A Comprehensive Review on Cynodon Dactylon (Durva): Pharmacological profile, Hemostatic activity and It's Potential in Herbal formulations

Ms.Tandale A.S[1], Ms.Khose S.D[2], Ms.Bhutambare P.M[3], Ms.Dhulgand S.C[4], Mr. Gagare A. G[5], Dr. Rahane R.D

[1,2,3,4]*Matoshri Miratai Aher College of Pharmacy, Karjule Harya*

Abstract – Known as Bermuda grass or Durva grass, Cynodon dactylon(L) Pers. is a long-lived plant that grows in many areas around the world and belongs to the grass family, Poaceae. It has been used for a long time in Ayurvedic and traditional medicine, especially for treating conditions like nosebleeds and helping wounds heal. The plant has various health benefits, such as reducing inflammation, fighting infections, protecting the liver, and helping with pain. Most importantly, it helps stop bleeding, which is due to its ability to narrow blood vessels, improve blood clotting, and speed up the formation of clots. This plant is also useful when combined with other herbs in health supplements, for managing bleeding issues, and for wound care.

Keywords - Cynodon dactylon, Durva grass, hemostatic activity, pharmacological profile, wound healing,

I. INTRODUCTION

Around the world, herbal medicine has been a crucial component of traditional healthcare systems, with plants being essential for managing and preventing a wide range of illnesses. Cynodon dactylon (L.) Pers., also referred to as Durva or Bermuda grass, is one of the many medicinal plants that have been found in traditional Indian medical systems like Ayurveda. C. dactylon is a resilient perennial grass that is found throughout tropical and subtropical areas. It is a member of the Poaceae family. It has historically been utilized in fever treatment, wound healing, rituals, and most notably for its hemostatic properties, which stop bleeding in diseases like epistaxis and superficial wounds.[1,2].

According to phytochemical analyses, C. dactylon has a variety of bioactive components that are linked to its wide range of pharmacological actions, such as flavonoids, alkaloids, saponins, triterpenoids, glycosides, and phenolic compounds. [3,4,5] According to studies, the plant has analgesic, hepatoprotective, anti-inflammatory, antioxidant, antibacterial, and antidiabetic properties. [6,7,8,9].

Figure-1: Durva grass

To enhance therapeutic efficacy and lessen side effects, there has been an increasing interest in investigating traditional medicinal plants as components in polyherbal preparations in recent years.

-Common name of Cynodon dactylon:

Language	Common name
English	Bermuda grass, Couch grass, Devils grass
Hindi	Doob ghaas, Durva
Tamil	Arugampul
Sanskrit	Durva, Swarna Durva
Kannada	Garike hullu
Marathi	Haritali
Gujarati	Dharo
Bengali	Dubla ghaas

Table-1:Common name of Cynodon dactylon

1. Botanical Description and Distribution:

Durva, Bermuda grass, or Doob grass are all names for Cynodon dactylon (L) Pers. a type of grass that grows quickly and is part of the Poaceae family. It is one of the most widely spread grasses on Earth and is known

for its health and environmental benefits.

1.1 Taxonomy:
- Kingdom: Plantae
- Phylum: Angiosperms
- Class: Monocots
- Order: Poales
- Family: Poaceae
- Genus: Cynodon
- Species: C.dactylon

1.2 Physical Features:
-Cynodon dactylon is a grass that spreads through underground stems called rhizomes and above-ground runners called stolons.

2. Medicinal Uses:
-Cynodon dactylon has a wide range of medicinal properties due to the variety of chemicals it contains.

-It has been used in traditional medicine systems like Ayurveda and Unani for treating many conditions. Recent scientific studies have validated some of these traditional uses, showing that the plant may have health benefits in several areas of the body.[10]

2.1 Fighting Free Radicals:
C. dactylon has strong antioxidant qualities because it contains high levels of phenolic compounds and flavonoids.[11]

2.2 Reducing Inflammation:
-Extracts from this plant have been shown to reduce both short-term and long-term inflammation.[12]

2.3 Stopping Bleeding:
One of the most notable properties of C. dactylon is its ability to stop bleeding.

2.4 Fighting Germs:
-Cynodon dactylon has antifungal and antibacterial properties that help fight off infections caused by germs like Candida albicans, Staphylococcus aureus, and Escherichia coli.

