ISSN 0974-3618 (Print) www.rjptonline.org
0974-360X (Online)

RESEARCH ARTICLE

Screening of Antimicrobial activity of Siddhar Agathiyar's Polyherbal preparation

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ABSTRACT:
Introduction: Siddha system of medicine is one of the ancient traditional system of medicines, which was originated by Siddhars.Siddha practitioners successfully handle thirty-two internal as well as external form of medicines. Chooranam is one of the internal medicines in powder form. *Kabasura Chooranam* is a Siddha poly herbal formulation, taken from Agasthiyar Vaidhya Deva Ragasiyam - 4th part, which has been indicated for respiratory ailments. It contains equal proportions of herbal drugs such as Thippili (*Pipper longum*), Kadukkai (*Terminalia chebula*), Nelli Vatral (*Phyllanthus emblicus*) and Thandrikkai (*Terminalia bellerica*). **Aim:** The aim of this study was to evaluate the antibacterial activity of Kabasura Chooranam against various microorganisms such as *Streptococcus, Staphylococcus, Psuedomonus, Escherichia coli* and *Proteus.* **Methods:** The medicine was tested for antimicrobial activity using Muller Hinton agar (MHA) media by disc diffusion method. **Result:** The study revealed that the test drug has significant inhibiting activity against *Streptococcus*, *Staphylococcus* and *Escherichia coli*. The individual ingredients of Kabasura chooranam contains the following active principles like piperine, myrobalan, chebuinic acid, chebulagic acid, gallic acid, phenolic compounds, saponins, ascorpic acid, antraquinone glycoside, arjungenin and many other compounds which are responsible for its antimicrobial activity. **Conclusion:** The pharmacological activity of these plants could be a possible scientific source to obtain effective herbal medicines with antimicrobial potential to treat various infectious diseases.

KEYWORDS: *Kabasura Chooranam*, Herbal drug, Siddhar Agathiyar, Phytochemicals, Antimicrobial activity.

INTRODUCTION:
Infectious diseases that are caused by a variety of microorganisms have become increasing worldwide. Besides the conventional causative microbes of infectious diseases, drug resistant microbes have emerged at a high level. Hence alternate medicines are being identified from plants and their bioactive compounds for their varied pharmacological properties[1]. In particular, respiratory diseases like COVID-19 are the major global health issue nowadays with increasing morbidity and mortality.

Received on 21.06.2021 Modified on 17.03.2022
Accepted on 10.12.2022
Research J. Pharm. and Tech 2023; 16(5):2441-2444.
DOI: 10.52711/0974-360X.2023.00402

Though we have acquired tremendous progress in understanding the basic pathology of respiratory ailments and enhanced the clinical supervision of patients, respiratory ailments are one among the increasing public health problems. To overturn this trend, we need to understand about the disease and formulate different new ways of treatment methods. At present, there are no medications to stop the damage once it has begun or to restore respiratory function. Lung tissue rejuvenation offers a new method to inadequate solutions for end-stage lung diseases and this requires innovative approaches to "rejuvenate" the lung[2]. Scientific research about the role of the lung microbiome along with other components of the respiratory tract in healthy and diseased patients may lead to new ways of approach concerning respiratory diseases. It leads to the development of new therapeutic targets and better preventive strategies. Several significant respiratory ailments contain upper and lower respiratory tract infection causing bronchitis, common cold, cough, tuberculosis, pneumonia, and whooping cough[3,4].

Antibiotics are unquestionably one of the most important therapeutic discoveries of the 20th century that has efficiency against serious bacterial infections. However, certain percentage of the infectious diseases known has not been treated from these synthetic components. This is because of the development of resistant strains of the pathogen due to continual and misuse of antibiotics[3]. One of the scientific methods to decrease the resistance to antibiotics is by using antibiotic resistance inhibitors from plant products. Plants are able to produce a variety of active principles to protect themselves against a variety of microbes. It is expected that plant extracts showing target sites other than those used by antibiotics, will be active against drug-resistant microbes[4]. Plant extracts are expected to provide a healthy well being for about 80% of the world's population and it has also been estimated that about 60 to 85% of every country's population rely on their traditional systems of medicine[5].

