WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Cyperus Scariosus: A Multifaceted Medicinal Herb with Promising Pharmacological Potential

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ABSTRACT :

Cyperus scariosus, commonly known as Nagarmotha or Nut Grass, is a medicinal plant widely used in traditional medicine, particularly in Ayurvedic practices. This plant, belonging to the Cyperaceae family, is known for its diverse therapeutic properties, including anti-inflammatory, anti-hyperglycemic, antimicrobial, and hepatoprotective activities. It is primarily utilized for treating ailments such as diarrhea, epilepsy, liver disorders, and various gastrointestinal and cardiac conditions. The plant's roots and rhizomes, which contain essential oils and a variety of bioactive compounds, have been shown to exhibit pharmacological benefits such as hypotensive, analgesic, and spasmolytic effects.

Phytochemical analysis reveals the presence of compounds such as terpenoids, flavonoids, glycosides, and sesquiterpenes, which contribute to its therapeutic efficacy. Furthermore, the essential oils obtained from the plant's rhizomes demonstrate antibacterial, antifungal, and plant growth-regulating properties. Despite its promising pharmacological activities, further research is needed to isolate and identify the specific metabolites responsible for its therapeutic effects. With its broad spectrum of biological activities, C. scariosus holds significant potential for the development of natural medicines and nutraceutical products. This review provides an overview of the botanical profile, therapeutic uses, phytochemistry, and pharmacological activities of Cyperus scariosus, highlighting its potential as a valuable resource in the pharmaceutical and healthcare industries.

Keywords: Cyperus scariosus , Essential oil , Pharmachological activities , Phytochemistry , Traditional medicine .

Introduction :

Medicinal and aromatic plants are widely used as medicine and constitute a major source of natural organic compounds. The traditional medicinal methods, recognized as alternativesystem of medicine, still play an important role to cover the basic health needs in the developing countries[1]. As indicated by World wellbeing association (WHO) over 80% of the total populace relies on conventional medication for their essential medical services needs.Natural medication, alludes to the utilization of a plant's seeds, obstructions, roots, leaves, bark, or blossoms for restorative purposes[2]. The restorative plants because of their most un-secondary effects when contrasted with manufactured synthetic compounds are utilized for the treatment of different infections. Normally happening naturally dynamic mixtures, for example, rejuvenating balms furthermore, a few plant removes are less unsafe and address a rich wellspring of potential diseasecontrol specialists [1].

Many individuals presently utilize natural items consistently, to keep up with great wellbeing, as well as to treat ailment. By and large, all drug arrangements are gotten from plants, whether as crude plant materials or in the refined type of unrefined concentrates, blends, etc[3]. By and large, all drug arrangements are gotten from plants, whether as crude plant materials or in the refined type of rough concentrates, blends, etc [4]. Cyperus scariosus has a place with family Cyperacae normally known as "Nagarmotha" in Hindi and "Nut grass" in English[4,23]. Cyperus scariosus is a significant multipurpose restorative spice of huge cosmopolitan group of monocotyledons containing around 3700 species inside 70 genera. C. scariosus is pestiferous enduring, fragile thin sedge tracked down ridiculously in different pieces of the country, around streams, cascade particularly in moist or muddy area[1,39].

These species are generally disseminated, with the focuses of variety for the gathering happening in tropical Asia and tropical South America. Environmental people group overwhelmed by sedges are

known as sedgelands[6]. The nut sedges start from tropical and subtropical regions. The plant produces rhizomes, tubers, basal bulbs and sinewy roots subterranean and rosettes of leaves, getaways and umbels above ground5 The neighborhood customary medication experts recommends it to treat a different illnesses including the runs, epilepsy, gonorrhea, syphilis and liver damage[21].

