Research article Available online www.ijrpsonline.com ISSN: 2249–3522

International Journal of Research in Pharmacy and Science

Evaluation of Anti Microbial Activity of *Cynodon dactylon*

D.Kanimozhi*, V. Ratha bai

Department of Zoology, Presidency College, Chennai-600 005, Tamilnadu, India

ABSTRACT

To investigate the antimicrobial activity of Ethanol, Methanol, Acetone, Chloroform, Hexane and Petroleum ether extract of *Cynodon dactylon* (L.) Pers.(Family - Poaceae) was tested against infectious disease causing bacterial pathogens such as such as *E.Coli, Pseudomonas aeruginosa, Staphylococcus aureus* and *Klebsiella pneumonia* fungus like *Aspergillus niger, Candida albicans, Candida kefyr* and *Candida tropicalis* using the Agar Well diffusion method. It was observed that Ethanol, Methanol, Acetone, Chloroform, Hexane and Petroleum ether showed activity against Bacteria and Fungi. The Ethanol extract of *Cynodon dactylon* showed more activity against *Pseudomonas aeruginosa* zone of diameter 13.83±0.29 and *Staphylococcus aureus* zone of diameter 12.0±0.10 and the Ethanol extract of *Cynodon dactylon* showed more activity against *Aspergillus niger* zone of diameter 12.23±0.21 and *Candida albicans* of diameter 11.0±0.20, when compared to other solvent extracts . In the present study, both in bacteria and fungi ethanol extract showed a varying degree of inhibition to the growth of tested organism than Methanol, Acetone, Chloroform, Hexane and Petroleum ether. The results confirmed that presence of antibacterial and antifungal activity in the sundried extract of *Cynodon dactylon* against the human pathogenic organisms.

KEYWORDS: *Cynodon dactylon, Pseudomonas aeruginosa, Staphylococcus aureus, Aspergillus niger*, *Candida albicans.*

***Corresponding Author**
D.Kanimozhi, Research Scholar,
PG & Research Department of Zoology,
Presidency College,
Chennai-5, Tamilnadu, India
E mail: kanphd5@gmail.com
Contact No: 09884544544

INTRODUCTION

Biomolecules of plant origin appear to be one of the alternatives for the control of these antibiotic resistant human and plant pathogens. In recent years there is increase in failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has led to the screening of several medicinal plants for their potential antimicrobial activity[1,2] Antimicrobial properties of medicinal plants are being increasingly reported from different parts of the world[3,4]. *Cynodon dactylon* (L).Pers. belongs to the family of Poaceae[5]and is said to have many medicinal properties including Antihelmentic[6], Antidiuretic, Antiinflammatory, Hepatoprotective activity[7] as well as treatment of Urinary tract infections[8], Prostatitis, and Dysentery. Traditionally it is used in diabetes[9,10] jaundice , kidney problems[11], urinary disease, gastrointestinal disorder[12], Constipation and abdominal pain. The whole plant is used for diuretic, dropsy, syphilis, wound infection and piles. *Cynodon dactylon* is used as antihaemorrhagic in dysentery and nasal bleeding[13].The juice of the plant is astringent and is applied externally to fresh cuts and wounds. It is used in the treatment of catarrhal opthalmia, hysteria, epilepsy, insanity,and chronic diarrhea . The plant is folk remedy for anasarca, calculus, carbuncles, cough, hypertension, snake bites, gout and rheumatic affections. *Cynodon dactylon* is a valuable herbal medicine and used for first aid for minor injuries[14,15]. Farmers traditionally apply crushed leaves to minor wounds as to stop bleeding similar to *Tridax procumbens, Achyranthes aspera,* and *Blumea iacera*[16].*Cynodon dactylon* is bitter, sharp hot taste, good odor, laxative, brain and heart tonic, aphrodisiac, expectorant, carminative and useful against grippe in children and for pains, inflammations, and toothache[17]. Virus-affected discolored leaves of *Cynodon* are used for the treatment of liver complaints. In Homoeopathic systems of medicine, it is used to treat all types of bleeding and skin troubles[18]. The Ethanolic extract of aerial parts of *C. dactylon* showed marked protection against convulsions induced by chemo convulsive agents in mice[19]. Ethanolic extract of defatted *C. dactylon* has high antidiabetic potential along with good hypolipidemic profile[20]. This suggests the potential for *Cynodon dactylon* to become an alternative to current diabetes medications.