2.5 Protecting the Liver:
Studies on animals have shown that extracts from C.dactylon can help protect the liver.

2.6 Controlling Blood Sugar:
In animals, both ethanol and water extracts of C.dactylon have been shown to lower blood sugar levels [13].

2.7 Other Uses:
- Diuretic
- Antipyretic

3. Phytochemical Constituents: -

-The medicinal value of Cynodon dactylon comes from the wide range of chemical compounds it contains.
-These substances in its leaves, stems, and roots give the plant its ability to help with stopping bleeding, fighting bacteria, reducing inflammation, and protecting against damage from harmful free radicals. [14,15].

3.1 Identification of the Principal Classes of Phytochemicals: -
Through various tests and analyses, it has been found that C.dactylon contains several key types of compounds, including: -
1. Flavonoids 2. Quercetin 3. Apigenin 4. Lutein 5. Alkaloids 6. Triterpenoids 7. Glycosides

3.2 Methods of Analysis Employed-
These compounds have been identified and studied using various techniques such as: -

1. Thin-layer chromatography (TLC)
2. High-performance liquid chromatography (HPLC)
3. Gas chromatography-mass spectrometry (GC-MS) [16].
4. UV spectrophotometry
5. Infrared Fourier-Transform Spectroscopy (FTIR)

3.3 Variability in Phytochemical Composition: - [17]
The types and amounts of these compounds can vary based on factors like: -

1. Where the plant is grown
2. The quality of the soil
3. The age of the plant
4. The method used to extract the compounds (such as using water, alcohol, or other solvents)

4. Hemostatic Mechanism and Activity: -
-One of the most recognized uses of Cynodon dactylon

is its ability to stop bleeding, known as hemostatic action.

-In Ayurvedic and traditional medicine, fresh juice from the leaves or crushed leaves are applied directly to minor cuts, wounds, or nosebleeds to stop bleeding and speed up healing.

4.1 Conventional Uses: -
- Applying fresh leaf juice to wounds and scrapes
- Putting it in the nose to control nosebleeds
- Gargling with a herbal decoction to treat mouth ulcers or bleeding gums

4.2 Mechanisms of Hemostatic Action: -
The way C.dactylon stops bleeding is not just one method but involves several processes: -
a. Vasoconstriction-
-Some compounds like flavonoids and tannins can make blood vessels narrower, which reduces blood flow to the area and helps stop bleeding.
b. Improved Platelet Aggregation-
-Experiments show that this plant may encourage blood platelets to stick together, which is important for forming a clot.
c. Astringent Effect of Tannins-
-The high amount of tannins in the plant gives it astringent properties.
-These help in forming a stable clot and create a barrier over wounds, preventing infection and promoting healing.
d. Anti-inflammatory and Wound Healing Support-
-The plant's anti-inflammatory effects help reduce swelling and speed up healing.

4.3 Scientific Evidence: -
-Studies have shown that extracts from C.dactylon significantly reduced bleeding time in animals compared to controls, confirming its ability to help blood clot.
-When compared to known treatments like tranexamic acid, C.dactylon has shown a moderate but significant ability to promote clotting, making it useful for minor bleeding conditions.

4.4 Potential for Clinical and Therapeutic Uses: -
Because of its low toxicity and effective ability to stop bleeding, C.dactylon can be used in various ways: -
- As a natural remedy for small cuts and wounds
- As an ingredient in products that help with wound healing

5. Formulation and Use: -
- Because of its broad-spectrum pharmacological actions, especially its hemostatic, wound-healing, anti-inflammatory, and antibacterial qualities, Cynodon dactylon has been extensively used in both traditional and contemporary herbal formulations.