There are different enemy of hypertensive plants accessible in customary medication, and their screening has been acted in a few creature models38. The natural balm of C. scariosus has hypotensive, mitigating, antimicrobial as well as CNS invigorating properties while the rhizome is utilized as a diuretic, stomachic and antidiarrheal[31]. The natural oil acquired on steam refining of rhizomes and underlying foundations of the plant has its worth in perfumery and is additionally referred to have antibacterial , antifungal as well as plant development directing properties, pain relieving and antidiabetic movement, hepatoprotective action, hypotensive and spasmolytic action. This plant is generally utilized for diuretic, astringent, mitigating, antimicrobial, energizer of focal apprehensive system[7]. The phytochemical and pharmacological exercises of C. scariosus have upheld its conventional as well as imminent purposes as a significant ayurvedic plant. This audit covers the phytochemistry and pharmacological activites of the plant and its rejuvenating oil. gives an outline on strong pharmacological properties displayed by this plant.

BOTANICAL PROFILE [6,8] :

Cyperus scariosus R.Br belongs to Cyperaceae family, which are well reputed plants in the traditional systems of medicine. Although they grow in different agro-climatic conditions.

Kingdom: Plantae

Sub phylam : Angiosperms

Class : Monocots

Family: Cyperaceae

Genus: Cyperus

Species: C. scariosus

Ocurance and distribuation :

Cyperus scariosus is broadly conveyed in India, particularly in Chhattisgarh, Bihar, Orissa, West Bengal and Uttar Pradesh. Nagarmotha is additionally tracked down in South Africa, China and Pacific Islands. It is viewed as irksome in 92 nations and antagonistically influences more than 30 crops[40,47]. The plant is notable for its purposes in the Indian Arrangement of Medication (ISM) for an assortment of direction. C. scariosus fills in sodden spots in U.P., Bengal and southern piece of India. It is additionally present in Chattarpur and Katni regions in Madhya Pradesh and connecting regions. The sort Cyperus is broadly dispersed all through the world and comprises of around 700 types of which around 60 species happen in India. Cyperus scariosus is sensitive thin sedge tracked down in moist places The roots and tubers of C. scariosus are significant elements of a few Ayurvedic preparations[5]. The business oil of Cyperus is known as cyperiol or oil of cyperiol, which is acquired from the rhizomes of C. scariosus byhydro-distillation[45]

Other than refining, rhizomes are utilized as such in 'dhoops', 'havansamgri', hina, hair oils and furthermore as medications. The primary market of C. scariosus rhizomes is in Mau-Ranipur of Jhansi region (U.P), from where the perfumers get the provisions of the material for their processing[45].

Description of plant parts :

A little spice that looks like grass, Cyperus scarious has a sensitive, precise stem and underground rhizomatous tubers. A spice is globous. The meager, 0.8-5.0 cm by 0.25 cm stolon are shrouded in elliptic, intense, remiss, striate, concolor us scales. The stem is 40-90 cm long, 1/8 inch long, thin, and triquetrals at the tip[2].

Root :

The roots and tubers of C. scariosus are significant elements of a few Ayurvedic arrangements. It is profoundly valued in India for its underlying foundations and is utilized in fragrance based treatment, as a scent and for the majority different purposes. The medicinal oil got after steam refining of rhizomes and underlying foundations of the plant has its worth in perfumery , and is likewise known to have antibacterial , antifungal and as well as plant development managing properties. The dried tuberous foundations of C. scariosus are utilized in customary medication. s. Cyperus develops quickly and fills the dirt with its knot of roots and rhizomes cell[14,32].

Leaves :

Leaves typically more limited than the stem, straight inflorescence an umbel of pretty much consolidated spikes; bracts foliar, for the most part surpassing the umbel. Spikelets pale, yellow, or brown, frequently with rosy hint. Glumes decurrent beneath as hyaline wings. Nuts obvoid ellipsoid. . The leaves of plant are utilized for making mats. Certain individuals to some extent consume it to eliminate the rootlets happening on it. Leafless or verdant shoots are created above ground[41].

Flower and fruit :

Bloom and organic product Blossoms are borne in contracted umbels; spikelets direct, pale strwcolour. Natural products are three-sided nuts. Blossoms and natural products develop during stormy season[10]. : blossoms are 5-17.5 cm long. In C. scariosus, blossoming is found in July and natural products are shaped in December.are direct straw hued

Therapeutic uses :

Inside, it is utilized in shortcoming of heart, mind, and stomach.it isuseful in hack and fever brought about by balgham (phelgm) and yellow bile it is valuable in the runs thirst and hemorrhoids .it prompts obstruction and is compelling as a vermicide[51]. It help wih gastroitestinal and cardiovascular circumstances . it is directed orally as fever since it is diaphoretic it is helpful asantimetic and ulcers of mouth . nagarmotha is helpful in thirst and sickness . orally and locally helpful in scorpion chomp . remotely it is helpful washing hairs in ayurveda ,nagarmotha is advantageous in treatment of fever brought about by disturbed pitta in looseness of the bowels ,anxorexia thirst consuming sensation and weariness [22].

