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Antimicrobial Profiling of Siddha Formulation Mallikai Choornam against Urinary Tract Infection

			
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ABSTRACT

The increased incidence of drug resistant in the treatment of urinary tract infection (UTI) of gram organisms has made therapy difficult and also leads to greater use of expensive broad spectrum drugs.^[1] So there is a need to seek remedies from indigenous systems of medicine. Mallikai choornam is the one from Siddha system of medicine known for its therapeutic efficacy in UTI of gram positive and negative organisms. The aim of the study was to assess the antimicrobial activity of Mallikai choornam, against five isolated uropathogens; 2 gram negative (*Escherichia coli*, *Klebsiella pneumonia*), 2 gram positive (*Staphylococcus aureus*, *Proteus vulgaris*), 1 fungus (*Candida albicans*) with two standard antibiotics used as a positive reference to determine the sensitivity of the test strains. The Standard drug Ciprofloxacin (10µg) for antibacterial and Fluconazole (25µg) for antifungal was used as a positive reference. The test compounds were used at the concentration of 100, 200, 300 µg. The antimicrobial activities were evaluated using the disc diffusion method. The target microorganism were cultured in Mueller- Hinton Broth (MHB). The diameter of the clear zone around the disc was measured and expressed in millimetres confirms the antimicrobial property of the study drug.

INTRODUCTION

Bacteria are ubiquitous pathogen causing various types of infections one among them is urinary tract infection, can result in fatal consequence if it is not treated properly or left untreated. To treat all kinds of microbial infections antibiotics are used worldwide, however, organism are gradually becoming resistant against these antibiotics. Most antimicrobial drugs are natural products derived from the plants.^[2] Since beginning of human civilization on this planet, plants are playing marvellous role in maintaining and improving human health. In addition to this problem, antibiotics have several adverse effects which include hypersensitivity, depletion of beneficial gut flora, immunosuppression and allergic reaction. Therefore there is a need to develop alternative antimicrobial drug for the treatment of UTI.^[3] The main purpose of the current study was to assess the polyherbal formulation of Mallikai Choornam against some human pathogens that cause Urinary Tract Infection. The present study mainly focused to determine activity against multidrug resistance bacteria isolated from UTI.

MATERIALS AND METHODS

Collection of Raw Drugs:

Raw drugs were purchased from country medical shop at Chennai, these drugs were authenticated by Medicinal Botany department, NIS Chennai.(No.NISMB2732017/02/2017) Medicine were prepared at Gunapadam laboratory, NIS, Chennai. Project ID: NRS/AS/0033/02/2017.

Preparation of Mallikai Choornam:^[4]

Ingredients:

Thaniya (<i>Coriandrum sativum</i> .Linn)	-315 grams (9palam)
Parangi chakkai (<i>Smilax china</i> .linn)	-35 grams (1palam)
Athimathuram (<i>Glycyrrhiza glabra</i> .Linn)	-35 grams (1palam)
Karunjeeragam (<i>Nigella sativa</i> .Linn)	-35 grams (1palam)
Jeeragam (<i>Cuminum cyminum</i> .Linn)	-35 grams (1palam)

Sajara (<i>Shorea robusta</i> .Gaertn) ^[5]	-35 grams (1palam)
Ealam (<i>Elettaria cardamomum</i> .Marton)	-35 grams (1palam)
Sannalavanga pattai (<i>Cinnamomum zylanicum</i> .Presl)	-35 grams (1palam)
Kirambu (<i>Syzygium aromaticum</i> .Linn)	-35 grams (1palam)
Vithai illa thirachai (<i>Vitis vinifera</i> .Linn)	-35 grams (1palam)

Purification of Raw Drugs:^[6]

- Paranki chakkai- Powered and steamed with cow's milk and then dried.
- Athimathuram- Washed with clean water, skin peeled and made into small pieces.
- Karunjeegam- Cleaned and kept in sunlight then fry it to golden colour.
- Sajara – Boiled with tender coconut.
- Jeeragam, Ealam, Sanna lavanga pattai, Krambu, Vithai illa thiratchi – Clean and kept in sunlight.
- Thaniya – Tie *coriandrum sativum* seeds using a cloth and boil it by dipping in lemon juice, then dry in sunlight.[4]

Method of Preparation:

Coriander seeds are dried in sunlight, the remaining raw drugs are fried to till they reach golden colour and powdered. Mix all the powder. The prepared drug will be stored in a clean and dry tight glass container.

Dose & Duration:

6 grams (½ thola) twice a day, before food with palm sugar powder, 15 days.

