



In-vitro Antimicrobial analysis of root powder of *Shatavari* (*Asparagus racemosus* Willd.) against common Uropathogens

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Abstract

Shatavari (*Asparagus racemosus* Willd.), belonging to the family *Asparagaceae* is a well renowned drug since the ancient past. In the Ayurvedic classical Compendiums, the drug has been portrayed as a 'rakshoghna dravya' that is, providing protection from microorganism. Moreover the drug has been repeatedly mentioned in the treatment aspects of urinary disorders. Hence an in vitro antimicrobial study has been conducted to analyse the activity of the drug against common pathogens causing urinary infection. The zone of inhibition obtained for *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Enterococcus faecalis*, and *Candida albicans*, using the three concentration of the aqueous extract of *Shatavari moola choorna* (tuberous root powder of *Asparagus racemosus* Willd.) 250µg/mL, 500µg/mL, 1000µg/mL and the standard drugs Streptomycin (10µg) and Clotrimazole (100µg) has been compared. From the result it is evident that the aqueous extract of tuberous roots of *Shatavari* (*Asparagus racemosus* Willd) showed significant zone of inhibition against all the uropathogens and shows almost half the effectiveness at 1000 µg/mL concentration of sample drug, to that of the standard drug.

Keywords: *Shatavari*, urinary infection, uropathogen, zone of inhibition.

Introduction

Shatavari (*Asparagus racemosus* Willd) was considered to be an auspicious herb, right from the ancient past. The word *Shatavari* means that it is covered by hundreds of roots. In samhithas, especially in Caraka Samhita and Susrtasamhita, it is seen that a 'rakshoghna' property has been assigned to the drug. Acharya Susruta explains this as one can defence oneself from an infection or microorganisms by the use of the rakshoghna dravyas just as how animals protects themselves and escapes fast from the oncoming attack of

lion⁽¹⁾. *Shatavari* is a drug that has been repeatedly mentioned in the context of the treatment aspects of urinary disorders.

Urinary infection is the most common disorder affecting the urinary tract. Urinary Tract Infection is the second most common infection after respiratory infection. Each year, approximately 10% of women report having UTI, and more than 50% of all women have at least one such infection in their lifetime⁽²⁾. The causative organism of infection are Gram – negative bacteria such as *Escherichia coli* (80%), *Proteus mirabilis*,

Klebsiella pneumoniae (11%), *Enterobacter Serratia*, *Pseudomonas aeruginosa*.(11%), Gram – positive bacteria such as *Staphylococcus saprophyticus* (10-15%), *Staphylococcus epidermis* (1-5%), *Staphylococcus aureus*(1-5 %), *Enterococcus sp.*(7%), Fungus like *Candida albicans*(9%)(3).

Materials and Method

Plant material: Fresh samples of tuberous root of *Asparagus racemosus* Willd. was collected, washed thoroughly in running water so as to remove soil particles. This was then chopped and dried well in sun and then powdered finely.

Preparation of sample: The aqueous extract of the root powder was taken from the powdered samples and it was taken in three concentrations viz. 250µg/mL, 500µg/mL, 1000µg/mL.

Standard drugs: Streptomycin (10µg) as antibacterial drug and Clotrimazole (100µg) as antifungal drug.

Antibacterial activity

The antibacterial of *Shatavari moola choorna* (tuberous root powder of *Asparagus racemosus* Willd.) was using agar well diffusion method.

Preparation of media: Muller Hinton Agar Medium (1 L).Muller Hinton Agar Medium (MHI Agar Media) in 1000ml of distilled water. The dissolved medium was autoclaved at 15 lbs pressure at 121°C for 15 minutes. The autoclaved medium was mixed well and poured into 100mm petriplates (25-30ml/plate) while still molten.

Test organism: The organism used for the study are-Gram negative bacteria -*E.coli*, *Klebsiella*

pneumonia, *Pseudomonas aeruginosa*, *Proteus* Gram positive bacteria- *Staphylococcus aureus*, *Enterococcus faecalis*.

Method of antibacterial activity: Wells of approximately 10mm was bored using a well cutter and different concentrations of sample such as 250µg/mL, 500µg/mL and 1000µg/mL were added. The plates were then incubated at 37°C for 24 hours. The antibacterial activity was assayed by measuring the diameter of the inhibition zone formed around the well. Streptomycin was used as a positive control.

Antifungal activity

Preparation of media: Potato Dextrose agar plates available commercially was used as the nutrient medium for the growth of fungus.

Test organism: *Candida albicans*.

Method of antifungal activity: Potato Dextrose agar plates were prepared and overnight grown species of fungus *Candida albicans* was swabbed. Wells of approximately 10mm was bored using a well cutter and samples of different concentration was added; the zone of inhibition was measured after overnight incubation at room temperature and compared with that of standard antifungal drug (Clotrimazole; 100µg/mL).

Result

The zone of inhibition obtained for the three concentration of the aqueous extract of the test drug and the standard drug has been summarized in the table 1 and the images of the culture of organism depicting the zone of inhibition is given in figure1.