MATERIALS AND METHODS

COLLECTION OF PLANT MATERIAL

Cynodon dactylon were collected from in Maduravoyal region, Tamilnadu India and used for this

study. Ach the lab works are done in microlabs, Institute of Research and tech. Arcot, Tamilnadu.

EXTRACTION OF PLANT MATERIAL

They were washed thoroughly with sterile distilled water in order to remove any dirt or filthy particles present on the surface and were dried in sunlight[21] then made into fine powder, this powdered samples (100g/100ml) in ethanol, methanol, acetone, chloroform, hexane and petroleum ether for over night at room temperature, soxhelt apparatus are used for this extraction[22,23]. The extract from these solvents are soaked and evaporated under pressure.

TEST ORGANISMS

The bacterial species used for the test were *E.Coli, Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella pneumonia*. The fungus species used for the test were *Aspergillus niger, Candida albicans, Candida kefyr, Candida tropicalis*. All the stock cultures were obtained from Microlabs, Institute of Research and technology, Vellore Tamilnadu, India.

CULTURE MEDIA AND INOCULUMN PREPARATION

Nutrient agar broth(Himedia, India) were used as the media for the culturing of bacterial strains. Loops full of all the bacterial cultures were inoculated in the nutrient broth and incubated at 37˚c for 72 hrs and potato dextrose agar and potato dextrose broth (Himedia, India) were used as the media for the culturing strains. Loops full of all the fungus were inoculated in the Potato dextrose broth (PDA) and incubated at room temperature for 72hrs.

ANTIBACTERIAL ACTIVITY

The extracts obtained above were screened for their antibacterial activity in comparison with standard antibiotic ciprofloxacin(100mg/ml) in vitro by well diffusion method[24,25]. Lawn culture were used using the test organism on Muller Hinton Agar(MHA).The inoculated plates were kept aside for few minutes using well cutter, four wells were made in those plates at required distance. In each step of well cutting the well cutter was thoroughly wiped with alcohol Using sterilized micropipettes 30ml of different solvents with selected *Cynodon dactylon* extract was added into the well.The plates were incubated at 37˚c for overnight.The activity of the extract was determined by measuring the diameters of zone of inhibition . For each bacterial strains, controls were maintained where pure solvents without extracts were used.

ANTIFUNGAL ACTIVITY

The extracts were also screened for their antifungal activity in comparison with standard antibiotic *Ketoconazole (*10mg/ml) invitro by well diffusion method[24,25]. Lawn culture was prepared using the test organism on Sabouraud's Dextrose Agar (SDA). The inoculated plates were kept aside for few minutes using well cutter, four wells were made in those plates at required distance. Using sterilized micropipettes 30ml of different solvents with selected leaf extract was added into the well. The plates with fungi were incubated at room temperature for 48hrs. The activity of the root extract was determined by measuring the diameter of zone on inhibition. For each fungal strains controls were maintained where pure solvents were used.

RESULTS AND DISCUSSION

The efficacy of different extracts of *Cynodon dactylon* is shown in the table1. The Ethanol, methanol and acetone extracts have shown better activity against these pathogenic organisms. Ethanol extract was more effective against *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Methanol extract was more effective against *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Acetone extract was more effective against *Klebsiella pneumonia* and *Pseudomonas aeruginosa*. Chloroform extract was more effective against *Escherichia coli* and *Pseudomonas aeruginosa*. Hexane extract was more effective against *Staphylococcus aureus* and *Klebsiella pneumonia*. Petroleum ether extract was more effective against *Staphylococcus aureus* and *E.coli*. Among these 6extracts Ethanol, Methanol, Acetone shows better activity against Chloroform, hexane and petroleum ether against the standard drug *Ciprofloxacin*. The results of antibacterial activity is shown in the table 1 and fig1.

