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EXPLORING THE HEALING POWERS OF DURVA (CYNODON DACTYLON): A COMPREHENSIVE REVIEW

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ABSTRACT

Durva grass (Cynodon dactylon), also known as Bermuda grass, has been revered for its medicinal and spiritual significance across cultures for centuries. This review explores its healing properties, focusing on its traditional applications, phytochemical composition, and therapeutic potential. Durva contains bioactive compounds such as flavonoids, alkaloids, terpenoids, and phenolic acids, which contribute to its antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. Its role in Ayurvedic medicine includes the treatment of skin disorders, diabetes, digestive issues, and bleeding conditions. Modern scientific studies provide evidence for its efficacy, highlighting its potential in managing oxidative stress, promoting tissue regeneration, and supporting immune function. Despite its promising benefits, challenges such as standardized extraction methods, dosage determination, and long-term safety assessment remain. This review emphasizes the need for integrated research to harness Durva's full therapeutic potential and validate its traditional uses in contemporary medicine.

KEYWORDS: Cynodon dactylon, Traditional medicine, potential, oxidative stress, tissue regeneration.

INTRODUCTION

The earth is enriched with a rich wealth of medicinal plants. Many weeds of our surroundings are often very powerful medicinal plant to address many of our today's major health problems.[1] According to an estimation of the World Health Organization, about 80 percent of the world's population depends on herbs for its Primary healthcare needs.[2] Ayurveda and Siddha in India, the Chinese medicines in China, the Unani medicines in Islamic countries are Traditional Knowledge Systems that use herbs or plant products for therapeutics on large scales. Many potent and powerful drugs are prepared from medicinal plants. They present healthier and safer alternative to the synthetic drugs.[3] Several phytochemical constituents are obtained from various parts such as root, stem, leaf, fruit, seed, bark etc. Various biologically active compounds of medicinal plants play an important role in drug discovery. In addition, extracts of medicinal plants are useful in the treatment of several health problems.

Pharmacotherapy with Cynodon dactylon (L.) Pers. (CdL) (Sanskrit name durva) has been described in Ayurvedic text. The traditional preparation of Cynodon dactylon, called swaras (juice), has rarely been evaluated for its phytochemical quality and phytomedicinal activities.

C. dactylon (L.) Pers. is a perennial grass having a variety of medicinal properties.[5] It is cultivated throughout the tropics and subtropics. Entire plant and its root stalk are used for medicinal use.[6] It possesses much therapeutic, decorative and other unexplored potential. Besides its significant uses, the species is natural resources and therefore needs to be explored.

Durva grass, also known as Cynodon dactylon, has many traditional uses in Ayurveda and Hinduism

Medicine

Durva is used in Ayurveda to treat a variety of health issues, including skin disorders, blood sugar levels, obesity, and women's problems. It can be taken as a juice, paste, or powder.

Hinduism

Durva is an important part of Hindu rituals and worship of Lord Ganesha. During puja, a clump of 21 durva shoots is offered. A festival called Durga Ashtami is celebrated on the eighth day of Shukla Paksha of Bhadra month to honor the grass.

Nepali hinduism

Durva is known as "dubo" in Nepal and is used in the Naga Panchami and Gaura festivals. In Nepalese Hindu

weddings, the bride and groom wear a garland made of durva.

Ifá system

In the Ifá system of orishas, durva is used as a Yoruba herb for Esu or Elegba.

C. dactylon was generally known to be in the east of Africa. It was then distributed extensively at above the sea level of 2000 meters of height or altitude. It is one kind of monocot weed that is inherent to Africa. Though it is not an inhabitant of Bermuda, it is a profuse obtrusive species there. It is set out to have landed in North America from Bermuda as pasture grass. It got transferred or distributed to the temperate and subtropical part of the world from east of Africa. It started to grow along the coastal region in the temperate parts and in the tropical areas where 650-1750 millimetres of rainfall was seen. It also grew along the riverside and the landscape regions irrigated in the arid zones of the Earth. It generally prefers warm weather with high light intensity. It can grow nearly anywhere in the world between about 30° S and 30° N scope and it can tolerate annual precipitation of 10 to 430 cm. It is indeed a perennial, monocot warm weather grass that occurs on almost all kind of soil types.[1]

Taxonomical classification of cynodon dactylon

Kingdom-Plantae
Division-Magneliophyta
Class-Liliopsida
Order-Cyperales
Family-Poaceae
Genus-Cynodon
Species-Cynodon dactylon

Description

Perennial grass, very variable, with long rapid-growing, creeping runner or stolons, rooting at nodes, forming a dense tuft on the surface of the soil, runners sometimes 20 m long; leaves 2.5-20 cm long, 2-6 mm broad, flat or sometimes folded or convolute; inflorescence on culms 15 cm to 1 m tall consisting of 2-12 spikes arranged star-like at apex of stem; spikes 2.5-10 cm long with numerous spikelets, arranged in 2 rows on one side of spike; spikelets flat, 2-2.5 mm long, awnless, with 1 floret; glumes unequal, the upper longer and onethird to three-fourths length of floret.[2]