5.1 Traditional Formulations -
In traditional medicine systems like Ayurveda and Siddha, C. dactylon has been utilized in basic formulations, such as:
a. Fresh juice (Swarasa): - Extracted from crushed leaves and administered topically for wounds, cuts, and epistaxis.
b. Kashayam decoction: Used internally to treat fever, bleeding problems, and diarrhea.
c. Lepa paste: Used on areas that are bleeding, inflamed, or infected.
d. Poultices: Used as anti-infective wound dressings in combination with turmeric or other herbs.

5.2 Polyherbal Combinations: -
To increase its effectiveness, Cynodon dactylon is frequently mixed with other herbs. Typical herbal companions include: -
a. Curcuma longa, or turmeric, which has anti-inflammatory and synergistic benefits on wound healing.
b. The antibacterial properties of Azadirachta indica (neem); the immune-boosting
c. antioxidant properties of Ocimum sanctum (tulsi)

5.3 Formulation Benefits: -
a. Biocompatibility: - Low toxicity or irritation when used topically or internally
b. Stability: - Stable formulations can be dried and pulverized.
c. Economical aspects: - It is widely accessible and easily cultivated.
d. Quick action: - Quick local impact for hemostatic and wound care applications

5.4 Restrictions and Things to Think About: -
a. Standardization: - Phytochemical content variation brought on by environmental factors [18].
b. Sensitivity of extraction method: - Aqueous extracts and their ethanolic or methanolic counterparts can

differ greatly. [19]

c. Shelf-life: - Fresh preparations with short shelf lives, such as juice, need to be refrigerated.

6. Toxicity and Safety Profile: -

- Despite being widely used in traditional medicine, Cynodon dactylon has undergone a number of toxicological assessments to guarantee its safety in therapeutic settings.[20].

6.1 Acute and Sub-Acute Toxicity: -

-Even at dosages of up to 2000 mg/kg body weight, aqueous and ethanolic extracts of C. dactylon do not cause appreciable toxicity, according to acute oral toxicity experiments conducted in mouse models.

6.2 Histopathological Studies: -

The absence of organ-specific toxicity was confirmed by histological analyses of the treated animals' primary organs (liver, kidney, heart, and lungs), which revealed no morphological changes or indications of necrosis or inflammation.

6.3 Cytotoxicity and Genotoxicity: -

-C. dactylon extracts have been shown to have low cytotoxicity in in vitro tests including the MTT and brine shrimp lethality test.

6.4 Reproductive and Developmental Toxicity: -

- Although more thorough research is necessary to ensure its safety during pregnancy and breastfeeding, the limited research on reproductive toxicity points to no negative effects on fertility or embryonic development.

6.5 Traditional Usage and Human Safety: -

II. RESULT

The thorough analysis of Cynodon dactylon (Durva) demonstrates both its traditional ethnomedical value and its wide range of pharmacological possibilities. C. dactylon has a broad spectrum of pharmacological actions, including antibacterial, anti-inflammatory, antioxidant, antidiabetic, anticancer, hepatoprotective, and wound healing effects, according to an analysis of the literature now in publication. Its several phytoconstituents, including flavonoids, alkaloids, glycosides, saponins, tannins, and phenolic chemicals, are responsible for these qualities. -Additionally, as an ingredient in polyherbal compositions, C. dactylon has demonstrated a great deal of potential. Its ability to work in concert with other therapeutic herbs improves the effectiveness of formulations used to treat wounds, diabetes, and high blood pressure. It is a strong contender for inclusion in the creation of contemporary herbal products due to its accessibility, safety record, and multi-target therapeutic effect.

III. CONCLUSION

When taken in therapeutic dosages, Cynodon dactylon is a safe medicinal herb according to current toxicological data. To create thorough safety guidelines for its use in standardized herbal formulations, more clinical trials and long-term toxicity investigations are necessary. A plant that is highly valued in traditional medical systems, Cynodon dactylon (Durva) exhibits a variety of pharmacological properties, including as hepatoprotective, anti-inflammatory, antioxidant, antibacterial, antidiabetic and most notably, hemostatic actions.