The results of antifungal activity are given in the table2. Which clearly show that all the extracts have shown antifungal activity against the tested organisms. Ethanol, methanol and acetone have shown better activity against against these pathogenic organisms. Ethanol extract was more effective against *Aspergillus niger and Candida albicans* .

Plant based antimicrobials have enormous therapeutic potential as they can serve the purpose with lesser side effects that are often associated with synthetic antimicrobials[26].There are many reports in the family Poaceae possessing antimicrobial activity. Ethyl acetate fraction of *Cynodon dactylon* on the activities of enzymic antioxidants in the liver of control and experimental mice[27].

Table1: Inhibition zone diameter different extracts of *Cynodon dactylon* against different organisms(Mean±SEM) (mm)

Organisms (Bacteria)	Zone of Inhibition (mm)						
	Ethanol	Methanol	Acetone	Chloroform	Hexane	Petroleum ether	*Ciprofloxacin*
Escherichia coli	9.90±0.10	8.03±0.58	7.03±0.58	8.00±0.00	Nil	6.00±0.00	10.17±0.15
Pseudomonas aeruginosa	13.83±0.29	11.1±0.10	9.07±0.11	7.03±0.58	Nil	Nil	14.20±2.27
Staphylococcus aureus	12.0±0.10	10.97±0.58	8.03±0.58	6.10±0.10	7.03±0.58	6.03±0.58	18.17±0.29
Klebsiella pneumonia	8.00±0.00	10.00±0.10	11.17±0.15	6.10±0.10	6.03±0.04	5.07±0.11	11.20±0.202

Methanol extract was more effective against *Aspergillus niger* and *Candida albicans*. Acetone extract was more effective against *Candida tropicalis* and *Candida albicans* . Chloroform extract was more effective against *Candida kefyr* and *Candida tropicalis*. Hexane and Petroleum ether extract shows no active against these pathogenic organisms**.**

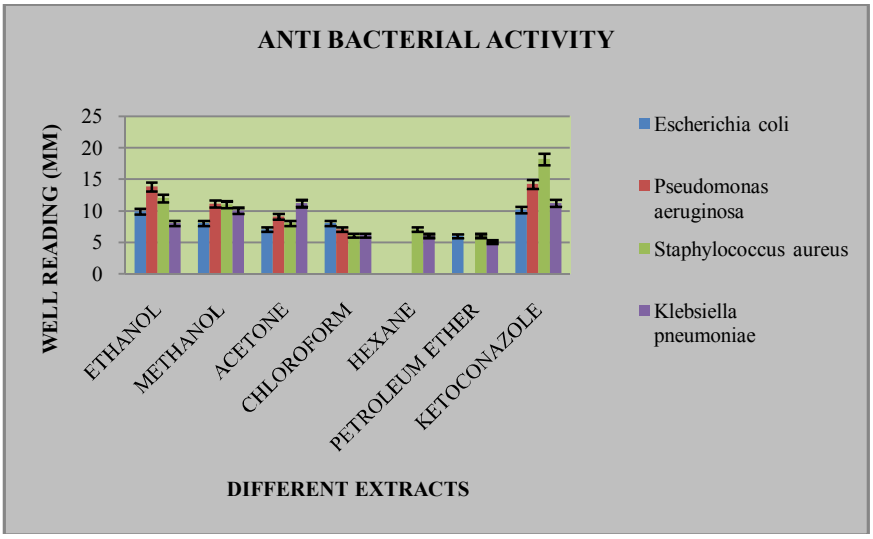

Figure 1: Antibacterial activity of different extracts of*Cynodon dactylon(* Poaceae) against different Organisms.

