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IN VITRO ANTIBACTERIAL ACTIVITY OF *CLEOME GYNANDRA* LINN

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ABSTRACT

The present study investigation of crude extracts from leaf, stem and root of *Cleome gynandra* L., in different solvent, were subjected to antibacterial activity against the selected Gram positive and Gram negative bacteria. The antibacterial activities were analyzed. All the extracts showed varying degree of inhibitory potential against all the tested bacteria. (Acetone, Chloroform) extracts of leaf had higher inhibitory action against *Pseudomonas*, *Escherichia coli*, *Staphylococcus aureus* and *Salmonella* respectively.

KEYWORDS: *Cleome gynandra* L, Antibacterial activity, Gram positive, and Gram negative.

INTRODUCTION

The diversity of plants growing with their known ethno- pharmacological uses is wealth of India. According to World Health Organization, medicinal plants are the best source to obtain a variety of newer herbal drugs. About 80 % of individuals from developed and developing countries use traditional medicine, which has compounds derived from medicinal plants. The extracts of many plant species have become popular in recent years and attempts to characterize their bioactive principles have gained momentum for varied pharmaceutical applications [1]. *Cleome gynandra* L. (*Capperdiceae*) is described in Ayurveda and other system of medicine as a curative medicine for neuralgia, headache, cough, wounds, anthelmintic, rubefacient, counterirritant and for snake bite and scorpion sting etc [2]. *Cleome gynandra* L. is commonly known as 'Hurhur'and 'Karaila' in India. *Cleome gynandra* is used as a medicinal plant and can be found in all over world .It grows as a weed in paddy fields and also in road sides and in open grass lands. In India it is never cultivated but grows

spontaneously everywhere. Different species of Cleome can be found in all states of India. Ayurveda, the Indian traditional system of medicine, lays emphasis on promotion of health concept of strengthening host defences against different diseases [3]. The medicinal application of this plant is also described in Ayurvedic pharmacopoeia of India and also in other ancient medical texts. In Ayurvedic medicine it is a chief constituent in *Narayana Churna* [4]. Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of humankind. Natural products are known to play an important role in both drug discovery and chemical biology. Although some therapeutic benefits can be traced to specific plant compounds, many herbs contain dozens of active constituents that, together, combine to give the plant its therapeutic value. Any part of the plant may contain active components. [5, 6, 7]

MATERIALS AND METHODS

Plant collection: The wild plants were directly collected along the road sides of Manamedu – Trichy Districts, Tamil Nadu, India.

Strains collection: The microbial strains were collected from the K.A.P. Viswanatham Government Medical College, Trichy-20. Medicinal plants were tested against the bacteria such as *Pseudomonas, Escherichia coli, Salmonella, Staphylococcus aureus,*

Sterilization of Plant Materials: The disease free and fresh leaves of plant were selected. About 2 grams of fresh and healthy leaves were taken, and washed with tap and distilled water for three times. Surface sterilization was done with 0.1% mercuric chloride for 2minutes. Again the plant materials were washed thoroughly with distilled water for three times.

Preparation of Plant extracts: The whole plants along with leaf, stem and root dogged out from their carefully. Plant was collected from nearby places, and the leaf, stem and root were separated and washed under running tap water. Thoroughly washed leaf, stem and root were allowed for shade drying under room temperature in the laboratory. The dried leaves were ground to fine powder using a blender. The powder was preserved in an air tight bottle for further studies. The samples were crushed into fine powder and dissolved separately in 100ml of solvent. The solution was kept at room temperature for seven days to allow the extraction of compounds from seeds. The solution of each sample was stirred after every 24 hrs using sterile glass rod. After 7 days the solution was filtered through what man filter paper No-1 and a greenish filerate was obtained. The solvent was evaporated and sticky cumbrances

obtain that was stored in the refrigerator and suspended in 10% dimethyl sulfoxide prior to use. crude extract was diluted with chloroform, acetone to the concentration of 1mg/ml.

Preparation Inoculums: A roomful of strain was inoculated in 30ml of nutrient broth in a conical flask and incubated on a rotary shaker at 37º C for 24 hours to activate the strain.

Bioassay: The bioassay used as the standard Agar Disc Diffusion assay adapted from [8].Mueller Hinton Agar was prepared for the study. Mueller Hinton agar plates were swabbed with a suspension of each bacterial species, using a sterile cotton swab. Subsequently, the sterilized filter paper discs were completely saturated with the test compound. The impregnated dried discs were placed on the surface of each inoculated plate. The plates were incubated overnight at 37º plant parts such as leaf, stem and root were tested against each organism in triplicate. Standard discs of Ampicillin served as positive antibacterial control. The test materials having antimicrobial activity inhibited the growth of the micro organisms and a clear, distinct zone of inhibition was visualized surrounding the disc. The antimicrobial activity of the test agents was determined by measuring the diameter of zone of inhibition in mm.

