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Original Research Article

Cynodon dactylon antimicrobial and phytochemical assessment against bacterial pathogens

Y.S Banginwar[1]*, A.Y Dawande[1]

[1]*Dept. of Microbiology, Art and Science College Pulgaon Affiliation to RTM Nagpur University, Nagpur, Maharashtra, India*

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ABSTRACT

The antibacterial activity of *Cynodon dactylon* aqueous and ethanol extracts were studied. The local variety of *Cynodon dactylon* which is used as traditional folk medicine in India for the treatment of different infection.

The *Cynodon dactylon* was evaluated for antibacterial activity against some selected strain using the agar well diffusion method.

The antibacterial properties of extract against 100 clinical strain belong to seven bacterial species and 1 isolate of fungi *Candida albicans* were tested.

The ethanol extract inhibited the growth of 80 strain of 7 bacterial species and both the growth was suppressed by aqueous and ethanol extracts. 1 isolates of *Candida albican* at the concentration of 200 micron per ml.

The ethanol extract shows persistant activity against *Staphyloccocus aureus, Streptococcus pyogens, Salmonella typhimutium ,Pseudomonas aeruginosa, Bacillus subtillis, E.coli* and *Proteus vulgaris.*

Phytochemical screening revealed the presence of β- carotene, vitamin C, palmitic acid, triterpenoids, selenium, alkaloids- ergonovine and ergonovinine, furfural, furfural alcohol, phenyl acetaldehyde, acetic acid, eicosanoic.

These antibacterial characteristics back up its long-standing usage in the treatment of infectious disorders.

1. Introduction

The *Cynodon dactylon* is traditionally for worship the god Ganesh. Herbal medicine represents one among the most popular important field of traditional medicine all over the world[1,2] To encourage the proper use of herbal medicines and assess their potential as a source of novel drugs.[3,4] The antibacterial activity of plants was investigated in this study. The presence of *of* β- carotene, vitamin C, palmitic acid, triterpenoids, selenium, alkaloids- ergonovine and ergonovinine, furfural, furfural alcohol, phenyl acetaldehyde, acetic acid and eicosanoic

The antibacterial activity of plants was investigated in this study.

The presence of β- carotene, vitamin C, palmitic acid, triterpenoids, selenium, alkaloids- ergonovine and ergonovinine, furfural, furfural alcohol, phenyl acetaldehyde, acetic acid and eicosanoic.[2,5] Diarrheal infections are major public problem in developing countries and contribute to the death of 3.4 to 6.1 million children annually.[6–8]

Infectious diseases represent a critical problem to health and they are one of the main causes of morbidity and mortality world wide.[9]

Because of an increase in susceptible people, the incidence of bacterial and fungal infection has increased

* *Corresponding author*.
E-mail address: drbyogesh@gmail.com (Y. S. Banginwar).

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over the last decade.

Cynodon dactylon, also known as Bermuda grass, Dhoob grass, Durva grass, ethana grass, dubo, dog's teeth grass, Bahama grass, devil's grass, couch grass, Indian doab, arugampul, grama, wiregrass, and scutch grass, is a grass that grows all over the world. It is endemic to Europe, Africa, Australia, and a large portion of Asia.[9]

Cynodon dactylon is a monocotyledon belong to the order Cyperales.

Cynodon dactylon (family: *Poaceae*) commonly known as dhub, doob, or harialil; other common names include durba (Bengali), garikoihallu (Kanarese), garikagaddi (Telugu), durua or haritali (Sanskrit), dhubkhabbal (Punjabi), durua (Marathi), and arugampul (Tamil). *C. dactylon* (L.) Pers. is a weed plant found in many regions such as East Africa, Asia, Australia, and Southern Europe.[10]

It is along jointed creeping grass with long branched rhizomes bearing many erect branches. The slender stem may end bearing a group of several narrow finger like spreading spikes.

Raw juice of the grass is used in fresh wound, cut, diarrhea and dysentery. The above plant was authenticated from the Department of Botany Arts and science College, Pulgaon.

This study shows antimicrobial properties of the plant.

2. Materials and Method

2.1. Plant extract method

The plant material collect from different localities was shade dried by cutting them into small pieces and powder in grinder.
The powder grass 100gms was extracted with ethanol and allowed to soaks in 200mls of ethanol. The extract was kept at room temperature for 24 hours and then filtered through Whatman filter paper no -1.

The crude aqueous prepared by adding warm or luke water to 100 gms of dried powder of grass material in glass flask.[7,8,11,12]

Bacterial culture

S. aureus, Streptococcus pyogens, Salmonella typhimurium ,Pseudomonas aeruginosa, Bacillus subtillis, E.coli , Proteus vulgaris and Candida albican were obtained from the Govt. medical college Yeotmal.

These were subcultured for further use. The culture were maintained on the Mullar-Hinton media (Himedia).

In the investigation, 5 clinical isolates from 7 different bacterial and fungal species were employed.

2.2. Antimicrobial activity

The grass extract were dissolved in the solvent (water and ethanol) have a concentration of 20 mg/ml, 40 mg/ml, 60 mg/ml and sterilized by filtration using 0.22 micron filter.

