

REVIEW ARTICLE

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Hidden Potential of Doob Grass- An Indian Traditional Drug

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Abstract

Medicinal plants are rich in several potential drugs and it carries healthier and harmless alternate to synthetic system of drugs. Plant *Cynodon dactylon* (L.) (doob/ bermuda grass) family (Graminae/Poaceae) is one of them. It is a perennial grass circulated all over the world, and particularly it is native to the high temperate and tropical regions. In various states of India doob grass is known by different names like Durva (Marathi), Arukampillu (Tamil), Durba (Bengali), Dhro (Gujarati), Shataparva (Sanskrit), Garichgaddi (Telugu) etc. It is the second most holy plant of Hindu religious after Tulsi (*Oscimium sanctum*). It has various medicinal values and it is used in the treatment of various types of diseases in the form of various dosage forms like powder, paste or extracts. The plant of *C. dactylon* has a variety of biological activities like antiviral, antibacterial, antimicrobial and specially wound healing properties. Furthermore, it has been broadly used in ancient medicines to treat various problems such as hypertension, epilepsy, cough, diarrhoea, headache, cramps, dropsy, dysentery, hemorrhage, hysteria, measles, snakebite, sores, stones urogenital disorders, tumors, and warts (outer growth on the skin). The herb contains crude proteins, carbohydrates, and mineral constituents, oxides of magnesium, phosphorous, calcium, sodium and potassium. The herb has β -sitosterol and β -carotoene, triterpinoids, vitamin C, cartone, palmitic acid, alkaloids, ergonovine and ergonovinine. The aim of this review is to produce an interest for further investigations of the phytochemical and pharmacological properties of this herb.

Keywords: *Cynodon dactylon*, Bermuda grass, Doob grass, Durva.

INTRODUCTION

Cynodon dactylon is a perennial creeping herb, wiry, stem (culms) slender, rooting at the nodes forming matted tufts. Leaves are (2-10 cm x 1.25-3 mm) narrow linear or lanceolate, soft, acute and glaucous-green. Spikes 2-6, radiating from slender ascending peduncle, green or purplish. The erect stems can grow 1-30 cm tall and are slender, prostrate, up to 1 mm thick, jointed, leafy, very smooth, yellowish green in colour. This grass has a deep root system, which is helpful in drought situations with penetrable soil. These are cylindrical, fibrous up to 4 mm thick, minute hair like roots arise from the main roots. *C. dactylon* reproduces through seeds, runners, and rhizomes. At the top of stem, the seed heads are produced in a cluster of two to six spikes together, each spike 2-5 cm long [1-4]. It is common in areas such as gardens, roadsides, overgrazed, trampled areas, uncultivated lands, localities with high levels of nitrogen, and is often found in moist sites along rivers. The grass can be cultivated under dry land conditions. It is widely distributed in southern African countries, in biomes such as grassland, Savanna, Nama-Karoo and Fynbos [5-10].

In traditional medicine it is used for indigestion and the treatment of wounds. According to an old Venda tradition, it is used in the fermentation process to make beer sour. The reports confirmed that doob grass is sudorific, astringent, cyanogenetic, demulcent, alterative, aperients, depurative, diuretic, emollient, sudorific, antiseptic and vulnerary. It is used for the treatment cancer, carbuncles, convulsions, cramps, cough, cystitis, diarrhoea, dropsy, dysentery, epilepsy, headache, haemorrhage, hypertension, hysteria, insanity, laxative, measles, rubella, snakebite, sore stones, tumors, urogenital disorders, warts, and wounds etc [11-13]. Apart from medicinal uses of this grass, it has importance in Hindu Rituals. The Durva word is derived from the two words i.e. duhu and avam. Durva is use by Hindus to bring the distant pure spiritual particles (pavitra) of God closer to the follower. The grass has three blades which represents the three values of Shiva, Shakti and Ganesha. Durva is said to have the highest ability to attract the Ganesha principle by hindus.

Doob grass contains essential oil triticin 12.4%. The other chemical constituents of *Cynodon dactylon* are glycosides, tannins, saponins, flavonoids and carbohydrates (36.16 %). It also contains agropyrene,

arunodin, furfural, furfural alcohol, β -ionine, 2-(4'-hydroxy phenyl) propionic acid, 2-(3'-methoxy-4'-hydroxy -phenyl) propionic acid, 3-methoxy -4-hydroxy benzoic acid, phytol, β -sitosterol-D-glucoside, stigmasterol acetate, phagostimulant phytone (6,10-14-trimethyl pentadecane -2-one). Cuticular wax contains triacontane, docosanol, tetracosanol, hexacosanol, octacosanol, eicosanic acid & docosanoic acid. Green doob grass contains protein 10.47 %, enzymes 28.17 % and ash 11.79 %. Ash contains calcium 0.77 %, phosphorus 0.58 %, manganese 0.34 %. Sodium 0.23 and potassium 2.08 %. [14-16]

According to Ayurveda, it is Gunna (properties) – laghu (light), Rasa (taste) – kashaya (astringent) and madhur (sweet) and Virya (potency) – sheet (cold). It is kapha and pitta suppressant. It helps in adhesion, wound healing and improves skin texture. It improves neurological functioning. It promotes digestion and improves the peristaltic movements. It purifies blood and fades away the infection. It is diuretic. It also removes toxins from the body.

