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ANTIMICROBIAL ACTIVITY OF SEVEN ENDANGERING MEDICINAL PLANTS

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ABSTRACT

Plants play a major role in all the traditional system of medicine. Plants contain the rich source of natural products like vitamins, minerals and other immune-modulators. Most of which have been used for human welfare especially to cure disease caused by pathogenic microorganisms without any side effects. The present study was conducted to determine the anti microbial activity of different plant leaf extracts with different solvent viz; ethanol against Gram positive bacteria (*Staphylococcus aureus*), Gram negative bacteria (E. coli) and Fungal (*Aspergillus niger & Candida parapsilosis)*. The disc diffusion method was used to test the antimicrobial activity. The result showed that more antimicrobial activity shown for E. coli *Staphylococcus aureus* by *Achyranthes aspera* at low concentration of *5µg/ml*. The result showed that more antimicrobial activity shown for by *Achyranthes aspera* at low concentration of *5µg/ml*. The result showed that more antimicrobial activity shown for *Aspergillus niger by Catharanthus roseus* at low concentration of *5µg/ml*. The result showed that more antimicrobial activity shown for *Candida parapsilosis* by *Achyranthes aspera* at low concentration of *5µg/ml*. This work shows important data for develop drugs from plant extracts against pathogenic microbes. Most of the bacteria are gaining the resistance for antibiotics so this study is important in developing medicine.

KEYWORDS: Immune-modulators, *Candida parapsilosis, Achyranthes aspera.*

INTRODUCTION

"A medicinal plant is any plant which, in one or more of its organ, contains substance that can be used for therapeutic purpose or which is a precursor for synthesis of useful drugs.These are used in herbalism(Mohammed Aktar Sayeed et al). Achyranthes aspera (Amaranthaceae) is an important medicinal herb found as a weed throughout India Saurabh Srivastav et al (2011).Aloe vera is the oldest medicinal plant ever known and the most applied medicinal plant worldwide. Extracts of Aloe vera helps in skin healing. Aloe vera help to soothe skin injuries affected by, skin irritations, burning, cuts and insect bites, and it also has bactericidal properties that relieve itching and skin swelling (R.Rajeswari et al.) Catharanthusroseus (Vinca rosea) a traditionally used medicinal plant, belongs to the family Apocynaceae, is an erected procumbent herb or under shrub containing latex. It is wid ely growing to 1m tall at subtropical area.This plant have known antibacterial, antimicrobial, antifungal, anticancer, antioxidant and antiviral activates(M. Jayanthi et al). Ficus religiosa Linn belongs to Moraceae family. It widely occurs in south india. (Rajiv P 2012), Ficusreligiosa Linn is a large evergreen tree found throughout India. It is popular indigenous system of medicine like Ayurveda, Siddha, Unani and Homeopathy. In traditional system of medicine, various parts such as root bark, aerial roots, stem bark, vegetative buds, leaves, fruits and latex are used in diabetes, vomiting, burns, dysentery, diarrhea, nervous disorders, tonic and astringent(Inder Kumar Makhija 2010). Mentha arvensis species belonging to family Lamiaceae, (commonly known as mint),constitute one of the most popular essential oil crops. These plants are widely distributed and cultivated in the temperate and sub temperate regions of the world. These species show considerable chemical diversity in the essential oil composition and are considered industrial crops as they produce a number of commercially valuable essential oils containing a complex mixture of mono terpenoids which are extensively used in pharmaceutical, food, flavour, cosmetics, beverages.(Rajendra C. Padalia et al). Ocimum(Tulsi), the "Queen of Herbs", is the most sacred herb of India. Ocimum belongs to the Lamiaceae family. The main chemical constituents in O. tenuiflorum were grouped as essential oils (0.516-0.596%), total carbohydrates (11.87-11.50%), total flavonoids (0.735-0.945%), proline (0.28-0.536 mmol/g leaves fresh weight) and higher amount of linalool (55.26%) and moderate amounts of methyl chavicol (6.66%), nerol (0.48-8.0%), geraniol (0.26-1.75%) and citral (4.26-6.79%)(Balaji R et al).Pongamia pinnata: The 'Pongam Tree' is known as one of the richest and brightest trees of India. The tree is named as 'Pongamia pinnata' in science. The name 'Pongamia' has derived from the Tamil name, 'pinnata' that refers to the 'Pinnate leaves'. The tree is a member of the 'leguminosae' family

