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THE ROLE OF HERBAL DRUGS IN ANTI- MICROBIAL ACTIVITY

D. Sathyapriya[1], S. Megha[1], S. N. Vinupriyaa[1], S. Sathish Kumar[1], Thomas M. Walter[2].

[1]Second year BSMS, Government Siddha Medical College, Palayamkottai, Tirunelveli (dt) - 627 002, sathyapriyakdl@gmail.com

[2]Lecturer, Government Siddha Medical College, Palayamkottai, Tirunelveli (dt)- 627 002

ABSTRACT

The literature works of Siddha medicine in Tamil are numerous. In Siddha literature a large number of medicines are involved in the treatment of diseases. Among them, certain medicines are used in the management of infectious diseases. Agents that kill microbes are called microbicidal, while those that merely inhibit their growth are called Biostatic. Anti-microbial resistance has a serious problem due to the massive application of anti biotics, which are used prophylactically or remedially without proper medical indications. The ingredients of the trial drug has proven pharmacological actions such as carminative *[Agattuvaai agatri]*, stimulant*[Veppam undakki]*, anthelmintic *[Puzhukkolli]* etc, so it can be given to GIT [Gastro Intestinal Tract] disorders, UTI [Urinary Tract Infection]. In this paper, we have given basic study on Anti microbial activity of the trial drug. The drug is effective against some microbes such as gram positive bacteria [eg: Staphylococcus aureus], gram negative bacteria [eg: Proteus vulgaris], fungi [eg: Aspergillus flavus] etc., the Anti-microbial (Anti- bacterial and anti- fungal) activity of Siddha drug is tabulated and high lightened in this paper.

KEY WORDS

Siddha System, Anti microbial, urinary disorders, gastrointestinal disorders.

INTRODUCTION

Siddhars listed out many drugs that save the human lives. Herbal drugs are chief and cheep. They are easily available in most of the all areas and vernacular names will be different in relation to that area. Herbals are easily handled and consumed by the people during their needed time. Herbs are used from ancient days to till this day due to their actions against microbes. Hence, it is well known that it has anti- microbial effects. A trial drug that prepared from the herbs had the best active microbial effects such as anti- bacterial, anti-fungal etc., activities. The trial drug that contains the selected drugs is described below.

INFECTIONS CAUSED BY CERTAIN MICRO-ORGANISMS AND THE NEED FOR EFFECTIVE THERAPIES TO TREAT THEM

Micro organisms name	Diseases
1) Staphylococcus aureus [G +]	Cutaneous infections: Including pustules, boils, impetigo, pemphigus neonatrum, wound and burn infections. Deep infections: Osteomyelitis, tonsillitis, pharyngitis, sinusitis, meningitis, pyaemia Food poisoning Skin exfoliative disease Toxic shock syndrome
2) Streptococcus mutans [G +]	Tooth decay
3) Bacillus subtilis [G +]	Eye infection, Septicaemia
4) Escherichia coli [G -]	Urinary tract infection, Diarrhoea, Pyogenic infection, Septicaemia
5) Klebsiella pneumonia [G -]	Atrophic rhinitis ,Rhinoscleroma
6) Proteus vulgaris [G -]	Urinary tract infection, nosocomial infection, infection of ear
7) Pencillium species	Pencillosis, Keratitis, Otomycosis
8) Aspergillus niger	Otomycosis
9) Aspergillus flavus	Sinusitis, Otomycosis, Mycotic keratitis.

Some diseases such as Urinary Tract Infection, Otomycosis and Keratitis may cause serious problems. In order to prevent the infections and the management of diseases caused by these micro-organisms, there exists a requirement of an effective therapy to withstand these strains. The trial drug has efficacy to control above mentioned diseases as proven by the Anti microbial test.

MATERIALS AND METHODS

The trial drug that undergoes anti- microbial test is prepared by the evidence of Siddha literature [*Gunapaadam Mooligai vaguppu]*.

PREPARATION PROCESS

INGREDIENTS OF THE TRIAL DRUG

1. Allium sativum – Vellulli

2. Dried Zingiber officinale _ Chukku

3. Piper nigrum _ Milagu

4. Piper longum _ Thippili

Apart from these, certain other drugs are also included in the preparation in respective proportions.