Medicinal uses of Doob Grass:

Doob grass is used in the treatment of many disorders like:

- **Redness and pain in eye** – we can apply grinded doob grass with help of cotton and cloth on eye.
- **Heavy And Prolonged Menstrual Period (Menorrhagia)** – Take the juice of medicinal doob grass with honey 2-3 times a day.
- **Stress** - Apply paste of doob grass on sole of feet to decrease the stress level.
- **Nose bleed (Nakseer)**- Put 4-4 drops of fresh juice of grass in nostril to stop bleeding.
- **Mouth ulcer** – For mouth ulcer, gargle with juice of doob grass with potash alum.
- **Acidity, ulcer, colitis, stomach infection**- For curing of colitis, swelling, stomach infection and acidity drink 3-4 spoon juice of doob grass with water empty stomach in morning for few days..
- **Ascites (Jaloder)** - Take grinded doob grass with black pepper to 2-3 times a day.
 - **Stomach pain and infection**- Take a mixture of 3-4 spoon doob grass juice with bit of sonth (dry ginger powder) empty stomach in morning for few days.

PHARMACOLOGICAL ACTIVITY

CNS Activity

The effect of grass herb was evaluated for Central Nervous System activities in the mice by Pal Dilip Kumar. The ethanolic extract of aerial parts of *C. dactylon* was found to cause significant depression in

mice general behavior. The extract increased the sleeping time of mice induced by standard hypnotics viz. pentobarbitone sodium, diazepam and meprobamate in a dose dependent manner. [17]

Antidiabetic Activity

Singh SK. et al. worked and reported antidiabetic potential of *Cynodon dactylon* extract in streptozotocin diabetic rats. A range of doses, including 250, 500 and 1000 mg/kg (bodyweight) of aqueous extract of *C. dactylon* were evaluated and the dose of 500 mg/kg was repeated by oral administration of drug and identified as the most effective dose. Furthermore, Avvarai et al found that the ethanolic extract of grass root stalks has a good anti-diabetic activity against the animal used. Diabetic rats were treated by Jerald et al with aqueous and non-polysaccharide fraction of *C. dactylon* exhibited significant anti hyperglycaemic activity and decreased the glucose, urea, serum cholesterol, serum triglyceride, high density lipoprotein (HDL), low density lipoprotein (LDL) and urea levels.[18-20]

Antiulcer Activity

Antiulcer properties of alcoholic extract of *Cynodon dactylon* was studied by Patil MB et al in rats. They evaluated the extract for preliminary identification of Phytoconstituents and screened at 200, 400, and 600 mg/kg body weight given orally for pylorus ligated and Indomethacin induced gastric ulcer models in albino rats. A significant (>0.001) antiulcer activity was showed by alcoholic extracts at 400 mg/kg and 600 mg/kg, comparable to the standard drug ranitidine, which may be due to the presence of flavonoids [21].

Antiarrhythmic Activity

The hydroalcoholic extract of herb produced a marked reduction in the number, duration and incidences of ventricular tachycardia at 25 and 50 $\mu\text{g/ml}$ during ischemia. Total number of ischemic ventricular ectopic beats was lowered by 25-100 $\mu\text{g/ml}$ of herb extract. At the reperfusion phase, the extract (25 and 50 $\mu\text{g/ml}$) decreased incidence of ventricular tachycardia from 100% (control) to 13 and 33%. Duration and number of VT and total VF incidence were also reduced at the same concentration. Perfusion of the extract (25–100 $\mu\text{g/ml}$) was markedly lowered reversible VF duration from 218 ± 99 sec to 0sec, 0sec and 10 ± 5 sec respectively. [22-23].

Analgesic and Anti-Pyretic Activity

Earlier the herb was used to treat painful and inflammatory conditions. The analgesic and anti-pyretic activity of aqueous extract of *Cynodon dactylon* was studied by Garg VK., Khosa RL. They

observed that the aqueous extract at the dose of 600 mg/kg showed a significant decrease in rectal temperature similar to that shown by standard drug, paracetamol. Analgesic activity of the extract was evaluated using hot plate method and writhing test in mice. They used acetic acid as an inducer for writhing syndrome, which causes algesia by liberation of endogenous substances and excite the pain nerve endings. The results showed analgesic activity in both models studied; indicate that this effect could be due to the presence of two components; one acting centrally and the other via peripheral route. [24].