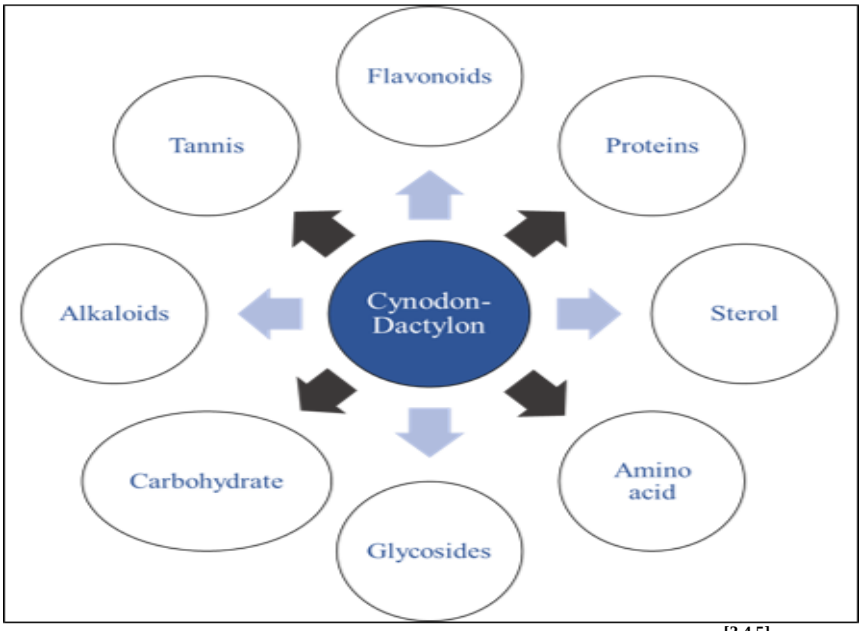

Fig. 1: Phyto-constituents present in Cynodon dactylon.[3,4,5]

Tests for Identity and Purity

(A) Thin layer chromatography

(TLC) TLC of alcoholic extract of the drug is performed on Silica gel 'G' plate using toluene:ethyl acetate in 90:10 ratios. It shows five spots in the visible light at Rf. 0.1 (green), 0.40 (yellow), 0.45 (green), 0.51 (yellow) and 0.57 (green). On exposure to iodine vapour six spots appear at Rf. 0.22, 0.40, 0.45, 0.51, 0.57 and 0.64 (all yellow in colour). On spraying with 5% methanolic-sulphuric acid reagent and heating the plate at 105°C for ten minutes six spots appear at Rf. 0.22, 0.40, 0.45, 0.51 (all grey), 0.57 (green) and 0.64 (grey).

(B) Purity and Strength

The following qualitative characteristics are described for the purity test of C. dactylon: Foreign matter: Not more than 2% Total ash: Not more than 9% Acid insoluble ash: Not more than 4.5% Alcohol soluble extractive value: Not less than 3% Water soluble extractive value: Not less than 9.5%

Phytochemistry

C. dactylon contains 28.17% enzymes, 11.79% ash, 10.47% Proteins. Ash contains 0.77% calcium, 0.58% phosphorus, 0.34% manganese, 0.23% sodium, 2.08% potassium. Dry grass contains per 400 grams 36.16%

carbohydrate, 6.04 % proteins. It contains phenolic phytotoxins viz. ferulic, syringic, paracoumaric, vanillic, para hydroxyl benzoic and orthohydroxy phenyl acetic acid.[6][7] Flavonoids and glycosides were found to be present in the aqueous extract of C. dactylon while alkaloids, glycosides and flavonoids were reported to be present in ethanol extract of the plant.[8] Other compounds like vitamin C, β carotene, fats, palmitic acid etc. have also been reported.[9] Analysis of leaves of C. dactylon by GC-MS technique revealed that C. dactylon leaves contain glycerin (38.49%), 9, 12-Octadecadienoyl chloride,(Z,Z)-(15.61%), hexadecanoic acid, ethyl ester (9.50%), ethyl -d-glucopyranoside (8.42%), linoleic acid, ethyl ester (5.32%), and phytol (4.89%).[10]

Healing properties of cynodon dactylon

The photosynthetic activity

The photosynthetic activity of chloroplasts isolated from C. dactylon has been investigated by Chen T. M. et al,[11] where isolated chloroplasts were assayed for photophosphorylation and electron transport activity. It was found that, during cyclic electron flow with phenazine methosulfate, the chloroplasts actively synthesized adenosine triphosphate. It was concluded that, the high photosynthetic capacity of leaves of C. dactylon could be supported by the photophosphorylation capacities indicated in these chloroplast studies.

