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ANTIMICROBIAL ACTIVITY IN DIFFERENT POPULATIONS OF *URGINEA INDICA* (ROXB) KUNTH . HYACINTHACEAE IN DIFFERENT SOLVENTS

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ABSTRACT

The *in vitro* antibacterial activity of various solvents and water extracts of (bulb extract) different populations of *Urginea indica* was assessed on 4 different pathogenic bacteria. The zone of inhibition is determined by agar well diffusion method varied with the plant extract, the solvent used for extraction, and the organism tested. *Serratia marsescens, Proteus vulgaris, Staphylococcus aureus* are the three types of pathogenic bacteria who showed maximum sensitivity to almost all populations of *Urginea indica* with maximum zone of inhibition. Where as *Pseudomonas aeruginosa* showed maximum resistance to all populations. It is an effort to test which solvent and which microbe showed maximum inhibition in *Urginea indica*. Previous work on different strains of bacteria such as *Bacillus cereus, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* pathogens showed inhibition more in petrolium ether. While alcoholic extract of *M. azedarach* showed maximum zone of inhibition and minimum inhibitory concentration against all the microorganisms. Antara sen and Amla batra 2012 Ethanol and methanol extracts were found to be more potent being capable of inhibitory activities against majority of bacteria investigated.

KEYWORDS: Antimicrobial activity, *Urginea indica*, Agar well diffusion method, Maximum zone of inhibition.

INTRODUCTION

Medicinal plants constitute the base of health care systems in many societies. The recovery of the knowledge and practices associated with these plant resources are part of an important

strategy linked to the conservation of biodiversity, discovery of new medicines, and the bettering of the quality of life of poor rural communities. Alviano, D.S. and C.S. Alviano. 2009.

According to World Health Organization medicinal plants represent source for a variety of drugs. About 80% of individuals from developed countries use traditional medicine, having compounds derived from medicinal plants Diallo D, Hveem B, Mahmoud MA, 2005.

Urginea indica is Medicinally important plant mentioned in British and Europian pharmacopoeias for its rich medicinal values. It has been reported to possess anticancer activity and used in Oedema, Gout , Dropsy, Rheumatism, Cardiac stimulant, Expectorant, Dog bites, Male sterility and in Psoriosis. In Unani medicines U. indica is one of the active ingradient and is used for the treatement in skin diseases as well as internal pain and scabies. It is also used as tumor suppressant. Khan Md. Ahad ali, et al. 2011.

The active principles isolated from plants serve as plant defense. Mechanism against invasions by microorganisms and it can provide valuable source of natural antibacterial agent. Antibiotic resistance of the recent bacterial strains resulted in "Multiple drug resistance" which is a major challenge to medical world. Use of herbal extracts and their active principles is an. important solution for assisting and treating major microbial disorders that cause deadly diseases to mankind.

Antibiotics have saved the lives of millions of people and have contributed to the major gains in life expectancy over the last century.

Antibiotics have saved the lives of millions of people and have contributed to major gains in life expectancy over the last century. However, the clinical efficacy of many existing antibiotics is being threatened by the emergence of multi-drug resistant (MDR) pathogens the recent appearance of strains with reduced susceptibility as well as, undesirable side effects of certain antibiotics. Most of the studies are directed to see the activity of plant extracts against a variety of test bacteria including both pathogenic and nonpathogenic strains.

In the present study antibiotic activity of *U.indica* populations was evaluated using different solvent extracts against few pathogenic bacteria to find its efficiency as antibacterial herbal extract. *Urginea indica* bulb extracts showed no inhibition zone with aqueous extracts, but showed maximum inhibition in ethanol extract against *Bacillus subtilis, Salmonella typhi, and*

Staphylococcus aureus. Mehamood ayesha, Khan Md. Ahad ali, 2011. This work is a effort to show the amount of inhibition showed by bulbs of different populations of *Urginea indica*.