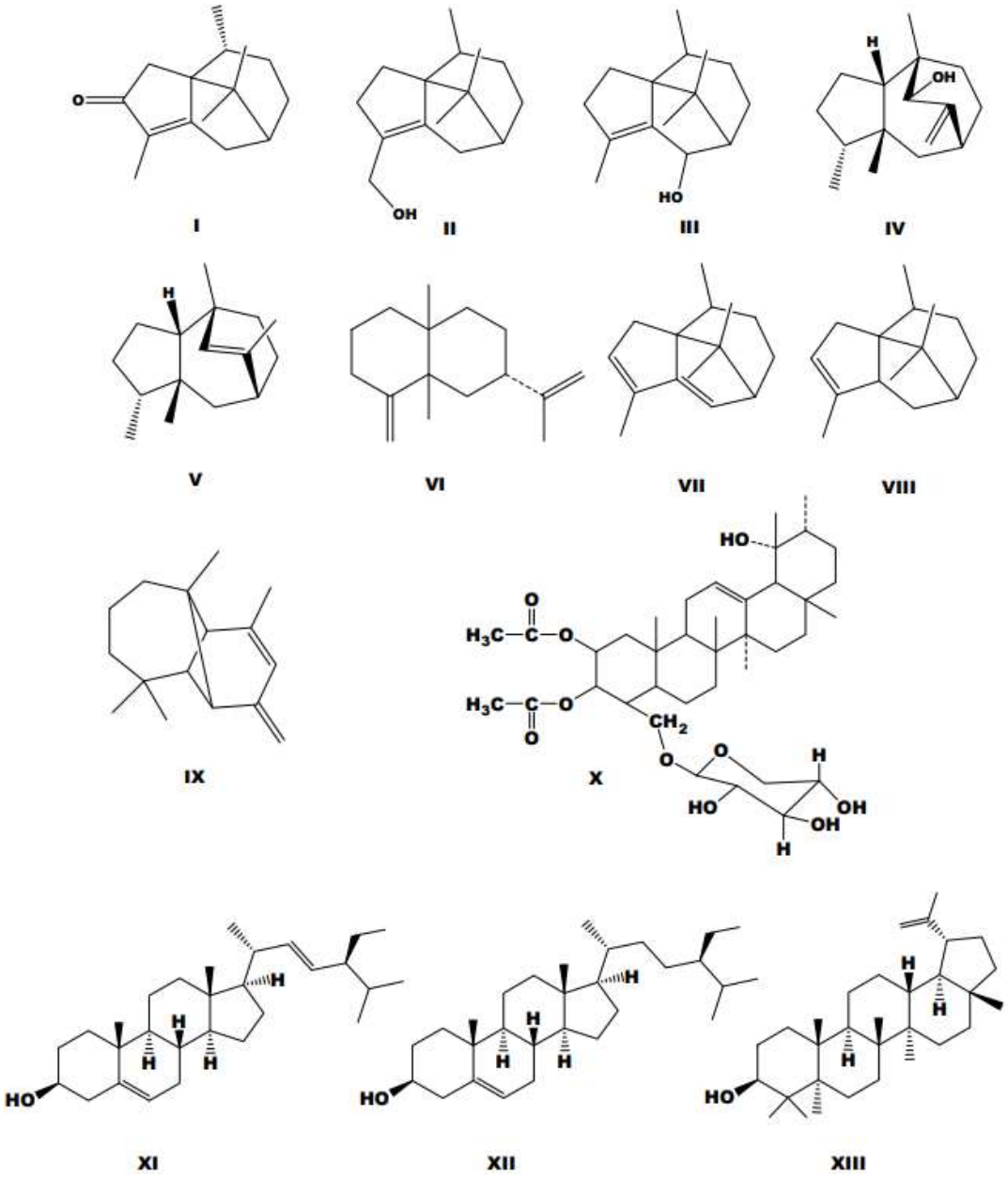
Phytochemistry profile of cyperus scariosus :