Table 1 Zone of inhibition of the test drug to standard drug

Organism	Zone of inhibition for Aq.extract of Shatavari in mm			Zone of inhibition for Standard drug in mm
	(250µg/mL)	(500µg/mL)	(1000µg/mL)	
Bacteria				Streptomycin (10µg)
<i>E.coli</i>	NIL	12	15	30
<i>Pseudomonas aeruginosa</i>	NIL	11	15	32
<i>Proteus</i>	NIL	NIL	13	30
<i>Klebsiellapneumoniae</i>	NIL	11	15	20
<i>Staphylococcus aureus</i>	NIL	10	14	31
<i>Enterococcus faecalis</i>	NIL	12	15	20
Fungus				Clotrimazole(100µg/mL).
<i>Candida albicans</i>	NIL	12	16	20

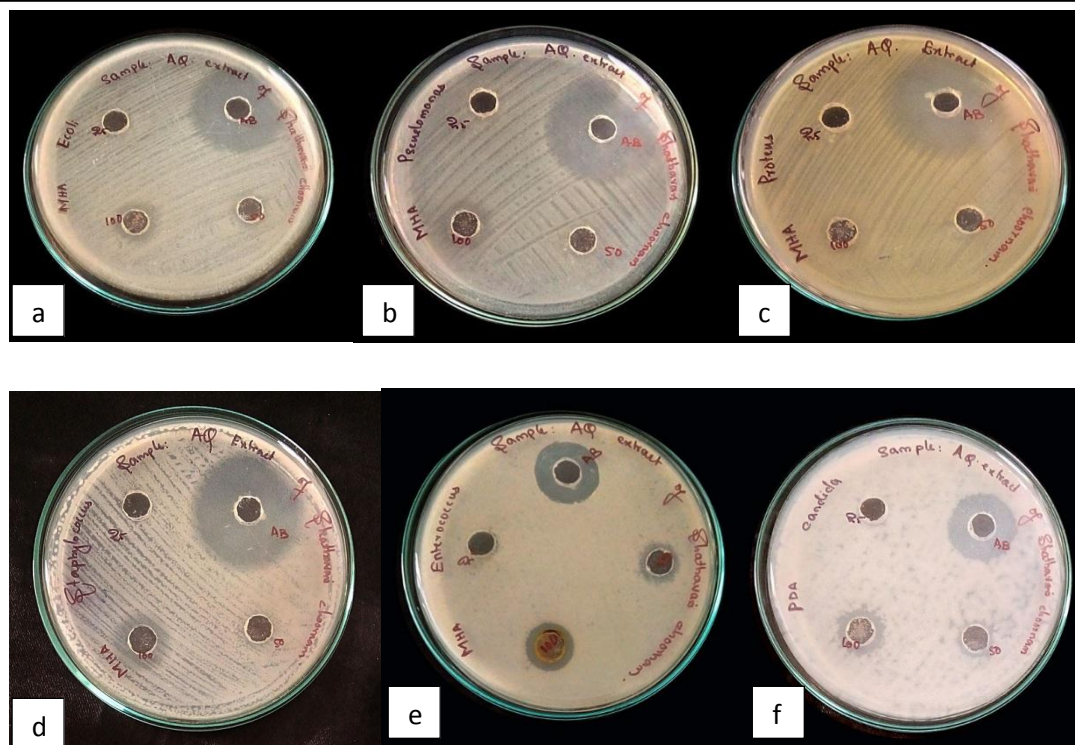


Figure1. Cultures of organism with Zone of inhibition against different concentration
 a. *E.coli* b. *Pseudomonas aeruginosa* c. *Proteus* d. *Staphylococcus aureus*
 e. *Enterococcus faecalis* f. *Candida albicans*

Discussion

In the Antibacterial study, for *Escherichia coli*, the zone of diameter *Shatavari moola choorna* at 1000 μ g/mL is half (15mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 30 mm. For *Pseudomonas aeruginosa*, the zone of diameter of *Shatavari moola choorna* at 1000 μ g/mL is half (15mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 32 mm. In case of *Proteus*, the zone of diameter of *Shatavari moola choorna* at 1000 μ g/mL is almost half (13mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 30 mm. It is absent for the other two concentrations. For *Klebsiella pneumoniae*, the zone of diameter of *Shatavari moola choorna* at 1000 μ g/mL is comparable (15mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 20 mm. In case of *Staphylococcus aureus*, the zone of diameter of *Shatavari moola choorna* at 1000 μ g/mL is almost half (14mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 31 mm. For *Enterococcus faecalis*, the zone of diameter of *Shatavari moola choorna* 1000 μ g/mL is

comparable (15mm) of that obtained for the standard drug Streptomycin (10 μ g) which is 20 mm. In the Antifungal study, for *Candida albicans*, the zone of diameter of *Shatavari moola choorna* at 1000 μ g/mL is comparable (15mm) of that obtained for the standard drug Clotrimazole (100 μ g) which is 20 mm.

Conclusion

From the above result it is evident that the sample drug tuberous roots of *Shatavari (Asparagus racemosus* Willd) showed significant zone of inhibition against all the uropathogens selected for the Anti-microbial study and shows almost half the effectiveness to that of the standard drug Streptomycin (10 μ g), and Clotrimazole 1000 μ g/mL concentration. Thus *Shatavari moola (tuberous root powder of Asparagus racemosus* Willd.) can be a promising drug of choice in par with the conventional antibiotics in treatment of Urinary Tract Infection.

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References

1. Prof. K.R. Srikantha Murthy, Susrutha Samhitha (English Translation) vol 1(Sutra sthana chap19), Varanasi Choukhamba Orientalia;2014.p 141.
2. Salvatore et al (June 2011).”Urinary Tract Infection’. European Journal of Obstetrics, Gynecology and reproductive Biology156 (2):131-6.
3. Surinderkumar, Textbook of Microbiology, Jaypee brothers medical publishers; pg 3.