PURIFICATION AND PREPARATION OF THE INGRIEDIENTS

Preparation and purification of the drugs were done based on the evidences in the Siddha literatures.

MICROBIAL ANALYSIS

TEST ORGANISM

The test microorganisms used for antimicrobial analysis were purchased from Microbial Type Culture Collection and Gene Bank (***MTCC***) Chandigarh. The bacterial strains were maintained on Nutrient Agar (NA) and fungi on Sabouraud Dextrose Agar (SDA).

NUTRIENT BROTH PREPARATION

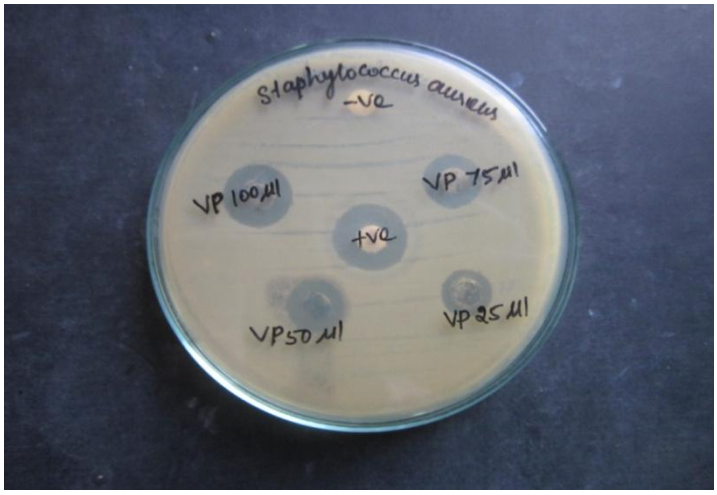
Pure culture from the plate were inoculated into Nutrient Agar plate and sub cultured at 37ºC for 24 h. Inoculum was prepared by aseptically adding the fresh culture into 2 ml of sterile 0.145 mol/L saline tube and the cell density was adjusted to 0.5 McFarland turbidity standard to yield a bacterial suspension of 1.5×108 cfu/ml. Standardized inoculum Used for Antimicrobial test.

ANTIMICROBIAL TEST

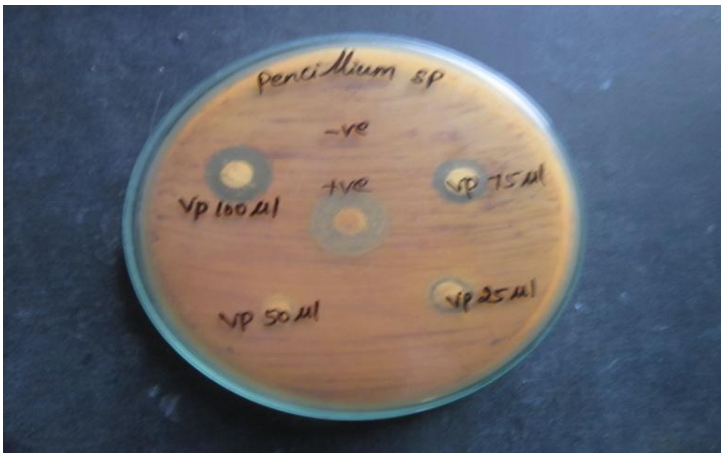
The medium was prepared by dissolving 33.9 g of Muller Hinton Agar Medium (Hi Media) in 1000 ml of distilled water. The dissolved medium was autoclaved at 15 Lbs pressure at 121^0C for 15 min (pH 7.3). The autoclaved medium was cooled, mixed well and poured onto 100 mm petriplates (25 ml/plate) the plates were swabbed with Pathogenic Bacteria culture viz. Finally, The Sample or Sample loaded Disc was then placed on the surface of Mullar-Hinton medium and the plates were kept for incubation at 37°C for 24 hours. At the end of incubation, inhibition zones were examined around the disc and measured with transparent ruler in millimeters. The size of the zone of inhibition (including disc) was measured in millimeters. The absence of zone inhibition was interpreted as the absence of activity (Kohner *et al*., 1994; Mathabe *et al*., 2006). The activities are expressed as resistant, if the zone of inhibition was less than 7 mm, intermediate (8-10 mm) and sensitive if more than 11 mm (Assam *et al*., 2010)