MATERIALS AND METHODS

Populations of ***Urginea indica*** selected for the experiment were collected from following areas, Trichy, Yedeyur and Seethampundi and were grown in the germplasm , department of Botany, Banagalore University, Banagalore under uniform environmental conditions.

Pathogenic bacteria were collected from Aristogen Biosciences, Rajajinagar Industrial estate, Rajajinagar, Bangalore. Bacterial strains selected for testing antimicrobial activity include, *Staphylococcus aureus(Sau), Pseudomonas aeruginosa(Psu), Proteus vulgaris(Pvu) and Serretia marcescens(Sma).*

Extraction of sample

2 grams of sample was weighed and extracted with Chloroform, methanol, ethanol, acetone and water using pestle and mortar. The extract was spun at 10000rpm for 10 min. The supernatant were incubated at 37 degree centigrade, till the solvent completely condenses leaving behind the precipitate. The precipitate was reconstituted with minimum amount of solvents.

Procedure

The surface of the Mueller Hilton Agar (MHA) was swabbed/spread with the respective cultures of all four types of bacteria namely *Staphylococcus aureus, Pseudomonas, Proteus vulgaris and Serretia marcesens.*

Agar well diffusion method Holder IA, Boyce ST. Burns. 1994

Agar well-diffusion method was followed to determine the antimicrobial activity. Mueller Hilton Agar (MHA) plates were swabbed (sterile cotton swabs) with 8 hour old - broth culture of respective bacteria. Wells (10mm diameter and about 2 cm a part) were made in each of these plates using sterile cork borer. Stock solution of each plant extract was prepared at a concentration of 1 mg/ml in different plant extacts viz. Methanol, Ethanol, Petroleum Ether, Water. About 100 µl of different concentrations of plant solvent extracts were added sterile syringe into the wells and allowed to diffuse at room temperature for 2hrs. 20ml of the extract were added in each well. Incubate the plates at 37 degree celcius. The diameter of the inhibition zone (mm) was measured and the activity index was also calculated. Triplicates

were maintained and the experiment was repeated thrice, for each replicates the readings were taken in three different fixed directions and the average values were recorded .

Results against Serretia

Against *Serratia marsescens* there is maximum inhibition observed in methanol and ethanol extracts and minimum in aqueaous extract. Medium inhibition in chloroform and acetone extracts.

Population **Trichy** showed maximum inhibition in almost every extracts including water. While **Yedeyur** population responded well to ethanol extract and next comes chloroform. **Seethampundi** population showed minimum zone of inhibition in methanol and ethanol but slight high inhibition in acetone. In chloroform no inhibition was observed Both Yedeyur and Seethampundi showed no inhibition with water extract.

Results

Against Proteus vulgaris.

Against Proteus vulgaris there is maximum inhibition observed in methanol and Ethanol extracts.

Population Trichy showed wide inhibition zones in almost every extract.

Ethanol extract in all populations is equally effective against bacteria.

Results

Against Staphylococcus aureus.

- Against Staphylococcus aureus Methenol, Ethenol and chloroform extracts appear to be effective.
- Population Trichy showed good inhibition zone in all extracts including water.
- Acetone extract in all populations showed moderate zone of inhibition.

Results

Against Pseudomonas aeruginosa.

- Pseudomonas aeruginosa appears to be totally resistant against almost every population.
- In Yedeyur population with Ethanol extract there is huge area of inhibition observed.
- Seethampundi population with methanol extracts the pathogen is showing slight

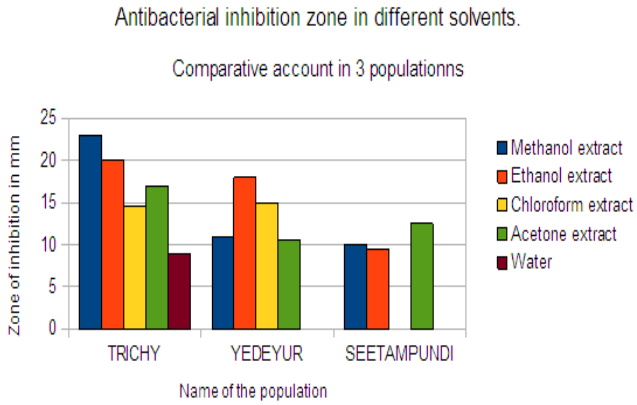
inhibition.

