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ANTIMICROBIAL ACTIVITY OF CERTAIN INDIGENOUS DRUGS IN PELVIC INFECTION

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ABSTRACT

Pelvic infections are a common and recurring health problem in women, and antibiotic treatment provides only temporary relief and can lead to antibiotic resistance. Traditional systems of medicine, such as Ayurveda, have recognized the antimicrobial properties of several herbs and plant-based medicines. This study aimed to evaluate the antimicrobial activity of three indigenous drugs used in Ayurvedic medicine, Triphala, Guduchi, and Danthi, against five different strains of microbes associated with pelvic infections. The results showed that Triphala kashaya (a mixture of Amalaki, Vibhitaki, and Haritaki) exhibited significant in vitro antibacterial and antifungal activity against the tested strains. These findings suggest that traditional medicines may provide effective and sustainable treatments for pelvic infections.

Key words: Pelvic infections, Ayurveda, Traditional medicine, Antimicrobial activity, Triphala, Guduchi, Danthi.

Introduction:

Pelvic infections, particularly those affecting the genital tract of women, are a common and recurring health problem. Several factors, such as menstruation, sexual intercourse, and childbirth, increase the susceptibility of women to these infections. Antibiotic treatment is often used to manage these infections, but it provides only temporary relief and can lead to the development of antibiotic resistance.

In contrast, traditional systems of medicine, such as Ayurveda, have long recognized the antimicrobial properties of several herbs and plant-based medicines. Ayurveda is a holistic system of medicine that originated in India thousands of years ago and is based on natural principles and practices. Ayurvedic texts describe the use of various herbs and formulations for treating infections of the pelvic region, which have been used for centuries to alleviate symptoms and promote healing.

The growing concern over antibiotic resistance and the need for more effective and sustainable treatments have led to an increased interest in exploring the potential of traditional medicines for managing infections. Research studies have reported the antimicrobial activity of several indigenous drugs used in Ayurvedic medicine for the treatment of pelvic infections. For example, studies have shown that extracts from plants such as Neem (Azadirachta indica), Tulsi (Ocimum sanctum), and Amla (Emblica officinalis) possess significant antimicrobial properties against a range of bacterial and fungal strains that commonly cause pelvic infections.

Given the potential benefits of traditional medicines, there is a need for more systematic and rigorous evaluation of their efficacy and safety in managing pelvic infections. This study aims to contribute to this effort by investigating the antimicrobial activity of selected indigenous drugs used in Ayurvedic medicine for treating pelvic infections. The findings of this study could provide important insights into the potential of traditional medicines for managing infections and could have significant implications for the development of effective and sustainable treatments for this important health problem.

Objective:

To evaluate the antimicrobial activity of Triphala, Guduchi and Danthi in 5 different strains of microbes in pelvic infections.

Methodology:

Different types of microbial strains associated with Pelvic Inflammatory Diseases were procured from MTCC, Chandigarh. The strains were sub cultured at standard laboratory conditions. The different strains were grown in suitable growth medium on petridishes. The cork borer used to make equal distance well on medium. Different concentrations / volume of test drug were added to different wells. Suitable antibiotic and solvent system was used for standard internal control respectively. The petridishes were incubated at standard temperature at incubator for 1 to 7 days to check the activity. The sensitivity was measured and compared to standard.

The antimicrobial activity of the drug would prove to help to cure the antibiotic resistant pelvic infections in the females.

MATERIALS, METHODS, RESULTS AND CONCLUSION

1. Antibacterial study:

Particulars of sample submitted:

Test requested by: Ms. Ayudha A Kembhavi

3rd Year BAMS, SDMCAU, RGUHS Funded project.

Test to be performed: Antibacterial activity

Sample name: Danti, Guduchi and Triphala

Sample Code: 220418

Sample presentation: Kashayas in sealed tubes.

A. Antibacterial study against *Escherichia coli* :

Preparation of Nutrient agar media:

Beef extract (1 g), yeast extract (2 g), peptone (5 g) and Sodium Chloride (5 g) were dissolved in 990 ml of distilled water. The pH was adjusted to 7.2 and the volume was made up to 1000 ml. Finally 15 g agar was added to the media and autoclaved at 121˚C for 20 minutes.