(Rahul Deo Yadav et al). All parts of the plant have been used in the treatment of tumors, piles, skin diseases, wounds and ulcers. (Arun K. Vuppaladadiyam et al).

MATERIALS AND METHODS

Leaves Collection

The leaves for the present study from the respective plants was collected from different regions of Telangana i.e, Achyranthes aspera, Aloe vera, Ficus religiosa, Mentha arvensis, Ocimum tenuiflorum, Pongamia pinnata and was allowed to dry under shade and made into a fine powder. The powder (100grams) was Soxhlet extracted with methanol and dried under rotavapor at 40-50°C for 3hours. This measure was taken in order to evaluate the antimicrobial activity.

Obtaining The Microorganisms

Bacterial Culture: The bacterial cultures for the present investigation were obtained from Primer Biotech Research Center, Hyderabad. They were inoculated into the Luria broth and stored.

Luria broth composition (g/lit):

1. Casein enzyme-10
2. Hydrolysate -5
3. Yeast extract -5
4. Sodium chloride-5

Two bacteria used for the present study were; E. coli and Staphylococcus aureus.

Fungal Cultures

Two fungi used for the present study, Candida parapsilosis and Aspergillus niger were also obtained from Primer Biotech Research Center.

Equipment Preparation

To conduct the experiment, the nutrient agar media was prepared by dissolving 28g of nutrient agar in 1000ml distilled water. It was then sterilized in autoclave along with the petri dishes, spreader, 4- 25ml conical flasks, forceps and cotton balls. The agar was then transferred into the petri dishes and was allowed to solidify. There after the procedure was executed in laminar air flow to ensure proper aseptic conditions.

Preparation of Paper Discs

The mode of anti microbial activity of the above medicinal plant leaves were performed using the Chromatographic paper. Fine round paper discs were obtained and were sterilized.

RESULTS AND DISCUSSION

Antimicrobial Activity

The antimicrobial activity of all the Leaf extracts was examined against Gram positive and Gram-negative bacteria and fungal strains by measuring zone of inhibition. The antimicrobial activity was performed by Agar disc diffusion method at concentration level of 2.5, 5.0, 7.0, 10µg/ml respectively. Ampicillin (antibacterial), Itraconazole (antifungal) as standard drug at a concentration of 200µg/ml.LB Agar was used as culture media for antibacterial and potassium dextrose agar was used as culture media for antifungal activity. The results of the antimicrobial activity are shown in figures and tables.

Achyranthesaspera

	2.5µg/ml	***5µg/ml***	***7.5µg/ml***	***10µg/ml***
E.coli	1 cm	2.5 cm	2.5 cm	3 cm
Staphylococcus aureus	2 cm	4 cm	3 cm	3.4 cm
Aspergillusniger	0.9 cm	1 cm	1 cm	1 cm
Candida parapsilosis	1.2 cm	1.7 cm	2.3 cm	2.5 cm

The *Achyranthes aspera* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2.5µg/ml) compared to *E.coli*, leaf extract showed high activity against *Candida parapsilosis* at a very low concentration (2.5µg/ml) compared to *Aspergillus niger*. The zone of inhibition had calculated in cm.

