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Research Article

A STUDY OF ANTI MICROBIAL ACTIVITY OF *PANCHVALKAL KWATH*

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ABSTRACT

Panchvalkal is a combination of five astringent plants, these are *Vata, Peepal, Udumbara*, *Parisha, Plaksha*. Individual and combinations of drugs have *Kashaya* rasa (astringent) dominant and useful in the management of *Vrana* (Wounds) as well as *Shotha* (Inflammations). *Panchvalakal* is used in different forms, for instance, *Kwath*, ointment, and powder. Its formulation can prepare in oil for future prospective to add more medicinal value and improve its shelf life without any chemical preservative. The purpose of this study was to demonstrate the scientific proof of old literature and further evaluate the wound healing property of water extract of *Panchvalkal* and blend with *Amaltas* (*Cassia fistula*) and *Neem* (*Azadirachta indica*). Disc diffusion was adopted to assess antimicrobial activity against the range of standard antimicrobial agents. The results were promising that *E.coli, S.aureus, P.areuginosa* are sensitive to *Panchvalkal kwath*. This herbal medicine is able to prevent vaginitis and also cure it without any side effects. Aqueous extract of *Panchvalkal* by soxhlet method showed significant results against E.coli and S.aureus with an inhibition value of 22 mm and 20 mm in diameter respectively. The results were compared with results obtained from reference (standard) antibiotics, Ciprofloxacin (5mcg/disc), Ceftriaxone (30mcg/disc), and Streptomycin (10mcg/disc) that served as the reference for inhibition zone diameter.

INTRODUCTION

Panchavalkal is one of the ideal combinations of herbs and their therapeutics available in Ayurveda. All five herbs are astringent (cause contraction in soft tissue) in nature. Researchers in recent and past evaluated anthelmintic, antimicrobial, Diabetic wound healing etc. activities of these plants in combination and individual too [2]. Microorganisms are developing resistance against many antibiotics due to the unsystematic use of antimicrobial drugs. Furthermore, antibiotics are sometimes associated with side effects [9]. *Panchvalkal* is one of the choice of the drug as a broad-spectrum antibiotic, and have wound healing properties. *Panchavalkala*, a combination of five strong drugs called, *Vata* (*Ficus bengaenesis*), *Udumbara* (*Ficus glomerata*.), *Ashvatha* (*Ficus religiosa*), *Parisha* (*Thespesia populanea*), *Plaksha* (*Ficus lacor*), is one of the great combinations. It shows properties like antiseptic, anti-inflammatory, immune-modulatory, antioxidant, antibacterial, antimicrobial wound purifying and healing, and astringent properties[6].

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MATERIALS AND METHODS

Collection of Sample

Barks of *Panchavalkala* were procured from Pharmacy, near National Institute of Ayurveda, Jaipur. A coarse *Panchvalkal* powder was prepared and used for decoction preparation.

Preparation of Decoction

For the preparation of decoction, soxhlet apparatus was used to water extract of *Panchvalkal kwath*. 10gm coarse powder of *Panchvalkal* is placed in a porous bag or thimble made from cellulose, which is placed in a thimble chamber (Fig. 1).

100 ml distilled water was taken as a solvent in a round bottom flask. Extraction solvent was heated by heating mental for 7 hours. The next day it was heated with continuous stirring and the volume was reduced to 1/4th of the original volume.

Micro organisms

Antibacterial activity of the sample was encountered with the below mentioned specified organisms:

1. *Escherichia coli* (gram-negative)
2. *Staphylococcus aureus* (gram-positive)
3. *Pseudomonas areuginosa* (gram-negative)

Culture Medium

Mueller Hinton Agar Composition: Beef infusion (300g/lit), Casein acid hydrolysate (17.5g/lit), Starch (1.5g/lit) and Agar (17g/lit). The final pH at 25℃was maintained at 7.3±0.1.

Culture conditions

24 hours old cultures of all these organisms were inoculated in sterile broths and incubated at 37℃

Anti Microbial Assay

Sterile Mueller Hinton Agar Media was used for the antimicrobial susceptibility test. 20 ml sterile medium was poured aseptically into sterile plates and allowed to solidify. Then 0.5 ml of culture was inoculated by sterile micropipette on the center of solidified agar plates and spread by L-shape spreader aseptically. After solidification of the medium, wells were made by the puncture of the gel with the help of a Sterile 10 ml syringe and 0.3 ml of plant extract was inoculated. Three different groups of standard antibiotic discs (HiMedia) were directly placed on the Mueller Hinton agar surface and pressed with the help of sterile forceps aseptically. For proper diffusion, plates were placed in the refrigerator for 20-25 minutes. Then plates were incubated at 37℃ for 24 hours. After 24 hours of microbial growth, zone of inhibition was measured with Himedia zone scale. Streptomycin (10mcg/disc), Ciprofloxacin (5mcg/ disc), and Ceftriaxone (30mcg/disc) standard discs were used as reference antibiotics.

RESULTS AND DISCUSSION

Antibacterial sensitivity was performed for sample *Panchavalkal* on Mueller Hinton against *E. coli, S. aureus,* and *P.areuginosa* by well diffusion method; Following were the results obtained using streptomycin (10mcg), ciprofloxacin (5mcg), ceftriaxone (30mcg) as positive control.