Preparation of the inoculum:

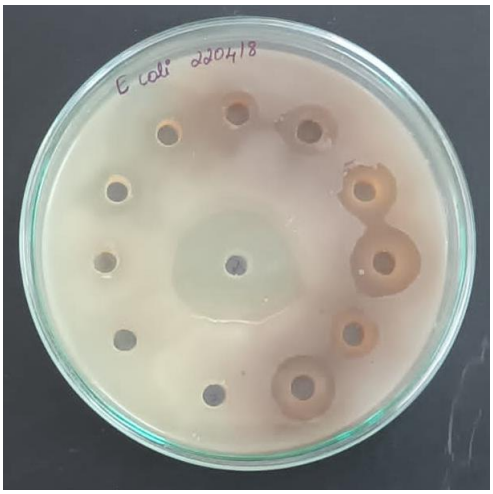
Escherichia coli (MTCC 42) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), IMTECH, Chandigarh. Loopful of 48h old culture from the slants was transferred to sterile saline and mixed well to prepare a homogenous inoculum.

Well diffusion method:

The media was cooled to around 45-55˚C, around 20ml each was poured into sterile petriplates. One ml of the inoculum was immediately added to the plate, swirled for uniform distribution. Wells were bored using a sterile borer. The samples and the antibiotic were dispensed into the wells. Plates were incubated overnight at 37˚C and observed after 48 h.

Table 1: *In vitro* antibacterial activity of Danti, Guduchi and Triphala kashayas against *E. coli*.

Kashaya samples	Volume	Zone of inhibition – (Radius in mm)	
Danti	50 µl	5	5
	100 µl	6	6
Guduchi	50 µl	7	8
	100 µl	7	7
Amalaki	50 µl	12	11
	100 µl	14	13
Vibhitaki	50 µl	11	11
	100 µl	13	13
Haritaki	50 µl	9	9
	100 µl	10	11
Distilled water (DD)	50 µl	0	0
Standard (Ampicillin) 1mg/ml	50 µl	16	16



Conclusion:
Danti, Guduchi and Triphala kashayas (Amalaki, Vibhitaki, Haritaki) showed antibacterial activity at different volumes against different volumes of Amalaki and Vibhitaki showed higher antibacterial activity compared to other tried drugs.

B. Antibacterial study against *Klebsiella pneumonae*:

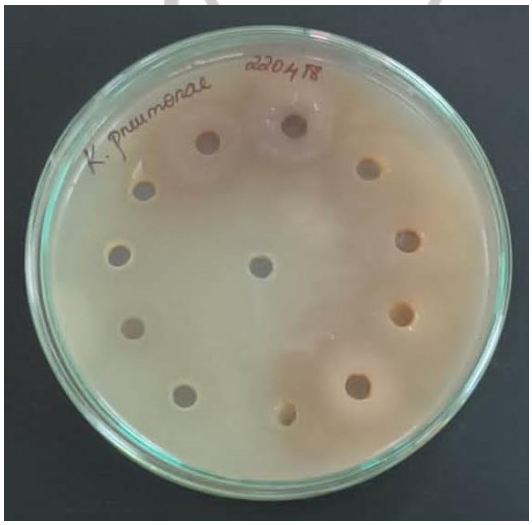
Preparation of Nutrient agar media:
Beef extract (1 g), yeast extract (2 g), peptone (5 g) and Sodium Chloride (5 g) were dissolved in 990 ml of distilled water. The pH was adjusted to 7.2 and the volume was made up to 1000 ml. Finally 15 g agar was added to the media and autoclaved at 121˚C for 20 minutes.

Preparation of the inoculum:
Klebsiella pneumonae (MTCC 7407) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), IMTECH, Chandigarh. Loopful of 24 h old culture from the slants was transferred to sterile saline and mixed well to prepare a homogenous inoculum.

Well diffusion method:
The media was cooled to around 45-55˚C, around 20ml each was poured into sterile petriplates. One ml of the inoculum was immediately added to the plate, swirled for uniform distribution. Wells were bored using a sterile borer. The samples and the antibiotic were dispensed into the wells. Plates were incubated overnight at 35˚C and observed after 24 h.

