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Original Article

Review On: Pharmacological, Phytochemical & Toxicological Study of Cyperus Rotundus

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ABSTRACT

Researchers are now becoming more interested in studying herbal remedies for potential health benefits for both humans and animals. Antimicrobial activity tests were performed on bacteria that cause illness in people, such as Morexilla catarrhalis, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Staphylococcus aureus, Acinetobacter, and the fungi Candida albicans and Aspergillus niger. The phytochemistry, pharmacological effects, processing, traditional use, botany, and other elements of CR are covered in this article. This study intends to examine the published report on the ethnomedicinal, phytochemical, and pharmacological activities of Kyllinga triceps rottb, as well as its therapeutic uses. Secondary metabolites, which were a significant component of several pharmaceutical medications, are commonly produced by plants. Toxicological research related to phytochemical analysis is essential to comprehend the potential harmful consequences that might lower its medicinal value. This review offers recommendations for future studies that seek to investigate its widespread use in ethnopharmacology as well as its potential as a novel source of bioactive natural compounds and/or herbal remedies.

Keywords: Cyperus Rotundus, Flavonoids, Tannins, Antidiabetic, Hypolipidemic, Antimicrobial, Cytotoxicity, Chemical Constituents, Pharmacological Effects

INTRODUCTION

The majority of people worldwide treat various illnesses with plant-based medications. Around the world, it is always crucial in the treatment of both human and animal ailments. Both traditional and modern medical systems heavily rely on herbal medications. [1] Commonly referred to as Nagarmotha, Cyperus rotundus is a member of the Cyperaceae family and is used extensively in traditional medicine worldwide to cure a variety of illnesses. Other names for this plant include motha, musta, purple nutsedge, or nutgrass. It has antipyretic, anti-inflammatory, and anti-diarrheal properties [2]. Roots are good for memory development. Additionally, it exhibits protective effects on the pancreas, spleen, and liver. It also has a variety of pharmacological properties, including astringent, anthelminthic, antifungal, antiparasitic, antirheumatic, antispasmodic, and aphrodisiac. [3] This plant has been utilised by traditional healers for thousands of years, particularly in Chinese traditional medicine. [4] The rhizome of Cyperus rotundus L, a plant that is widely spread worldwide, has been utilised for ages in Arab, African, and Indian Ayurvedic medicine as well as for perfume and spices. Particularly in Southeast Asia and the Middle East, Cyperus rotundus L. leaves are used extensively to flavour cuisine. The purpose of this review was to highlight Cyperus rotundus's pharmacological effects and chemical components. This report also discusses the species' pharmacological or biotechnological potential and medical significance.

2. Vernacular name

English : Nutgrass, Purple nutsedge.
Marathi : Barik motha, Lavala.
Hindi : Motha, Nagarmotha.
Sanskrit : Muthakasu, Musta, Varida.
Gujrati : Nagarmothava.
Malyalam : Korakizanna.

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Figure 1. Plants of Cyperus rotundus.

3. Toxinomical classification

Kingdom : Plantae.
Order : Poales (Cyperales).
Family : Cyperaceae.
Genus : Cyperus.
Species : Rotundus.

Figure 2. Tubers of Cyperus rotundus.

4. Chemical Constituent

After the Poaceae and Orchidaceae, the Cyperaceae family is the third biggest monocot family and one of the largest flowering plant groups [5]. Numerous studies have shown that the existence of various bioactive elements in this family's species accounts for their many potential uses as medications. For instance, a variety of fragrances and medications contain cypriol, which was extracted from Cyperus scariosus R.Br. essential oil. Cypriol is really in high demand in the perfume business because to its ambery, balsamic, spicy, warm, and woody qualities [6]. Further more, several additional Cyperus species, including C. articulatus L., C. rotundus, and Cyperus maculatus Boeckeler, also contain the essential oil [7].

