



# A REVIEW: ETHANOPHARMACOLOGICAL PLANT, CYNODON DACTYLON (DOOB)

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**Abstract:** The *Cynodon dactylon* plant, commonly known as Doob or Bermuda grass, belong to the Graminae /Poaceae family and is renowned for its medicinal properties across various cultures. With a wide distribution in both temperate and tropical region, it holds significant important in traditional medicine system, particularly in India, where it is revered as the second most sacred plan after Tulsi (*Oscimum sanctum*). Its diverse medicinal application include treating ailments such as diuretic, antiarthritic, antibacterial, antifungal, wound healing properties, hepatoprotective, bronchodilator, anthelmintic, anticonvulsive, antidiarrheal, antidiabetic, analgesic anti-pyretic and antiulcer among others. Rich in protein, carbohydrates, minerals, and reactive compounds like beta sitosterol and alklaoids, it exhibits various biological activities, including wound healings, antibacterial, and antiviral properties. Further exploration of its phytochemical characteristics could lead to valuable insights for future medical research and applications.

**Keywords:** *Cynodon dactylon* (L.) Pers., pharmacological activities, Ethnobotanical

## 1) INTRODUCTION

The utilization of medicinal plants for basic needs has been longstanding with their bioactive components offering functional food benefits. This trend is gaining attraction due to traditional values, increased health awareness, availability and economic value. Medicinal plant based foods are recognized for their diverse health promoting properties such as antioxidant, antimicrobial, anti-inflammatory, Anti-diabetic, anti-carcinogenic and cardio-protective activities. The various medicinal plants like giloy, curry leaf, amla, aloe vera and asparagus have potential benefits. According to World Health Organization (WHO) 80% of world population still depend on medicinal plants<sup>1</sup>. There are many therapeutic plants can be found in the world. In our environment there are many weeds which are used as medicinal plants that can help in a variety of significant health issues<sup>2</sup>. Ayurveda and siddha in India, Tradition Chinese Medicine (TCM) in China and Unani Medicine in Islamic countries are indeed traditional knowledge systems that heavily utilize herbs and plant based therapies on a large scale. These systems have been developed over centuries and continue to practiced widely today. The plant-based therapies offered by tradition knowledge systems are often consider as potentially less dangerous alternatives to manufactured drugs<sup>1</sup>.

***Cynodon dactylon*** (L.) Pers. Commonly known as “Bermuda grass” (English), “Aruvaumpullu” (Tamil), “Doob” (Hindi) and “Garikahullu” (Kanada), Dhoorva (Marathi), Garike and Thellagariki”(Telugu) and belong to family Poaceae<sup>3</sup>. It is indeed widely recognized for its therapeutic properties and cultivated globally<sup>4</sup>.It can be used both internally as well as externally due to it’s antiviral and antimicrobial activities. Decoctions of its roots are particularly employed in treating secondary syphilis and urinary organ irritation. Additionally, it exhibits various other beneficial properties such as astringent, cooling and tonic effects, making it useful in treating condtions related to pitta andkapha as well as ailments like diarrhoea, wound, and vomiting. The “bhavaprakashNighantu” mentions three varieties of durva grass: ‘nildurva’with bluish or greenish stem, ‘shveta durva’ with whitish stem and braches and “gandadurva” with nodulose stem<sup>5</sup>.

Durva grass holds significance in hindu rituals, with its name derived from “duhu” and “avam”, symbolizing its role in bringing distant spiritual particles closer to followers during worship. It has three blades which represents the three values of Shiva, Shakti and Ganesh. It is highly auspicious in Hinduism, especially in the worship of lord Ganesha<sup>6</sup>.



**Figure No.1: Cynodon dactylon**

**Table NO. 1: Taxonomical classification of C. dactylon (L.) Pers.**

<b>Kingdom</b>	<b>Plantae</b>
Subkingdom	Tracheobionta
Super division	Spermatophyte
Division	Magneliophyta
Class	Lilopsida
Subclass	Commelinidae
Order	Cyperales
Family	Poaceae
Genus	Cynodon
Species	Cynodondactylon

## 2) DISTRIBUTION

It is a perennial creeping herb with slender stems, matted tufts, narrow linear or lanceolate leaves 2.5-20cm long and spikes (2.5-10cm) that radiate from a slender ascending peduncle, which can be green or purplish. It is found in various environment, particularly in southern Africa countries such as grasslands, savannas, Nama-karoo, fynbos. This herb can thrive in diverse conditions, including gardens, roadsides, overgrazed areas and moist site along rivers. It's adaptable enough to be cultivated even in dry land condition<sup>6</sup>.