OBSERVATIONS

Bacterial inhibition zone against *Serratia marsescens (in mms)*

Table 1.1.

Name of the population	Methanol extract	Ethanol extract	Chloroform extract	Acetone extract	Water
TRICHY	23mms	20mms	14.5mms	17mms	9mms
YEDEYUR	11mms	18mms	15mms	10.5mms	0mms
SEETAMPUNDI	10mms	9.5mms	0mms	12.5mms	0mms



Graph showing sinsitivity of *Serratia marsescens* in 3 populations of *(Graph 1.1)*.

Graph 1.2.

Bacterial inhibition zone against *Proteus vulgaris (in mms)*

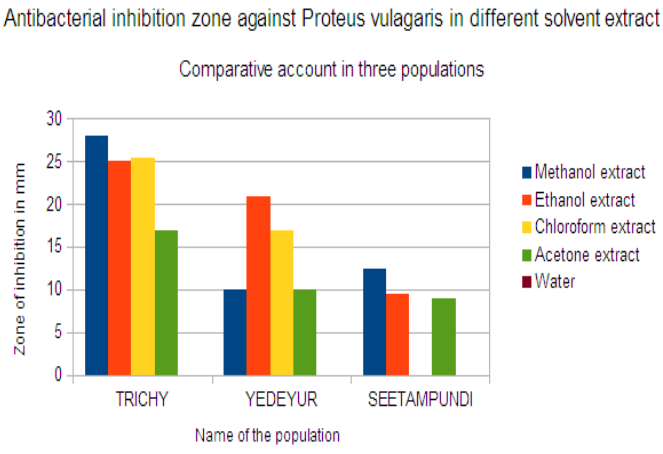


Table 1.2: Antibacterial activity in Proteus vulgaris.

Name of the population	Methanol extract	Ethanol extract	Chloroform extract	Acetone extract	Water
TRICHY	28	25	25.5	17	0
YEDEYUR	10	21	17	10	0
SEETAMPUNDI	12.5	9.5	0	9	0

Graph 1.3.

Bacterial inhibition zone against *Staphylococcus aureus (in mms)*

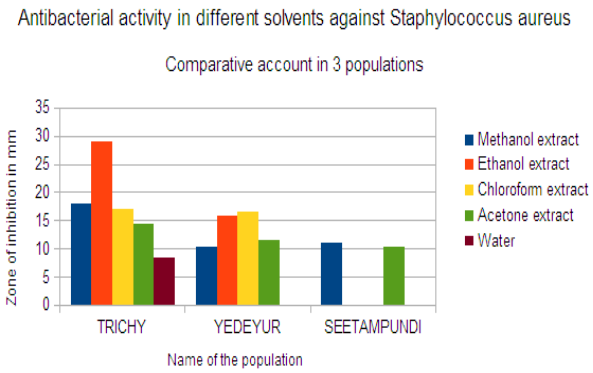


Table 1.3. Antibacterial activity against Staphylococcus aureus.