The next subsections also provide a brief explanation of the most prevalent phytochemicals found in the newly studied Cyperus species. Articular Cyperus The perennial plant L. Cyperus articulatus has scaled subterranean perennial rhizomes that grade into culm leaves. As a source of potentially helpful medications for the treatment of metabolic problems, they are also considered herbal switch plants due to their remarkably high photosynthetic performance in comparison to other plants [8]. Articulatus include mustakone, cyperotundone, caryophyllene oxide, α-cyperone, α-corymbolol, and α-pinene. From the volatile oil of Nigerian C. articulatus, researchers also discovered articulone, myrtenal, and myrtenol.[9] Mustakone, mandassidione, isopatchoul-4(5)en-3-one, and almost all sesquiterpene diketones were detected in Cameroonian C. articulatus hexane extracts [10]. Similarly, mustakone (14%), caryophyllene oxide (10.2%), and α-pinene (6.4%) were found in the Brazilian rhizome volatile oil. [11]. α-pinene (3.5–25.2%), βpinene (2.3–12.6%), trans-pinocarolol (2.2–5.5%), myrtenal + myrtenol (2.3–5.6%), α-copaene (1.3–2.6%), cyperene (0.7–1.6%), β-selinene (0.8–2.4%), lithol (0.9–5.1%), caryophyllene oxide (3.1–8.3%), mustakone (3.4–9.9%), cyperotundone (2.6–4.1%), and α-cyperone (3.2–8.8%) were all detected in volatile oil taken from C. articulatus rhizomes [12]. According to these observations, the volatile oil content varies both qualitatively and quantitatively. Air pollution, altitude, harvesting time, developmental stage, brightness, seasonality, temperature, water availability, nutrients, UV radiation, and infections were among the factors that were blamed for the discrepancy [13,14].

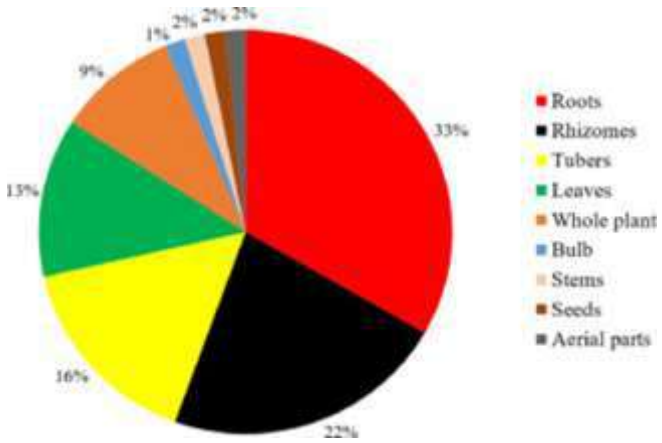

Figure 3. Pie chart of part distribution in % of Cyperus rotundus.

5. Geographical Description

The perennial weed Cyperus rotundus, sometimes referred to as purple nutsedge, is indigenous to tropical and subtropical parts of India, Africa and Eurasia, but it has spread around the world as an invasive plant. Around the world, it flourishes in warmer, disturbed environments such as roadsides, wastelands, and farmed fields. It is a very tenacious and challenging plant to eradicate worldwide because of its vast subterranean network of rhizomes and tubers, which enables it to reproduce quickly and adapt to differen soil types and extreme temperatures.

Native Range

- Origin: The species is indigenous to the Old World, mainly to Africa and Eurasia's tropical and subtropical zones. India is frequently regarded as its birthplace.

6. Global Distribution

- Cosmopolitan: In more than 90 nations in Africa, Asia, Europe, and the Americas, Cyperus rotundus is a common weed.
- Africa: Found extensively throughout the continent's warmest regions.
- Asia: Originally from southern Asia, it may be found in China, India, the Philippines, and other countries.
- Europe: Mostly found in southern Europe, although it is also becoming more prevalent in certain temperate locations.
- Americas: Native to North and South America, it has established itself as a perennial weed in several nations. [15]

