A Review on Cynodon Dactylon

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Abstract- *Cynodon dactylon (L) Pers, family-poeace, is a perennial herb found in various regions of India. It has different names in different Indian languages such as Durva (Marathi), Durba (Bengali), Dhro (Gujarati), Garichgaddi (Telugu), Arukampillu (Tamil), Shataparva (Sanskrit) etc. Cynodon dactylon occupies a key position in ethno medicinal practices and traditional systems of medicine. It has vast medicinal value and it is used in the treatment of various diseases in the form of its powder, paste or juice. Cynodon dactylon contains many metabolites notably proteins, carbohydrates, minerals, flavonoids, carotenoids, alkaloids, and glycosides. This review attempts to encompass the available literature on Cynodon dactylon with respect to its pharmacognostic characters, traditional uses, chemical constituents, summary of its various pharmacognostic and pharmacological activities and a brief review on patents associated with it.*

I. INTRODUCTION

According to an estimation of the World Health Organization, about 80 percent of the world's population uses herbs to fulfil its primary healthcare needs. More than 35,000 plant species are being used around the world as medicinal plants in traditional and ethno medicinal practices. Among numerous species of plants growing in India, Durva or taxonomically the **Cynodon dactylon** occupies a key position in ethno medicinal practices and traditional medical knowledge systems (Ayurveda, Unani, Nepalese, and Chinese). Durva consists of dried whole plant of **Cynodon dactylon** (Linn.) Pers. (Family: Poaceae), an elegant, tenacious, perennial, creeping grass growing throughout the country.

Cynodon dactylon possesses immense medicinal value and may be applied both externally as well as internally. The plant possesses antiviral and antimicrobial activity **.** Decoctions of root are used in secondary syphilis and irritation of urinary organs **.** The plant is astringent, sweet, cooling, haemostatic, depurative, vulnerary, constipating, diuretic and tonic and is useful in impaired conditions of **pitta** and **kapha**, hyperdipsia, burning sensation, haemoptysis, haematuria, haemorrhages, wounds, leprosy, diarrhoea, dysentery, conjunctivitis, vomiting etc.

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

Geographical distribution

The plant **C. dactylon** prefers light sandy, medium loam and heavy clay soils. It can even grow in very acidic, alkaline and saline soils. However, it cannot grow in shady places. It needs moisture in soil. It has been introduced throughout warm-temperate and the sub-tropical world primarily for use as a lawn grass or as a forage grass, especially in saline habitats as reported by various workers

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%

Acetylcholinesterase inhibition and antioxidant activity
In a study by Rai and co-workers, it was reported that, the aqueous extract of **C. dactylon** plays an important role in prevention of carbofuran-induced oxidative stress and acetylcholinesterase inhibition in rat brain. The study was

designed to investigate the ameliorating effect of aqueous extract of **C. dactylon** on carbofuran-induced oxidative stress and alterations in the activity of acetylcholinesterase (AChE) in the brain of rats. The oxidative stress parameters such as lipid peroxidation, the effects **C. dactylon** on antioxidant enzymes including super oxide dismutase, catalase and glutathione-S-transferase and that of Acetylcholinesterases were studied in brain. It was found that the activities of glutathione-S-transferase and acetylcholinesterase were diminished by 25 and 33%, respectively. Wistar rats were administered with single sub-acute oral dose (1.6 mg/kg) of carbofuran for 24 hr. It was concluded that, this particular study proved to be useful to develop new anticholinestesterase and antioxidant antidotes from **C. dactylon** against carbofuran

ECOLOGY AND CULTIVATION

Cynodon dactylon is found abundant as weed along the roadsides, in lawns and can readily take possession of any uncultivated area. In winter, the grass becomes dormant and turns brown in colour. Growth is promoted by full sun and retarded by full shade. Plant readily propagated by cuttings and rooting. It can spread very quickly from the rooted runners, which grow more than 7.5 cm day^{-1}. Planting is best done in wet weather to ensure quick sprouting. It gives a complete ground cover in 4-8 weeks when sprigged 30-45 cm apart.