Table 2: *In vitro* antibacterial activity of Danti, Guduchi and Triphala kashayas against *K. pneumonae.*

Kashaya samples	Volume	Zone of inhibition – (Radius in mm)	
Danti	50 µl	0	0
	100 µl	0	0
Guduchi	50 µl	0	0
	100 µl	0	0
Amalaki	50 µl	6	6
	100 µl	8	9
Vibhitaki	50 µl	9	9
	100 µl	8	8
Haritaki	50 µl	9	8
	100 µl	9	8
Distilled water (DD)	50 µl	0	0
Standard (*Ampicillin* 1mg/ml)	100 µl	8	8



Conclusion: Triphala (Amalaki, Vibhitaki and Haritaki) kashaya showed *in vitro* antibacterial activity against *K. pneumonae.*

C. Antibacterial study against *Pseudomonas aeruginosa*:

Preparation of Nutrient agar media:

Beef extract (1 g), yeast extract (2 g), peptone (5 g) and Sodium Chloride (5 g) were dissolved in 990 ml of distilled water. The pH was adjusted to 7.2 and the volume was made up to 1000 ml. Finally 15 g agar was added to the media and autoclaved at 121˚C for 20 minutes.

Preparation of the inoculum:

Pseudomonas aeruginosa (MTCC8077) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), IMTECH, Chandigarh. Loopful of 24h old culture from the slants was transferred to sterile saline and mixed well to prepare a homogenous inoculum.

Well diffusion method:

The media was cooled to around 45-55˚C, around 20ml each was poured into sterile petriplates. One ml of the inoculum was immediately added to the plate, swirled for uniform distribution. Wells were bored using a sterile borer. The samples and the antibiotic were dispensed into the wells. Plates were incubated overnight at 37˚C and observed after 24h.

Table 3: *In vitro* antibacterial activity of Danti, Guduchi and Triphala kashayas against *P. aeruginosa.*

Kashaya samples	Volume	Zone of inhibition – (Radius in mm)	
Danti	50µl	0	0
	100µl	0	0
Guduchi	50µl	0	0
	100µl	0	0
Amalaki	50µl	10	10
	100µl	12	11
Vibhitaki	50µl	10	09
	100µl	8	8
Haritaki	50µl	7	7
	100µl	8	8
Distilled water (DD)	50µl	0	0
Standard (*Gentamicin* 240 µg)	30 µl	16	17

Conclusion:

Triphala (Amalaki, Vibhitaki and Haritaki) kashayas showed *in vitro* antibacterial activity against *Pseudomonas aeruginosa.*

D. Antibacterial study against *Staphylococcus aureus:*

Preparation of Nutrient agar media:

Beef extract (1 g), yeast extract (2 g), peptone (5 g) and Sodium Chloride (5 g) were dissolved in 990 ml of distilled water. The pH was adjusted to 7.2 and the volume was made up to 1000 ml. Finally 15 g agar was added to the media and autoclaved at 121˚C for 20 minutes.

Preparation of the inoculum:

Staphylococcus aureus (MTCC 3160) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), IMTECH, Chandigarh. Loopful of 24 h old culture from the slants was transferred to sterile saline and mixed well to prepare a homogenous inoculum.

The media was cooled to around 45-55˚C, around 20ml each was poured into sterile petriplates. One ml of the inoculum was immediately added to the plate, swirled for uniform distribution. Wells were bored using a sterile borer. The samples and the antibiotic were dispensed into the wells. Plates were incubated overnight at 37˚C and observed after 24 h.

Well diffusion method:

Table 4: *In vitro* antibacterial activity of Danti, Guduchi and Triphala kashayas against *S. aureus*.