7. Pharmacological Aaction

7.1 Actions against diarrhoea

In mice with castor oil-induced diarrhoea, the methanolic extract of Cyperus rotundus rhizomes demonstrated antidiarrheal efficacy at 250 and 500 mg/kg. [16] An aqueous extract of Cyperus rotundus tubers has been shown by Das et al. to exhibit antigiardial action against infectious diarrhoea. Additionally, it demonstrated antidiarroheal activity against Shigella flexneri and enteroinvasive Escherichia coli invasion of human epithelial type 2 (HEP-2) cells as well as adhesion to enteropathogenic Escherichia coli. Heat labile toxin (HLT), heat stable toxin (HST), cholera toxin (CT), and enterotoxins such enterotoxigenic E. coli were also evaluated. The decoction was shown to decrease bacterial invasion and adhesion to HEP-2 cells. HLT synthesis rose but ganglioside monosialic acid receptor (GM1) binding declined. There was no impact on binding to GM1, and the generation of CT was reduced. [17]

7.2 Activity against bacteria

According to a study by Prasad MP et al., Cyperus rotundus exhibited antibacterial activity. [18] Additionally, it was shown that Cyperus rotundus oil had antibacterial activity against bacteria such as Escherichia coli, Proteus vulgaris, Staphylococcus aureus, Klebsiella pneumoniae, and Staphylococcus pyogenes. Cyperus rotundus oil shown considerable antibacterial action against Gram-positive bacteria, but reduced activity against Gram-negative bacteria and no activity against Pseudomonas aeruginosa and proteus vulgaris. [19]

7.3 Antipyretic action

Additionally, Singh N et al. discovered that Cyperus rotundus's alcoholic extract had antipyretic properties. [20] Additionally, pyrexia caused in albino rats by subcutaneous injection of a suspension of dried Brewer's yeast in gum acacia in normal saline was shown to be significantly alleviated by an alcoholic extract of Cyperus rotundus. [21]

7.4 The action of antioxidants

The antioxidant and α-amylase inhibitory properties of several of the extracted phenolic compounds from Cyperus rotundus's aerial parts were investigated by Sayed HM et al. [22] Because of its high flavonoid content, Sirivastav S.discovered that methanol extracts of Cyperus rotundus had greater in vitro antioxidant activity than ethanol extracts. Methanolic extract exhibits greater DPPH free radical inhibition and reducing power than ethanolic extract. [23]

7.5 Activity of hypolipidemic

In a research, Okwu1 et al. found that the rhizome of Cyperus rotundus contains bioactive chemicals that have hypolipidemic potential. [24] After 15 days of therapy, alcoholic extract of Cyperus rotundus at dose levels of 70 mg/kg/day, 140 mg/kg/day, and 280 mg/kg/day shown greater improvement in the lipid profile, according to Chandrate. [25]

7.6 Activity against amoebic

Additionally, in vitro experiments revealed that the entire Cyperus rotundus plant had superior anti-amoebic action against Entamoeba histolytica trophozoites. Cyperus rotundus (whole plant) ethanol extract demonstrated 100% inhibition at 500 µg/ml after 96 hours, according to another investigation. [26]

7.7 The analgesic effect

Cyperus rotundus hydro-alcoholic extract has been studied for its anti-nociceptive properties in mice and has demonstrated analgesic effectiveness at doses of 50, 100, and 200 mg/kg. The highest percentage of licking inhibition in the early (61.60%) and late phases (87.31%) was seen at a dosage of 200 mg/kg. [27]

7.8 Activity against ulcers

Cyperus rotundus tuber powder, at a dosage of 1.25 gm/kg, demonstrated a substantial decrease in the ulcer index in the histamine-induced stomach ulcer technique. [28]

7.9 Anti-inflammatory properties

The anti-inflammatory properties of Kyllinga triceps rottb methanolic extract were investigated. Here, a hot plate, an acidic caustic that caused squirming, and a yeast-induced hyperthermia technique were used to examine the pain-relieving and antipyretic properties of methanolic concentrate of Kyllinga triceps at different doses. In every model examined, Kyllinga triceps shown notable pain-relieving and antipyretic activities. The results validate the plant's historic usage to relieve fever and pain. [29]

