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FORMULATION PROSPECTIVES: CYNODON DACTYLON

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ABSTRACT
Bermuda grass, also known as Cynodon dactylon, is a perennial grass that can be found all over the world but is native to warm temperate and tropical climates. In particular, proteins, carbohydrates, minerals, flavonoids, carotenoids, alkaloids, glycosides, and triterpenoids were abundant in the plant. The entire C. dactylon plant retains a number of biological functions, including antibacterial, antimicrobial, antiviral, and wound-healing abilities. Additionally, it has a long history of usage in traditional remedies to treat a wide range of conditions, including tumours, warts, dropsy, dysentery, haemorrhage, hypertension, hysteria, measles, and snakebite. Other conditions it has been used to cure include cough, headache, diarrhoea, cramps, epilepsy, dropsy, and dysentery. In light of the foregoing, this article summarises the most recent data on the phytochemical characteristics and pharmacological effects of C. dactylon extract, as well as some of its other applications.

KEYWORD: Cynodon dactylon, Antidiabetic, Anti-Pyretic, Anti-diarrheal, Anti-inflammatory.

INTRODUCTION
To create novel medications for the treatment of various ailments, research on medicinal plants is necessary. The Poaceae family includes Cynodon dactylon. In ayurveda, it is one of the most commonly utilised plants in this family. This plant has a variety of chemical components, including acids, steroids, carbohydrates, oxides, salts, carotene, and alkaloids. Previous research suggests that this plant can treat a variety of ailments both internally and externally. It has many different uses, including those for wound healing, steroid, skin allergies, diarrhoea, epilepsy, hypertension, piles, diuretic, menstrual disorders, renal stones, antioxidant, promote spermatogenisies, boost libido, anabolic protection, and more. Studies have shown that this plant extract has antibacterial properties and can treat infections of the urinary tract, syphilis, and amiobiosis. When treating oral problems like toothaches, cynodon dactylon was utilised as an analgesic. Artificial diuretics increase the excretion of urine water and electrolytes by inhibiting nephron ion transporters.

HISTORY
This grass is employed in the Ayurvedic medical system and is frequently referred to as "durva" or "drvyugma" in India.[1] Long life is bestowed by doing Puranokta Rudrabhisheka while offering Durva 11 times. It is regarded as significant in Hinduism's worship of Lord Ganesha. During puja (prayer), a clump of 21 shoots from this grass is typically offered. Since the time of the Vedas, it has been a part of Hindu rites. On the eighth day of Shukla Paksha in the Hindu calendar month of Bhadra, a special ceremony named Durga Ashtami honours this grass.[2] It is a part of the Dashapushpam (Ten Sacred Flowers) in Kerala and is referred to as "Arugampul" in Tamil and "Karuka" in Malayalam.[3] a bride's neck with a dubo garland tied by the groom

TAXONOMICAL CLASSIFICATION
Kingdom-Plantae
Division-Magneliophyta
Class-Liliopsida
Order-Cyperales
Family-Poaceae

Genus-Cynodon
Species-Cynodon dactylon

DISTRIBUTION

Most likely a native of East Africa, where it is widely dispersed from sea level to 2,160 m in elevation. It was now found in temperate and subtropical locations all over the planet. It grew along sea shores in temperate zones, most frequently in tropical regions with 670–1750 mm of rainfall, and along rivers and on irrigated land in arid zones. Inflorescence on culms 15 cm to 1 m tall consists of 2-12 spikes arranged star-like at apex of stem; spikes 2.5-10 cm long with numerous spikelets, arranged in a dense tuft on the surface of the soil. Perennial grass, very variable, with long, rapid-growing, creeping runner or stolons, rooting at nodes; spikes 2.5-10 cm long with numerous spikelets, arranged in a dense tuft.[4]

SIDE EFFECTS OF DURVA (DOOB) GRASS

Dhruva grass doesn't actually have any adverse effects, however an overdose can occasionally cause issues including paraesthesia, dermatitis, and burning sensations on the skin.[5]