Aloe Vera

	2.5µg/ml.	***5µg/ml***	***7.5µg/ml***	***10µg/ml***
E.coli	1.6 cm	1.6 cm	2.5 cm	3.5 cm
Staphylococcus aureus	1 cm	1.1 cm	1.1 cm	1.2 cm
Aspergillusniger	0.5 cm	0.7 cm	0.7 cm	0.7 cm
Candida parapsilosis	1 cm	0.7 cm	2 cm	1.6 cm

The *Aloe vera* leaf extract showed high activity against *E.coli* at very low concentration (2.5µg/ml) compared to *Staphylococcus aureus* , leaf extract showed high activity against

Candida parapsilosis at a very low concentration (2.5µg/ml) compared to *Aspergillus niger*. The zone of inhibition had calculated in cm.

Catharanthus Roseus

	2.5µg/ml	***5µg/ml***	***10µg/ml***
E.coli	0.7 cm	1.2 cm	1 cm
Staphylococcus aureus	0.8 cm	1.1 cm	1.3 cm
Aspergillusniger	0.7 cm	1.3 cm	1.5 cm
Candida parapsilosis	1.1 cm	1.2 cm	1.3 cm

The *Catharanthus roseus* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2.5µg/ml) compared to *E.coli*, leaf extract showed high activity against *Candida parapsilosis* at a very low concentration (2.5µg/ml) compared to *Aspergillus niger*. The zone of inhibition had calculated in cm.

Ficus Religiosa

	2.5µg/ml	***5µg/ml***	***7.5µg/ml***	***10µg/ml***
E.coli	0.6 cm	0.7 cm	0.8 cm	0.9 cm
Staphylococcus aureus	0.9 cm	1.4 cm	1.4 cm	1.9 cm
Aspergillusniger	0	0	0	0
Candida parapsilosis	0	0.6 cm	0.7 cm	0.7 cm

The *Ficus religiosa* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2.5µg/ml) compared to *E.coli*, leaf extract showed high activity against *Candida parapsilosis* at a concentration of 5µg/ml. Leaf extract didn't showed any activity against *Aspergillus niger*. The zone of inhibition had calculated in cm.

Mentha Arvensis

	2.5 µg/ml	***5 µg/ml***	***7.5 µg/ml***	***10 µg/ml***
E.coli	0.7 cm	1.5 cm	1.5 cm	1.5 cm
Staphylococcus aureus	0.9 cm	0.9 cm	0.9 cm	2 cm
Aspergillusniger	0.6 cm	0.9 cm	1 cm	1 cm
Candida parapsilosis	0.6 cm	0.7 cm	0.6 cm	0.6 cm

The *Mentha arvensis* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2.5µg/ml) compared to *E.coli*, leaf extract showed high activity against

Aspergillus niger at a very low concentration (5µg/ml) compared to *Candida parapsilosis.* The zone of inhibition had calculated in cm.

Ocimum Tenuiflorum

	2.5 µg/ml	***5 µg/ml***	***7.5 µg/ml***	***10 µg/ml***
E.coli	1 cm	1.2 cm	1.2 cm	1.4 cm
Staphylococcus aureus	*0*	*0*	*0*	*0*
Aspergillusniger	*0*	*0*	*0*	*0*
Candida parapsilosis	0.9 cm	0.9 cm	0.9 cm	0.9 cm

The *Ocimum tenuiflorum* leaf extract showed high activity against E.coli at very low concentration (5µg/ml) compared to Staphylococcus aureus which has no activity on it, leaf extract showed high activity against Candida parapsilosis at a very low concentration (2.5 µg/ml) compared to Aspergillus niger which has no activity in it. The zone of inhibition had calculated in cm.

Pongamia Pinnata

	2.5 *µg/ml*	**5 *µg/ml***	**7.5 *µg/ml***	**10 *µg/ml***
Escherichia coli	0.6 cm	0.7 cm	1.9 cm	2.2 cm
Staphylococcus aureus	1.4 cm	1.6 cm	1.7 cm	2.3 cm
Aspergillusniger	0	0	0	0
Candida parapsilosis	0	0	0	0

The *Pongamia pinnata* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2. 5µg/ml) compared to E.coli. And leaf extracts of this plant doesn't had any activity on *Aspergillus niger & Candida parapsilosis.*

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