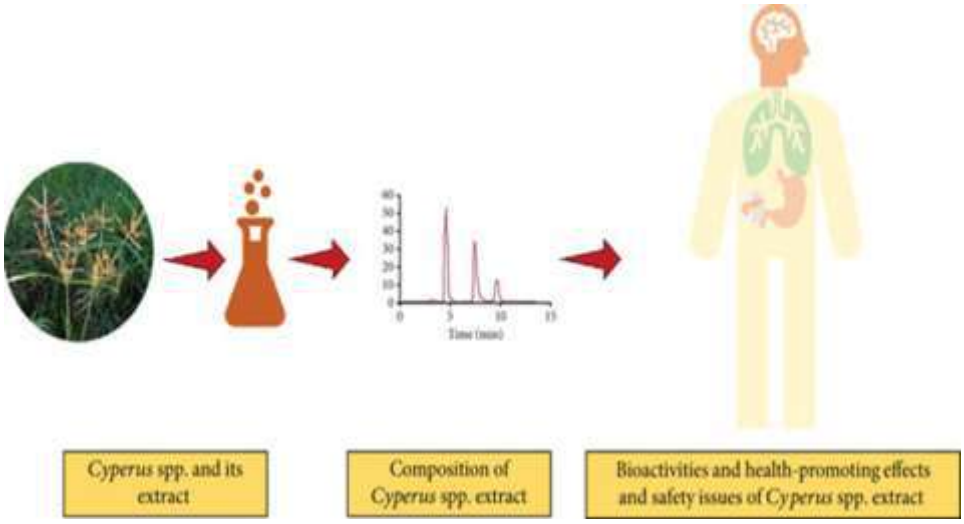

Figure 4: Diagram showing various components discussed in the review.

10. Safety & Adverse Effect

Cyperus plants have been utilised extensively in folk medicine for a variety of ailments because of their abundance of chemical ingredients [30,31,32]. After a thorough review of the literature, researchers have begun to investigate the medicinal potential of Cyperus plants, which are a common cure among many ethnic groups [33]. However, assessing the toxicological aspects of botanical medications and goods for customers' safe and dependable use is also very important. Several researchers have provided toxicological data from extracts of C. rotundus [34]. According to the majority of them, using Cyperus extracts is safe [30, 35], with either no negative effects or very mild ones noted. For instance, the toxicity and biochemical activity of C. rotundus extracts were investigated in vivo in rats and mice. When given intraperitoneally, the fatal dosage (LD50) of C. rotundus root extract was 90 g/kg [36,37]. Mice of both sexes were given an ethanolic extract of the plant's dried roots, and the LD50 was more than 0.5 mg/kg [38]. When given to mice of both sexes, aqua-ethanolic (1:1) rhizome extracts had an LD50 of 681.0 mg/kg [39]. In rats, Cyperus essential oils had an LD50 of 5000 mg/kg [40]. According to other research, a single oral dose of 5000 mg/kg of C. rotundus ethanolic extract did not cause any toxicity symptoms, behavioural abnormalities, animal death, or variations in the animals' internal organs' overall appearance. For 14 days, all rats were given repeated oral doses of 1000 mg/kg of the ethanolic extract to test for subacute toxicity. The parallel group was retained for an additional 14 days after receiving the ethanolic extract throughout the same time frame. There were no effects or reversible harmful effects upon application. Accordingly, it was determined that, when compared to the control group, the extract had no effect on mortality, weight growth, general behaviours, or haematological and clinical blood chemistry markers [41]. The safety of Cyperus extracts was also validated by another study. Mice administered 250 and 500 mg/kg body weight of C. rotundus methanolic extracts did not exhibit any harmful effects [42]. Conversely, Lemaure and colleagues [43] reported that giving rats hexane extracts from C. rotundus tubers at doses of 45 or 220 mg/kg/day for 60 days caused a notable decrease in weight increase without causing any harmful side effects. After administering C. rotundus crude extract at several concentrations and oral dosages, Raut and Gaikwad [44] likewise reported no adverse effects. Jebasingh and associates [45] conducted acute toxicological tests using C. rotundus extract and discovered that rats did not die or become ill at doses up to 2000 mg/kg body weight. Although the animals' white blood cell count and haemoglobin level increased and their kidney and liver function improved, toxicity assessments also showed no changes in the animals' food, water intake, or body weight. [46] Krisanapun et al. conducted an acute toxicity test on rats using water extracts from C. rotundus and found that the single oral LD50 was greater than 5 g/kg body weight. Three dosages of C. rotundus extract—10, 100, and 1000 mg/kg—were employed, and none of them showed any symptoms of toxicity. However, a small reduction in motor activity was noted at 1000 mg/kg. Several biochemical indicators (glucose, lipid profile, cardiac enzymes, liver enzymes, and kidney function test) were also used to evaluate the effects of C. rotundus extract. Serum bilirubin, gamma-glutamyl transferase (GGT), and serum glutamic-pyruvic transaminase (SGPT) all showed nonsignificant increases, while liver enzymes were determined to be normal. Furthermore, histological analysis verified that the tested extract was safe and nontoxic, and haematological investigations revealed no appreciable toxic alterations [47]. The use of Cyperus species for biotechnological purposes—specifically, as a functional food additive—is the last and equally noteworthy use. To lower total fat and saturated fatty acids in the examined samples, Carvalho Barros and colleagues [48] assessed the use of tigernut (C. esculentus) oil emulsion in lieu of beef fat in beef burgers. According to the authors' primary results, a well-liked and healthier meat product with lower levels of total and saturated fat and higher levels of unsaturated fatty acids was produced when beef burgers were completely replaced with tigernut oil emulsions [48]. To fully investigate the additional agroindustrial and biotechnological potentialities of Cyperus sp., more research is necessary.

