammation, rheumatoid arthritis, stomach ailments, skin rashes, vomiting, excessive thirst, wounds and worm infestation^[11-13]. Also, they are used as a remedy for renal colic and dysentery^[14]. Moreover the plant possesses several biological deeds such as antioxidant, cytotoxic^[15, 17], anti-allergic^[18, 19], insecticides^[20, 21], anti-malarial, antimicrobial^[22, 23], anti-diarrheal^[24], antipyretic, inflammatory, antiemetic, hypotensive^[25], hepatoprotective^[26, 27], anti-diabetic^[17, 26, 28] and anticonvulsant^[29].

Phytochemical analysis has demonstrated that the principal chemical components of this herb are essential oils, terpenoids, mono sesquiterpenes and flavonoids. The plant includes the following chemical components; acyperone, isocyperol, cyperotundone, mustakone, cyprotene, acopaene, cyperene, aselinene, rotundene, valencene, cyperol, gurjunene, trans-calamenene, dcadinene, gcalacorene, cadalene, amurolene, gmurolene^[30], 1,8-cineole and 4,11-selinnadien-3-one^[31]. The oil of *C. rotundus* was chiefly made of α -cyperene, cyperol, α -cyperone, rotundine, α -copaene, β -pinene, α -pinene and α -Selinene, myrtenol, sesquiterpene hydrocarbons (Caryophyllene), valeranal^[32, 33].

The medicinal benefits of different natural components were established in different aboriginal societies. Development of modern medicine took those conventional experiences as its base and became well-established. Modern medicine is at the apex of success to combat diseases. Different researches are being conducted all over the world through the year round to promote efficiency of the present drugs, to find new components with minimum untoward effects and

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to design new ways of treatment. This study was designed to sum up all the important information related to nut grass so that researchers can find it helpful to their future research.

General Description

Cyperus rotundus (coco-grass, Java grass, nut grass, or purple nutsedge, red nut sedge [34], Khmerkravanh chru [35]) is a species of sedge (Cyperaceae) native to Africa, southern and central Europe (north to France and Austria), and southern Asia. Cyperous derives from a Greek word kyperos and the word rotundus derives from Latin which means round [36].

C. rotundus is perennial plant with maximum height of 140 cm (55 inches). Nut grass name is derived from the tubers of the plants which has similar appearance of nuts. The genus *Cyperus* has 700 species distributed throughout the world [37, 38]. This plant is usually grow near water or place with slow moving water. It has slender grass like leaves, greenish flower and small nutlet seed [39-41].

Taxonomic Hierarchy [42, 43]

Kingdom: Plantae

Sub kingdom: Tracheobionta

Superdivision: Spermatophyta

Division: Magnoliophyta

Class: Liliopsida

Subclass: Commelinidae

Order: Cyperales

Family: Cyperaceae

Genus: *Cyperus*.L

Species: *Cyperus rotundus* L

Pharmacological Activities

Antidiarrheal activity of *C. rotundus* was observed in castor oil induced diarrheal mice and methanolic rhizome extract showed significant antidiarrheal activity [44]. Study done by Nagulendran *et al.* claimed that rhizome extract of *C. rotundus* have potential antioxidant activity [45]. Oils extract of *C. rotundus* exhibited significant activity against Gram positive bacteria, moderately significant activity against mycobacterium and fungi but insignificant activity against

Gram negative bacteria in disc diffusion method [46]. Results obtained from a study revealed that hexane extracts of *C. rotundus* can be used against liver diseases as it can inhibit lipogenic pathway [47]. *C. rotundus* plant extract significantly reduced blood glucose level in a study against alloxan induced hyperglycemic in rats [48]. Alcoholic extract of *C. rotundus* demonstrated anti-inflammatory effects in carrageenan induced oedema and gave activity against formaldehyde induced arthritis in rats [49]. Analgesic activity was also found in petroleum ether extracts of *C. rotundus* but sedative activity was absent [50, 51].

Chemical Constituents of Rhizomes

The rhizome extract of plant have significant chemical value with presence of α -cyperolone, α -rotunol, β -cyperone, β -pinene, β -rotunol, β -selinene, calcium, camphene, copaene, cyperene, cyperenone, cyperol, cyperolone, D-copadiene, D-epoxyguaiene, isocyperol, isokobusone, kobusone, limonene, linoleic-acid, linolenic-acid, mustakone, myristic acid, oleanolic acid, oleic acid, P-cymol, patchoulone, rotundene, rotundenol, rotundone, selinatriene, sitosterol, stearic acid, sugeonol, sugetriol, caryophyllene and cyperotundone [52].