PHARMACOLOGICAL EFFECT OF DURVA GRASS

1. **Antidiabetic activity:** Cynodon dactylon extract has been shown to have anti-diabetic properties in streptozotocin-induced diabetic rats by Singh SK. et al. A variety of doses of C. dactylon aqueous extract, including 250, 500, and 1000 mg/kg (bodyweight), were assessed; the dose of 500 mg/kg, which was repeated orally, was found to be the most efficacious dose. Avvarai et al. also discovered that the grass root stalk's ethanolic extract had potent anti-diabetic effects on the animal tests. Jerald et al. administered the non-polysaccharide aqueous fraction of C. dactylon to diabetic rats, and the rats' glucose, urea, serum cholesterol, serum triglyceride, high density lipoprotein (HDL), low density lipoprotein (LDL), and HDL levels all decreased.[6-8]

2. **Antiviral activity:** C. dactylon has been shown to have antiviral activity against the human vaccinia virus and the White Spot Syndrome Virus (WSSV).[9] Black tiger shrimp (P. monodon) used in the experiment were fed the plant extract of C. dactylon at a concentration of 1% or 2% together with artificial pellet feed. The shrimp meat was contaminated with the WSSV. At the conclusion of the experiment, a Western blot analysis, bioassay, and PCR method were used to demonstrate the presence of WSSV infection. The study's findings demonstrated that the C. dactylon plant extract prevented WSSV infection in black tiger shrimp (P. monodon) with no mortality and no evidence of WSD.[10]

3. **Anti-Arthritic activity:** When rats were given Freund's complete adjuvant to produce arthritis, C. dactylon significantly reduced the severity of the arthritis. The oral administration of 100, 200, and 400 mg/kg of the ethanolic extract of C. dactylon was determined to be safe, and there was no mortality up to a dose of 5000 mg/kg of the extract. At a dose of 400 mg/kg, the ethanolic extract of C. dactylon is more efficient at boosting haemoglobin levels, lowering CRP, and reducing TNF alpha levels. The effectiveness of C. dactylon against rats with adjuvant-induced arthritis was examined in the study. C. dactylon taken orally significantly reduced oxidative stress, the inflammatory response, and the arthritic alterations to close to normal levels.[11]

4. **Anti-Pyretic activity:** A hot plate, acetic acid-induced writhing, and yeast-induced hyperthermia in rats were used to test the analgesic and antipyretic effects of C. dactylon aqueous extract at various doses. In all the models examined, C. dactylon demonstrated strong analgesic and antipyretic effects. When the antipyretic activity of C. dactylon aqueous extract was tested in mice, it was discovered that at a dose of 600 mg/kg, the aqueous extract significantly decreased the mice's rectal temperature in a manner comparable to paracetamol.[12]

5. **Anti-diarrheal activity:** In a study, whole-plant extracts of C. dactylon were investigated for their ability to treat albino rat models of entero pooling, gastro intestinal motility caused by charcoal meal, and castor oil-induced diarrhoea. Castor oil-induced diarrhoea was significantly less inhibited by methanolic extract, and it also significantly lowered gastrointestinal motility by charcoal meal and the weight of intestinal contents in enter pooling animals. These findings suggest that the herb has potent anti-diarrheal properties.[13]

6. **Anti-inflammatory activity:** This study looks at the anti-inflammatory qualities of an extract from the plant Cynodon dactylon, which is traditionally used to treat painful and inflammatory conditions. At all tested dosages, the extract was found to be safe; up to 4000 mg kg-1, there was no mortality. When compared to Indomethacin, it dramatically reduced the production of edoema and prevented the formation of dry weight cotton pellets at a dose of 600 mg kg-1. The extract's anti-inflammatory qualities might be attributed in part to its flavonoid content.[16-17]

7. **Snakebite therapy:** In the Indian state of Tamil Nadu's Chengapattu area, a survey of medicinal plants having anti-snake venom properties was conducted. According to a study conducted in the Tamilnadu district of Chengapattu, C. dactylon is particularly successful in the treatment of snakebite

injuries. It also produces antisnake venom when it is extracted from the plant.[18]