The different dissolvable concentrates were exposed to phytochemical examination to research the presence or nonattendance of different phytoconstituents like glycosides, terpenoids, saponins, phytosterols, alkaloids, phenolic compounds, tannins, flavonoids and diterpenes according to the standard strategies . Phytochemical examination showed the presence (+) and nonappearance (−) of phytochemical intensifies in various dissolvable extractions. Petrol ether, hexane, chloroform, ethyl acetic acid derivation, methanol and ethanolic extraction divisions uncovered the presence of phenolic compounds and terpenoids[20]. Phytosterols and tannins are found in all solvents aside from petrol ether9. Glycosides and saponins demonstrated to be positive in solvents like ethyl acetic acid derivation, methanol and CH3)2CO separately. Among every single dissolvable concentrate, methanol extricate hold all phytoconstituents and in this manner it is utilized for additional biochemical analysis[24].

Phytochemical concentrates on uncovered that Cyperus scariosus has various synthetic constituents, significant compound constituents of this spice are medicinal ointments, flavonoids, terpenoids, mono and hydrocarbons steroids, ketones[28]. t the natural balm of C. scariosus contains a bicyclic ketone, a tricyclic tertiary liquor and a tricyclic sesquiterpene hydrocarbon. a-cyperone(III), a-rotunol, ß-cyperone, ß-pinene, ß-rotunol, Calcium, , Cyperene, Cyperenone, Cyperol (IV), Cyperotundone(V), Isocyperol(VI), Isokobusone, Linoleic-corrosive, Magnesium, Manganese, , Stearic corrosive, Sugeonol (VII), Sugetriol,a-cyperone, B-cyperene(VIII), cyperotundone, patchoulenone, sugeonol, and isokobusone a large number of which might show pharmacological movement, yet the really dynamic parts have all the earmarks of being the sesquiterpenes[15]. Stigmasta-5,24(28)- diene-3-B-O-a-L rhamnopyranosyl-O-B-D-arabino-pyranoside (IX) new glycoside was confined from the leaves and (-)- β-selinene (X) and another tricyclic hydrocarbon, isopatchoula-3,5-diene (XI) secluded from Cyperus scariosus oil. Rejuvenating oil, sesquiterpene", cyperenone, cyperenol, patchoulenol, isopatchoulenone, Rotundene(XII), rotundenol, 2, 3-of stomach muscle diacetoxy-19-hydroxy-urs-12-ene-24-O-B-D 2 xylopyranoside (XIII) separated from rhizomes of this plant[16].

A few unstable mixtures including cuperine (15.8%), isopapatchoulene, selina-4(5) - en-3-one , selina-4,(5), 7(11)- dien - 12-old and patchoulanol have been accounted for from the oil. Steam refining of the tubers of cypriol yields 0.075-0.080% of a natural balm, the chief substance of which is cyperine. A new hydrocarbon isopatchoul-3-ene has been disconnected from the natural balm of Cyperus scariosus[17].

C. scariosus contains a bicyclic ketone, a tricyclic tertiary liquor and a tricyclic sesquiterpene hydrocarbon. detailed the seclusion of a new sesquiterpene ketone isopatchoulenone (I) which was structuraly like patchoulenone from C. scariosus. separated two sesquiterpene alcohols, cyperenol (II) and patchoulenol (III) from the alcoholic parts of the rejuvenating oils of the tubers[48]. laid out the design and stereochemistry of scariodione, from the oil of Cyperus scariosus segregated rotundene (IV) and rotundenol (V) sesquiterpenes from C. scariosus and the design was laid out by sesquiterpenoids hydrocarbon (-)- beta-selinene (VI) and the new compound isopatchoula 3,5-diene (VII) was segregated from the natural ointment of C. scariosus rhizome]. detached another hydrocarbon, isopatchoul-3-ene (VIII) which on unearthly portrayal was viewed as a tricyclic compound with an isopatchoulane type carbon skeleton[4]. Longiverbenone (IX), a normally happening sesquiterpene was secluded from ethanolic concentrate of C. scariosus rhizome by dissolvable partioning and chromatographic method another compound, 2, 3-diacetoxy-19-hydroxy-urs-12-ene-24-O-β-D-xylopyranoside (X) from tubers of C. scariosus. The primer phytochemical examination of hexane and chloroform concentrates of C. scariosus rhizomes chromatograph on silica gel prompted the segregation of stigmasterol (XI), β-sitosterol (XII) and lupeol (XIII) as significant constituents examined the phytoconstituents of the leaves of C. scariosus and confined a phenolic glycoside[27].



