

Antibacterial Activity of Some Medicinal Plants Oil Used Against Uti Causing Pathogens

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ABSTRACT: Infections of the urinary tract due to microorganisms affect patients of all age groups and both sexes, and they vary in severity from an unsuspected infection to a condition of severe systemic disease. UTI are generally characterized by bacteriuria (bacteria in urine).

In present research work, we isolate bacteria from urine of UTI infected woman and characterized by pour-plate method, direct smear of fresh urine culturing on blood agar media, gram staining, and morphological character, samples are send to Jagtap-patil laboratory at Barshi, for strain identification. They perform biochemical test by Biomerieux Vitek-2 compact and they reported Enterococcai family infection (*E. faecalis*, *E. casseliflavus*, and *Vagococcus fluvialis*). Medicinal plants oils such as neem, mustard, and eucalyptus were collected from market to check their antibacterial activity against bacteriuria. By compairing zone of inhibition with zone of inhibition of proposed standard antibiotics such as Gentamycin, Streptomycin, and Vancomycin, results showed that medicinal plants oils alone and their mixtures are highly active as like standard antibiotics to inhibit the growth of bacteria.

Key Words-UTI,Antibacterial activity,Gram Staining,antibiotics

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I. INTRODUCTION

A urinary tract infection (UTI) is an infection that begins in the urinary system. It is the second most common disease after respiratory infection. The urinary tract consists of the kidneys, bladder and the urethra [1]. There are many risk factors for UTIs. In general, any interruption or impedance of the usual flow of urine (about 50 cc per hour in normal adults) is a risk factor. Kidney stones, urethral strictures, enlarged prostate, or any anatomical abnormalities in the urinary tract increases infection risk. This is due in part to the flushing or wash-out effect of flowing urine; in effect the pathogens have to "go against flow" because the majority of pathogens enter through the urethra and have to go retrograde (against a barrier, urine flow) to reach the bladder, ureters, and eventually the kidneys. Women are far more susceptible than men to UTIs because their urethra is short and its exit (or entry for pathogens) is close to the anus and vagina, which can be sources for pathogens. Other risk factors for UTI include sexual activity, mode of birth control, menopause, diabetes and catheter use[1].

Urinary tract infection (UTI) is defined as significant bacteriuria in the presence of a constellation of symptoms such as dysuria (painful urination), increased urinary frequency and urgency, suprapubic discomfort and costovertebral angle tenderness [2]. *E. coli* is the predominant uropathogens responsible for approximately 80% of urinary tract infections then followed by *Klebsellia*, *Enterobacter*, and *Enterococci* species [3].

Symptoms of UTI- [1] and [4]

- Frequent urge to urinate
- Incontinence
- Painful, burning feeling in the area of the bladder or urethra during urination
- Fatigue, lethargy
- Women feel an uncomfortable pressure above the pubic bone.
- Some men experience a fullness in the rectum.
- Despite the urge to urinate, only a small amount of urine is passed
- Milky, cloudy or reddish urine
- Foul-smelling urine
- A fever, which may mean that the infection has reached the kidneys
- Pain in the back or side below the ribs.

Several potent antibiotics are available for the treatment of urinary tract infection but increasing drug resistance among bacteria has made therapy of UTI difficult [5]. The changing antibiotics sensitivities make appropriate empiric treatment a moving target over time [6].The use of natural antimicrobial compound is

important not only in the food preservation but also in the control of microbial growth in the disease condition, several species and herbs exert antibacterial influence due to their essential oil fraction [5] and [7]. The antimicrobial activity of the essential oil varied depending upon the origins and cultivars. The synergistic effect of the mixture of phytochemicals play important role to use plant extract as antimicrobial agent [8]. In this study antimicrobial activity of the oils was checked against the bacteria isolated from UTI patients, the three different oils; Euclyptus, Neem and Mustard oil were collected from market for antibacterial activity.

II. MATERIAL AND METHOD

MATERIAL

Fresh urine sample collected from civil hospital, Osmanabad, Gram staining reagents

DRUGS

Medicinal Oil (Procure from market) -Eucalyptus oil (Amod Ayurved), Neem oil(Yogesh Pharmacy), Mustard oil (Amod Ayurved) – each 100 µl

Standard Drugs (Procure from market) –Gentamycin(100 µl), Streptomycin(100 µl), Vancomycin(100 µl)

III. METHODS

Firstly the urine sample of the urinary tract infected patient no.1 to 5 was collected, which is cultured on the nutrient agar media to check the presence of microorganism. Then the urine sample were cultured in the nutrient broth and after it the morphology, shape, size and margin was studied. The gram staining procedure is carried out for identification of gram positive or gram negative bacteria. The sample is transfer on blood agar media for the determination of total no. of bacterial strain in sample. Then for the maintainance of bacteria the slants are prepared and send to Jagtap-Patil laboratory, at barshi for strain identification.