PRINCIPAL CONSTITUENTS

The plant contains crude proteins, carbohydrates, mineral constituents, oxides of magnesium, phosphorous, calcium, sodium and potassium. The whole plant affords β-sitosterol, flavanoids, alkaloids, glycosides and triterpenoides. Other compounds like vitamin C, carotene, fats, palmitic acid etc. are also reported. Green grass contains (on dry matter basis) 10.47% crude protein, 28.17% fiber and 11.75% of total ash.

Competitive relationship:

Plant residues and actively growing plant parts of Cynodon dactylon may pose a direct threat to thegrowth of neighboring plants.Light textured soils mixed for four months with extracts from decaying Bermuda grass plants caused an inhibition of radicle elongation in barley and mustard seedlings. Incubation of test plants for two months with Bermuda grass results in a high degree of inhibition. In addition to the importance of the duration of exposure, is the concentration. The inhibition is proportional to the concentration of plant material. In general, root growth and germination are both affected by decaying residues and actively growing Cynodon dactylon plants.The importance of the allelopathic substances produced by Bermuda grass in the field is unclear. Threats due to completely decayed residues should not be overlooked. In addition to the allelopathic effects of Cynodon dactylon is the direct competition for space and nutrients by this rapidly growing perennial grass. Bermuda grass's notoriety as a tremendous colonizer comes from the spreading ability of both the rhizomes and stolons. The open growth pattern of Bermuda grass's stolons provides for greater land coverage than seen with species which lack stolons, such as Sorghum halepense; the average monthly area increase in the warm season for Cynodondactylon and Sorghum halepense is 1.6 m2 and 1.3 m2, respectively.Aerial growth from shoots,tillers and previous season's rhizomes produce an abundance of stolons, which in turn produce moreshoots, rhizomes and roots. This growth pattern explains the tremendous spreading capacity ofBermuda grass; the highest monthly area increase was 6 m2 during July and August.however, theaverage area increase for Cynodon dactylon is only 0.9 m2 per month. This growth rate is far less thanother perennial grasses; Cyperus rotundus has a mean area increase of 2.8 m2 per month.[30]other perennial grasses; Cyperus rotundus has a mean area increase of 2.8 m2 per month.

Doses form:

Paste: It is used in application of any inflammation, wounds, skin aliments,and pain.

Powder: It is very helpful in nausea,piles.

Juice: It is helpful in urine related disorders and urinary tract infections.

II. CONCLUSION

Cynodon dactylon occupies a key position in ethno medicinal practices and traditional medicinal systems. It is extremely useful in wide variety of diseases and disorder. Various pharmacognostic and pharmacological actions of Cynodon dactylon have been investigated by researchers all around the world, supporting its medicinal uses mentioned in the traditional medical knowledge systems.The compatitive study,ecology,various tests,acetylcholinesterase inhibition and antioxidant property discussed in this paper.

REFERENCES

[1] Chopra RN, Nayer SL, Chopra IC. CSIR, New Delhi:Publication and Information Directorate. J Glossary of Indian Medicinal Plants 1999:88.

[2] Dilipkumar P, Kousik P. Evaluation of anthelmintic activities of aerial parts of C. dactylon Pers. J Ancient Sci Life 2010;30:12-3.

[3] Garg VK, Paliwal SK. Antiinflammatory activity of aqueous extract of **C. dactylon**. Int J Pharmacol 2011;7:370-5.

[4] Sadki C, Atmani F. Acute diuretic activity of aqueous Erica multiflora flowers and **C. dactylon** rhizomes extracts in rats. J Ethnopharmacol 2010;128:352-6.

[5] Garjani A, Afrooziyan A, Nazemiyeh H, Najafi M, Kharazmkia A, Maleki-Dizaji N. Protective effects of hydroalcoholic extract from rhizomes of **Cynodon dactylon** (L.) Pers. on compensated right heart failure in rats. J BMC Complement Altern Med 2009;9:28.

[6] Shivalinge GKP, Satish S, Mahesh CM, Vijay K. Study on the diuretic activity of **Cynodon dactylon** root stalk extract in Albino rats. Res J Pharm Tech 2009;2:338-40.