Name of the population	Methanol extract	Ethanol extract	Chloroform extract	Acetone extract	Water
TRICHY	18	29	17	14.5	8.5
YEDEYUR	10.5	16	16.5	11.5	0
SEETAMPUNDI	11	0	0	10.5	0

Graph 1.4

Antibacterial inhibition zone against *Pseudomonas aeruginosa (in mms)*

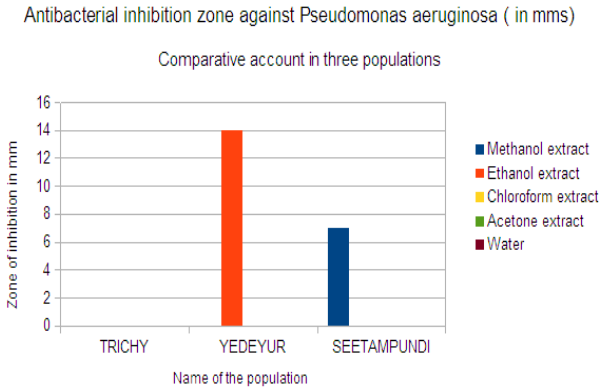


Table 1.4: Antibacterial activity against Pseudomonas aeruginosa.

Name of the population	Methanol extract	Ethanol extract	Chloroform extract	Acetone extract	Water
TRICHY	0	0	0	0	0
YEDEYUR	0	14	0	0	0
SEETAMPUNDI	7	0	0	0	0

Result summery

Summery of all results of all microbial inhibition with different solvent extracts

1. Against *Serratia marsescens*

there is maximum inhibition observed in methenol and ethenol extracts. Population Trichy showed inhibition in almost every extract.

2. Against *Proteus vulgaris*

there is maximum inhibition observed in methenol and Ethenol extracts. Population Trichy showed wide inhibition zones in almost every extract. Ethanol extract in all populations is equally effective against bacteria.

3. Against *Staphylococcus aureus*

Methenol, Ethenol and chloroform extracts appear to be effective Population Trichy showed good inhibition zone in all extracts including water Acetone extract in all populations showed moderate zone of inhibition.

4. Against *Pseudomonas aeruginosa*

appears to be totally resistant against almost every population. In Yedeyur population with Ethanol extract there is huge area of inhibition observed. Seethampundi population with methanol extracts the pathogen is showing slight inhibition.

List showing solvent extrats with Maximum inhibition and the highest antibacterial population.

Sl. no	Name of the pathogenic bacteria	Solvent extracts with maximum inhibition	Populations with maximum inhibition	Populations with minimum inhibition
1	***Serratia marsescens***	Methanol, Ethenol	Trichy	Seethampundi
2	***Proteus vulgaris***	Methenol, Ethenol	Trichy	Seethampundi
3	***Staphylococcus aureus***	Methenol, Ethenol, Chloroform	Trichy	Seethampundi
4	***Pseudomonas aeruginosa***	Ethenol, Methenol	Yedeyur	Trichy

DISCUSSION

All plants showed significant activity against all pathogens but the alcoholic extract showed the maximum zone of inhibition and minimum inhibitory concentration against all the microorganisms. Thus it can be concluded that the alcoholic extracts of these plants could be a possible source of obtaining new and effective herbal medicines to treat infections of major pathogenic bacteria.

CONCLUSIONS

Ethanol is the most effective solvent as it shows antimicrobial property in almost all populations of *Urginea indica (Among the different solvent extracts studied methanol and* ethanol showed a high degree of inhibition, followed by petroleum ether and aqueous extract *(*Antara Sen, Amla Batra, *March 23, 2014)* Water is most ineffective against every microbes. Ethanol is highly effective against *Staphylococcus aureus* as it showed inhibition zone of 11mm, compaired to other extracts like petrolium ether. Khan Md. Ahad ali, et al. 2011.

All the four microbes namely *Staphylococcus aureus(Sau), Pseudomonas aeruginosa(Psu), Proteus vulgaris(Pvu), and Serretia marcescens(Sma)* show inhibition with mostly methanol and ethanol extract. Trichy population is most effective among all four populations of *Urginea indica* in almost all solvents except water. *Serratia marsescens* is most sensitive strain among four bacterial pathogens tested as all populations were able to show zone of inhibition with all solvent extracts. *Pseudomonas aeruginosa* is most resistant bacteria in most populations of *Urginea indica* as zone of inhibition is observed only in Yedeyur and Seethampundi only in methenol and ethenol extract.

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