Kashaya samples	Volume	Zone of inhibition – (Radius in mm)	
Danti	50 µl	0	0
	100 µl	0	0
Guduchi	50 µl	0	0
	100 µl	0	0
Amalaki	50 µl	8	8
	100 µl	9	9
Vibhitaki	50 µl	8	9
	100 µl	10	10
Haritaki	50 µl	9	10
	100 µl	11	11
Distilled water (DD)	50 µl	0	0
Standard (*Ampicillin)*1mg/ml	50 µl	12	12

Conclusion: Triphala (Amalaki, Vibhitaki and Haritaki) kashayas showed *in vitro* antibacterial activity against *S. aureus*.

2. Antifungal study against *Candida albicans*:

Particulars of sample submitted:

Test requested by: Ms. Ayudha A Kembhavi

3rd Year BAMS, SDMCAU, RGUHS Funded project.

Test to be performed: Antifungal activity

Sample name: Danti, Guduchi and Triphala

Sample Code: 220418

Sample presentation: Kashayas in sealed tubes.

Preparations of Yeast Extract Dextrose agar media:

Yeast extract (3 g), peptone (10 g) and dextrose (20 g) were dissolved in 990 ml of distilled water. The pH was adjusted to 7.4 and the volume was made up to 1000 ml. Finally 15 g agar was added to the media and autoclaved at 121˚C for 20 minutes.

Preparation of the inoculum:

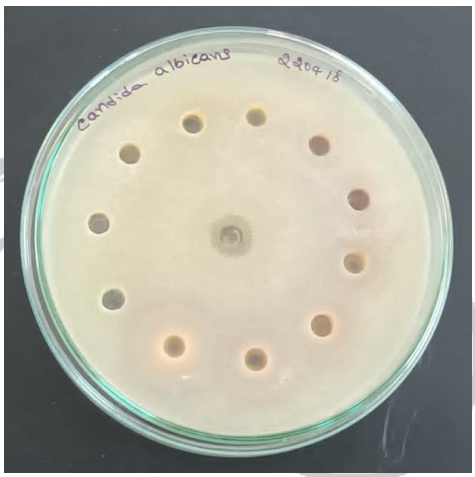
Candida albicans (MTCC 183) was procured from Microbial Type Culture Collection and Gene Bank (MTCC), IMTECH, Chandigarh. Loopful of 48 h old culture from the slants was transferred to sterile saline and mixed well to prepare a homogenous inoculum.

Well diffusion method:

The media was cooled to around 45-55˚C, around 20 ml each was poured into sterile petriplates. One ml of the inoculum was immediately added to the plate, swirled for uniform distribution. Wells were bored using a sterile borer. The samples and the antibiotic were dispensed into the wells. Plates were incubated overnight at 30˚C and observed after 48 h.

Table 5: *In vitro* antifungal activity of Danti, Guduchi and Triphala kashayas against *C. albicans*.

Kashaya samples	Volume	Zone of inhibition – (Radius in mm)	
Danti	50 µl	0	0
	100 µl	0	0
Guduchi	50 µl	0	0
	100 µl	0	0
Amalaki	50 µl	11	11
	100 µl	12	12
Vibhitaki	50 µl	12	12
	100 µl	13	13
Haritaki	50 µl	12	12
	100 µl	14	14
Distilled water (DD)	50 µl	0	0
Standard (Clotrimazole)-1 % w/v	10 µl	9	9



Conclusion: Triphala kashaya (Amalaki, Vibhitaki and Haritaki) showed *in vitro* antifungal activity against *C. albicans*.

Conclusions:

1. Danti, Guduchi and Triphala kashayas (Amalaki, Vibhitaki, Haritaki) showed antibacterial activity at different volumes against different volumes of Amalaki and Vibhitaki showed higher antibacterial activity compared to other tried drugs.
2. Triphala (Amalaki, Vibhitaki and Haritaki) kashaya showed *in vitro* antibacterial activity against *K. pneumonae*.
3. Triphala (Amalaki, Vibhitaki and Haritaki) kashayas showed *in vitro* antibacterial activity against *Pseudomonas aeruginosa*.

4. Triphala (Amalaki, Vibhitaki and Haritaki) kashayas showed *in vitro* antibacterial activity against *S. aureus*.
5. Triphala kashaya (Amalaki, Vibhitaki and Haritaki) showed *in vitro* antifungal activity against *C. albicans*.

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Conflict of Interest:None

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