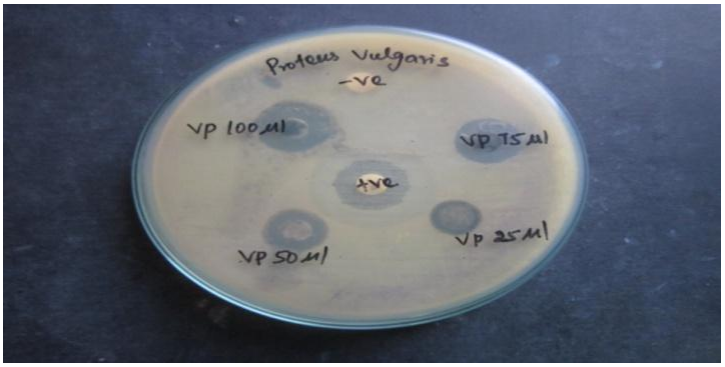
ANTIFUNGAL ASSAY BY DISC DIFFUSION METHOD (Bauer *et al*., 1966)

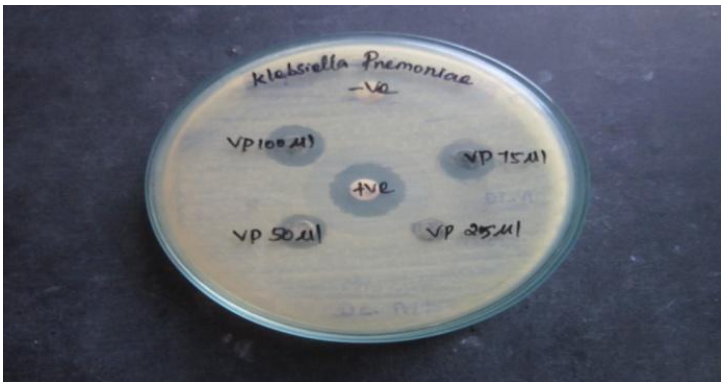
Antibiotic susceptibility tests were determined by agar disc diffusion (Kirby–Bauer) method. Fungi strains were swabbed using sterile cotton swabs in SDA agar plate. Up to 40 µl of each concentration of the extract were respectively introduced in the sterile discs using sterile pipettes. The disc was then placed on the surface of SDA medium and the compound was allowed to diffuse for 5 minutes and the plates were kept for incubation at 22°C for 48 hours. At the end of incubation, inhibition zones were examined around the disc and measured with transparent ruler in millimeters.