Fig(1).Compounds Isolated From Cyperus Scarious

Pharmacological :

Anti-inflammatory Activity :

The oil of C. scariosus roots was found to have potent antiinflammatory activity in a dose of 100mg/kg intraperitonially in rats against carrageenan induced edema, adjuvant arthritis and cotton pellet induced inflammation[19,43].

Anti-hyperglycemic activity and Antinociceptive activity :

The outcomes from the examination proposed that the methanol concentrate of Cyperus scariosus departs displayed portion reliant and huge enemy of hyperglycemic movement in glucose-prompted hyperglycemic mice[1]. The concentrate showed next with no impact at lower portions except for at higher dosages showed massive impact contrasted with control. The methanol concentrate of C. scariosus departs has had helpful impacts as a pain killer and furthermore in diminishing the raised blood glucose level of hyperglycemic mice[34].

Glucose resilience property of C. scariosus not entirely settled on mice. Six gatherings of abstained seven mice each were made Antinociceptive movement of Methanolic leaf concentrate of Cyperus scariosus was resolved involving a model of acidic corrosive prompted gastric torment in mice and hostile to hyperglycemic action through glucose resistance test utilizing glucose stacked mice. The methanolic leaf separate showed portion subordinate critical agony hindrance contrasted with control in squirming measures actuated by acidic acid[35].

Antidepressant activity :

The review was attempted for similar pharmacological assessment of Cyperus scariosus oil and imipramine for energizer action. The outcome shows Cyperus scariosus oil has stimulant impacts Imipramine and natural concentrate of Cyperus scariosus oil were oppressed for its upper action utilizing two distinct exploratory models of sorrow Tail Suspension test (TST) and Constrained Swim Test (FST) in Swiss pale skinned person male mice.

The n-hexane concentrate of C. scariosus oil displayed stimulant movement in mice. With two portion levels at 100 and 200mg/kg stimulant action was screened utilizing constrained swim test and tail suspension test in mice and results were contrasted and standard medication (imipramine) at 15mg/kg. C. scariosus n-hexane separate oil fundamentally[25].

Antifungal activity :

Rejuvenating balms from leaves of 14 plants were tried for their antifungal properties against 6 dermatophytes . Natural ointment from Cyperus scariosus showed high action against all the dermatophytes, while oils from the growths did the antifungal action of steam refined rejuvenating balm, hexane concentrate of new and refined C. scariosus rhizome from Uttar Pradesh (India) and Madhya Pradesh (India) against the phyto-pathogenic parasite Rhizoctonia solani[12].

Antibacterial Activity

It is evident from the study that longiverbenone isolated from Cyperus scariosus rhizome exhibited moderate to good antibacterial activity against the organisms tested herein. It appeared that the compound gave moderate to good antibacterial activity against all the test bacteria[26] The in vitro antibacterial activities of the column separated fractions and of the chemically isolated pure compound Longiverbenone is a naturally occurring sesquiterpene isolated from ethanolic extract of Cyperus scariosus rhizome by solvent-solvent portioning and chromatographic technique[37]. The antibacterial activity of longiverbenone was evaluated against eleven potential human pathogenic bacteria using disc diffusion method[18,44].

Immunosuppressant Activity :

The results from the investigation suggested that Cyperus scariosus causes immune suppression by inhibiting Th1 cytokines in Balb/C mice .The extract was fractionated with chloroform, n-butanol and water and then used to investigate the T-cell specific immune suppressive potential of these fractions by flow cytometry . Cyperus scariosus inhibited both humoral and cell-mediated immune responses significantly ($p < 0.01$) by suppressing primary (26.8 %) and secondary (29.7 %) antibody titres, and also inhibited cell-mediated delayed type hypersensitivity (DTH) immune response (45.9 %) at 600 mg/kg dose, phagocytosis - both in vitro (37.4 %) and ex vivo (37.8 %) and delayed the graft rejection time (45.8%), thus confirming marked immunosuppression[33].