11. Traditional Use

Cyperus rotundus was used to treat intestinal parasites, food poisoning, indigestion, intestine discomfort, nausea, vomiting, and stomach problems.

Fever, wounds, bruises, and carbuncles, malaria, cough, bronchitis, renal and vesical calculi, urinary tenesmus, amenorrhoea, dysmenorrhea, inadequate lactation, memory loss, insect bites, dysuria, bronchitis, infertility, cervical cancer, and menstrual disorders were among its other uses [49, 50]. The rhizomes of Cyperus rotundus were regarded as astringent, diuretic, diaphoretic, analgesic, aromatic, carminative, antitussive, emmenagogue, litholytic, sedative, stimulant, stomachic, vermifuge, tonic, and antibacterial by the Ayurveda [51].

12. Application

Several investigations have shown that J. gossypiifolia has the capacity to produce molecules with a variety of uses, indicating its multifunctional nature, in addition to scientific proof of its medicinal qualities. One might list the generation of biodiesel from J. gossypiifolia seed oil as one of the primary uses stated. Researchers' attention has recently been focused on the Jatropha species since it has emerged as a very ideal feedstock plant for the manufacture of biodiesel [52]. Among the species, seeds with a high oil content are produced by J. gossypiifolia, J. curcas, and J. pohliana [52]. A study that looked into the potential of two plants in the Jatropha genus, including J. gossypiifolia, found that the physicochemical characteristics of the biodiesel that was produced fell within the acceptable range for use as biodiesel in diesel engines. This suggests that these raw materials could be exploited economically [53]. Research has shown the species' potential for the creation of novel biochemical analysis instruments. With results similar to those from the traditional protein precipitants sodium tungstate and trichloroacetic acid, a recent study demonstrated that the diluted fresh latex of J. gossypiifolia can be used as a precipitating agent for the biochemical determination of proteins in plasma, urine, and cerebrospinal fluid [54]. The authors speculate that the precipitating potential may be connected to the latex's ability to coagulate when applied to a cut or bleeding sore in traditional medicine [54]. For haematological studies, a different investigation demonstrated the potential of the juice taken from fresh J. gossypiifolia leaves as an anticoagulant [55]. It was found that 0.1 millilitres of extract per millilitre of blood was appropriate for collecting plasmas for biochemical examination on par with traditional anticoagulants [55]. However, the authors stress that in order for the extract to be completely appropriate for biochemical examination, it needs to be processed to exclude any interfering chemicals [55]. The potential of J. gossypiifolia as a source of pesticide biomolecules has been shown in some investigations. The primary ingredient causing the crude extract's toxicity in Spodoptera exigua larvae, ricinine, was extracted from the ethyl acetate extract of senescent leaves by Bullangpoti. [56], suggesting that it would be a viable substitute for chemical insecticides. The potential of the species as an insecticide agent was once again demonstrated by Bullangpoti et al. [57], who demonstrated that the ethanol extract of J. gossypiifolia in combination with the ethanol extract of Melia azedarach was toxic and inhibited some enzymes from Spodoptera Evidence-Based Complementary and Alternative Medicine 27 frugiperda larvae. [58] Calatayud et al. revealed the existence of 100 kDa proteins that were poisonous to another kind of bug, Phenacoccus herreni. In order to show the species' capacity to produce insecticidal proteins, the authors of this study used an extraction technique that removed nonprotein substances [58]. When applied to stored product insect pests, Tribolium castaneum, J. gossypiifolia leaf extract decreased fertility and egg viability [59]. As an alternate method of schistosomiasis prevention, J. gossypiifolia's possible molluscicidal action has also been assessed. Methanol and n-butanol extracts from unripened J. gossypiifoli seeds were shown to be poisonous to the eggs and adults of two species of freshwater snails, Lymnaea luteola and Indoplanorbis exustus, according to Sukumaran. [60] The findings showed that eggs were more vulnerable than adults and that n-butanol extract was the most effective. [60]

