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Study The Antimicrobial Activity of Cynodon Dactylon (L.) Pera. (leaves)

Revati R. Deshmukh[1], Riya S. Saundane[2], Pruthviraj Karale[3], Ravikant Sutar[4],

Asst. Prof. Shivraj Dhage[5]

Shri Ganpati Institute Of Pharmaceutical Sciences And Research, Tembhurni

Abstract : The use of medicinal plants in the world and especially in India contributes significantly to this primary health care. Cynodon dactylon (L.) Pers. (poaceae) is frost-resistant perennial grass and is one of the most common weeds in India and it has great medicinal value. Cynodon dactylon has a long history of use in systems of traditional medicine, especially in Ayurveda and Traditional Chinese Medicine. Different parts of the plant, including leaves, roots and rhizomes, were used for their medicinal properties. Traditionally, the whole Cynodon dactylon plant is used for treatment of painful and inflammatory conditions. This study describes a phytochemical evaluation and antimicrobial activities of Cynodon dactylon. For current studies, extraction of active constituents are performed using ethanolic extracts and using ethanolic extract of Cynodon dactylon leaf powder antimicrobial activities were studied. The ethanol extract shows the highest yield. Phytoconstituents present in Cynodon dactylon are saponins, tannins, triterpenoids, phenolic compounds, alkaloids and flavonoids. In this study, the ethanolic extract of Cynodon dactylon was used for the determination of antimicrobial activity against Escherichia coli. Antimicrobial activity was determined using the diffusion method on agar plates. The ethanolic extract showed antimicrobial activity against Escherichia coli. The diameter of the net inhibition zone surrounding the well was measured. It can be concluded that the ethanolic extract of Cynodon leaf powder dactylon can be considered an antimicrobial agent

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IndexTerms **- Leaf powder, Cynodon dactylon, extraction, evaluation.**

INTRODUCTION

Since time immemorial, plant extracts have been recognized as important healing activities. Ayurveda, the oldest healing system of our country, includes in its Materia Medica drugs from plant and animal sources. Ayurveda, broadly the Indian system of medicine followed, is not only a system of medicine but evokes science of life and his approach is more about health than about disease, more about prevention than about treatment; it is similar to the modern World Health Organization (WHO) concept of positive health. Cynodon dactylon (poaceae) is a hardy perennial grass, it is one of the most common weeds in India. It is commonly known as dhub, doob or hariali; other common names include durba (Bengali), garikoihallu (Kanarese), durua (Marathi), durua or haritali (Sanskrit), arugampullu (Tamil), garika gaddi (Telugu) and dhubkhabbal (Punjabi). It is a hardy, perennial grass distributed throughout the world and especially its homeland in warm regions temperate between 45 degrees south and north latitude and tropical regions. Available during the year. It is a creeping grass, very tough, resistant to drought, light green in color, it has a rough structure and grows quickly. It occurs in short cylindrical pieces about 3 to 20 mm long and 2 to 3 or sometimes 4 mm in diameter. According to the estimate of the World Health Organization, about 80 percent of the world's population uses herbs to fulfill their primary health needs.

More than 40,000 species of plants are used worldwide medicinal plants in traditional and ethnic treatments. Cynodon Dactylon is a traditional medicine in India and has a renowned status for minor treatments. Paste from its root with water when taken internally is used to treat fever, its paste is applied for headaches in the head as an analgesic, as an antiseptic to stop bleeding. It is traditionally used for diabetes, anti-inflammatory, kidney problems, urinary tract diseases, gastrointestinal disorders, constipation, abdominal pain and as a blood purifier. The whole plant is used as a diuretic, watery, syphilis, wound infection, piles. The juice of the plant is astringent and is applied externally for fresh cuts and wounds. It is used in the treatment of catarrhal ophthalmia, hysteria, chronic diarrhoea, epilepsy, insanity and dysentery. The plant is a folk remedy for stones, carbuncles, cough, hypertension, snake bite and gout. The ethanolic extract of the aerial parts i.e. leaves of Cynodon dactylon has a marked depressant effect on the CNS and antioxidant activity. The leaf, root and rhizome of the plant are used in folk medicine in different countries. Three varieties namely 'mildura' with a bluish or greenish stem, 'shweta durva' with whitish stem and branches and 'gandharva' with nodular stem are mentioned in 'Bhavaprakash nighantu'. In appearance, the leaves of C. dactylon are lanceolate, about 2 to 10 cm long and 1.25 to 3 mm wide, the flowers are characterized by the presence spikelets with 1 perfect floret, Glumes are lanceolate and up to 2 mm long, but The lower felt is slightly smaller than the upper, the anthers are 1 to 1.5 mm long, tan in color to yellow, the styles are purple

in color, while the roots are fibrous and cylindrical and thick of the roots is between 2 and 4 mm, the stem is very smooth and yellowish green inside color.

