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# STUDIES ON CYNODON DACTYLON (L. Pers.:) – MEDICINAL PLANT

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**Abstract:**Plant Cynodon dactylon belongs to the family Poaceae is widely used in Pharmacological activities have been reported. It is a very familiar plant almost available in the entire world. In medicinal practices, the plant Cynodon dactylon is used in the treatment of various diseases like dysentery, cancer, urinary tract infection, cough, epilepsy, cardiac and piles. The phytochemical analysis showed that Cynodon dactylon have constituents like flavonoids, alkaloids, volatile oils, fixed oils, glycosides, terpenoids, tannins, saponins, reducing sugars, carbohydrates and proteins. Cynodon dactylon possess antiulcer, antioxidant, antifungal, antiviral, cardioprotective and antibacterial activity. The acoustical parameters like acoustical impedance (Z), compressibility (β), Relaxation time (τ) are determined from velocity, density and viscosity measurements. Stability constant had been obtained by using Yoshida and Osawa and Kannappan Method.

**Keywords**: Ultrasonic, Antibacterial, Medicinal Plant.

## 1. Introduction

Medicinal plants are storehouse of new chemical substances that have pharmacological effects. Medicinal plant renders many effective and powerful drugs [1]. Medicinal plants provide a healthier and safer replacement for the synthetic drugs. Different parts of medicinal plants like root, stem, flower, fruit, seed etc., are used to access pharmacologically active compounds. Cynodon dactylon possessed central nervous antioxidant, antidiabetic, antifungal, antibacterial properties [2]. The physical parameters like ultrasonic velocity, density and viscosity measurements and stability constant had been determined.

## 2. Pharmacognostical Characteristics

**Figure 1. Cynodon Dactylon – Medicinal Plant**

Cynodon dactylon is a stolons and it is called as Bermuda grass, crab grass, dhoob, dog tooth grass. It is also called as arugampul in Tamil which is the part of Hindu rituals. It roots in the nodes to form animpenetrable cluster on the periphery of the soil. The stolons are 20m long. The leaves size ranges from 2.5 – 20cm long, 0.5 – 1 cm broad. The leaves are flat or convolute or sometimes folded with sharp edges. The colour of the flowers and fruits are green and grayish respectively and the fruit grains are tiny in size [Fig. 1].

## 3. Traditional Uses

It is used in the treatment of cancer, cystitis, headache, hysteria, asthma, tumors, stones, eye disorders, weak vision, pain, inflammation and grippe in children. Cynodon dactylon is mixed with sugar to treat the case of urine retention.

## 4. Materials and Methods

In the present investigation, the powdered samples of Cynodon dactylon is used. The aqueous solution of 0.0025 and 0.0075 g/ml concentration is prepared using triple distilled water. High precision single crystal ultrasonic interferometer (Mittal enterprises) of frequency 2 Mhz with thermostatic water bath maintained at 303K (0.1% accuracy) used for measuring ultrasonic velocity. Ostwald viscometer is used to quantify viscosity using the flow time taken by the pure solvent and aqueous solutions from upper to the lower mark of the viscometer bulb. The density is assessed employing 10 ml specific gravity bottle. The measured parameters like velocity, viscosity and density are used to compute the thermo acoustical parameters and stability constants using standard relations. The UV-Vis absorption spectrum of aqueous solution has been recorded using a T90 - PG spectrophotometer in the range between 400 and

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800nm.The antibacterial activity of the extracted sample is investigated using agar disc diffusion method. The antifungal activity measured applying agar well diffusion method. The antioxidant potential is studied by DPPH assay.

## 5. Results and Discussion

### 5.1Physical Parameters:

The physical parameters were calculated from the measured values of ultrasonic velocity (u), density (ρ) and viscosity (η) [3], given in Table 1

**Table 1. Physical Parameters**

| S.No. | Conc. **g/ml** | Velocity (u) **m/s** | Density (ρ) **$kgm^{-3}$** | Viscosity (η) **$Nsm^{-1}$** |
|---|---|---|---|---|
| 1. | 0.1 | 1073.2 | 951 | 0.009876 |

### 5.2Acoustical Parameters

The various Acoustical parameters like Acoustic impedance (Z), coefficient of absorption$\left(\frac{\alpha}{f^2}\right)$, adiabatic compressibility (β), free length ($L_f$), relaxation time (τ). Attenuation factors (α) have been determined using velocity, density and viscosity values [4]. The calculated acoustical parameters are tabulated in Table 2.

