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CYNODON DACTYLON - A SYSTEMIC REVIEW OF PHARMACOGNOSY, PHYTOCHEMISTRY AND PHARMACOLOGY

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ABSTRACT: Family-peace, also known as *Cynodon dactylon* (L) Pers, is a perennial herb that can be found throughout India. It goes by a variety of names in different Indian languages, including Durva in Marathi, Durba in Bengali, Dhro in Gujarati, Garichgaddi in Telugu, Arukampillu in Tamil, and Shataparva in Sanskrit, among others. In conventional medical systems and ethnomedical practices, *Cynodon dactylon* plays a significant role. Its powder, paste, or juices are used to cure a variety of illnesses due to its extensive therapeutic properties. Numerous metabolites are present in *Cynodon dactylon*, including glycosides, flavonoids, carotenoids, alkaloids, proteins, carbohydrates, and minerals. This study aims to include all relevant material on *Cynodon dactylon*, including summaries of its numerous pharmacognostic and pharmacological activity, traditional uses, chemical ingredients and pharmacognostic characteristics.

INTRODUCTION: *Cynodon dactylon* (Doob grass) [1] is the sacred grass next to *Ocimum sanctum*, (Tulsi) because it is used to feed the sacred cows in India. The Sanskrit name of Doob is durva, which is cut or eaten by the animal. The plants sacred to lord Sankara, Ganesa and Vishnu are vilva, durva and tulsi, which alleviate vata, pitta and kaphadosas. Hindus worship the God Ganesa with the leaves durva religiously. This plant has been recognized for its cooling, haemostatic, diuretic, and tonic properties since ancient times, cited in Dhanvantari, Kaiyadeva and Raja Nighantus. Ayurvedic texts mention two types of durva *viz*. white and green.

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According to Ayurveda, India's traditional pharmacopeia, Cynodon plant is pungent, bitter, fragrant, heating, appetizer, vulnerary, anthelmintic, antipyretic, alexiteric. It destroys foulness of breath, useful in leucoderma, bronchitis, piles, asthma, tumors, and spleen enlargement. In Homoeopathic systems of medicine, it is used to treat all types of bleeding and skin troubles [2, 3]. Doob grass originally came from the savannas of Africa and is the common name for all the East African species of Cynodon.

It is called Bermuda grass in the United States because it was introduced from Bermuda Island. In ancient Roman days they squeezed the juice from the stems and used it as a diuretic and astringent to stop bleeding. This article intends to provide an overview of the chemical constituents in various parts of Durva and their pharmacological actions. Durva is explained in almost all the important Nighantus with a variety of synonyms and Gunakarmas [3].

Sushruta Nighantu (6th Cent.A.D.) based on Susrutasamhita. In this Nighantu, Durva has not been mentioned [4]. Ashtanga Nighantu (8th Cent. A. D.) Acharya Vahata has detailed the greatest group of medications in this Nighantu based on the categorization of Ashtanga Sangraha and Astanga Hridaya. Furthermore, certain Page 3 of 19 medications are referenced in Viprakirnavarga. Shyamadivarga describes Nighantu Durva in this context. Shari, Suvrata, Gyeya, Gandhadwa, Somsambhava, Sita, Golomi, Durva, Sahasravirya, and Shadwala are some synonyms [5]. Sodhala Nighantu (12th Cent. A. D.) Acharya Sodhala wrote this Nighantu in two parts: Namasangraha, which deals with synonyms, and Gunasangraha, which deals with attributes and acts. Synonyms of durva are given in Sodhalanighantu's "Karaviradivarga": Niladurva, Harita, Sashpa, Sadvala, Satavirya, Sataparva, Sita, Lata, Amrita, Tvamari, Saumya, Sitali, Amara; Sveta durva Golomi, Svetapatra, Sita, Lata Sahasravirya, Useful for Raktapitta, Kandu, and skin ailments [6]. Abhidhanaratnamala (Shadrasa Nighantu) (13th Cent. A. D.) Synonyms of Durva in Abhidhanratnamala are mentioned in Madhura dravyaskandha. The following synonyms are listed here: Sveta durva's synonyms include Sahasravirya, Golomi, Sita, Ananta, and Gandapriya, whereas Niladurva's synonyms include Harita, Shadvala, and Asita [7].