Characteristics of Cynodon Dactylon:
Cynodon dactylon, commonly known as Bermuda grass or couch grass, is warm season a perennial grass native to Africa but widely distributed and cultivated in many parts of world. Below are some characteristics of Cynodon Dactylon:

1. Appearance: Bermuda grass has a fine texture with slender, wiry stems that grow horizontally along the ground (stolons) and send roots in nodes. Leaves they are narrow, about 2-15 cm long and 2-4 mm wide.
2. Growth Habit: Forms a dense, low-growing lawn, making it popular for lawns, golf playgrounds, athletic fields and pastures.
3. Adaptability: Bermuda grass is highly adaptable to a variety of soil types, including sandy, loam and loamy soils. It is also drought, heat and salt tolerant, so it is suitable for use in dry and coastal areas.
4. Aggressiveness: It spreads rapidly with its extensive network of stolons and rhizomes, allowing it to establish quickly and fill in bare spots.
5. Maintenance: Bermuda grass requires regular mowing to maintain the desired height, typically ranging from 1/2 to 2 inches. It also responds well to fertilization and irrigation but can become invasive if not properly managed.
6. Resistance: This type of grass has good resistance to pests, diseases and foot traffic, making it durable for high traffic areas.
7. Propagation: Bermuda grass can be propagated from seed, sod, cuttings or cuttings. It establishes quickly from seed, but is commonly propagated vegetatively for faster propagation establishment.
8. Uses: In addition to ornamental uses in lawns and landscapes, Bermuda grass is also used for erosion control, grazing grass and in some cases as a fodder crop livestock.
9. Allelopathic properties: Bermuda grass has allelopathy.

Morphology of Cynodon dactylon:
1. Stems: Bermuda grass has creeping stems called stolons that grow horizontally along Earth's surface. These stolons root at the nodes, allowing the plant to spread and they form dense mats. In addition, Bermuda grass produces vertical stems called stalks that can grow to a height of 40-70 cm.
2. Leaves: Bermuda grass leaves are narrow and linear, measuring about 2-15 cm in length and 1-5 mm in width. They have a characteristic folded or rolled appearance and are arranged alternately along the stems. Leaf blades are often smooth, but they may have hair around the edges.
3. Roots: Bermuda grass has a fibrous root system that extends horizontally close to the soil Surface. These roots help the plant to anchor and absorb water and nutrients soil.
4. Inflorescence: The inflorescence of Bermuda grass consists of spike-like racemes which emerge from the tips of the stalks. Each crayfish contains several spikelets arranged in two rows along the central axis. Spikelets are small and flattened, containing several flowers.
5. Reproductive Structures: Bermuda grass flowers are wind pollinated and colored petals are missing. Instead, they have inconspicuous structures such as rods and pistils. After pollination, the flowers give rise to small, grain-like seeds contained within inside spikelets.

Potential uses of Cynodon Dactylon:
1.Digestive disorders: Bermuda grass is often used to relieve digestive problems such as indigestion, constipation and diarrhoea. Ilts calming properties can help calm agitation stomachs and promote healthy digestion.
2. Anti-inflammatory: The plant contains compounds with anti-inflammatory properties, which can help reduce inflammation and related symptoms in conditions such as arthritis or inflammatory bowel disease.
3. Diuretic: Bermuda grass has diuretic properties, meaning it can increase urine production and help with conditions such as urinary tract infections or swelling by flushing out toxins and excess fluid from the body.
4. Antioxidant: Some studies suggest that Bermuda grass exhibits antioxidant activity, which can help protect cells from damage caused by free radicals and oxidative stress, potentially reducing the risk of chronic diseases.
5. Wound Healing: In traditional medicine, Bermuda grass is used topically for wound healing. Its antimicrobial properties can help prevent infection while soothing and calming anti-inflammatory effects may promote tissue repair.
6. Antidiabetic: There is some evidence to suggest that Bermuda grass may have hypoglycemic effects, meaning it can help lower blood sugar. This could be beneficial for people with diabetes or those at risk of developing this condition.
7. Respiratory Health: Bermuda grass is used to treat respiratory conditions such as cough, bronchitis and asthma. It is believed to have expectorant properties that help to relax mucus and clear the airways.
8. Anti-cancer: Some research suggests that Bermuda grass extracts may contain anti-cancer properties, although further studies are needed to fully understand its potential cancer prevention and treatment.

Traditional Use of Cynodon dactylon:
Ayurveda:
In Ayurvedic medicine, Cynodon dactylon, known as "Durva", is considered a valuable medicinal plant. It is often used in the treatment of various infectious conditions due to its perceived antimicrobial properties.
Durva herb is traditionally used in Ayurvedic formulations to treat infections, wounds, skin disorders and digestive problems.

Traditional Chinese Medicine(TCM):
In traditional Chinese medicine, Cynodon dactylon is known as "Gou Qi" or "Couch Grass". It is used in herbal medicines for its purported antimicrobial, anti-inflammatory and diuretic properties.

Cynodon dactylon is used in TCM formulations to treat conditions such as urinary tract infections, gastrointestinal infections, and various skin disorders.