[7] Gokaraju GR, Gokaraju RR, Trimurtulu G, Chillara S, Sengupta K, Bhupathi RK. Anti-adipocyte fatty acid-binding protein (Ap2), anti-flap and anti-cyslt1 receptor herbal compositions. United States patent application number 20090298941A1. 2009. Available at:http://www.freepatentsonline.com/y2009/0298941.html

[8] Meillo G. Capsules containing the active principle of an allergen and process for their preparation. United States patent 4681752. 1987. Available at:http://patft.uspto.gov.

[9] Desai UM, Achuthankutty CT, Sreepada RA. Composition for treating White Spot Syndrome Virus (WSSV) infected tiger shrimp penaeus monodon and a process for preparation thereof. United States patent 6440466. 2002. Available at:http://patft.uspto.gov.

[10] Fiebig H, Wald M, Nandy A, Kahlert H, Weber B, Cromwell O. Variants of group I allergens from poaceae having reduced allergenicity and maintained t-cell reactivity. United States patent application number 20080267985A1. 2008. Available at:http://www.freepatentsonline.com/y2008/0267985.html

[11] Arora N, Bijli MK, Singh BP, Sridhara S. Novel protein capable of inhibiting anthrax toxin activity. United States patent application number 20050107295A1. 2005. Available at:http://appft.uspto.gov.

[12] Shahreen S., Banik J., Hafiz A., Rahman S., Zaman A.T., Shoyeb M.A., Chowdhury M.H., Rahmatullah M. Antihyperglycemic activities of leaves of three edible fruit plants (Averrhoa carambola, Ficus hispida and Syzygium samarangense) of Bangladesh. Afr. J. Tradit. Complement. Altern. Med. 2012;9:287–291. doi: 10.4314/ajtcam.v9i2.16. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[13] 117. Rangika B.S., Dayananda P.D., Peiris D.C. Hypoglycemic and hypolipidemic activities of aqueous extract of flowers from Nycantus arbor-tristis L. in male mice. BMC Complement. Altern. Med. 2015;15:289. doi: 10.1186/s12906-015-0807-0. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[14] 118. Doss A., Palaniswamy M., Angayarkanni J., Dhanabalan R. Antidiabetic activity of water extract of Solanum trilobatum (Linn.) in alloxan-induced diabetes in rats. Afr. J. Biotechnol. 2009;8:5551–5553. [Google Scholar]

[15] 119. Olaokun O.O., McGaw L.J., Awouafack M.D., Eloff J.N., Naidoo V. The potential role of GLUT4 transporters and insulin receptors in the hypoglycaemic activity of Ficus lutea acetone leaf extract. BMC Complement. Altern. Med. 2014;14:269. doi: 10.1186/1472-6882-14-269. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[16] 120. Zengin G., Mollica A., Aktumsek A., Picot C.M.N., Mahomoodally M.F. In vitro and in silico insights of Cupressus sempervirens, Artemisia absinthium and Lippia triphylla: Bridging traditional knowledge and scientific validation. Eur. J. Integr. Med. 2017;12:135–141. doi: 10.1016/j.eujim.2017.05.010. [CrossRef] [Google Scholar]

[17] 121. Liu N.Q., van der Kooy F., Verpoorte R. Artemisia afra: A potential flagship for African medicinal plants? S. Afr. J. Bot. 2009;75:185–195. doi: 10.1016/j.sajb.2008.11.001. [CrossRef] [Google Scholar]

[18] 122. Nedjimi B., Beladel B. Assessment of some chemical elements in wild Shih (Artemisia herba-alba Asso) using INAA technique. J. Appl. Res. Med. Aromat. Plants. 2015;2:203–205. doi: 10.1016/j.jarmap.2015.06.003. [CrossRef] [Google Scholar]

[19] 123. Al-Khazraji S.M., Al-Shamaony L.A., Twaij H.A.A. Hypoglycaemic effect of Artemisia herba alba. I. Effect of different parts and influence of the solvent on hypoglycaemic activity. J.Ethnopharmacol. 1993;40:163–166. doi: 10.1016/0378-8741(93)90064-C. [PubMed] [CrossRef] [Google Scholar]

[20] 124. Cruz E.C., Andrade-Cetto A. Ethnopharmacological field study of the plants used to treat type 2 diabetes among the Cakchiquels in Guatemala. J. Ethnopharmacol. 2015;159:238–244. doi: 10.1016/j.jep. 2014.11.021. [PubMed] [CrossRef] [Google Scholar]