13.Toxicology

The hazardous potential of Jatropha species is well established. [61,62] The main causes of this toxicity are seeds and latex. The latex, which is very caustic and irritating to skin and mucous membranes, is released from the plant's aerial sections by mechanical damage. The seeds have a lipoid resin complex that can lead to dermatitis and are abundant in toxalbumins, which harm other cell types and cause erythrocytes to agglutinate and hemolyze. [63,64,61] In general, gastrointestinal issues (diarrhoea, nausea, vomiting, and abdominal discomfort) make up the

symptomatology. Cardiovascular, neurological, and renal problems may also arise during the clinical course. [62] Because fruit and seeds resemble edible chestnuts, human poisoning cases typically result from eating them. [62] While some toxicological investigations have shown that J. gossypiifolia is harmful, others have shown that it is not. To draw the right conclusions regarding toxicity, it is crucial to pay attention to a number of factors, including the models utilised, dosages administered, and types of extracts used (solvent and plant part). According to research on experimental poisoning in sheep, the animals died when they were given a single dosage of 40 g/kg of fresh plant leaves [65]. In addition to mild regressive alterations shown in hepatic and renal histological investigations, the experimental sheep's clinical and pathological picture was marked by abnormalities of the heart, lungs, and digestive tract [65]. However, as noted by Mariz it is crucial to remember that the plant is seldom used medicinally in its natural state but rather in various preparations, such as decoctions or infusions, occasionally of the dried material, which may inactivate any potentially harmful components. But since this is just a theory, it is impossible to rule out the possibility that leaf extracts are harmful. [66] Adolf reported one of the earliest research linked to the discovery of the elements responsible for the poisonous effects of the Jatropha species. This study used countercurrent chromatography to separate the irritating polyunsaturated ester 12-deoxy-16-hydroxylphorbol from the ether extract of J. gossypiifolia seeds using a bioguided isolation method [67]. After applying the fractions and isolated chemicals for 24 hours, the irritating activity was seen in the mouse ear [67]. Ethanol and methanol extracts (unspecified plant organ) demonstrated minimal toxicity in the brine shrimp larvae in vitro cytotoxicity test [68]. The water and ethyl acetate fractions of a methanol extract from J. gossypiifolia aerial parts did not exhibit toxicity against the same organisms, according to a previous study [69]. The toxicity of the ethanolic root extract of J. gossypiifolia at 10, 20, and 30 mg/kg administered orally was assessed in a research conducted in Wistar rats [70]. Based on histological investigations and blood biochemical research, the scientists found that the extract was toxic to the kidney and increased blood urea retention [70]. The crude ethanol extract from J. gossypiifolia leaves exhibited comparatively low oral acute toxicity in Wistar rats, according to a preclinical toxicological evaluation [71,72]. The most significant indicators of toxicity were ptosis, weight loss, and paralysis of the hind limbs in rats given oral dosages ranging from 1.2 to 5.0 g/kg during a 14-day period. Leucopenia, a little change in the colour and consistency of the viscera, a decrease in urea and albumin, a rise in creatinine, aspartate aminotransferase, sodium, and potassium seric levels, and other notable changes only happened in men receiving a dosage of 5.0 g/kg. For both men and females, the median fatal dosage (LD50) exceeded 4.0 g/kg and 5.0 g/kg, respectively [72]. Only at 5.0 g/kg did some liver and lung change appear in the histological assessment, indicating the extract's comparatively low toxicity [71]. However, this extract demonstrated considerable oral chronic toxicity in rats over the 13-week treatment period in the chronic toxicological research [73].The two most important toxic indications were stomach difficulties and a decrease in central nervous system activity. Hepatotoxicity and pulmonary injury were found by the histological investigation. Under the higher tested dosage (405 mg/kg), the mortality was 13.3% for females and 46.6% for men [73]. Accordingly, Mariz talked about how the chemical refining of the crude extracts should be given priority in the creation of herbal medicine based on this species in order to obtain less toxic fractions that should be investigated for safety and therapeutic efficacy. [66] However, another investigation that assessed the oral acute toxicity of the ethanol and aqueous extracts from J. gossypiifolia leaves showed no toxicity in rats up to 2 g/kg, allowing the authors to conclude that this extract may be regarded as safe [74]. Given that the plant is often utilised as tea (aqueous extract), this is an intriguing finding. Based on the widespread use of the latex as a haemostatic agent in skin lesions, the toxicity of J. gossypiifolia stem latex was investigated in Wistar rats by applying varying dosages of crude latex to incised skin every day for 18 days [75]. The stem latex had no negative effects, according to the scientists, who noted that there was no discernible difference between the control and experimental animals' biochemical and haematological parameter findings after the latex was applied [75].