CONFLICT OF INTREST:

The authors declare that there is no conflicts of interest. Written informed consent for publication was obtained from all participants.

REFERENCE

[1] Kanth, V. R., etal. Wound healing and antibacterial activities of Cynodon dactylon extract. Indian Journal of Experimental Biology, 45(6), 533–536. (2007).

[2] Pradhan, D., etal. Cynodon dactylon as a wound healing agent. International Journal of Pharmacy and Life Sciences, 4(2), 2325–2330. (2013).

[3] Rekha, M., etal. Characterization of bioactive compounds in Cynodon dactylon. Journal of Chemical and Pharmaceutical Research, 4(7), 3427–3430.(2012).

[4] Anwar, F., etal. Analysis of bioactive constituents in Cynodon dactylon. Pakistani Journal of Botany, 45(5), 1773–1778. (2013).

[5] Bhatt, P., etal. Analysis of flavonoids in Cynodon dactylon. Asian Journal of Chemistry, 24(12), 5907– 5910. (2012).

[6] Jalalpure, S. S., etal. Hepatoprotective activity of the fruit extract of Cynodon dactylon against CCl4- induced hepatic damage in rats. Journal of

Pharmacy Research, 4(2), 359–361. (2011).
[7] Saranya, P., etal. Antioxidant and anti-inflammatory activities of Cynodon dactylon in vitro. Asian Journal of Pharmaceutical and Clinical Research, 10(6), 200–203. (2017).
[8] Mahapatra, D. K., etal. Antioxidant and phytochemical screening of Cynodon dactylon. International Journal of Pharmacy and Pharmaceutical Sciences, 5(4), 214–218. (2013)
[9] Raju, N. J., etal. Antidiabetic activity of Cynodon dactylon in alloxan-induced diabetic rats. Pharmacologyonline, 2, 497–503. (2011).
[10] Sharma, M., etal. Cynodon dactylon: A review on its pharmacognostic, phytochemical and pharmacological aspects. International Journal of Pharmacy and Pharmaceutical Sciences, 9(5), 1–5.(2017).
[11] Sultana, B., etal. Investigation of antioxidant activity and total phenolics of Cynodon dactylon. African Journal of Biotechnology, 11(26), 6825–6833. (2012).
[12] Gopinath, H., etal.Evaluation of topical anti-inflammatory effect of Cynodon dactylon extract gel. Journal of Ethnopharmacology, 119(3), 551–553.(2008).
[13] Patil, U. S., etal. Immunomodulatory activity of ethanolic extract of Cynodon dactylon. Journal of Ethnopharmacology, 135(3), 550–553. (2011).
[14] Suba, V., etal. Evaluation of hemostatic potential of Cynodon dactylon. Phytotherapy Research, 19(10), 869–872. (2005).
[15] Srivastava, S., & Srivastava,S.Study on hemostatic activity of Cynodon dactylon. Asian Journal of Pharmaceutical and Clinical Research, 5(3), 163–165.
[16] Mehta, R. G., etal. GC-MS analysis of phytochemical constituents of Cynodon (2012).
[17] Khan, M. A., etal. Phytochemical analysis and antioxidant potential of Cynodon dactylon. Journal of Medicinal Plants Research, 3(12), 905–908. (2009).
[18] Senthilkumar, R., etal.Comparative phytochemical screening of Cynodon dactylon from different habitats. International Journal of Green Pharmacy, 8(2), 132–136. (2014).
[19] Dhanabal, S. P., etal. Diuretic activity of Cynodon dactylon aqueous extract in rats. Indian Journal of Pharmaceutical Sciences, 69(3), 292–294.(2007).
[20] Jaiswal, D., etal. Antihyperglycemic profile of Cynodon dactylon in streptozotocin diabetic rats. Journal of Ethnopharmacology, 123(2), 392–396.(2009).