Chemical Constituents of Leaves

Sitosteryl (6-hentriacontanoyl)- β -D-Galactopyranoside, Some furochromones, khellin, visnagin and ammiol, bezo- α -pyrone (coumarin), salicylic acid, caffeic acid, protocatechuric acid, P-coumaric acid, triclin and isohammetin.

The oils extracted from the plant has compound comprising of sesquiterpene hydrocarbons, contains α -copaene (1.97%), Cyperene (15.73%), α -hisaholene (2.14%), α -gurjunene (1.29%), 2-methoxy-8-methyl-1, 4-naphthalenedione (4.01%), β -selinene (17.99%) Oxo- α -ylangene (3.00%), 4, 4 α -5, 6, 7, 8-hexahydro-4 α -5dimethyl-3-(1-methyl ethylidene)-2(3H)-naphthalenone (8.11%), α -cyperone (26.15%), Logipinocarvone (1.11%). Overall Presence of Glucose (8.3~9.1%), Fructose (1.0~1.7%), Starch 40-41.1%), Protein (4.9%), Mg 1285.7 μ g [53-55].

Traditional Uses of *C. rotundus*

Table 1: Traditional uses of *C. rotundus* to treat various diseases [56-62]

Traditional uses for		Usable plant parts	Methods of using
Internal Uses	Chest pain	Whole plant	Whole plant is boiled to decoction and then 4 to 9 grams of plant preparation taken with 4 gm of Citrus.
	Painful menstruation	Whole plant	2 to 6 gm of dried material in a standard cup of water, boil to concentration and drink [61]
	Dysentery	Tubers	Grind nut grass tuber and ginger with honey into pill form taken.
	Diarrhea:	Tubers	Tubers boiled in milk with three folds of water used to cure diarrhea [62].
	Asthma		25 gm of powdered tuber of <i>Cyperus rotundus</i> , 21 numbers of piper nigrum, 10 gm of ginger, 5 gm of clove and 5 gm of cumin seeds were boiled with ghee for few minutes, then cool it to become a paste. Take 10 ml of this paste thrice a day for 5 days with a little honey.
	Worm infection		Rhizome is made into a paste and 10-20 gm of it is eaten 3 times a day for 2-3 days for anthelmintic action.
	Rheumatoid arthritis	Root	<i>Cyperus rotundus</i> root powder and <i>Withania somnifera</i> root powder each 1 gm is given oral twice a day for Rheumatoid arthritis.
	Mental debility and Epilepsy	Whole plant	Powdered plant extracts is taken along with cow's milk.
	Polydipsia in diabetes	Tubers	Tuber is sliced and dried in sun and powdered, to the 5 gm of powder add 2 black pepper and is prescribed for polydipsia in diabetes
	Lactation	Root	The decoction of its roots is the best remedy for purifying the breast milk in lactating mothers.
	Obesity	Root	Oral administration of 1 gm of nut grass root powder twice a day shows significant reduction of body weight.
Bronchitis	Tubercles	A decoction prepared from 10g of the crushed tubercles in 100ml of water with a little salt is given twice a day for 2-5 days to treat bronchitis.	
External	Conjunctivitis:	Root	The root extract oil instilled into eyes in conjunctivitis reduces the pain, redness and ocular

Uses			discharges.
	Sprains & bruises		Use pounded fresh material as poultice.
	Obesity	Whole plants	The massage with its dry powder is beneficial for reducing the subcutaneous fat deposition.
	Sores on head	Tubers	Grind the tubers of <i>Cyperus rotundus</i> (25 g), and the tender leaves of <i>Terminalia bellerica</i> into pastes to apply it on the head before bath.
	Headache	Tubers	Grind the tuber of <i>Cyperus rotundus</i> into paste. Apply this paste on fore head only once to relief from headache.
	Skin diseases	Whole plant	Grind 25 g of <i>Cyperus rotundus</i> whole plant into paste and apply this paste on itching area.
	Spreading ulcer	Tubers	Dry powder of tuber is used as dusting in Spreading ulcer.

Conclusion

This article was designed to summarize important information of *Cyperus rotundus*. All the information was collected from literature search. Intention of the study was to help people find information regarding phytochemistry, traditional uses, and pharmacological activities *C. rotundus* in one article. So that, researcher can find its potential medicinal value for future research.

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