**Table 2. Acoustical Parameters**

| **S. No.** | Acoustic impedance **(Z) $kgm^{-2}s^{-1}$** | Free length **$(L_f)$ $m/10^{-11}$** | Adiabatic compressibility **(β) $kg^{-1}ms^2/10^{-10}$** | Relaxation time **(τ) (secs.)/$10^{-12}$** | Attenuation factor **(α) $Nps^2m^{-1}/10^{-2}$** | Absorption coefficient $\left(\frac{\alpha}{f^2}\right)$ **Neper/$10^{-14}$** |
|---|---|---|---|---|---|---|
| 1. | 1022381.20 | 6.4276 | 9.0599 | 1.872 | 7.9512 | 1.9878 |

### 5.3UV – Vis Spectrum

The UV radiation region extends from 10nm to 400nm and the visible radiation region extends from 400nm to 800nm. Near UV Region from 200nm to 400nm.The UV spectroscopy is studied under vacuum condition. The results are tabulated in Table 3 and Fig. 2. The absorption is maximum at 480-520 nm in cynodon dactylon.

**Table 3. UV – Visible Spectrum**

| **S.No.** | **Wave Length nm** | **Absorption (OD)** |
|---|---|---|
| 1. | 400 | 0.45 |
| 2. | 420 | 0.49 |
| 3. | 480 | 1.03 |
| 4. | 500 | 0.97 |
| 5. | 520 | 0.95 |
| 6. | 540 | 0.73 |
| 7. | 620 | 0.62 |
| 8. | 680 | 0.51 |

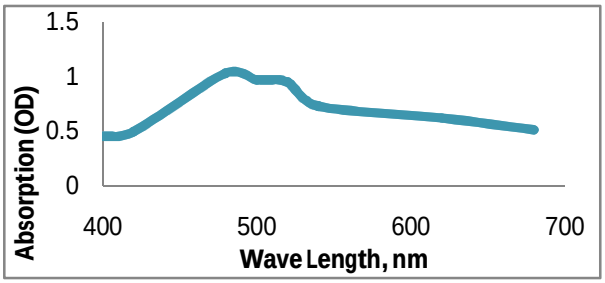


**Figure 2. Plot of Wavelength Vs Absorption for cynodon dactylon**

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**5.4Stability Constant**

Molecular association studies help to determine the physical and chemical properties. The stability constant can be calculated by different methods [5].

- Yoshida and Osawa method $K = \frac{2\sqrt{k(c+c)-(c+c^1)}}{(c-kc^1)}$
- Kannappan method $K = \frac{Y}{(c_2-y)^2} Y = \frac{c_1-(c_2\sqrt{k})}{(k-\sqrt{k})}$

where 'k' is ratio of deviation in ultrasonic velocity at different concentration, $C_1$ and $C_2$. The results are tabulated in Table 4.

**Table 4. Stability Constant**

| S.No. | Conc. | Yoshida &Osawa | Kannappan |
|---|---|---|---|
| 1. | 0.0025 | 0.039 | 9.0 |
| 2. | 0.0075 | 0.19 | 15.38 |

The magnitude of stability constant shows strong binding capacity of the sample. Conductivity is a measure of water's capability to pass electrical flow. This ability is directly related to the concentration of ions in the water. The conductivity of Cynodon dactylon mixed in water and its value is 0.6 x $10^3$micromhos.

**6. Antibacterial Activity**

**Agar disc diffusion method**

The antibacterial activity of Cynodon dactylon plant species was evaluated by agar disc diffusion method for aqueous extract and agar well diffusion for solvent extract using Muller Hinton agar (MHA) medium. The microorganism was activated by inoculating a loopful of the strain in the nutrient broth Antibiotic standard maximum value of 35ml and incubated at room temperature on a rotary shaker Muller Hinton agar medium is poured into the petri plate. After the medium was solidified, the inoculums were spread on the solid plates with sterile swab moistened with the bacterial suspension. The zone of inhibition was interpreted in millimeter and standard antibiotic values of tabulated in Table 5. The methanol extract showed for other species of bacteria very prominent inhibiting the bacterial growth Figure 3. The test compound was introduced into the well and all the plates were incubated at $37^0$C for 24h. These results reveal that the leaves of Cynodon dactylon could be a potential source of traditional medicine for infections caused by Shigella, Salmonella, Staphylococcus auresus, E.coil, and Micrococcus. The antibacterial activity was determined by measuring the diameter of zone of inhibition [6] - [7].