Staphylococcus aureus
-ve
VP 100µl
VP 75µl
+ve
VP50µl
VP 25µl


Straptococcus mutans
-ve
VP 100µl
VP75µl
+ve
VP 50µl
VP 25µl

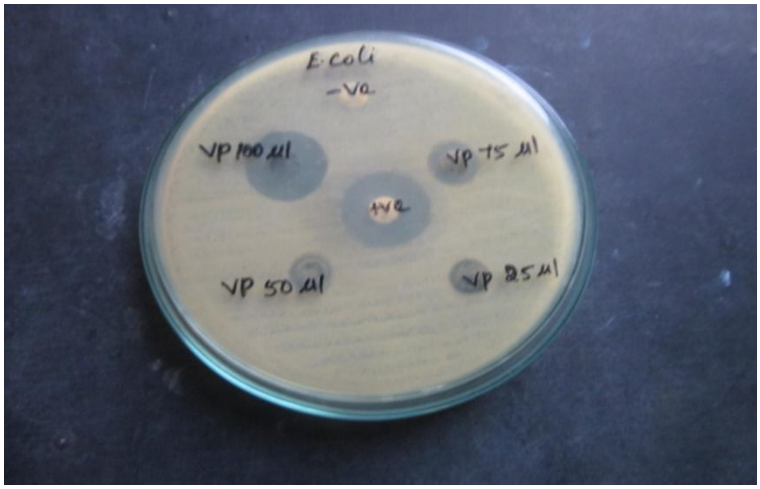

Penicillium sp
-ve
+ve
VP 100µl
VP 75µl
VP 50µl
VP 25µl


Proteus Vulgaris
-ve
VP 100µl
VP 75µl
+ve
VP 25µl
VP 50µl


Klebsiella Pneumoniae
-ve
VP100µl
VP 75µl
+ve
VP 50µl
VP 25µl


Aspergillus flavus
-ve
VP100µl
VP 75µl
+ve
VP 50µl
VP 25µl


Bacillus Subtilis
-ve
VP100µl
+ve
VP 75µl
VP 50µl
VP 25µl



RESULTS AND DISCUSSION

ANTIBACTERIAL RESULT

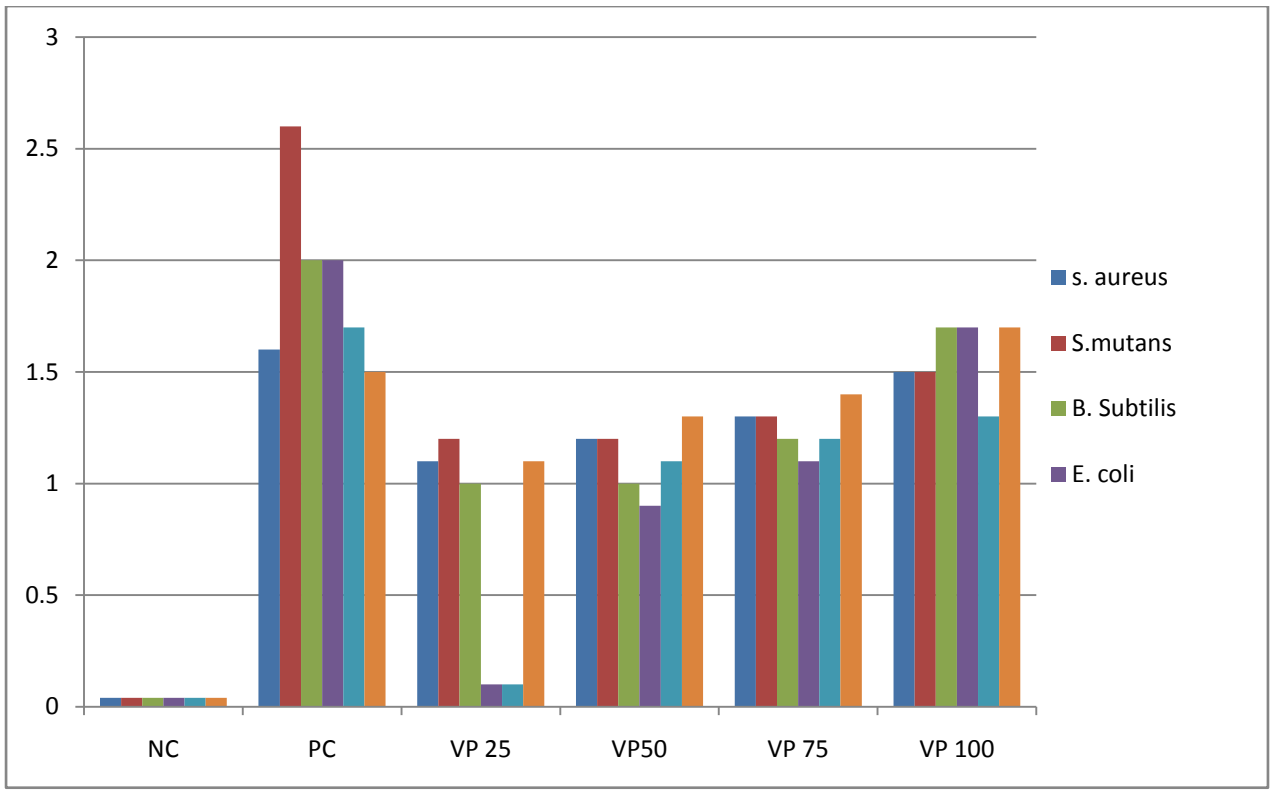
Sample code	Bacterial Strains Name					
	Staphylococcus aureus [G +]	Streptococcus mutans [G +]	Bacillus subtilis [G +]	Escherichia coli [G -]	Klebsiella pneumonia [G -]	Proteus vulgaris [G -]
VP 100	15	15	17	17	13	17
VP 75	13	13	12	11	12	14

VP 50	12	12	10	9	11	13
VP 25	11	12	10	-	-	11
PC (Streptomycin)	16	26	20	20	17	15
NC	-	-	-	-	-	-