Traditional systems of Medicine not only acts as therapeutic agents, but also helps in the prevention of infectious diseases and also acts as immune boosters with immunomodulatory effects[6]. Indian Medicinal plants has a plethora of pharmacologically active phytochemical compounds in them. Medicinal herbs have been used as traditional cures for various human ailments for thousands of years and in many parts of the world. The phytochemical analysis of these compounds aids in the drug discovery for many kind of illnesses [7]. Bioactive compounds like alkaloids, quinines, flavones, tannins and terpenoids accounts to the antimicrobial activity of these medicinal plants [8]. It is noteworthy to mention that the World Health Organization (WHO) stated that 80% of the worldwide population is nutritionally dependent upon herbs as a remedy for major health problems. In addition, about 11% of vital drugs are originated from plants as phyto therapeutic agents [9]. Herbal treatment methods for respiratory disorders are in common practice in many parts of the world. Siddha medical experts handle a lot of medicinal preparations for a variety of respiratory diseases. In this research, we attempt to provide scientific evidence for *Kabasura Chooranam* (KC), especially for its antimicrobial and phytochemical properties. The phytochemical components of the drug are responsible for its pharmacological validity.

Table 1: Ingredients of KC, phytochemicals and pharmacological property

S. No	Ingredient	Active phytochemicals	Pharmacological property
1.	*Pipper longum*	Piperine, piplartine, sesamin, piplasterol, pipelonguminin, steroids, glycosides[10,11]	Traditionally used for diseases of the respiratory tract (expectorant) and as an analgesic and counterirritant for musculo - skeletal pain and inflammation. Considered to be a blood "cleanser." Improves circulation, digestion, and immune function. Increases secretory immunoglobulin A (IgA), cholagogue for gallbladder disease[10].
2.	*Terminalia chebula* Retz.	Rich in Myrobalan tannins and a plant sterol, beta-sitosterol, Chebuinic acid, chebulagic acid, chebulic acid, corilagin, ethyl gallate, terflavin B, ellagic acid, arjungenin[12,13].	Antiviral, anti yeast, antihistaminic, anti- inflammatory, laxative, and antibacterial activities (*E. coli, Salmonella typhi, Salmonella paratyphi* A, B, and C, *Cholera*, *Shigella*, *Klebsiella* and *Pseudomonas*) Balances the Thiri Dosha [13].
3.	*Phyllanthus emblicus*	It contains tannins, flavonoids, phenolic compounds, saponins, terpenoids, ascorbic acid, carbohydrates and many other compounds. gallic acid 1.32%, gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12% and moisture 3.83% [14,15]	It has Antibacterial, Antifungal, Antioxidant, Antidepressant, Immunomodulatory, anti-inflammatory, Hypo lipidemic, Anti-diabetic, Anti hypoglycemic, Anti-cancer, Anti-proliferative and Hepato - protective activity [14].
4.	*Terminalia bellerica*	Termilignan,thannilignan,7-hydroxy-3',4' flavones, anolignan B 5, gallic acid, ellagic acid, ß-sitosterol , anolignan B Flavonoids, 2, 3, 7, 8 -Tetrao xy-chro meno (5,4,3-cde) chro mene-5,10-dione, antraquinone glycoside, saponins, polysaccharides, Tannin , Arjungenin, belleric acid, bellericoside, cannogenol 3-O-d galactopyranosyl - (1g4)-O-l-rhamnopyranoside, sitosterol, ethyl gallate, chebulagic acid, galloyl glucose, mannitol, glucose, galactose, fructose and rhamnose , ellagic acid , Gallo-tannic acid and glycoside bellericanin [16].	It has Anticancer, Antidepressant, Angiogenesis, Anti urolithiatic, laxative, astringent, anthelmintic, hair tonic and antipyretic activity. It is also useful in hepatitis, bronchitis, asthma, dyspepsia, piles, diarrhea, cough, hoarseness of voice, eye diseases and scorpion-sting [16].

MATERIALS AND METHODS:

Preparation of *Kabasura Chooranam (KC):*

It contains equal proportion of drugs such as *Pipper longum*, *Terminalia chebula*, *Phyllanthus emblicus* and *Terminalia bellerica*. The herbal drugs were collected from local vendor. All drugs were purified according to the traditional method. Each drug was made into fine powder, sieved and was mixed together in equal proportion. The *Chooranam* was kept safely in an air tight container for further investigation[17].

Preparation of extract:

To 1gm of *Kabasura Chooranam*, 10ml of water was added and kept in a boiling water bath for 20 minutes and then filtered. The crude extract was used for the antimicrobial analysis.

Determination of Antimicrobial activity:

Preparation of the medium:

The anti - microbial (bacterial) activity of KC was analyzed using Muller Hinton agar (MHA) medium by agar disc diffusion method. The Media was prepared by using the following components.