Antimicrobial test were then carried out by agar diffusion method.

The bacterial suspension was standardized by using standard method by using spread plate technique.

The well of 6-7 mm diameter was made. The ethanol were used to prepare desired dilution with concentration of 20, 40, 60 and 80 mg/100 ml.

The 100ul of each dilution was poured into the well and the sample extract were allowed to diffuse and incubated at 37^0 C for 24 hours.

In this study, the antibacterial activity of *C. dactylon* ethanol and aqueous extract against microorganisms was investigated and their potency was quantitatively examined by the presence or absence of inhibition zone and zone diameter.

3. Phytochemical Analysis

1. **Screening for alkaloids**: Five mL of the extract was heated with 2N HCL (5mL), the mixture was filtered, and a few drops of Mayer's reagent were added to the filtrate. The presence of alkaloids is quickly indicated by the formation of a cream-colored precipitate.
2. **Screening for saponins**: In a test tube, 5mL of the extract was heated in 10mL of distilled water for 30 seconds before being agitated briskly for 30 seconds and allowed to stand for half an hour. The presence of saponins is indicated by the formation of foam.
3. **Screening for tannins**: A few drops of 1% lead acetate were added to 5ml of extract. The presence of tannins was shown by the formation of a yellow precipitate.
4. **Screening for phenols**: When 2 mL of the extract was added to 2 mL of Ferric chloride solution, the solution turned deep bluish green, indicating the presence of phenols.
5. **Screening of steroids**: 1 ml of extract was dissolved in 10ml of chloroform and an equal volume of Conc Sulphuric acid. The sides of the test tube were used to add Sulphuric acid. The upper layer turns red, and the Sulphuric acid layer turns yellow with green fluorescence, indicating the presence of steroids.
6. **Screening for cardiac glycosides:** A few drops of ferric chloride and concentrated sulphuric acid were added to the extract solution in glacial acetic acid, and the reddish brown coloration at the intersection of two layers, as well as the bluish green coloration in the upper layer, indicated the existence of cardiac glycosides.

7. **Screening for anthraquinones:** 5mL of the extract was heated with 10mL of Sulphuric acid and filtered while it was still hot. 5mL of chloroform was added to the filtrate and shaken. After pipetting the chloroform layer into another test tube, 1mL of weak ammonia was added. Color changes were noted as a result of the solution.
8. **Screening for flavonoids**: A few drops of weak sodium hydroxide were added to one mL of the extract. The plant extract created a bright yellow colour, which went colourless after a few drops of dilute acid were added. This shows that flavonoids are present.
9. **Screening for terpenoids**: After dissolving the extract in 1mL of chloroform, 1mL of acetic anhydride was added, followed by 2mL of conc.H_2SO_4. The presence of terpenoids is indicated by the formation of a reddish violet colour.
10. **Screening for amino acids:** A few drops of Ninhydrin reagent were added to one ml of the extract. The presence of amino acids is indicated by the appearance of purple colour.
11. **Screening for reducing sugars**: 5-8 drops of Fehling's solution were added to 1ml of the extract and heated before looking for the brick red precipitate.

4. Result

Table 1:

Sl. no	Microorganism	Isolates	Zone of inhibition (mm in diameter)	
			Ethanol	Aqueous
1	*Staphylococcus aureus*	*5 isolates*	23	-
2	*Streptococcus pyogens*	*5 isolates*	18	-
3	*Salmonella typhimurium*	*5 isolates*	26	-
4	*Pseudomonas aeruginosa*	*5 isolates*	14	-
5	*Bacillus subtillis*	*5 isolates*	19	-
6	*E.coli*	*5 isolates*	31	-
7	*Proteus vulgaris*	*5 isolates*	-	-
8	*Candida albican*	*5 isolates*	16	13

5. Result

The ethanol extract shows inhibition activity *against Staphylococcus. aureus, Streptococus pyogens, B.subtilis, E.coli, S.typhimurium,and Pseudomonas aeruginosa.*

The ethanol and aqueous extract had no inhibitory activity against *Proteus vulgaris*.

The aqueous and ethanol extract of *C. dactylon* show antibacterial and antifungal activity.

Table 2: Anti microbial activity

Concentration	*Staphylococcus aureus*		*Streptococcus pyogens*		*Salmonella typhimurium*		*Pseudomonas aeruginosa*		*Bacillus subtillis*		*E.coli*		*Proteus vulgaris*		*Candida albican*	
	E	Aq	E	Aq	E	Aq	E	Aq	E	Aq	E	Aq	E	Aq	E	Aq
20 mg/100ml	10	-	16	-	25	-	14	10	17	-	28	-	-	-	10	-
40 mg/100ml	23	-	18	-	26	-	12	-	19	-	31	-	-	-	16	13
60 mg/100ml	21	-	15	-	17	-	11	-	18	-	21	-	-	-	10	-
80 mg/100ml	20	-	10	-	-	-	10	-	14	-	9	-	-	-	-	-

Figure 2: Cynodon dactylon, also known as durva grass

Table 3:

Phytochemicals	Cynodon dactylon (D/W)	Cynodon dactylon (methanol)
Alkaloids	+++	+++
Saponins	++	++
Tannins	+	++
Phenol	+	+
Steroids	++	+
Cardiac glycosides	++	++
Antraquinones	++	++
Flavanoids	+	++
Terpenoids	-	++
Amino acids	+	+++
Reducing sugars	+	+++
Monosaccharides	++	++

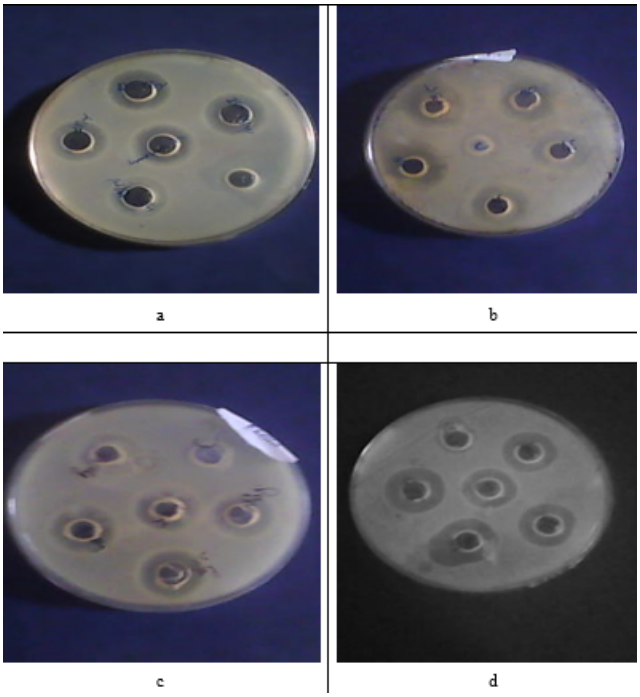

Figure 1: a: Ethanol extract against E.coli. **b:** Ethanol extract against S.aureus Plateno 2 Plate no 1 **c:** Ethanol extract against Bacillussubtilis **d:** Ethanol extract againstSalmonella typhymurium Plate no 4

According to Table **??**, the present findings give experimental proof that the leaf extract of *Cynodon dactylon* and bud extract of in D/W and methanol are utilized as a traditional treatment due to the presence of secondary metabolites. In the current investigation, the presence of alkaloids, saponins, tannins, flavonoids, glycosides, coumarins, flavonoids, carbohydrates, reducing sugars, monosaccharides, amino acids, and protein was detected.

The present study show the ethanol extract of *C. dactylon* contains palmitic acid, triterpenoids, selenium, alkaloids-ergonovine and ergonovinine, antibacterial and anti fungal substance.

6. Discussion

Antibiotic provide the main basis for therapy of bacterial infection.

It is interesting to note that antimicrobial activity was highly pronounced in solvent extract as compared to aqueous extract.

This indicates that presence of more than one active principle in *C. dactylon* plant are rich reservoir of antimicrobial. It is observed that a single plant is known to contain serval active principle of biological significance.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Anonymnous. *Natural Product Radiance*. 2005;4(2):1–3.
2. Agarwal SS, Paridhavi M. Herbal Drug Technology", Universities press (India) Private Limited. Hyderabad; 2007. p. 491–508.
3. Anonymous. The Ayurvedic Formulary of India, Ministry of Health and Family Planning, Govt. of India. New Delhi; 1978. p. 249–249.
4. The Ayurvedic Pharmacopoeia of India. vol. 4; 2004. p. 28–30.
5. Raghunathan K, Mitra. Roma, Pharmacognosy of Indigenous Drugs, Central Council;.
6. Anonymous. Qual Control Methods Med Plant Mater. and others, editor; 1998. p. 38–9.
7. Tambekar DH, Banginwar YS, Khante BS, Panzade BK, Dahikar SB. Evaluation of phytochemical and antibacterial potential of Helicteres isora l. Fruits against enteric bacterial pathogens. *Afr J Trad Compl Alter Med*. 2008;5(3):290–3.
8. Banginwar Y, Tambekar D. Effect of various Plant extract on the growth of Vibrio cholera. *J Microb World*. 2003;5(1):972–1487.
9. Wallis TE. Text Book of Pharmacognosy. vol. 3. CBS Publishers and Distributors; 2004. p. 1146.
10. Venkatachalam D, Thavamani BS, Muddukrishniah K. Antimicrobial activity and phytochemical analysis of aerial parts of Cynodon

dactylon. *Int J Acad Res Develop*. 2018;3(3):116–21.
11. Banginwar Y. Assessment of phytochemical and antimicrobial activity of Moringa oleifera lam against pathogenic bacteria. *Int J Chem Sci*. 2012;10(4):2248–54.
12. Banginwary S, Ingle ST, Kshirsagar Y. L Effective management of colletotrichum dematium causing leaf blight of safed musli. *Int J Chem Sci*. 2012;10(2):967–71.

Author biography

Y.S Banginwar, Assistant Professor https://orcid.org/0000-0002-2466-814X

A.Y Dawande, Assistant Professor and Head

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