8. **Antiulcer Activity:** In rats, Patil MB et al. investigated the antiulcer effects of an alcoholic extract of Cynodon dactylon. They tested the extract for phytoconstituents at doses of 200, 400, and 600 mg/kg body weight administered orally for albino rat models of pylorus ligation and indomethacin-induced stomach ulcers. Alcoholic extracts had considerable (>0.001) antiulcer action at 400 mg/kg and 600 mg/kg, comparable to the active ingredient in ranitidine. This activity may be attributed to flavonoids.[19]

9. **Antioxidant Activity:** Reactive oxygen species (ROS), which can postpone or slow the oxidation of lipids in food systems, are scavenged or suppressed by antioxidants. In addition to harming cells, free radicals are a significant factor in ageing and the course of disease. Antioxidants protect against the harm caused by free radicals and are essential for preserving optimum health. According to Bhalerao et al., ethanolic extracts of the herb's aerial component have strong DPPH free radical scavenging and nitric oxide scavenging properties. Saroja et al. evaluated the enzymatic and non-enzymatic antioxidants in Ehrlich's lymphoma ascite (ELA) by fractionating grass with ethyl acetate. Due to the generation of free radicals from the ELA-induced animals, the enzymatic, non-enzymatic, and vitamin E levels were dropped.[20]

10. **Anticonvulsive property:** Brain biogenic amines in mice treated with Cyperus rotundus and Cynodon dactylon were identified by Pal Dilip Kumar. Mice exposed to ethanol extracts of Cynodon dactylon aerial parts (EECD) and Cyperus rotundus roots and rhizomes (EECR) demonstrated a significant defence against convulsions brought on by chemoconvulsive drugs. The investigation verified that both extracts had noteworthy anticonvulsive properties, modifying the mice's brain amino acid levels and catecholamine levels.[21-23]

11. **Neuroprotective Activity:** An ethanol extract of C. dactylon was tested for its neuroprotective properties against diazepam-induced neurotoxicity in rat brains. Acetylcholinesterase, cholesterol, malondialdehyde (MDA), and superoxide dismutase (SOD) were all markedly elevated by diazepam, whilst glutathione-s-transferase (GST), glutathione (GSH), and glutathione peroxidase (GPx) were all dramatically decreased. When CD is administered, the values are recovered. The ethanol extract has the potential to be a useful adjuvant for neurotoxicity and a phytomedicine for neurodegenerative illnesses, according to the results.[24]

12. **Diuretic Activity:** Aqueous extracts of C. dactylon rhizomes were tested for diuretic action in rats by a variety of scientists; at 500 mg/kg body weight, the extract dramatically enhanced urine output and electrolyte excretion. According to Sadki et al., rhizome extract has traditional medical uses as a diuretic. Aruna et al. investigated the diuretic effect of herb extract in guinea pigs and found that when crude extract was administered, the urine production was higher than in the control group.[25-26]

METHOD FOR EXTRACTION OF PLANT

1. Separately, 500 mg of powdered plant material was dispensed in 1000 ml of the solvents and water.
2. The powdered plant material was extracted with methanol, ethanol, and chloroform in a Soxhlet apparatus for 72 hours at 40°C, after being defatted with petroleum ether for 24 hours at 20°C.
3. The thick mass that is produced at room temperature when the solvent is evaporated at low pressure.
4. It turned the chocolate concentrates into gummy black lumps. Crude extract was the designation given to the gooey concentrate.
5. The phytochemical screening was conducted using the obtained extract.

CONCLUSION

Ever since the dawn of human civilization, medicinal plants have offered significant advances in the fight against illness. C.dactylon is a weed that has been shown to have a wide range of potential medical uses and activity. Sufficient details regarding the pharmacological, pharmacognostic, and medicinal qualities of this plant were given in this review article. It may be utilised as a novel medication in the near future to treat a variety of illnesses, including those with anti-inflammatory, antiviral, anti-diuretic, anti-ulcer, antipyretic, anti-diabetic, anticonvulsive, and diuretic properties, as well as snakebite treatment. Extensive research is required to fully understand the therapeutic potential of the diverse chemical compounds found in this adaptable medicinal plant, as they represent a unique source of medicinal properties.

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