



VIRULENCE FEATURES OF EXTENDED SPECTRUM BETA-LACTAMASE OF PRODUCING *Escherichia coli* IN URINARY TRACT INFECTION PATIENT AND INHIBITED BY HERBAL PLANTS

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ABSTRACT

Natural antimicrobials have gained increasing attention as alternatives to synthetic agents. Plant-derived phytochemicals offer effective and less toxic options for controlling microbial growth. In this study, ethanol extracts of the herbal components *Embolica officinalis*, *Terminalia chebula* and *Nigella sativa* were evaluated for their antimicrobial activity against *Escherichia coli* isolated from urinary tract infections. The results showed that Triphala churan and its individual components exhibited significant inhibitory effects on the pathogens. These findings suggest that the herbal preparations possess promising antimicrobial compounds with potential application in developing therapies for urinary tract infections.

KEYWORDS : microorganisms-antimicrobial activity-triphala

INTRODUCTION

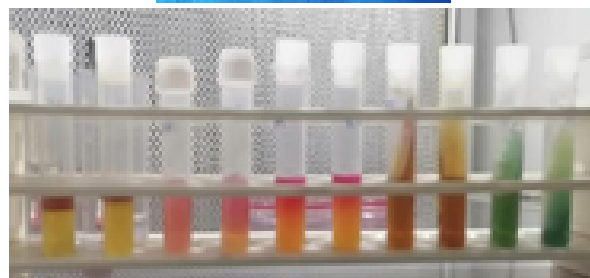
Urinary tract infection (UTI) is a general term used to describe an infection of any part of the urinary tract may be kidney, the ureters, the bladder or the urethra. It is one of the most prevalent bacterial infections in women and elderly individuals. The infection occurs more commonly in women than in men and it was estimated that about 40–50% of women experience one episode in their lives and 20–30% of them have other episodes. UTI is caused when microorganisms, usually bacteria from the digestive tract, cling to the opening of the urethra and begin to multiply. Most infections arise from the Gram negative bacterium *Escherichia coli*, which normally grows and multiplies in the colon.

MATERIALS AND METHOD:

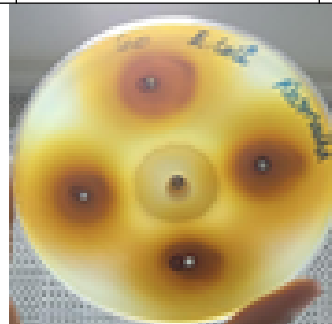
Identification of isolates Identification of all isolates was done on the basis of routine biochemical tests. Ex. Fermentation of lactose, ability to produce indole, reaction on triple sugar iron medium, haemolysis on blood agar, citrate utilization. Size, shape, colour and appearance of the colony were studied on MacConkey, blood, Nutrient agar media. Extended spectrum beta-lactamase. The given sample was swabbed in the Muller Hinton agar plates that were inoculated with standardized inoculum. Increase in zone size of more than or equal to cefotaxime and ceftazidime antibiotic discs. Extraction of Amala: *Embolica officinalis*, harad: *Terminalia chebula*, *Nigella sativa*. They were dried under shade for a period of 7 days to remove the excess moisture present in them and this process helps to avoid destruction of active compounds. After drying, they were ground completely and stored. The extraction of *Embolica officinalis*, harad: *Terminalia chebula*, *Nigella sativa*. of powder (20 g) was executed with the help of Soxhlet extractor based on continuous hot extraction method using ethanol as solvent. The solvent from extraction was distilled off after it becomes concentrated, evaporated.

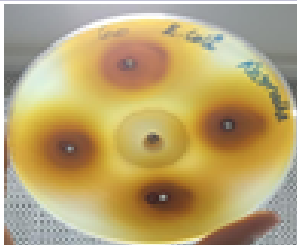
Agar well diffusion method, Muller Hinton agar plates were swapped with 24 hr old -broth culture of respective bacteria. Wells (10 mm diameter) were made in each of these plates using sterile cork borer. Stock solution of herbal preparation was prepared at a concentration of 1 mg/ml in different solvents. About 100 µl of different concentrations of herbal solvent extracts were added into the wells and allowed to diffuse at room temperature for 2 hr. Control experiments comprising inoculums without herbal extract were set up. The plates were incubated at 37°C for 18–24 h. Congo red preparation: Streak *E. coli* cultures onto the Congo Red agar plates using an inoculating loop. Incubate the plates inverted (lid down) at 37°C for 24 to 48 hours to allow biofilm formation. After incubation, observe the colour of the colonies on the Congo Red agar plates. Black colour colonies indicate biofilm formation due to the binding of Congo Red dye to the exopolysaccharides in the biofilm matrix. Red or pink colonies indicate non-biofilm-forming strains.

RESULTS:



S.No	Biochemical Test	Result
1	Indole	Positive
2	Methyl Red	Positive
3	Voges Proskauer	Negative
4	Citrate Utilization	Negative
5	Urease	Negative





S. No	Antibiotic	Zone Of Inhibition(mm)
1	CIPROFLOXACIN	35mm
2	IMIPENEM	28mm
3	LEVOFLOXACIN	28mm
4	GENTAMYCIN	21mm
5	CO-TRIMOXAZOLE	30mm
6	AMIKACIN	12mm
7	NITROFURANTOIN	26mm
8	Ampicillin	Nil

SUMMARY AND CONCLUSION

Phytochemicals derived from plant products serve as a prototype to develop less toxic and more effective medicines in controlling the growth of microorganism. These compounds have significant therapeutic application against human pathogen including bacteria. Numerous studies have been conducted with the extracts of various plants, screening antimicrobial activity as well as for the discovery of new antimicrobial compounds. The ethanol solvent extracts of a herbal drug, components *Embolica officinalis*, *Terminalia Chebula* and *Nigella sativa* were evaluated for exploration of their antimicrobial activity against urinary tract infection causing isolated bacteria in *Escherichia coli*. In conclusion, of the present investigation of these herbal preparations contain potential antimicrobial components that may be of great use for the development of pharmaceutical industries as a therapy against urinary tract infections. Preparation ethanol of trifla churan and its components possess significant inhibitory effect against isolated pathogens.

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