INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN CHEMISTRY AND PHARMACEUTICAL SCIENCES

(p-ISSN: 2348-5213: e-ISSN: 2348-5221)

www.ijcrcps.com

DOI: 10.22192/ijcrcps Coden: IJCROO(USA) Volume 5, Issue 3 - 2018

Research Article

DOI: http://dx.doi.org/10.22192/ijcrcps.2018.05.03.004

Evaluation of Anti bacterial Activity of Herbal formulation- Aarkathi chooranam

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Abstract

The Emergence of new infectious diseases, the resurgence of several infections that appeared to have been controlled and the increase in bacterial resistance have created the necessity for studies directed towards the development of new antimicrobials. In recent times, the search for potent antimicrobial agents has been shifted towards herbals. The anti microbial efficacy value attributed to some medicinal herbals is beyond belief. In Developing countries like India, Children with ENT infections are often due to bacteria .Therefore, there is a need to develop alternative antimicrobial drugs for the treatment of infectious diseases . As a result medicinal herbals are still recognised as the bedrock for the Modern medicine to treat infectious diseases. In this study, an attempt has been made to highlight the in depth scientific value and antimicrobial sensitivity testing of the Siddha herbal formulation Aarkathi chooranam against Ear, Nose, Throat infections ,to ensure quality health .

Keywords: Siddha, Ear-Nose-Throat infections, Antimicrobial sensitivity testing

Introduction

A tremendous interest exists in global herbals and herbal based medicine is rapidly increasing the scientific value. Till now, the concept of herbal combination is appreciated with its superior efficacy and lesser side effects in comparison with either single isolated constituents of herbal .As per WHO, about 80% of world population use medicinal plants to treat human diseases (1).Because of available antimicrobials failure to treat infectious diseases, many researchers have focused on the investigation of natural herbals.

Objective

The objective of the present study was to evaluate the antibacterial activity of the aqueous extract of test drug by using Disc diffusion assay. The zones of inhibition was represented by table and graph.

Materials and Methods

Test drug in powder form

The ingredient was collected, identified, purified as per the Siddha Materia Medical procedures and made into fine powder.

Table: Information about the ingredient of test drug

S no	Botanical name	Vernacular name	Family	Part used	Chemical constituents	Uses
01	*Piper longum*	Thippili	Piperaceae	Dried fruit	Piperine,volatile oil,carypphulline,piperine piplartine, sesquiterpene, methyl- 3,4,5 trimethoxy cinnamate, dimethylene dioxybenzene	Cough, bronchial asthma, ear-nose-throat infections, eye diseases
02	*Justicia adatoda*	Adatoda	Acanthaceae	Leaf	Vasicine, adhatodic acid, volatile oil	Cough, bronchial asthma, tuberculosis

Uses: Management of Ear, Nose, Throat infections (6)

In vitro Anti-microbial activity:

The aqueous extract of test drug was subjected to Anti-microbial sensitivity testing using Disc Diffusion Method at Malar Micro Labs, Palayamkottai. Out of organisms tested, the Siddha drug was sensitive against *Staphylococcus aureus* and *Streptococcus pneumoniae.*

The zone of inhibition given below.

Solvent : Distilled water
Method : Kirby Bauer
Medium : Prepared plates of

Muller Hinton Agar (M173)

Preparation of plates Muller Hinton Agar (M173):

Components of Muller Hinton Agar (M173) medium

Beef extract - 300 gms/lit
Agar - 17 gms/lit
Starch - 1.5 gms/lit
Casein Hydroxylate - 17.5 gms/lit
Distilled water - 1000 ml
pH - 7.6