Disc-Diffusion Method:

The antibacterial activities of the sample MC were carried out by disc diffusion method. The concentrations of the test compounds were used at the concentration of 100, 200, 300 µg. The target microorganisms were cultured in Mueller–Hinton broth (MHB). After 24 h the

suspensions were adjusted to standard subculture dilution. The Petri dishes containing Muller Hinton Agar (MHA) medium were cultured with diluted bacterial strain. Disc made of Whatman No.1, diameter 6 mm was pre-sterilized and was maintained in aseptic chamber. Each concentration was injected to the sterile disc papers. Then the prepared discs were placed on the culture medium. Standard drug Ciprofloxacin (10µg) for anti-bacterial and Fluconazole (25µg) was used as a positive reference standard to determine the sensitivity of each microbial species tested. Then the inoculated plates were incubated at 37° C for 24 h (Bacterial) - 72 hr (Fungal). The diameter of the clear zone around the disc was measured and expressed in millimetres as its anti-microbial property. The results were depicted in **Table No. 3**.

Table No.1: Organisms used for Anti-Bacterial Activity

S.no	Organisms	Type
1.	<i>Staphylococcus aureus</i>	Gram-positive
2.	<i>Proteus vulgaris</i>	Gram-positive
3.	<i>Escherichia coli</i>	Gram-negative
4.	<i>Klebsiella pneumoniae</i>	Gram-negative