RESULTS AND DISCUSSION

Antibacterial Activity

The antibacterial property of chloroform, acetone extract of leaf, stem and root of *Cleome gynandra* L was analysed against bacterial pathogens using Positive as control. Out of these four bacterial pathogens three were found to be gram negative (*Escherichia coli, Pseudomonas, Salmonella)* and one were gram positive (*Staphylococcus aureus*). Disc diffusion method was used to evaluate the antibacterial activity of taken samples. After twenty-four hours the minimum inhibitory zone of chloroform, acetone leaf, stem and root extract of *Cleome gynandra* L and control were measured (Table)

The leaf, stem and root extracts of *Cleome gynandra* L were found tested for their *pseudomonas* was found to be more susceptible towards the chloroform and acetone extracts of leaf with a maximum inhibitory zone (6mm each), followed by acetone in stem with a maximum inhibitory zone (5mm). Chloroform in the following inhibitory zone of maximum stemand root (4mm each), acetone extracts and root with a maximum inhibitory zone (3mm each). *Escherichia coli* were tested in *Cleome gynandra* L were found to be acetone and chloroform extracts of leaf with a maximum inhibitory zone (5mm each), followed by

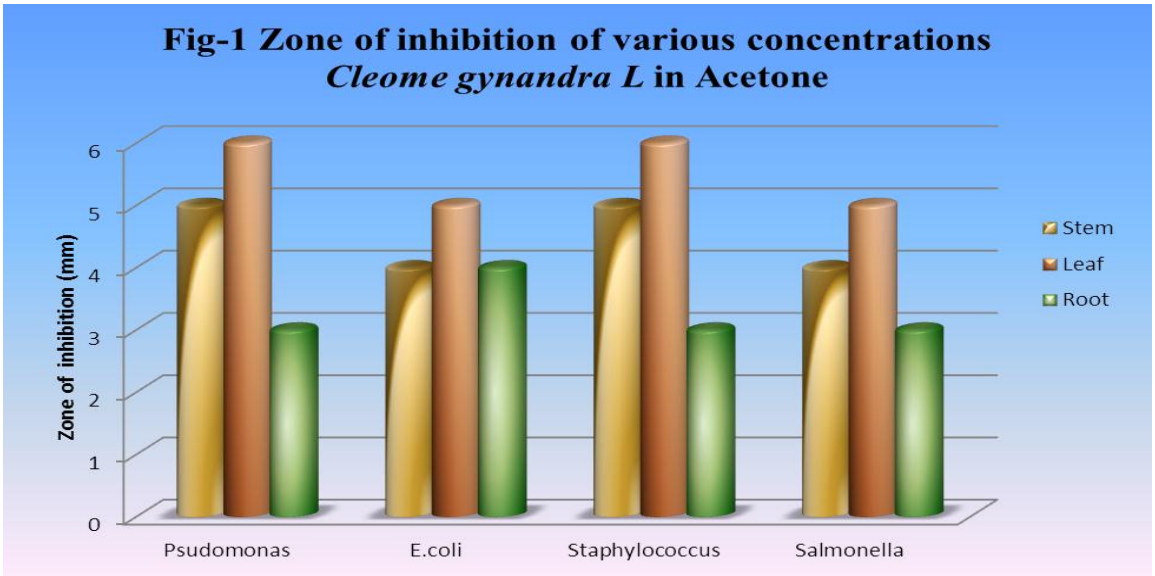
acetone in stem and root with a maximum inhibitory zone (4mm). Chloroform in the following inhibitory zone of maximum stem and root (3mm each), *Staphylococcus aureus* was found to be more susceptible towards the acetone and chloroform maximum inhibitory zone (6mm), followed by acetone stem (5mm), inhibitory zone acetone and chloroform root and root (3mm), and chloroform in the following inhibitory zone of maximum stem (4mm each), *Salmonella* was found to be more susceptible towards the chloroform extracts of leaf with a maximum inhibitory zone (6mm each), acetone in leaf (5mm), followed by stem (4mm), acetone, chloroform extracts of stem and root maximum inhibitory zone (3mm each).