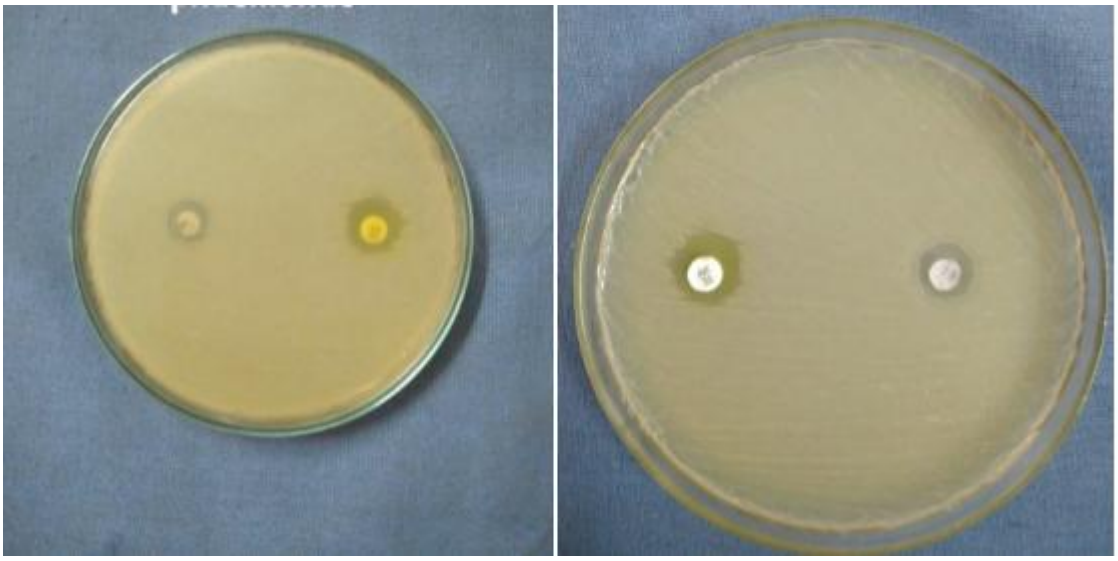
The medium was prepared from the components and poured and dried on a petri dish.The organism was streaked on the medium and the test drug (1 gm drug in 10 ml distilled water) was placed on the medium. This is incubated at 37*c for one over night and observed over night and observed for the suspectibility shown up clearance around the test drug.

Results

The test drug was screened against bacterial strains by using agar disc –diffusion as shown in Table 1 and Figure 1.

Table: 1 Anti-microbial sensitivity testing

S.No	Organisms	Extract(mm)	Positive Control Amikacin(mm)
1	*Streptococcus pneumoniae*	20	24
2	*Staphylococcus aureus*	7	20
3	*E.coli*	--	24



Streptococcus pneumoniae ***Staphylcoccus aureus***

Fig: 1 The Aqueous extract of test drug was screened against bacterial strains by using Muller Hinton Agar (M173) agar disc –diffusion Kirby Bauer Method.

The test siddha drug was sensitive against *Streptococcus pneumoniae* with zone of inhibition 20 mm and moderate sensitive against *Staphylococcus aureus* with zone of inhibition 7 mm.

Discussion

Description about the causative micro organisms:

Micro organisms	Site of invasion	Diseases
Staphylococcus aureus	Naso pharynx, Throat, Para nasal sinuses, Bronchi, Bronchioles, Lung parenchyma	Acute epiglottitis, Ulcerative pharyngitis, Tonsillitis . (7) bronchopneumonia, lung abscess, empyema, rarely pneumonia.(8)
Streptococcus Pneumoniae	Conjunctiva, Eye lids,	Blepharitis, Adult and neonatal
	Cornea, intra ocular contents. otitis externa, lower respiratory tract.	conjunctivitis, corneal ulcers, intra ocular infections, Ear infections, Chronic bronchitits, bronchiectasis, pneumonia (9)

Staphylococcus aureus

Gram positive cocci that occur in grape-like clusters. They are ubiquitous and are the most common cause of localised suppurative lesions in human beings. Pauster (1880) obtained liquid cultures of the cocci from pus and produced abscesses by inoculating them into rabbits. (10)

Morphology

They are spherical cocci,arranged in grape like structure. Cluster formation is due to cell division occurring in three planes, with daughter cells tending to remain in close proximity. They are non motile and non sporing.(11)