Table 2: Inhibition zone Diameter of different extracts of *Cynodon dactylon(Poaceae)* of Against different organisms(Mean± SEM) (mm).

Organisms (Fungus)	Zone of Inhibition (mm)						
	Ethanol	Methanol	Acetone	Chloroform	Hexane	Petroleum ether	*ketoconazole*
Aspergillus niger	12.23±0.21	10.93±0.12	10.00±0.10	Nil	Nil	Nil	11.00±0.20
Candida albicans	11.0±0.20	10.17±0.15	10.10±0.10	Nil	Nil	Nil	13.20±0.20
Candida kefyr	10.93±0.12	8.00±0.00	9.03±0.06	7.07±0.12	Nil	Nil	11.10±0.10
Candida tropicalis	8.10±0.10	9.10±0.10	11.07±0.11	6.03±0.06	Nil	Nil	10.17±0.15

Ethanolic extracts of *Moringa oleifera*, *Musa paradisiaca*, *Azardiratica indica*, *Cynodon dactylon, Alternanthera sessilis*, *and Anisochilus carnosus* had inhibitory effects on one of the four tested micro organisms shows that the full concentration of the ethanolic extracts had mildly active inhibitory effect only on *Escherichia coli*[28] antibacterial activity. All extracts of *Cynodon dactylon* showed varying degrees of antibacterial and antifungal activity against all microorganisms tested. several studies have been conducted in the past three decades that focused on the antimicrobial properties of herbs, spices and their derivates such as essential oils, extracts and decoctions[29,30,31,32].

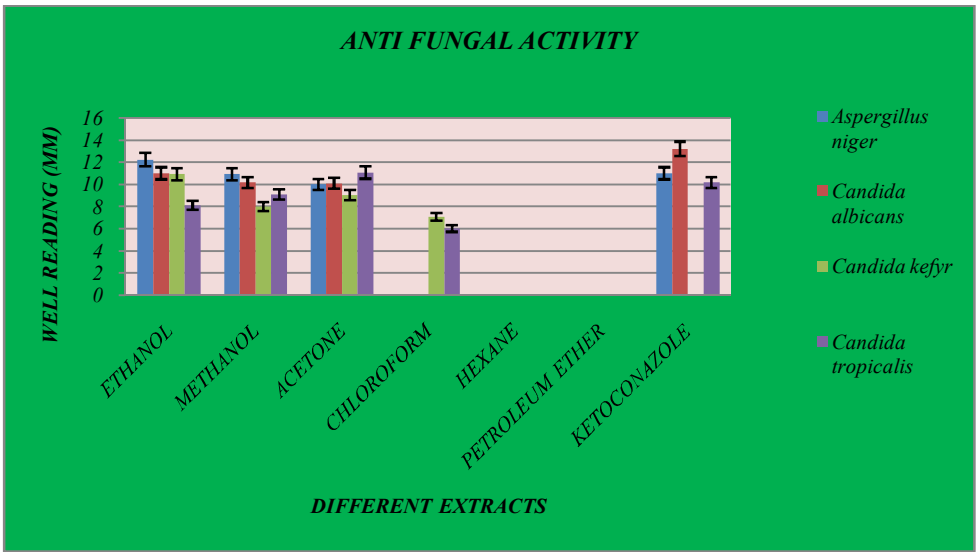

Figure 2: Antifungal activity of different extracts of *Cynodon dactylon (Poaceae*) against different organisms.

From this study it can be said that, Ethanol, Methanol and Acetone sun dried extract of *Cynodon dactylon* showed wide range of Antibacterial and Antifungal activity and can be used and administered in the ethno medical practice. The present study has shown a spectrum of antibacterial activities which provides a support to some tradition uses of these few medicinal plants. But the effective biomolecules which act as antibacterial have to be identified , isolated and subjected to extensive scientific and pharmacological screening that can be used as sources for new drugs.