Result of jagtap-patil laboratory-

By performing different biochemical tests such as catalase test, indole production test, citrate utilization test, triple sugar iron test, urease activity and also MR and VP test. They putforth the result for five different samples.

The sample no 1,2 and 5 are bacterial strain of Enterococci family (Enterococcus faecalis, Enterococcus casseliflavus, Vagococcus fluvialis), whereas sample no. 3 and 4 are not contain infectious bacteria for UTI, they recognise as normal sample. So we carry our study with only sample no. 1, 2 and 5.

Testing Of Antibacterial Activity

By prepared nutrient agar plate, make a cup plate by metal borrier for sample no. 1, 2 and 5. The medicinal plant oils such as Eucalyptus (Eucalyptus globulus), Neem (Azadirachta indica), and Mustard (Brassica nigra) are used for to inhibit the infectious bacterial growth. we prepare a four petriplate each containing four cuplate, one cuplate in each plate stands for standard antibiotics such as Gentamycin, Streptomycin, Vancomycin and remaining three cuplate in each plate for medicinal plant oils, for observing the inhibition to growth of Enterococcai family, such as E. faecalis, E. casseliflavus, and Vagococcus fluvialis. Again we analyse a combination of medicinal plant oils with our standard antibiotics for to enhance and improving the inhibition power by compairing zone of inhibition. So in next step we given a dose of mixture of neem and eucalyptus oil with our three standards for compairing the inhibiting activity.

IV. RESULT AND DISCUSSION

As we analyse the infectious urine sample no. (1,2 and 5) of UTI infected women. In present project research work we prove that infectious bacteria are responsible for to creation of infection to UTI of womens. History reveals that a no. of bacteria such as klebsiella, Pseudomonas, Enterobacter, Proteus, staphylococcus, Mycoplasma, Chlamydia, Serratia, and Neisseria spp. are responsible for UTI infection of womens. It is reported that about 35% of healthy women suffer symptoms of urinary tract infection and about 5% of women each year suffer with problem of painful urination.

As we pick up different urine sample no. (1 to 5) and make it culturing. Hence it proved the infectious microbes present in different urine sample no. (1,2 and 5) by observing microscopically (shape, size, arrangement of colony in pair, cluster and chain). Identifying this bacteria by blood agar media for analysing total no. of bacterial strain present in urine sample causing infection to UTI of that women Hence infectious bacteria introduce in a nutrient broth for further analysis such as movement, strain identification. As the nutrient broth is turbid after fully growth of bacteria, used this broth culture for the gram staining. Result of gram staining revels that sample no. (1 to 5) categories as gram positive bacteria.

Then our aim is that identify specific strain of that gram positive bacteria, so samples are send to a microbial lab (Jagtap-Patil lab, Barshi) for strain identification. Laboratory result showing that the sample no. 1,2 and 5 containing a family of Enterococci infection such as E. faecalis, E. Casseliflavus, Vagococcus fluvialis. To

inhibition of growth of these bacteria antibiotics such as Gentamycin, Vancomycin, and Streptomycin are used that showing a powerful activity against that bacteria. Among all these antibiotics Gentamycin showing the greater zone of inhibition to Enterococii family. So we concentrate on Gentamycin for comparing zone of inhibition to a separate medicinal plant oils (Eucalyptus, Neem, and mustard) and also a mixture of the these oil and observe the zone of inhibition. Result showing that alone Eucalyptus (10, 10, and 11 mm) and neem(8, 9, and 9 mm) have a greater zone of inhibition against Enterococii family. Whereas a mustard alone shows the negligible activity i.e unable to inhibit the growth of Enterococci family. So we putforth our assumptions that if the mixture of these two oils (Eucalyptus and Neem) are given then obviously zone of inhibition increases, and it is compare with gentamycin.

So as we concluded that the mixture of medicinal oil such as Eucalyptus and Neem are showing a powerful inhibiting activity against infectious bacteria like Gentamycin. So in future our target is, these oils such as neem oil and eucalyptus oil are used to prepare formulation to take down orally to inhibit the microbial flora that causes UTI.

Table- Diameter of zone of inhibition shown by various oils and antibiotics Against Enterococii family.

organism	Eucalyptus (zone of inhibition in mm)	Neem (zone of inhibition in mm)	Mustard (zone of inhibition in mm)	Eucalyptus + Neem (zone of inhibition in mm)	Gentamycin (zone of inhibition in mm)
Enterococii faecalis	10	8	5	13	12
Enterococii casseliflavus	10	9	4	11	12
Vagococcus fluvialis	11	9	6	11	11



Figures- showing zone of antibacterial activity of different oils against the different bacteria.

V. CONCLUSION

In the present study we analyse that the Eucalyptus and Neem oils have powerful activity against the bacteria (Enterococii family) which causes the UTI infection. hence we concluded that the mixture of Eucalyptus and Neem oil can be use orally for preventing the infection of UTI in womens, and it is safe for oral use in small quantity.

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