Fluorescence analysis of roots

Namdeo and Deore performed the fluorescence analysis of root samples obtained from C. dactylon. The physicochemical properties such as loss on drying, total ash value, acid insoluble ash, water soluble ash value and extractive values of Cynodon dactylon were estimated. This detailed microscopy study revealed the presence of wide cortex, wide circular metaxylem and parenchymatous cells loaded with starch grain and intact epidermis. Researchers concluded that carbohydrates, flavonoids, phenols and tannins were found to be present in Cynodon dactylon.[12]

Study on biotypes

The study of growth response of biotypes of C. dactylon to trichloroacetic acid (TCA) and 2, 2-dichloropropionic acid (dalapon), both formulated as the sodium salt, has revealed that the tetraploid biotypes were more resistant than the triploid, and that biotypes of the same chromosome number showed different responses to these herbicides. Development of C. dactylon was studied on one-node rhizome fragments, planted at successive dates for one year. Authors found no relationship between flowering and rhizome formation. The water-soluble sugar content of rhizomes was high in November December, decreased in late winter, rose again in spring, and decreased in late summer. Percent germination of rhizome buds fluctuated greatly during the year, but researchers never observed the complete dormancy.[13]

Study on released phenolic acids

In a study, the release of phenolic acids from C. dactylon was investigated with help of sequential sodium hydroxide treatment in relation to biodegradation of cell types. Sections of solvent-extracted leaf blades were treated sequentially with increasing concentrations of sodium hydroxide. Study of biodegradation of cell types was performed by scanning electron microscopy and for the purpose of histochemical analysis of lignin (after treatment with sodium hydroxide), light microscopy technique was implemented. Treatment with 0.1 m sodium hydroxide for 1 h did not show significant changes from untreated sections. However, researchers found that, the continuous treatment for 24 h released 86% of the ferulic acid, 65% of the dimers, and 50% of the p-coumaric acid.[14]

Cell wall biodegradability study

Hartley and Akin studied the cell walls of C. dactylon for their lignification and wall biodegradability by using the technique of microspectrophotometry. This study proved that, the sclerenchyma walls which were indigestible to rumen microorganisms gave positive tests with acid phloroglucinol reagent for lignin. Parenchyma walls, which were either digested or partially digested, showed much lower absorbance values in the ultraviolet region and gave negative tests with acid phloroglucinol but positive tests with diazotized sulphanilic acid (upper and lower internodes) and chlorine-sulphite (lower internodes) reagents.[15]

Hypoglycaemic activity

The hypoglycaemic potential of ethanolic extract of C. dactylon has been studied by Singh and co-workers; by its oral administration of 250, 500 and 750 mg/kg body weight of the extracts to normal as well as Streptozocin-induced diabetic rats. The dose of 500 mg/kg body weight was identified as the most effective dose as it lowered the blood glucose levels of normal by 42.12% and of diabetic by 43.42% during fasting blood sugar (FBG) and glucose tolerance test respectively. The study proved that, the ethanolic extract of C. dactylon had high antidiabetic potential along with good hypolipidemic profile.[16]

Effect on nephrolithiasis

Mousa-Al-Reza Hajzadeh et al. investigated the effect of hydroalcoholic extract of C. dactylon on experimentally induced nephrolithiasis in a rat model. Urinary biochemical and other variables were measured during the course of study along with the examination of crystal luria and renal histology. Beneficial effect of Cynodon extract was seen in kidney tissues where reduced levels of Calcium oxalate deposition have been noticed especially in medullary and papillary sections from treated rats.[17]

Anticonvulsant activity

In a study, it was reported that, the C. dactylon imparts protective action against convulsions induced by chemo

convulsive agents in mice. The amount of GABA, which is most likely to involved in seizure activity, was increased significantly in mice brain after six week treatment. Results revealed that the extracts of C. dactylon showed a significant anticonvulsive property by altering the level of catecholamine and brain amino acids in mice.[18]

Anticancer activity

An investigation conducted by Albert-baskar and Ignacimuthu revealed the anticancer activity of C. dactylon; where in-vivo chemoprotective property of plant extract of C. dactylon was found to be antiproliferative and antioxidative at lower concentrations and induced apoptotic cell death in COLO 320 DM cells. Researchers found that, the treatment with methanolic extract of C. dactylon increased the levels of antioxidant enzymes and reduced the number of dysplastic crypts in DMH-induced colon of albino rats. This investigation proved the anticancer potential of methanolic extract of C. dactylon.[19]

Action on white spot syndrome virus (WSSV)