Forage for livestock:
Cynodon dactylon has a long history of traditional use as livestock feed due to its nutritional value and ability to thrive in a variety of climates. Cynodon dactylon has a long tradition as a valuable forage source for livestock, offering nutritional benefits, resistance to environmental challenges and versatility in agricultural systems.
Nutritional value: Bermuda is rich in nutrients and is considered a valuable source of feed for livestock. It provides essential nutrients such as carbohydrates, proteins, vitamins and minerals that are important for animal health and productivity.
Taste: Bermuda grass is generally palatable to livestock, making it readily consumed by grazing animals such as cattle, sheep and horses. Its palatability can vary depending on factors such as maturity, growing conditions and management practices.
High Yield: Bermuda grass is known for its prolific growth and high yield potential, especially in warm climates with sufficient moisture. It can produce significant biomass and provides a reliable source of forage for livestock throughout the growing season.
Drought resistance: One of the key benefits of Bermuda grass as a forage is its ability to withstand drought conditions. It has deep, extensive root systems that allow it to access water from deeper layers of the soil, allowing it to persist in periods of water scarcity.

Extraction Procedure:
Cynodon Dactylon is a plant that belongs to the Poaceae family and originates from India. The Cynodon Dactylon extraction method typically involves the use of a solvent extraction technique. The general overview of the extraction process:
1. Plant material (CynodonDactylon leaves) is collected and dried to remove moisture.
2. The dried plant material is then ground into a fine powder to increase the surface area for extraction.
3. Take 50 g of powdered plant material and mix with a suitable solvent, i.e. 100 ml of ethanol in a specific ratio.
4. The mixture is then subjected to extraction using a percolation technique to extract the bioactive compounds from the plant material.
5. The extract is filtered to remove all solids and then concentrated using a rotary evaporator technique to remove the solvent to give a concentrated extract.
6. The final extract can be further processed and purified.

Agar media:
Agar media, also known as agar plates or agar medium plates, are a type of solid growth medium used in microbiology to cultivate and grow microorganisms. Agar is a gelatinous substance derived from seaweed, primarily used to solidify a liquid growth medium. Agar isvideal for this purpose because it remains solid at typical laboratory temperatures but liquefies at higher temperatures and can be poured into dishes or other containers to solidify.

Components of Agar media:
Agar
Nutrients
pH buffers
Selective agents
Indicators

Preparation of Agar media:
Agar - 20gms [1000ml]
Peptone - 10gms [1000ml]
Beef extract - 10gms [1000ml]
NaCl - 5mg [1000ml]

1. Peptone, Nacl and beef extract are heated and agar is added to this broth. A gel is formed. Add this to a boiling tube and close it with a cotton plug. They are now autoclaved for 15 minutes at 121 degrees at 15 lbs. Inoculate the pre-liquefied medium suitable for testing with the desired amount of microorganism suspension.
2. Add the suspension to the medium at a temperature between 40-50 degrees and immediately pour the inoculated medium into the Petri dishes to a depth of 3-4 mm. Give plate on a flat surface.
3. Store the prepared dishes so that there is no significant growth on the surface of the agar.

Disk Diffusion Method (Kirby-Bauer method):
This is one of the most used methods to check the Antimicrobial activity of plant extract of Cynodon dactylon. From the ethanol extract, prepare 4 solutions with known concentrations of 25 ml, 50 ml, 75 ml, 100 ml. After that, paper discs prepared on the surface of agar plates, i.e. E. coli, were impregnated with the antimicrobial ethanol extract of Cynodon Dactylon and then placed on the surface of the agar plate giving four dots. Incubate the Petri dish in a hot air oven for 24 hours.
After the incubation period, the diameter of the zone of inhibition around each disc is measured. Larger zones indicate greater sensitivity to the antimicrobial agent.
Result:
The result obtained showed Antimicrobial activity through Disk Diffusion Method for ethanolic extract of leaf powder of Cynodon dactylon, which is evident by the formation of clear zone. For ethanol extraction, in terms of zone diameter measurements showed maximum clear zone indicating their greater sensitivity to this specific extract.
The zone of inhibitions obtained for different concentrations:
25ml - 11mm

50ml - 17mm
75ml - 22mm
100ml - 29mm
These results show that C. dactylon exhibits significant antimicrobial activity against Escherichia coli bacteria. The zone of inhibition (ZOI) results further confirm that the significant antimicrobial activity of Cynodon dactylon against a range of E.coli bacteria demonstrates its potential as a natural antimicrobial agent.

Conclusion:
In conclusion, the antimicrobial activity of Cynodon Dactylon is a significant finding with potential applications in the prevention and treatment of various microbial infections. The plant's bioactive compounds, including flavonoids, phenolic acids, triterpenoids, alkaloids and saponins, have shown inhibitory effects against Escherichia coli bacteria. From the presented study, it can be concluded that the traditional use of the Cynodon dactylon plant for infectious diseases is promising, especially against a wide range of microorganisms.
The study shows that the ethanolic extract from the leaves of Cynodon dactylon shows the highest yield. And it shows antimicrobial activity against E.coli bacteria.

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