14. Taxaonomical classification and cultivation

Native to India, Africa, southern and central Europe, and southern Asia, Cyperus rotundus L. (family: Cyperaceae) is also referred to as musta, mustaka, nutgrass, java grass, purple nutsedge, and red nutsedge [76, 77]. It is found all over the world in tropical and subtropical areas [78]. According to Historia Plantarum, IX 7.3, Theophrastus lists C. rotundus among other perfume plants, of which "the most excellent and most fragrant come from Asia and sunny regions. [79]" The Latin term round, which refers to the plant tuber, is the source of the species name rotundus, while the genus name Cyperus is derived from the ancient Greek name Cypeiros [80]. It is a perennial sedge with fibrous roots that spread widely through tubers and rhizomes, and an umbel flower. It is a common species in unfavourable environments and is now regarded as the most problematic weed in agriculture because of its great adaptation, herbicide resistance, and competitiveness for ground nutrients, which result in significant production losses [81]. Nonetheless, it contains essential oil and other phytochemical ingredients that have a variety of ethnomedical applications and therapeutic qualities. Transcription factors, enzymes, growth factors, cytokines, kinases, proliferative factors, inflammatory mediators, receptors, and proteins involved in cell survival, death, and metastasis are among the most often targeted substances by mustaka and its constituents.

CONCLUSION

The scientifically claimed medicinal uses of Cyperus rotundus are covered in this review along with comprehensive data on various bioactive compounds and ethnopharmacology. Additionally, it has a wide range of medicinal uses in the treatment of various human diseases. The study examines the advancements made in CR research in botany, conventional uses, phytochemistry, pharmacology, and other fields. The analysis technique, quality control, processing method, and processing are also summarized and analyzed simultaneously. More research on the CR will benefit future academics. Furthermore, this study also includes an in-depth analysis of the shortcomings of existing studies in certain areas of CR, and offers our own perspectives and remedies. In spite of its active phytochemicals, its widespread application in traditional medicine and extensive pharmacological features have not been proven by irrefutable data utilizing animal models. They are members of the Cyperus genus. There are still insufficient thorough studies on the pharmacological effectiveness of isolated compounds. Additionally, pharmacokinetic, pharmacodynamic, bioavailability, and pharmacognosy studies are necessary to identify the phytochemicals that cause different pharmacological effects and to determine their mechanism and manner of action. at the clinical safety level in humans as well as at the molecular and cellular level. This review examines the pharmacological, therapeutic, and chemical components of Cyperus rotundus as a potential herbal therapy due to its safety and efficacy.

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