Antiviral activity of a large scale produced plant extract of C. dactylon on white spot syndrome virus (WSSV) was studied in black tiger shrimp Penaeus monodon by in vivo testing after administration through oral route. The plant extract isolated from C. dactylon was incorporated with artificial pellet feed at a concentration of 1% or 2%. PCR technique, bioassay and Western blot analysis were performed to confirm the WSSV-infection. Researchers concluded that, C. dactylon Part Used was highly effective in preventing WSSV infection with no mortality.[20]

Antidiabetic

An investigation showed that the aqueous extract of Cynodon dactylon has high antidiabetic potential along with significant hypoglycemic and hypolipidemic effects.[21] A range of doses, viz., 250, 500 and 1000 mg kg b.wt. of aqueous extract of Cynodon dactylon were evaluated and the dose of 500 mg kg was identified as the most effective dose to lower the blood glucose level. The Total Cholesterol Level (TCL), Low Density Lipoprotein (LDL) and triglyceride level (TGL) were also found to decrease by 35, 77 and 29% respectively in severely diabetic rats whereas high density lipoprotein level (HDL) was found to be increased by 18%. From the study it was concluded that Cynodon dactylon aqueous extract shows remarkable effects on blood glucose level and marked improvement on hyperlipidemia due to diabetes.

In another experiment the ethanolic extract of Cynodon dactylon at doses of 250, 500 and 750 mg kg b.wt. were administered orally to normal as well as streptozotocin-induced diabetic rats so as to study its glycemic potential.[22] The effect was also studied on serum lipid profile of severely diabetic rats. The dose of 500 mg kg b.wt. was identified as the most effective dose as it lowered the blood glucose levels of normal by 42.12% and of diabetic by 43.42% during fasting blood glucose and glucose tolerance test respectively. Total cholesterol, low density lipoprotein and triglyceride levels were also decreased by 32.94, 64.06 and 48.46%, respectively in severely diabetic rats whereas cardioprotective high density lipoprotein was found to increase by 16.45%.

In an experiment conducted by[23] aqueous extract and non polysaccharide fraction of Cynodon dactylon were tested for antihyperglycemic activity in rats. Both the test substances were found to exhibit significant antihyperglycemic activity. Only the non polysaccharide fraction was found to produce hypoglycemia in fasted normal rats.

Antioxidant

The enzyme and non enzymic antioxidant effects of the protein fraction of Cynodon dactylon were determined in Ehrlich's Lymphoma Ascite (ELA) transplanted swiss albino mice.[24] The study showed an enhanced enzymic antioxidants levels (69.18, 4.11 and 49.39 units mg protein) and non enzymic antioxidants level (5.63, 5.20 µg g protein and 3.43 nmoles g protein) in the test animals. It proved the protective action of the plant against the free radical damage caused by ELA tumor cells.

Antidiarrheal

In an investigation hexane, dichloromethane, ethyl acetate and methanol extracts of Cynodon dactylon whole plant were tested in albino rats for antidiarrheal activity on castor oil induced diarrhea.[25] Gastro intestinal motility by charcoal meal and entero pooling models were also examined in albino rats. Methanolic extract exhibited considerable reduction in inhibition of castor oil induced diarrhea and also showed a significant decrease in gastrointestinal motility. These results indicate that the plant possess good antidiarrheal property.

Immunomodulatory

Immunomodulatory activity of the Cynodon dactylon protein fraction was evaluated in healthy swiss albino mice.[26] The protein fraction was administered by intra peritoneal route Immunomodulatory activity was assessed by testing humoral and cellular immune responses to the antigenic challenges with sheep RBCs and by neutrophil adhesion test. A significant increase in the test parameters viz, neutrophil test, haemagglutinating antibody titre and delayed type hypersensitivity response was observed.

CONCLUSION

Durva grass (Cynodon dactylon) stands out as a medicinal plant of immense traditional and therapeutic significance. Its rich phytochemical profile, encompassing flavonoids, alkaloids, terpenoids, and phenolic acids, forms the foundation of its diverse pharmacological activities, including antioxidant, anti-

inflammatory, antimicrobial, and wound-healing properties. The plant's extensive use in traditional medicine, particularly Ayurveda, highlights its relevance in treating skin disorders, diabetes, digestive issues, and bleeding conditions.

Modern scientific studies have begun to validate these traditional claims, showcasing its potential in addressing oxidative stress, supporting immune health, and promoting tissue repair. However, despite these promising findings, several challenges persist, such as the need for standardized extraction techniques, precise dosage guidelines, and thorough evaluation of long-term safety.

To fully harness the therapeutic potential of Durva, it is imperative to integrate traditional knowledge with modern scientific approaches. Rigorous, multidisciplinary research is essential to translate its ancient wisdom into evidence-based applications in contemporary medicine. By addressing existing research gaps, Durva grass can emerge as a valuable natural resource in advancing healthcare solutions globally.

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