Detail of Plant Botanical Name:

***Cynodon dactylon* Family:** Poaceae

Genus: Cynodon

Species: Dactylon

Synonyms: Durva grass, Bermuda grass, Dog's Tooth grass, Indian Doab, Scutch grass, Bahama grass, Devil's grass, Couch grass, Hariyali Grass [7].

Habitat and Distribution: The plant *Cynodon dactylon* is frequently grown in warm areas between 30° S and 30° N latitude, where the annual rainfall ranges from 625 to 1,750 mm (24.6 to 68.9 in) (or less, if irrigation is available). In the United States, for instance, it is primarily grown in the nation's southern region. The soil types that the plant *C. dactylon* loves are light sand, medium loam, and heavy clay. It may even flourish on saline, alkaline, and even acidic soils. It cannot, however, grow in shaded areas. Soil moisture is required. It has been spread throughout the warm-temperate and subtropical world largely for use as a lawn grass or feed grass, especially in saline settings, according to various workers [8].

Ecology and Cultivation: *Cynodon dactylon* is found abundant as a 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. Plants readily propagated by cuttings and rooting. It can spread 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 [8].

Morphology: Doob grass is a creeping grass, light green in color, and has a coarse texture. It has three parts i.e. root, stem and leaves. It is fast growing and its root grows where ever a node touches the ground, forming a dense mat. It also reproduces from roots under the ground. It has a deep root system; in drought situations the root system can grow 47 to 59 inches (120-150 cm) deep. Most of the root mass lies 24 inches (60 cm) under the surface. Its blades are gray-green and short, usually 1 to 4 inches (3-10 cm) long with rough edges. The erect stems can grow tall by 0.3 to 1.3 feet (0.1-0.4 m). The stems are slightly flattened, and an inflorescent purple in color. It has no odour and has a sweet mucilaginous taste [9].

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% carbohydrates 6.04 % proteins. It contains phenolic phytotoxins *viz.* ferulic, syringic, paracoumaric, vanillic, para hydroxyl benzoic, and orthohydroxy phenylacetic acid. 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. Other compounds like vitamin C, β carotene, fats, palmitic acid *etc*., have also been reported [8]. 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%) [9].

Traditional Uses: Cynodondactylon is a traditional treatment for diarrhoea, bronchitis, anasarca, calculus, dropsy, haemorrhage, urogenital diseases, cough, headache, sores, cancer, carbuncles, convulsions, cramps, cystitis, dysentery, epilepsy, haemorrhoids, leucoderma, hypertension, hysteria, asthma, tumours. It also effectively treats pains, inflammations, toothaches, and grippe in youngsters. The expressed juice of the plant acts as an astringent and is applied to bleeding cuts and wounds to halt the bleeding. Epitaxis use a plant paste combined with honey.

Oral administration of the plant's juice with honey for 2 to 3 times a day for a few days effectively cures menoeehagia. Local application in the form of paste of the plant extract upon the lower abdomen reduces severe bleeding in vagina. A decoction of *Cynodon dactylon* mixed with sugar is useful in the problem of urine retention.

According to the Ayurvedic system of medicine it acts as an appetizer, anthelmintic, antipyretic, alexiteric agent. Some classical Ayurvedic plant preparations are Durvadikvatha, Durvadyaghrta, Durvadyataila, and Durvadi yoga. According to the Unani system of medicine, *Cynodon dactylon* is used as a laxative, coolant, and expectorant, carminative and as a brain and heart tonic. In Homoeopathic systems of medicine, it is used to treat all types of bleeding and skin troubles [20, 21, 22].

Pharmacological Action:

Anticonvulsant Activity: Paul *et al* (2005) studied that *C. dactylon* has a protective effect against the convulsions that chemo convulsive drugs cause in mice. After six weeks of treatment, there was a large rise in the amount of GABA, which is most likely to be implicated in seizure activity. According to the findings, *C. dactyl* on extracts significantly reduced the amount of catecholamine and brain amino acids in mice, which prevented seizures [9].

Anticancer Properties: Albert-baskaret *et al.* (2010) *In-vivo* chemoprotective effect of plant extract of *C. dactylon* was shown to be antiproliferative and antioxidative at lower doses and produced apoptotic cell death in COLO 320 DM cells in a research done by Albertbaskar & Ignacimuthu. Researchers discovered that treating albino rats with a methanolic extract of C. dactylon boosted antioxidant enzyme levels and decreased the amount of dysplastic crypts in the DMH-induced colon. This study established the anticancer potential of *C. dactylon* methanolic extract [10].