**Table 5. Antibacterial Activity by Zone Inhibition.**

| Organisms | Zone of Inhibition (mm) Sample (1mg/ml) | | | Antibiotic (1mg/ml) |
|---|---|---|---|---|
| | 1000 | 750 | 500 | |
| Shigella sp. | 18 | 13 | 12 | 25 |
| Salmonella sp. | 13 | 10 | 8 | 29 |
| Staphylococcus aureus sp. | 15 | 13 | 10 | 35 |
| E. coli sp. | 8 | 7 | 6 | 27 |
| Micrococcus sp. | 8 | 7 | 7 | 23 |

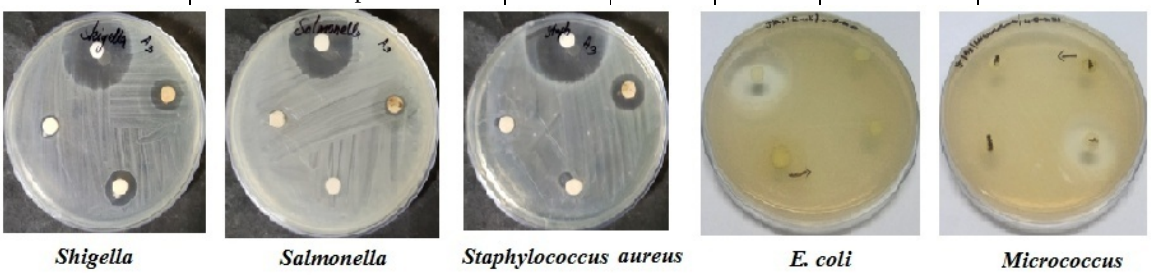


**Figure 3. Antibacterial Activity of cynodon dactylon**

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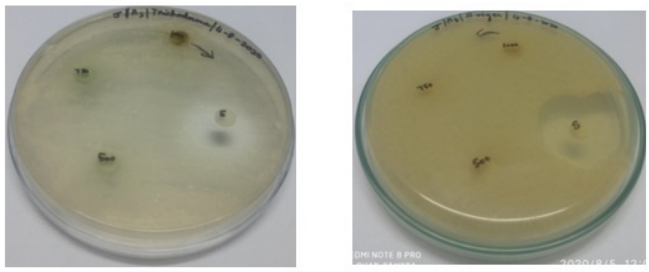
**7. Antifungal Activity**

**Agar well diffusion method**

The agar well diffusion method was modified. Sabouraud's dextrose agar (SDA) was used for fungal cultures. The culture medium was inoculated with the fungal stains separately suspended in sabouraud dextrose broth. The maximum concentration of species Trichoderma-10ml were punched into the agar and filled with cynodon dactylon plant extracts using solvent of methanol, standard antibiotic value of 1-2 samples is shown in Table 6 & Figure 4 and positive control of 20µl each were added in sterile discs and placed in SDA plants. The plates were incubated at $28^0$C for 24h. The antifungal activity was determined by measuring the diameter of zone of inhibition [8] – [9]. The extracts showed good results by visible zone inhibiting fungal growth Figure 4.

**Table 6. Antifungal Activity by Zone Inhibition Method**

| Organism | Zone of inhibition (mm) Sample(µg/ml) | | | Antibiotic (1mg/ml) |
|---|---|---|---|---|
| | 1000 | 750 | 500 | |
| Trichoderma | 10 | 7 | 7 | 24 |
| Aspergillus niger | 8 | 7 | 6 | 29 |



Trichoderma Aspergillus niger

**Figure 4. Antifungal Activity of cynodon dactylon**

**8. Antioxidant Activity**

**DPPH Assay (Molyneux, 2004)**

The activity of the stable DPPH (α, α-Diphenyl-β-Picrylhydrazyl) radical is used to evaluate free radical scavenging activity in Cynodon dactylon plant. The DPPH is a violet stable hydrophilic free radical with the highest absorbance at 520nm. When a solution of DDPH is mixed with a constituent having ability to donate a hydrogen atom, then this gives rise to the reduced form with the loss of this violet colour. The antioxidant activity of different concentrations of the methanolic extract of Cynodon dactylon rhizomes with that of 200, 400, 600, 800, 1000 ppm of the synthetic antioxidant BHT measured by DPPH. The free radical scavenging activity significantly improves with increasing concentrations of the methanolic extract of Cynodon dactylon rhizomes. The scavenging activity at 200 ppm was 35.99% and improved to 55.17% as the extract concentration is increased to 1000 ppm. The maximum concentration shows the best DPPH Activity percentage. The stability of these radicals may affect antioxidant capacity of phenolic compounds as less stable phenoxyl radicals compete with DPPH radicals [10] – [11]. The procedure for DPPH Assay and Antioxidant of DPPH activity percentage is tabulated in Table 7 and 8.