CONCLUSION

The result of this work suggest that the whole plant extract of *Cynodon dactylon* has number of medicinal properties. From this work it can be said that the sun dried *Cynodon dactylon* extract of Ethanol, Methanol and Acetone has more effective against these pathogenic organisms and can be used for the future references for various other diseases.

REFERENCES

1. Colombo ML, Bosisio E. Pharmacological activities of *Chelidonium majus L* (Papaveraceae).*Pharmacol Res*. 1996; 33(2): 127-134.
2. Rajesh Dabur**,** Amita Gupta, Mandal TK, *et al.* Antimicrobial Activity of some Indian Medicinal plants. *Afr Traditional*, Complementary and Alternative Medicines. 2007; 4 (3): 313 – 318.
3. Saxena and Sharma RN**.** Antibacterial activity of essential oils of Lankan aculeate. *Fitoterapia.*1999; 70(1): 59-60.
4. Prasanth kumar V**,** Neelam S, Chauhan Harish Padh, Rajani M. Search for antibacterial and antifungal agents from selected Indian medicinal plants. *Journal of Ethnopharmacology*. 2006; 107(2): 182-188.
5. Harlan J. *Cynodon* species and their value for grazing and Hay.Herbage Abstract. 1970; 40(3): 233-238.
6. Sujon M A, Mostofa M, Jahan M S, Das A R and RobS. Studies on Medicinal plants against Gastrointestinal Nematodes of Goats**.** *Bangl. J. Vet. Med.* 2008; 6(2): 179–183.

7. Singh S K, Rai P K, Mehta S, Singh R K, Watal G. Curative Effect Of *Cynodon dactylon* Against Stz Induced Hepatic Injury In Diabetic Rats. *Indian Journal Of Clinical Biochemistry*. 2009; 24(4): 410-413.
8. Cheryl A L. Ethnomedicines used in Trinidad and Tobago for urinary problems and Diabetes mellitus. *Journal of Ethnobiology and Ethnomedicine* 2006; 45(2): 1746-4269.
9. Singh S K, Kesari A N, Gupta R K, Jaiswal D, Watal G, Assessment of antidiabetic potential of *Cynodon dactylon* extract in streptozotocin diabetic rats. *J Ethnopharmaco*. 2007; 114(2): 174-179.
10. Jarald E E, Joshi S B, Jain D C. Antidiabetic activity of aqueous extract and non polysaccharide fraction on *Cynodon dactylon* Pers. *Indian journal of Experimental Biology*. 2008; 46(9): 660 -667.
11. Khajavi Rad A, Hadzadeh M A, Rajaei Z, Mohammadian N, Valiollahi S, Sonei M. The beneficial effect of *Cynodon dactylon* on ethylene glycol-induced kidney calculi in rats. *Vrol J.* 2011; 8(3): 179 -84.
12. Das S, Dutta Choudhury M. Plants Used Against Gastro-Intestinal Disorders and As AntiHemorrhagic by Three Tribes of North Tripura District, Tripura, India. *Ethnobotanical Leaflets.*2010; 10(4): 467-78.
13. Kunja B. Satapathy, Binod B.Sahu, Gouri Shankar jena. Crop weeds diversity and their ethnomedicinal uses in the treatment of common ailments in Jaipur district of odisha(India). *Int.J.Med.Arom.Plants*. 2012; 2(1): 80 -89.
14. Oudhia P. Medicinal weeds in rice fields of Chhattisgarh (India). *Int. Rice Res*.1999; 24(1): 40.
15. Oudhia P. Medicinal weeds in groundnut fields of Chhattisgarh (India). *Int. Arachis Newslett*.1999; 19: 62-64.
16. Oudhia P, Pal A R. Rainy season medicinal weed flora in wastelands of Chamra nallah watershed area at Bagbahera. *J. Medicinal Aromatic Plant Sci*. 2000; 22/ & 23/1A: 44-449.
17. Agharkar S P. Medicinal plants of Bombay presidency. *Scientific Publ*., Jodhpur, India. 1991; p. 80-87.