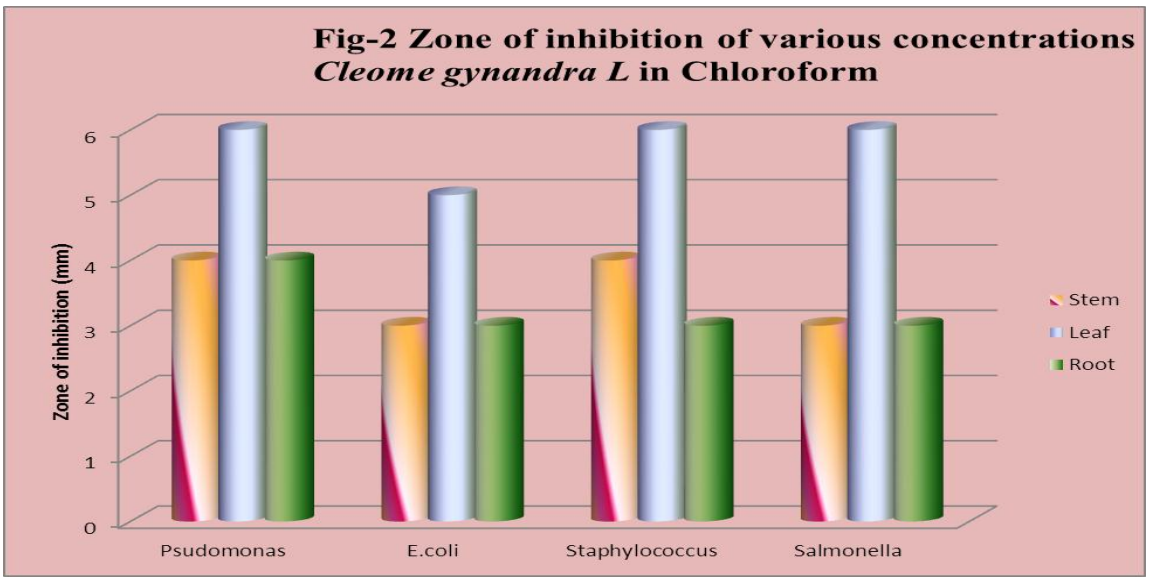
The ethanolic extract of *C. gynandra* leaf might exert antiinflammatory activity by modifying the lysosomal membrane in such a way that it is capable of fusing with the plasma membrane and thereby preventing the release of lysosomal enzymes, and could retard complications and spread of the inflammatory process by reducing the destruction of TNF-α during rheumatism[9]. Others searchers are showed that ethanolic of *C. gynandra* have stimulatory effect on both humoral immunity as well as cellmediated immunity by stimulating phagocytosis, increases in delayed type hypersensitivity response from 50/kg [10]. The results obtained are encouraging as the acetone, chloroform extracts have shown considerable antibacterial activity against the tested organisms. In general, the plant sample has maximum activity against gram positive bacterial pathogens than that of gram negative bacterial pathogens. Plant based antibacterial have enormous therapeutic potential as they can serve the purpose with lesser side effects that are often associated with synthetic antibacterial [11].

Table: 1 Antibacterial activity of *Cleome gynandra L.* plant extract.

S. No	Number of organisms	Acetone			Chloroform		
		S	L	R	S	L	R
1.	*Psudomonas sp.,*	5mm	6mm	3mm	4mm	6mm	4mm
2.	*E.coli sp.,*	4mm	5mm	4mm	3mm	5mm	3mm
3.	*Staphylococcus sp.,*	5mm	6mm	3mm	4mm	6mm	3mm
4.	*Salmonella sp.,*	4mm	5mm	3mm	3mm	6mm	3mm

S – Stem. L- Leaf. R- Root





CONCLUSION

The following conclusion was drawn based on the results; crude plant extracts showed significant antibacterial activity. The plant extractive studied could be an answer to the people seeking for better therapeutic agents from natural sources which is believed to be more efficient with little or no side effects when compared to the commonly used synthetic chemotherapeutic agents. The present study verified the traditional use of *Cleome gynandra* L. Thus this plant can be utilized as an alternative source of useful drugs. Further studies are needed with this plant to isolate, characterize and elucidate the structure of the bioactive compounds of this plant for industrial drug formulation. Finally it is conceded that the whole plant extract of potential source of active antimicrobial agents due to the presence of number of chemical constituents which can be the pant of new and novels bioactive Compounds.

REFERENCES

1. Lis-Balchin M, Deans SG, Bioactivity of selected plant essiential oil against Listeria monocytogenes. *J. Applied. Microbiol*, 1997; 82(6): 759-762.
2. Chopra RN, Nair SL, Chopra IC. Glossary of Indian Medicinal Plants. New Delhi: CSIR, 1956; 70.
3. Thatte, U.M, and Dhanukar, *Trends in Pharmacological Sci*, 1986; 7:247.
4. Anbazhagi K, Kadavul G, Suguna and Petrus A.J.A, *Natural Product Radiance*, 2009; 8(2): 151-157.
5. Chukwuka KS, Ikheloa JO, Okonko IO, Moody JO, and Mankinde TA. *Adv. Appl. Sci. Res,* 2011; 2(4): 37-48.
6. Dhanalakshmi D, Kumar S, Prasad MS, Koli V, Kumar BP., and Harani A. *Eur. J. Exp. Bio,* 2011; 1(1): 103-105.
7. Pai V, Chanu TR, Chakraborty R, Raju B, Lobo R, and Ballal M. *Asian J. Plant Sci. Res,* 2011; 1(2): 57-62
8. Nair R, Kalariya T, Chanda S. Antibacterial activity of some selected Indian medicinal flora. Turk J Biol, 2005; 29: 41-47.
9. Narendhirakannan R.T, Subramanian S, Kandaswamy M. *Food and Chemical Toxicology*, 2007; 45: 1001-1012.
10. Kumar D, Arya V, Kaur R, Bhat Z.A, Gupta GV.K, Kumar V. *Journal of Microbiology, Immunology and Infection,* 2012; *4*5:165-185.
11. Lwu M.W, Duncan A.R. Okunji C. O. New antimicrobials of plant origin. In janick J, ed, perspectives on new crops and New uses, Alexanderia, VA: ASHS Press, 1999; 457-462.