**Table 7. Procedure for DPPH Assay**

| S.NO | REAGENTS | BLANK | STANDARD | TEST |
|---|---|---|---|---|
| 1 | Methanol | 3.8ml | 3.7ml | 3.7ml |
| 2 | BHT | - | 100µl | - |
| 3 | Sample | - | - | 100µl |
| 4 | DPPH | 200µl | 200µl | 200µl |
| Incubation at dark for 30 minutes | | | | |
| O.D at 517 nm | | | | |

**Table 8. Antioxidant of DPPH Assay: (Molyneux, 2004)**

| S No. | Concentration | O.D | DPPH Activity % |
|---|---|---|---|
| 1 | 1000 | 0.208 | 55.17 |
| 2 | 800 | 0.230 | 50.43 |
| 3 | 600 | 0.253 | 45.47 |
| 4 | 400 | 0.277 | 40.30 |
| 5 | 200 | 0.297 | 35.99 |

**Control: 0.464**

## 9. Conclusion

Cynodon dactylon has widely been used in Indian ayurvedic medicine since ancient times for curing several human diseases. Physical parameters, acoustical parameters, stability constants help in understanding the intermolecular interaction existing in the solute and solvent molecules. It is anticipated that it may be used as a novel drug in the near future to control many diseases like antioxidant, antibacterial, antifungal and wound healing. The present work provides information to generate keen interest among researchers.

## References

1. Garg VK and Paliwa SK, (2011), Anticonvulsant activity of ethanolic extract of cynodondactylan Der Pharmacia Sinica. 2 (2): 86 – 90.

2. Baby, D S R, Neeharika V, Pallavi V and Reddy M B, (2009), Antidiarrheal activity of cynodondactylon Pers. Pharmacog Magazine. 5:23 – 27.

3. Vasantharani, P, Kalaimagal P and Kannappan A N, (2009), Molecular interaction studies on some organic liquid mixtures at different temperatures using ultrasonic technique. Asian J. Applied Science. 2: 96-100.

4. Dikko A B, Ahmed A D, Oriolowo N Z, (2015), Effect of Temperature Change on Ultrasonic Velocity and Some Acoustic Parameters of Ternary Liquid Mixture of Methanol+Ethanol+1- Propanol. International Journal of Applied Research, IJAR, 1(3), 75 – 77.

5. Yoshida and Osawa, Bulletin of Chemical Society, Japan 38.140, 1965.

6. Yogesh HS, Kidchadi SCK, Muchandi IS, Gopalakrishna B, (2013), Evaluation of Anti-Inflammatory activity of Cynodondacylon (L.Pers). On carrageenan induced paw edema in rats. Indian I Nat. Prod. Resour. 4(2): 151-54.

7. Renu S, Prakesh NB, (2012). Screening of antibacterial activity of hydroalcoholic extract of Cynodondacylon (L. Pers), Int. J. Res. Ayurveda Pharm. 3(6): 827-829.

8. Broekaert W F, Terras F RG, Cammue B P A, and Vanderleyden J (1990), An automated quantitative assay for fungal growth inhibition, FEMS Microbiology Letters 69:55-60.

9. Morrisey, J P., and Osbourn A., (1999), Fungal resistance to plant antibiotics as a mechanism of pathogenesis, Microbiology and Molecular Biology Reviews 63:708-724.

10. Sharma N. Rana AC, Bafna P (2011). Effect of aqueous extract of Cynodondacylon on reserpine induced catalepsy, Int. J. Pharm. Pharm. Sci. 3(4): 424-426.

11. Ruberto G, Baratta MT, Deans SG, Dorman HJD, (2000), Antioxidant and antimicrobial activity of Foeniculum vulgare and Crithmum maritimum essential oils, Planta Med 19:2943–2950.

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