Pathogenicity

Staphylococcal infections are among the most common of bacterial infections and range from the trivial to the fatal. Staphylococcal infections are characteristically localised pyogenic lesions, in contrast to the spreading nature of Streptococcal infections. Common

Staphylococcal infections in Respiratory system are Tonsilitis, pharyngitis, sinusitis, otitis, bronchopneumonia, lung abscess, empyema, rarely pneumonia. (12)

Streptococcus pneumoniae

Pneumococcus, a Gram-positive, lanceolated diplococcus, formerly classified as *Diplococcus pneumoniae*, has been reclassified as Streptococcus pneumonia because of its morphology, bile solubility, optochin sensitivity and possession of a specific polysaccharide capsule. Pneumococci are normal inhabitants of the human upper respiratory tract. They are the single most prevalent bacterial agent in pneumonia and in otitis media in children. They can also cause sinusitis, bronchitis, bacteremia and other infections.(13)

Morphology:

Streptococcus pneumonia are typically small ,slightly elongated cocci, with one end broad or rounded and the other pointed, presenting a flame-shaped or lanceolate appearanace. (14)

Pathogenicity:

Streptococcus pneumoniae colonise the human nasopharynx and cause infection of the middle ear, paranasal sinuses and respiratory tract by direct spread. The commonest pneumococcal infections are otitis media and sinusitis. Pneumococci are one of the most common bacteria causing pneumonia, both lobar and broncho pneumonia. They also cause acute tracheobronchitis and empyema. (15)

Description about Positive control Amikacin:

Aminoglycosides are antibiotics with amino sugars joined by glycosidic linkages.They are derived from the soil actinomycetes of the genus Streptomyces and the genus micro-monospora- hence the difference in spelling. Amikacin and netilmicin are newer semisynthetic products.

Antibacterial-spectrum: Aminoglycosides have a narrow spectrum and are effective mainly against aerobic organisms .(16)

Uses: Aminoglycosides are used in the treatment of infections due to bacteria. Aminoglycosides are also used in Streptococcal infections. (17)

Amikacin a semi synthetic derivative of kanamycin, has widest antibacterial spectrum among aminoglycosides because it is resistant to aminoglycoside inactivating enzymes.(18)

Test drug, Aarkathi chooranam was sensitive against Staphylococcus aureus and Streptococcus pneumoniae,thus it is proved as a antimicrobial drug in management of Ear, Nose, Throat infections. Thus,Siddhar's literature (19) evidence in "Siddha materia medica" becomes true to this scientific world.

Conclusion

We conducted a *in vitro* study of antibacterial activity of Aqueous extract of Siddha drug .Thus, herbal drug proves to play a vital role in management of ENT infections and considered to be a heart of the new antimicrobial siddha drug discovery . Apart from their theoretical knowledge, our Ancestor have acquired great experience through their forefathers and palm leaf manuscripts. It is the duty of the Graduates of Siddha medicine to bring out these experiences, evaluate them and document them. We have taken a small initiative towards this step. We hope to extend the search for finding and documenting such good medicine with scientific sensitivity for overcoming various health problems.

Acknowledgments

The Authors wish to thank to The vice Chancellor, The Tamilnadu Dr.M.G.R Medical University, Guindy, Chennai and to Indian Medicine and Homoeopathy Department Arumbakkam Chennai, and Specially Thank to the Principal Govt Siddha Medical College Palayamkottai, Tamilnadu, India

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Access this Article in Online	
	Website: www.ijcrcps.com
Quick Response Code	Subject: Siddha Medicine
DOI: 10.22192/ijcrcps.2018.05.03.004	

How to cite this article:
Vaniswari D.S, Kiruthiga Devi S, Soundararajan D.K. (2018). Evaluation of Anti bacterial Activity of Herbal formulation- Aarkathi chooranam. Int. J. Curr. Res. Chem. Pharm. Sci. 5(3): 16—20
DOI: http://dx.doi.org/10.22192/ijcrcps.2018.05.03.004