Table No. 2: Organisms used for Anti-Fungal Activity

S.no	Organisms
1.	<i>Candida albicans</i>

ANTIBACTERIAL EVALUATION OF MC

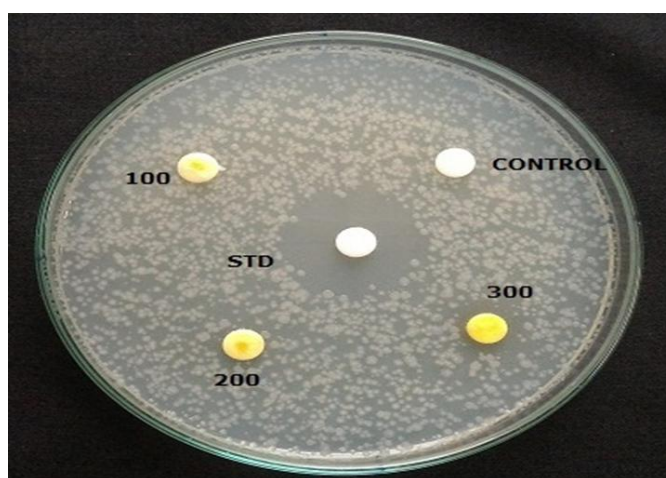


Fig. No. 1: Antimicrobial effect of MC against *Escherichia coli*

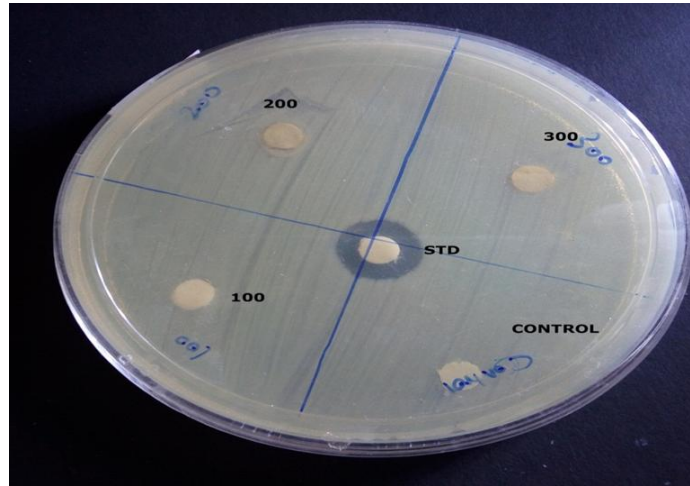


Fig. No. 2: Antimicrobial Effect of MC against Klebsiella pneumonia

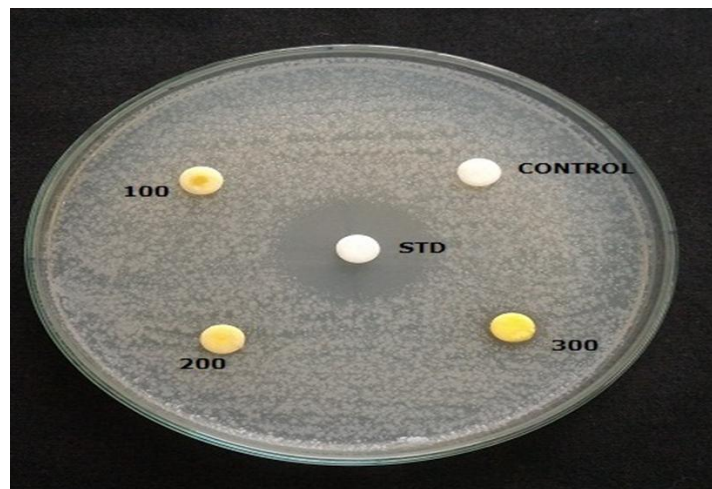


Fig. No. 3: Antimicrobial Effect of MC against Staphylococcus aureus

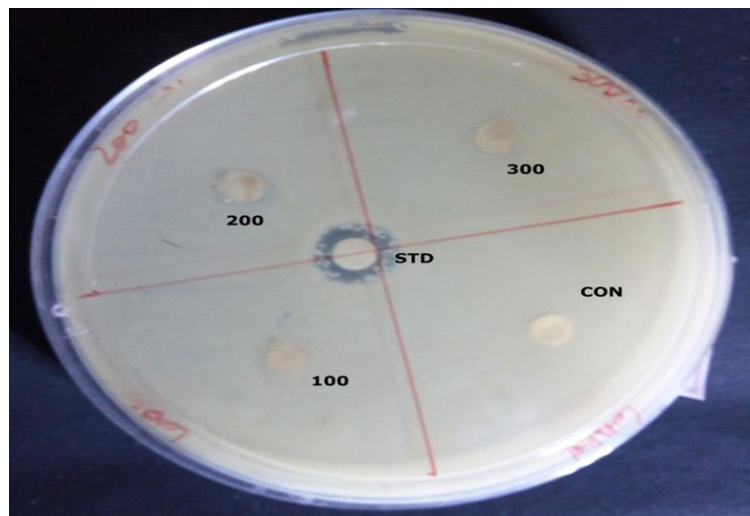


Fig. No. 4: Antimicrobial effect of MC against Proteus vulgaris

ANTIFUNGAL EVALUATION

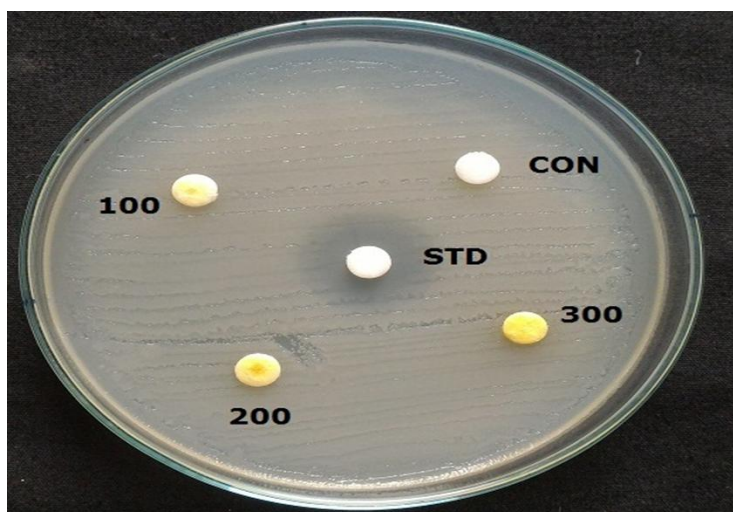


Fig. No. 5: Antimicrobial Effect of MC against Candida albicans

RESULTS AND DISCUSSION

The present study investigated the antimicrobial potential of polyherbal preparation against common gram positive (*Staphylococcus aureus*, *Proteus vulgaris*), gram negative (*Escherichia coli*, *Klebsiella pneumoniae*) and fungus (*Candida albicans*) urinary pathogens. The results were tabulated.

Table No. 3: Zone of Inhibition data of Anti-Microbial Activity

Sample code	<i>Proteus vulgaris</i>			<i>Staphylococcus aureus</i>			<i>Escherichia coli</i>			<i>Klebsiella pneumoniae</i>			<i>Candida albicans</i>		
	100 µg	200 µg	300 µg	100 µg	200 µg	300 µg	100 µg	200 µg	300 µg	100 µg	200 µg	300 µg	100 µg	200 µg	300 µg
MC	-	-	-	-	-	14	-	9	15	-	-	-	-	-	-
Ciprofloxacin (10µg)	18			22			23			16			-		
Fluconazole (25µg)	NA			NA			NA			NA			21		

- = Not active; NA = Not Applicable

From the results of the present study, it was concluded that the sample Mallikai Choornam was effective against *Escherichia coli*, *Staphylococcus aureus* and not active against *Klebsiella pneumoniae*, *Proteus vulgaris* and *Candida albicans*.

In recent year, the focus of researchers is to isolate and characterize antimicrobial compounds from these polyherbal preparation. The aim of the present study, to prove the Mallikai Choornam act against the specific microorganism in urinary tract infection. Also, this medicine may used alternative for antibiotic.

The severe side effects associated with the use of commercially available antibiotics especially in immune compromised patients and childrens. Strongly recommended the use of natural products for treatment of infection. Furthermore, the multidrug resistance pathogens causing nosocomial infections are a serious threat to the health community.

CONCLUSION

Antibiotics that once readily cured a wide range of infections are becoming and the development of antibiotic resistance. Scientists have realized an immense potential in natural products from medicinal plants to serve as an alternative source of combating infections in human beings which may also be of lower cost and lesser toxicity. Further work on isolation and characterization of active compounds from medicinal plants and their pharmacodynamics study would be highly beneficial for the management of sever life threatening infection.

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