FIGURES

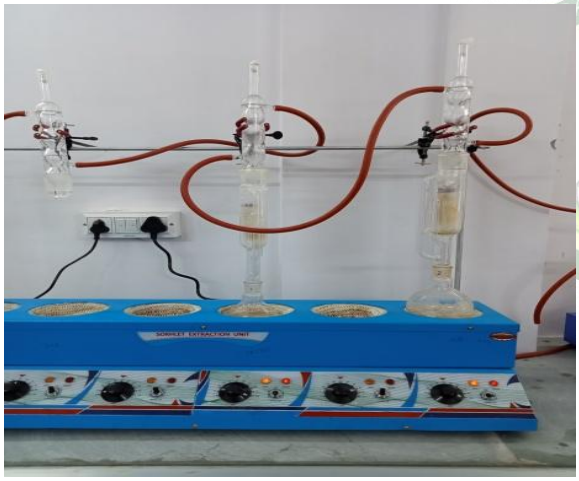

Fig.1: Soxhlet apparatus

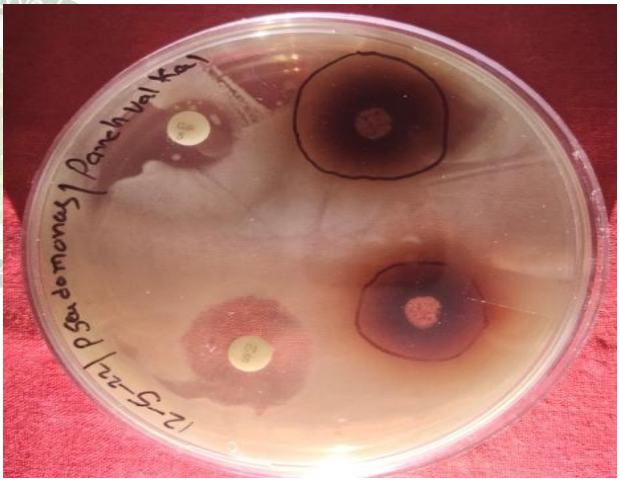

Fig. 2: *Panchvalakal* showing 16 mm ZOI against P.areuginosa

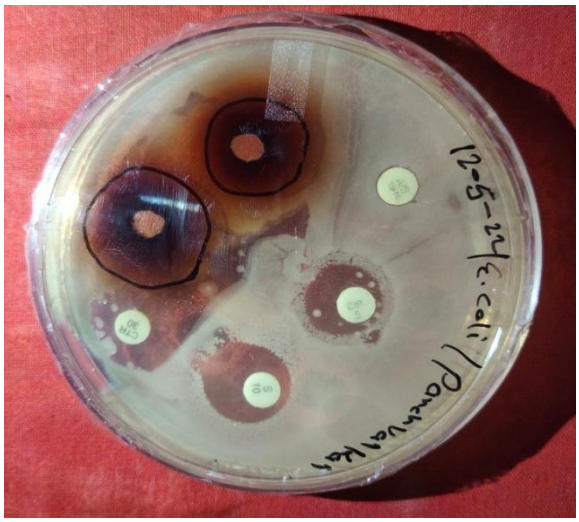

Fig. 3: *Panchvalkal* Showing 22 mm ZOI against *E.coli*

Fig. 4: *Panchvalkal* showing ZOI 20 mm against S.aureus

Table 1: In-vitro activity of water extract of *Panchvalkal kwath* against *P.areuginosa, S.aureus, E.coli*

Name of the Organism	Streptomycin (10mcg/disc)	Ceftriaxone (30mcg/disc)	Ciprofloxacin (5mcg/disc)	Sample
P. areuginosa	22 mm	22 mm	15 mm	16 mm
E.coli	20 mm	18 mm	19mm	22 mm
S.aureus	21 mm	23 mm	13mm	20 mm

Result Interpretation:

If mean value of the zone of inhibition is <13 then it is considered as Inactive.

Mean value of the zone of inhibition is 13-18 then it is considered as Bioactive.

Mean value of the zone of inhibition is >18 then it is considered as Highly Active. (Sakhitha et al, 2013)

Results revealed that *Panchvalkal* water extract showed great antibacterial activity on both gram-negative and gram-positive bacteria. Zone of inhibition reaches 16 mm against *Pseudomonas areuginosa* and this activity is similar to the Ciprofloxacin (Fig. 2), 22 mm against E.coli which shows this more active than all taken antibiotics(Fig. 3), 20 mm against *S.aureus* and it shows high antimicrobial activity against *S.aureus* (Fig. 4).

CONCLUSION

Many of the existing traditional antibiotics cause drug resistance and various side effects, therefore plant-based drugs will encounter a new approach of treatment. In this experiment *Panchvalkal kwath* is a classical formulation of Ayurvedic medicine and this experiment demonstrates that water extract of *Panchvalkal kwath* has high antimicrobial activity. The idea is, Iodine in Betadine (Povidone Iodine) causes hypersensitivity in many patients, so it can be replaced by decoction of *Panchvalkal*, Because of cost-effective and due to herbal formulation no side effects were observed. E.coli is a leading opportunistic pathogen in females, it causes inflammation and other vaginal infections so as per the in vitro study this extract might use as a preventive and cure medicine.

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