## 3) PRINCIPLE CONSTITUENT

The chemical composition of cynodon dactylon includes essential oil triticin at 12.4% and it also includes glycosides, tannins, saponins, flavonoids and carbohydrates, terpenoids, triterpenoids, resins and reducing sugar<sup>7</sup>.

**Table No. 2: Phytochemical constituent extracted using different organic solvent<sup>8</sup>.**

Sr. no.	Organic solvent	Phytochemical present
1	Petroleum ether	-----
2	Choloform	-----
3	Benzen	-----
4	Alcohol	Flavonoids and glycoside sugars, steroidal saponins, phenols, alkaloids, tannins, carbohydrates, proteins and amino acid.
5	Aqueous	Flavonoids and glycosides phenols, alkaloids, tannins, carbohydrate, proteins and amino acid.
6	Ethanol	flavonoids

**Table No. 3: Ethnobotanical uses<sup>9</sup>**

Sr.NO	ETHANOBOTANICAL	USES
1	AYURVEDIC SYSTEM	Appetizer, anthelmintic, skin related diseases, psoriasis, herpes, allergies, rashes, hemorrhoids, restore normal color of the skin, wound healing, reduce itching, menorrhagia, irregular menstrual cycle, habitual abortion, strengthens the uterus, use in urinary tract infection, cooling effect, reduce inflammation of mucus layer of bladder in cystitis
2	UNANI SYSTEM	Laxative, emetic, carminative, coolant, heart tonic, use in grippe in children, pain, expectorant, brain tonic, emmenagogue, inflammation
3	TRADITIONAL SYSTEM	Diarrhea, dysentery, wounds, hemorrhages, hyperdipsia, cancer, epilepsy, cough, warts, snakebites, calculus, dropsy, sores, carbuncle, cramps, eye diseases, dandruff, fever, measles, leukoderma, hysteria, bronchitis
4	Morocco	Treatment of kidney stone

## 4) PHARMCOLOGICAL ACTIVITY

### 4.1 Antibacterial and antifungal activity

The study demonstrates that the aqueous extract of the whole plant of cynodondactylon exhibits antimicrobial activity against various bacteria, including pseudomonas aeruginosa, Escherichia coli, staphylococcus aureus, klebsiella pneumonia, and proteus mirabilis. However, it did not show activity against candida albicans. The presence of phytoconstituents such as saponins, tannins, steroids, and flavonoids in the extract suggests its potential as an antibacterial agent. Further research could explore its potential as a source of antibiotic substance for treating bacterial infections<sup>10</sup>.

### 4.2 Wound healing properties

The preliminary phytochemical studies indicate the presence of various compounds such as carbohydrates, proteins, tannins, phenols, flavonoids, amino acids, alkaloids, and glycosides in both aqueous alcoholic extracts. Additionally both extracts showed a significant increase in the rate of wound healing in the excision model, with the gel formulation being particularly effective. This suggests potential therapeutic benefits for wound healing from these extracts<sup>11</sup>.

### 4.3 Hepatoprotective activity

Treatment for liver disorders often involves strategies to prevent further damage to hepatocytes, address metabolic abnormalities, and stimulate the regeneration of liver cells. This can include lifestyle, dietary adjustments and in some cases, medical procedures or surgery. Early detection and management are key to preventing progression and promoting liver health. The treatment with ethanolic and aqueous extract of cynodondactylon leaves at doses of 200 and 400mg/kg showed significant prevention in rifampicin-induced rise in certain parameters<sup>11,12</sup>.

### 4.4 Bronchodilator activity

The study indicates that the chloroform extract of cynodondactylon (CECD) exhibits bronchodilator activity similar to atropine in guinea pigs, possibly mediated through antimuscarinic and calcium channel blocking (CCB) activities, as well as phosphodiesterase (PDE) inhibition. Scopoletin, identified as an active ingredient, contributes to these effects by inhibiting high K<sup>+</sup> and Ca<sup>2+</sup> induced contractile responses, similar to verapamil and potentiating isoprenaline-induced inhibitory responses, to papaverine. Therefore, CECD's bronchodilator effect is attributed in part due to presence of scopoletin and mediated possibly through calcium channel blocker (CCB) and phosphodiesterase (PDE) inhibition<sup>13</sup>.