Immunomodulatory Activity: Mangathayaruet *et al.* (2009) study immunomodulatory activity of the Cynodondactylon protein fraction was evaluated in healthy swiss albino mice. 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 [11].

Diuretic Activity: Sadki *et al* (2010) investigate diuretic activity of *C. dactylon* by oral administration of different concentrations of its extracts (0.125, 0.250, and 0.500 g/kg of body weight) along with the reference drug Furosemide (0.015 g/kg) to hydrated male Page 13 of 19 Wistar rats, and their urine output was measured at several intervals of time after a single dose administration. Furthermore, researchers also studied the toxicological effect of the same plant [12].

Hypoglycaemic Activity: Singh *et al* (2013) perform hypoglycaemic potential of ethanolic extract of *C. dactylon* has been studied 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 [15].

Hepatoprotective Activity: Surendra *et al* (2005) evaluated hepatoprotective activity of aerial parts of *C. dactylon* against CC14 induced hepatotoxicity in Wister rats. Various doses of ethanolic extract of aerial parts of *C. dactylon* such as 100, 250 and 500 mg/kg were administered to animals. Researchers assessed the serum bilirubin, cholesterol, SGPT, SGOT and ALP levels. It was found that the extract of *C. dactylon* significantly reversed the rise in serum bilirubin and cholesterol levels [14].

Wound Healing: Druvagritha *et al* (2011) was evaluated wound healing property by incision and excision wound model in male Wister rat promotes wound contraction and reduces the time for closure showing healing potential comparable to Framycetin sulphate 1% cream [18].

Antiviral G. Balasubramanian *et al.,* (2008) Cynodondactylon exhibited potent antiviral activity against white spot syndrome virus (WSSV) and they have also been reported to possess antiviral activity against human vaccinia virus [17].

Antiulcer: Babu *et al* (2012) alcoholic extract of *Cynodon dactylon* was screened for antiulcer activity in albino rats at dose level of 200, 400 and 600 mg kg"1 b.wt. The extract at 400 mg kg"1 and 600 nig kg"1 showed significant (>0.001) antiulcer activity as compared to the standard drug, ranitidine. This activity may be due to the presence of flavonoids [16].

CONCLUSION: Durva (*Cynodon dactylon* Linn.) is a plant with a rich ethnobotanical history. The present review on Durva of different Nighantus can be useful to know about the different formulations of Durva in which different parts of this plant is used. By this way we can use Durva in the treatment of different diseases. Most of the Nighantus have mentioned Durva use full in the treatment of Atisar (dysentery), Vaman (bilious vomiting), Garbhapat (Abortion), Apasmara (epilepsy), Ascitis (Jalodar), Atyartava (hypermetrogia), Unmad (Psychosis). In this regard, further studies need to carry out to explore Durva for its potential in preventing and treating diseases.

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REFERENCES:

1. Kaliyaperumal A, Kumarakurubaran S & Saradha DM: *Cynodon dactylon* (L.) Pers.: An Updated Review of Its Phytochemistry and Pharmacology. Journal of Medicinal Plants Research 2013; 7(48): 3477-3483.
2. Parihar S & Sharma D: *Cynodon dactylon*: A Review of Pharmacological Activities. SchAcad J Pharm 2021; 11: 183-189.
3. Singh S, Sanjeev K, Dwivedi KN & Pandey SK: Therapeutic Review on an Auspicious Grass: Durva (*Cynodon dactylon* Linn. Pers): From Kosha and Nighantus 2015.
4. Sausruta Nighantu: Edited By Kashiraja Sharma and Narendra Nath Tiwari. 1st Ed, Nepal; Mahendra Sanskrit Vishvavidhalaya 2001.
5. Vahata and Astanga Nighantu: Edited By P. V. Sharma. 1st Edition, Kuppuswamy Shastri Research Institute, Madras 1973.
6. Sodhala Nighantu: Edited By Priya Vrit Sharma. 1st Ed, Oriental Institute, Baroda 1978.
7. Goli Penchala Prashad. Abhidhan Aratnamala. Edited By Vaidya P. S Shastri. 1st Edition, Chaukhamba Sanskrit Series Office Varanasi 2009.
8. Nagori BP, Solanki RC and Dactylon L: Pers: A Valuable Medicinal Plant. Res J Med Plant 2011; 5: 508-14.
9. The Ayurvedic Pharmacopoeia of India, Ministry of Health and Family Welfare, Department of Ayush. Gov of India 2001.
10. Albert-Baskar A, Ignacimuthu S. Chemoprotective Activity of *C. dactylon* L. (Pers) Extract Against Dmh Induced Colon Carcinogenesis In Experimental Animals. J Exp Toxicol Pathol 2010; 62: 423-31.
11. Sadki C and Atmani F: Acute Diuretic Activity of Aqueous Erica Multiflora Flowers and *C. dactylon* Rhizomes Extracts in Rats. J Ethnophar 2010; 128: 352-6.
12. Mangathayaru K, Umadevi M and Reddy Cu.: Evaluation of the Immunomodulatory and Dna Protective Activities of the Shoots of *C. dactylon*. J Ethnophar 2009; 123: 181-84.
13. The Ayurvedic Pharmacopoeia of India, Ministry of Health and Family Welfare, Department of Ayush Gov of India 2001.
14. Surendra V, Prakash T, Sharma Ur, Goli D, Dayalal S and Kotresha F: Hepatoprotective Activity of Aerial Plants of C. Dactylon Against Cc14-Induced Hepatotoxicity In Rats. J Pharmacogn Mag 2008; 4: 195-201.
15. Singh SK, Rai PK, Jaiswal D and Watal G: Evidence Based Critical Evaluation of *C. dactylon*. J Evid Based Complement Alternat Med 2008; 5: 415-20.
16. Patil MB, Jalalpure SS, Prakash NS and Kokate OK: Antiulcer Properties of Alcoholic Extract of *Cynodon dactylon* in Rats. Acta Horticulturae 2005; 480: 115-118.
17. Dhar ML, Dhar MM, Dhawan BN, Mehrotra BN & Roy C: Screening of Indian Plants for Biological Activity Part 1. Indian J Exp Biol 1968; 6: 232–247.
18. Charde MS, Fulzele SV, Joshi SB, Satturwar PM and Dorle AK: Wound Healing Activity of Druva Ghrita. Indian J Pharm Sci 2003; 65(5): 482-485.
19. Wallis Te: Text Book of Pharmacognosy, Plant Profile for *Cynodon dactylon* (Bermudagrass) Usda Plants. 5th Ed. 2: 243-244.
20. Chopra RN, Nayar SL and Chopara IC: Council of Scientific and Industrial Research (CSIR), 1st Edn., Council of Scientific and Industrial Research (CSIR), New Delhi 1999.
21. Rajakumar N and Shivanna MB: Ethno-Medicinal Application of Plants in the Eastern Region of Shimoga

District, Karnataka, India J Ethnopharmacol 2009; 126: 64–73.
22. Saikia AP, Ryakala Venkat K, Sharma P, Goswami P and Bora U: Ethno Botany of Medicinal Plants Used by Assamese People for Various Skin Ailments and Cosmetics. J Ethnopharmacol 2006; 106: 149–157.
23. Patil SS, Ahire PA, Patil SV & Kadam VJ: A Review on Doob Grasss (*Cyndon dactylon*): A Hidden Potential Plant 2021.
24. Shendye NV & Gurav SS: *Cynodon dactylon*: A Systemic Review of Pharmacognosy, Phytochemistry and Pharmacology. Int J Pharm Pharm Sci 2014; 6(8): 7- 12.
25. Singh S, Sanjee K, Dwivedi KN & Pandey SK: Therapeutic Review on an Auspicious Grass: Durva (*Cynodon dactylon* Linn. Pers): From Kosha and Nighantus. IJLSR 2015; 5(9): 138-142.
26. Chaudhary and Tawar: Pharmacognostic and Phytopharmacological Overview on *Bombax ceiba*. Systematic Reviews in Pharmacy 2019; 10(1): 20-25.
27. Chaudhary PH and Khadabadi SS: *Bombax ceiba* Linn. Pharmacognosy, Ethnobotany and Phyto-pharmacology. Pharmacognosy Communications 2012; 2(3): 2-9.

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