Diuretic Activity

Aqueous extracts of *C. dactylon* rhizomes were evaluated by different scientists for its diuretic activity in rats and the results showed that the extract increased significantly urinary output and electrolytes excretion at the dose of 500 mg/kg body weight. Sadki et al suggested that rhizome extract can be used as a diuretic remedy in traditional medicine. The diuretic activity of herb extract in guinea pigs was studied by Aruna et al. and they reported that administration of crude extract increase the urine output compared to control group [25, 26]

Snakebite Therapy

As per the survey done in 1995 in the district Chengapattu (Tamilnadu) it was found that *Cynodon dactylon* is very effective in snakebite therapy and the antsnake venom from the plant extract is very effective in the treatment of snakebite. [27].

Anticonvulsive Property

Pal Dilip kumar determined brain biogenic amines in *Cynodon dactylon* and *Cyperus rotundus* treated mice. The ethanol extract of aerial parts of *Cynodon dactylon* (EECD) and roots & rhizomes of *Cyperus rotundus* (EECR) showed marked protection against convulsions induced by chemoconvulsive agents in mice. It was confirmed by the study that both the extracts showed significant anticonvulsive property, which altered the level of catecholamine and brain amino acids in mice [28- 33].

Immunomodulatory and DNA Protective Activities

Immunomodulatory and DNA protective activities of the shoots of *Cynodon dactylon* was studied by Mangathayarua K. et. al. At doses equivalent to 50, 100 and 200mg total solids/kg body weight the juice (*Cynodon dactylon* of 1.46% (w/w) solid content had a phenolic content of 47 ± 0.33 mg/kg GAE) protected human DNA against doxorubicin-induced DNA damage as demonstrated in DNA spectral studies. The study confirmed the nucleic acid purity in the *Cynodon dactylon* treated samples [34].

It was observed by Saradha Devi et al that the daily treatment of 70 μ l of ethyl acetate fraction of herb polyphenols significantly prevented the immunosuppression caused by pyrogallol in mice [35]. Santhi and Annapoorani confirmed that the protein fraction of grass promises strong utility for useful immunostimulant in swine albino mice. [36].

Chemo Preventive Effect

Chemo preventive effect of *C. dactylon* extract against DMH-induced colon carcinogenesis was studied in albino rats by Baskar AA. The scientist found that methanolic extract of *C. dactylon* is anti proliferative and anti oxidative at lower concentrations and induced apoptotic cell death in COLO 320 DM cells. This herb extract enhanced the levels of antioxidant enzymes and decreased the number of dysplastic crypts in DMH-induced colon of albino rats. [37].

Anti-Inflammatory Activity

Earlier this herb is used to treat many chronic inflammatory diseases in India [38- 39]. The anti-inflammatory activity of aqueous extracts of *C. dactylon* at different doses using the carrageenan, serotonin dextran and histamine induced rat paw edema was observed by Garg and Paliwal. In this study, all the doses (200, 400, and 600 mg/kg of body weight) were oral administrated, and results showed significant anti-inflammatory activity in all the models. [40]

In addition, the 50% ethanolic extract of *C. dactylon* at 300 and 600 mg/kg showed significant anti-inflammatory activity in rodent which was observed by Dhande SR. One other group of scientist Yogesh et al. investigated chloroform-methanolic extract of *C. dactylon* in carrageenan induced rat paw edema and observed significant inhibition at doses of 125, 250 and 500 mg/kg for both acute and chronic models and are comparable with standard anti-inflammatory drug, indomethacin. This study also confirmed that chloroform-methanolic extract of *C. dactylon* had significant anti-inflammatory activity. [41-42].

Antioxidant Activity

Antioxidants scavenge or suppress the formation of reactive oxygen species (ROS) that can delay the start or slow the rate of lipid oxidation reaction in food systems. Free radical damages the cells and plays a major role in the aging process and in disease progression. Antioxidants defense free-radical damage and are critical for maintaining optimum health [43]. Bhalerao et al observed that ethanolic extracts of aerial part of the herb have potent DPPH free radical

scavenging activity and nitric oxide scavenging activity. [44] Fraction of grass with ethyl acetate was studied by Saroja et al to evaluate the enzymatic and non-enzymatic antioxidants in Ehrlich's lymphoma ascite (ELA). The enzymatic, non-enzymatic and vitamin E level were decreased in ELA induced mice due to release of free radicals from the Swiss albino mice liver [46- 47].

CONCLUSION

The grass (*C. dactylon*) consists of three blades which represents the three principles of primal Shiva, primal Shakti and primal Ganesh. Due to this the grass has great importance in Hindu Rituals. Besides this from all the above study it was clear that *C. dactylon* has broadly been used in Indian ayurvedic system of medicine since olden days it was used for treatment and cure of many diseases. Aqueous and alcoholic extracts of whole plant, aerial parts, leaves, and rhizomes of *C. dactylon* has numerous medicinal and clinical applications. Several studies showed clearly that *C. dactylon* is a natural crude drug having a widespread of natural and pharmacological functions against many diseases like as anticancer, antiulcer, antidiabetics, antibacterial, antimicrobial, antiviral and wound healing. Therefore, it should be used as a new drug for the future prospective to control many more diseases.

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