Table 3: Media components

S. No	Components	Quantity
1	Beef extract	300gms/lit
2	Starch	1.50 gms/lit
3	Casein Hydroxylate	7.50gms/lit
4	Agar	17 gms/lit
5	Distilled Water	1000ml
6	pH	7.6.

Procedure:

The media was prepared from the above components and poured onto a petri dish. The organism was streaked on the medium and the discs impregnated with the extract of the test drug were placed on the medium. This is incubated at 37^0 C overnight and observed for the susceptibility which was shown by a zone of clearance around the drug. The diameter of the inhibition zones was measured in millimeter [18, 19]. This analysis was carried out in Malar Micro Diagnostic centre, Tirunelveli, Tamil Nadu, India.

RESULTS AND DISCUSSION:

The study revealed that the extract of test drug had significant inhibiting activity against *Streptococcus* (10mm), *Staphylococcus* (15 mm) and *Escherichia coli* (14 mm). It is illustrated in Table 3 and Figure 1.

Table 3: Antimicrobial activity of *Kabasura Chooranam*

S. No.	Organism	Susceptibility	Zone of inhibition in (mm)
1	*Staphylococcus*	Sensitive	15
2	*Pseudomonas*	Resistant	-
3	*Streptococcus*	Moderately sensitive	10
4	*Escherichia coli*	Sensitive	14
5	*Proteus*	Resistant	-

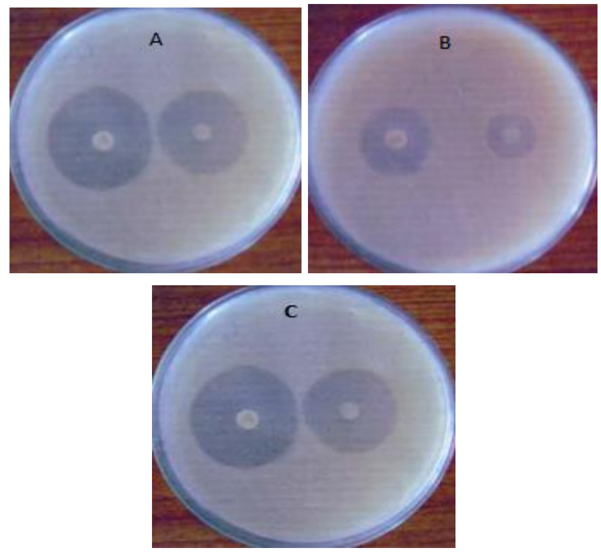

Figure 1. Zone of antibacterial inhibition of KC against *Staphylococcus* (A), Streptococcus (B) and *Escherichia coli* (C).

Antibiotic resistance has increased extensively in recent years and is posing an ever-increasing curative problem [20]. The search for antimicrobials from natural sources is of much importance. Many such efforts have been made to identify the actual active principles that can act as suitable antimicrobial agents to replace synthetic medicines. Phytochemicals derived from plant products in fact serve as a prototype to develop less toxic and more effective medicines to control the growth of microorganism[21,22]. These compounds have more significant therapeutic applications against human pathogens including bacteria, fungi and virus. Several scientific studies have been conducted with the extracts of various plants, screening for their antimicrobial activity as well as for the discovery of new antimicrobial compounds[23,24].

Therefore, medicinal plants are finding their way into the modern scientific world in the form of medicines and food Supplements. In the present investigation, *Kabasura Chooranam* (KC) was evaluated for exploring its antimicrobial activity against certain Gram negative and Gram positive bacteria which were regarded as pathogenic microorganisms to humans. The individual constituents of *Kabasura Chooranam* contains the following active phytochmicals like piperine, myrobalan, chebuinic acid, chebulagic acid, gallic acid, phenolic compounds, saponins, termilignan, antraquinone glycoside, arjungenin, anolignan B, belleric acid, ascorpic acid, and many other compounds which are responsible for its antimicrobial activity. The antimicrobial analysis using the agar disc diffusion method has been used by many scientific investigators.

CONCLUSION:

Kabasura Chooranam possesses significant inhibitory effect against the tested pathogens. It is inferred from the present investigation; the herbal ingredients of the preparation contain potential antimicrobial components that may be of great use for the development of pharmaceutical industries as a therapy against various diseases. Further preclinical and clinical research will be updated.

CONFLICT OF INTEREST STATEMENT:

The authors declare that there is no conflict of interest to disclose.

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