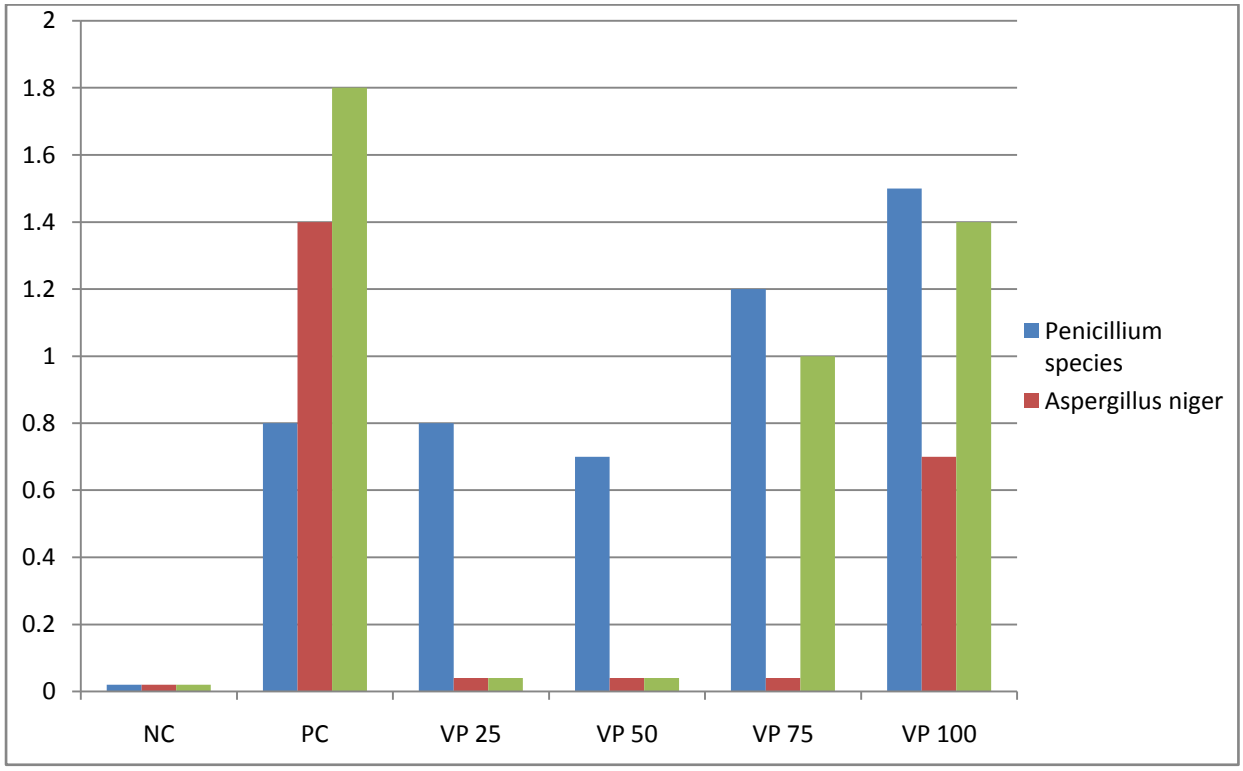
ANTI FUNGAL RESULT

Sample code	Fungi strains name		
	Pencillium species	Aspergillus niger	Aspergillus flavus
VP 100	15	7	14
VP 75	12	-	10
VP 50	7	-	-
VP 25	8	-	-
PC (Clotrimazole)	8	14	18
NC	-	-	-

ANTI-BACTERIAL RESULTS



ANTI FUNGAL RESULTS



CONCLUSION

Proteus vulgaris, a gram negative bacteria is more sensitive to the trial drug. Bacteria such as Staphylococcus aureus (G+), Streptococcus mutans (G+), Bacillus subtilis (G+), Escherichia coli (G-), Klebsiella pneumonia (G-) are sensitive to the trial drug. And also sensitive to the fungal strains such as Pencillium species, Aspergillus niger, Aspergillus flavus. This shows that the trial drug not only has Anti- bacterial activity but also has Anti-fungal activity.

Thus, the trial drug may be recommended for the management of several diseases such as Otomycosis, Urinary Tract Infections, Diarrhoea, Keratitis etc., as the above mentioned micro organisms plays a major role in infectious diseases. This is an initial work and further extensive studies are to be done in future.

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