Cytotoxic Activity :

Cytotoxic activity of longiverbenone was determined on new borne brine shrimp . It showed moderate to good antibacterial activity against the test organisms tested herein. The shrimp according to an established method[37]. The median lethal concentration 50% (LC50) of the test compound (1.5625 to 20µg/ml water) was calculated by trend line fit linear regression analysis of the experimentally obtained data[49]. The cytotoxic bioassay result of longiverbenone may lead to the exploration of its potential and practical application as a novel less toxic[18].

Hypotensive and spasmolytic effect :

Hydro-methanolic crude extract of C. scariosus produced hypotensive and braycardiac effects. The cardiovascular effects of the plant extract were not mediated through activation of 484uscarinic receptors, as these effects remained unaltered in atropinized animals[13,30]

Hepatoprotective activity :

The hepatoprotective activity of aqueous-methanolic extract of Cyperus scariosus (Cyperaceae). was investigated against acetaminophen and CCl4-induced hepatic damage. Acetaminophen produced 100% mortality at a dose of 1g/kg in mice while pretreatment of animals with plant extract (500mg/kg) reduced the death rate to 30%.y[51]. The plant extract also prevented CCl4-induced prolongation in pentobarbital sleeping time confirming hepatoprotectivity. These results indicate that it have hepatoprotective activity and thus, rationalizes the folkloric use of this plant in hepato-biliary disorders[36].

Anti-hyperglycemic activity Glucose tolerance property of C. scariosus leaves fasted mice were grouped into six groups of seven mice each. Prior to administration of vehicle, standard drug, and test samples, each mouse was weighed and doses adjusted accordingly. All substances were orally administered. Group-I received vehicle (1% Tween 80 in water, 10 ml/kg body weight) and served as control, group-II received standard drug (glibenclamide, 10 mg/kg body weight) and the other four groups (III-VI) received the methanol extract of C. scariosus leaves at four different doses[34].

Anti-nociceptive activity :

In the acidic corrosive actuated squirming model mice, organization of methanol concentrate of leaf of C. scariosus showed huge portion. Mice were isolated into five gatherings containing seven mice each. Bunch filled in as control (1% Tween 80 in water, 10 mg/kg body weight)[50]. Ibuprofen was controlled to Gathering II mice at a portion of 200 mg/kg body weight. Subordinate squirming restraint. For the methanol concentrate of leaves, the greatest hindrance of squirming (46.62%) was acquired at the portion of 200 mg extricate/kg body weight f the concentrate, individually orally 30 min before acidic corrosive injection[31,46].

Acute toxicity study :

Intense harmfulness test was completed as. Creatures were isolated into nine gatherings comprising of six creatures for every gathering. The benchmark group was given 1% Tween 80 in ordinary saline (2 ml/kg body weight). Different gatherings got 100, 200, 300, 600, 800, 1000, 2000 and 3000 mg/kg of the methanol concentrate of leaves. Creatures were held under close perception for the following 8 hours and were kept up with as long as 14 days for any mortality to occur[50].

Cyperus Leaves

Cyperus Rhizomes

Conclusions :

C. scariosus is an exceptionally famous therapeutic spice in Indian Ayurvedic medication frameworks with different pharmacological and customary purposes. Because of its different ethnomedical, pharmacological and helpful properties this plant species has been utilized to create nutraceuticals and pharmacological items and showing its adequacy against a few infections. the dynamic phytochemicals as well as the specific systems of antinociceptive and hypoglycemic activity of C. scariosus Accordingly, more different examinations on the substance intensifies present in the concentrates and fundamental are expected to study to portray the metabolites liable for these exercises. Ayurvedic and conventional specialists for treatment of sicknesses. . Taking everything into account, because of presence of a few phytochemicals, C. scariosus has an extraordinary potential for use in drug enterprises.

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