18. Oudhia P, Joshi B S, Kosta V K. The possibilities of preparing homeopathic drugs from the obnoxious weeds of Chhattisgarh. Bhartiya Krishi Anusandhan Patrika.1998; 13(1/2):53-57.
19. Dilip Kumar Pal. Determination of Brain Biogenic Amines in *Cynodon dactylon* pers & *Cyperus rotundus* treated mice. *International Journal of Pharmacy and Pharmaceutical Science*. 2009; 1(1): 190-197.
20. Santosh Kumar Singh, Prashant Kumar Rai, Dolly Jaiswal, and Geeta Watal. Evidence based Critical Evaluation of Glycemic Potential of *Cynodon dactylon*. *Evidence-based Complementary and Alternative Medicine*, 2007; 5(4): 415-420.
21. Naznin Ara, Hasan Nur . In Vitro Antioxidant Activity of Methanolic Leaves and Flowers Extracts of *Lippia Alb**a,*** Research *Journal of Medicine and Medical Sciences*. 2009; 4(1): 107-110.
22. Grouch I J, Smith M T, Vanstadan J , Lewis M J and Hoad G V. Identification of auxim in a commercial seaweeds concentrate, *J. Plant Physiol.,* 1992; 139:590- 594.
23. Matanjun P, Matanjun S Mohamadm , Mustapha N M, Muhammed K and Ming G H. Antioxidant activity of Phenolic content of eight sps of seaweeds from the north Borneo.*J Appl Phycol.,* 2008; 20 (4): 367-373.
24. Perez C. Agnese A M, Cabrera J l. The essential oil of *Senecia graveolens* (compositae) : chemical composition and antimicrobial activity test. *J. Ethnopharmacol.* 1999; 66: 91-96.
25. Bagamboula C F , Uyttendaela M, Devere J. Inhibitory effect of Thyme and basil essential oil, carvacrol, thymol, estragol, inalool and p-cymene towards *Shigella sonnei* and *S. flexneri*. *Food Microbiol*., 2004; 21: 33-42.
26. Iwu M W, Duncan A R, Okunji C O. New antimicrobials of plant origin. In: Janick J.ed. Perspectives on New Crops and New Uses. Alexandria, VA: ASHS Press; 1999: pp. 457-462.
27. Saradha Devi K M, Annapoorani S and Ashokkumar K. Hepatic antioxidative potential of ethyl acetate fractionof *Cynodon dactylon* in Balb/c mice, *Journal of Medicinal Plants Research*. 2011; 5(6): 992-996.
28. Valarmathy K, Gokulakrishnan M, Salma Kausar M, Dr.Kusum Paul. A Study of Antimicrobial. Activity of Ethanolic extracts of various plant leaves against selected

microbial species. International *Journal of Pharma Sciences and Research* (IJPSR). 2010; 1(8): 293-295.

29. Kivanc M, Akgul A . Antibacterial activities of essential oils from Turkish spices and Citrus. Flavour and Fragrance.1986; 1: 175-179.
30. Dorman H J D, Deans SG . Antimicrobial agents from plants: antibacterial activity of plant volatile oils. *J. Appl. Microbiol*.2000; 88: 308- 316.
31. Hsieh P C, Mau J L, Huang S H . Antimicrobial effect of various combinations of plant extracts. *Food Microbiol*. 2001; 18: 35-43(9).
32. Alma M H, Mavi A, Yildirim A, Digrak M, and Hirata T. Screening chemical composition and *in–vitro* antioxidants and antimicrobial activities of the essential oils from the *Origanum syriacum* L, growing in Tuckey. *Biol. Pharm. Bull*. 2003; 26: 1725-1729.