### 4.5 Anticonvulsive property

The ethanol extract of aerial parts of Cynodondactylon demonstrated significant protection against convulsions induced by chemically convulsive agents in mice was studied by Al-snafi AE et. al. This effect was associated with increased levels of catecholamines in the brains of treated mice. Additionally, there was a significant increase in the amount of GABA which is likely involved in seizure activity, after six weeks of treatment. These findings suggest that the extract possesses significant anticonvulsive properties, possibly through alterations in catecholamine and brain amino acid level in mice<sup>14</sup>.

### 4.6 Anthelmintic activity

The study evaluated the anthelmintic activity on adult Indian earthworm Pheretima Posthuma, using albendazole as the standard drug. The aqueous extract of cynodondactylon demonstrated anthelmintic activity comparable to the standard drug albendazole<sup>15</sup>.

#### 4.7 Antidiarrheal activity

Babu DS determined that extract from the whole plant of *Cynodondactylon* possess significant anti-diarrheal properties as evidenced by the reduction in castor oil-induced diarrhea, decreased gastrointestinal motility and lowered weight of intestinal contents in animal models. Specifically, the methanol extract showed promising results in inhibiting diarrhea and reducing gastrointestinal motility. This suggest the potential of *cynodondactylon* as a natural remedt for diarrhea in traditional medicine<sup>16</sup>.

#### 4.8 Antidiabetic effect

The different solvent extracts of *cynodondactylon* may offer a promising avenue for combating diabetes and its related complications. Methanolic extract of *C. dactylon* may exert control over diabetic condition possibly through the biological condition activity of certain compounds. These compounds could stimulate the pancreas to secrete insulin or participate in the reduction of blood glucose level through related biochemical mechanisms. Additionally, the ability of *C. dactylon* extracts to mitigate diabetic condition in rats could be linked to their capacity to modulate the immune system, thus reducing beta-cell damage. Importantly, the therapeutic effects observed may be attributed to the presence of specific phytochemical compound in the extract both in term of their quality and quantity<sup>17</sup>.

#### 4.9 Analgesic and anti-pyretic activity

The traditional uses of the whole plant of *cynodondactylon* for managing painful and inflammatory condition. The research investigated the analgesic and anti-pyretic effects of aqueous extract of *cynodondactylon* across various doses employing methods such as the hot plate test, acetic acid-induced writhing test and yeast-induced hyperthermia model by vipin kumar garg. Notably the findings revealed significant analgesic and anti-pyretic activities associated with *cynodondactylon* extract supporting its potential therapeutic us in pain and fever management<sup>18</sup>.

#### 4.10 Antiulcer activity

The plant extract may have anti-secretory properties which reduce secretion and potential to enhanced the e local healing process contributing to its ulcer healing process contributing to its ulcer healing activity. The presence of flavonoids in the alcoholic extract may contributes to its antiulcer properties. Flavonoids are know for their various pharmacological activities including anti ulcer effects<sup>19</sup>.

#### 4.11 Diuretic Activity

The study aimed to assess the diuretic effects of the aqueous extract of *Cynodondactylon*, a plant used in traditional indian medicine, administered orally to rats at varying doses (100mg, 250mg, 500mg and 750mg/kg body weight). The results indicated a significant diuretic activity in the experimental rats<sup>20</sup>.

#### 4.12 Antiarthritic Activity

The ethanolic extract of *C. dactylon* demonstrated safety at various dose levels and exhibited significant antiarthritic activity in rats induced with Freund's complete adjuvant arthritis. It notably reduced paw inflammation, ankle diameter, clinical severity, and increased body weight. Additionally, it improved hematological parameters such as haemoglobin and red blood cell levels, while suppressing inflammatory markers like white blood cell erythrocyte sedimentation rate, c-reactive and protein. although it primarily improved bone lesions rather than cartilage lesions, the extract on arthritic joints. Phytochemical analysis revealed the presences of alkaloids, flavonoids, and glycosides, supporting the plants traditional use in rheumatoid arthritis treatment<sup>21</sup>.

## 5) CONCLUSION

*C. dactylon* has widely been used in Indian ayurvedic medicines since ancient times for curing several human diseases. The interpretation of blades representing the principles of primal Shiva, primal Shakti and Ganesh is a symbolic aspect in hindu rituals. It signifies the presence and interconnectedness of these divine energies within nature, reflecting their significance in spiritual practices and ceremonies. 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, wound healing. Therefore, it should be used as a new drug for the future prospective to control many more diseases.

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