

Research Article

Antibacterial and Antifungal activity of Hydro-Alcoholic Extract of *Orthosiphon stamineus benth*

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ABSTRACT

The leaves of the plant *Orthosiphon stamineus Benth* were extracted with different solvents by soxhlet apparatus and screened for antibacterial and antifungal activities. The Hydro-alcoholic extract of the plant *Orthosiphon stamineus Benth* has showed the presence different active chemical constituents. Antibacterial activity was evaluated using MIC (Agar cup plate) method against gram positive and gram negative bacteria and the antifungal activity is evaluated against the unicellular and multicellular fungi. The 100µg/ml & 200µg/ml of hydro-alcoholic extract was used to find out the antimicrobial properties using Streptomycin, Nystatin (10µg/ml) as a standard against the various strains of gram positive, negative bacteria and fungi. The diameter of inhibition zone was measured in millimeters from the center of disc. The study demonstrates that leaves of *Orthosiphon stamineus Benth* has showed significant antibacterial and antifungal activities.

Keywords: *Orthosiphon stamineus Benth*, Antibacterial activity, Antifungal activity, MIC.

INTRODUCTION

Despite the use of various preservation methods in foods, food poisoning is still a concern for both the food industry and consumers. Therefore, the interest in developing new types of effective and nontoxic antimicrobial compounds is increasing due to concerns about the safety of food containing synthetic preservatives¹. Consequently, interest in using natural antibacterial compounds, such as extracts of spices and herbs for preserving food, has become increasingly popular, as consumers today ask for natural products, free of synthetic additives.² In the present study an attempt has been made to enrich the knowledge of antibacterial and antifungal activity of hydro-alcoholic extract of leaves of *Orthosiphon stamineus Benth* (Family:Lamiaceae (Labiatae)³. *Orthosiphon stamineus Benth* has several uses, mainly used as antidiabetic⁴, in gout, rheumatism, diuretic⁵, anti-allergic, anti-inflammatory, anti-hypertensive, anti-tumor & antioxidant⁶. In India many researchers found that leaves extracts of *Orthosiphon stamineus Benth*. exhibit antimicrobial, antidiabetic, Anti-inflammatory, Antihyperlipidemic and Urolithiasis activity⁷. Based on literature survey in present study leaves of *Orthosiphon stamineus Benth*. plant screened for antibacterial and antifungal activities.

MATERIAL AND METHODS

Plant material collection and extraction

The plant *Orthosiphon stamineus Benth*. was collected from ratnagiri district, Maharashtra in the month of Oct-Nov 2011. The plant *Orthosiphon stamineus Benth*. was authenticated by Dr. S. G. Bhawe, HOD, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, College of forestry, Dapoli, Ratnagiri. The leaves were dried under shade and then coarsely powdered with a mechanical grinder. The powdered leaves were extracted with solvents of increasing polarity such as petroleum ether (60-80°C), ethanol-water (50:50) (95%v/v) by the hot soxhlet successive extraction method. After completion of extraction, the solvent was removed by distillation. Both the extracts were subjected to qualitative tests for the identification of various active constituent. Depending on preliminary phytochemical investigation hydro-alcoholic extract was selected for further study.

Microorganisms used

The following standard strains were obtained from National Collection of Industrial Micro-organism (NCIM), NCL, Pune, and were used for the study. For antibacterial activity *Gram positive like staphylococcus aureus*, *Micrococcus glutamicus*, & *Gram negative like Escheriachia coli*, *Klebsiella Pneumoniae* were used. For antifungal activity unicellular Fungi like *Candida albicans*, *Candida tropicalis*, *Cryptococcus neoformans* & multicellular

Fungi like *Aspergillus niger*, *Penicillium notatum*, *Rhizopus stolonifer*, *Mucor* were used. The medium Mueller Hinton agar was obtained from Hi-media Laboratories Limited, Mumbai.

Antimicrobial Studies

The 100µg/ml & 200µg/ml of hydro-alcoholic extract was used to find out the antimicrobial properties using streptomycin, Nystatin (10µg/ml) as a standard against the various strains of gram positive, negative bacteria and fungi⁶. The nutrient agar medium was prepared and sterilized by autoclaving at 120°C 15 lbs pressure for 15 minutes then aseptically poured the medium into the sterile petri plates and allowed to solidify the bacterial and fungal broth culture was swabbed on each petri plates using sterile buds. Then wells made by well cutter. The hydro-alcoholic extract of leaves was added to each well aseptically. This procedure was repeated for each petri plates then the plates were incubated at 37°C

for 24hrs after incubation the plates were observed for the zone of inhibition and the results are shown in the Table No. 1 & 2.

RESULTS AND DISCUSSION

The plant *Orthosiphon stamineus Benth* belonging to the family Lamiaceae. In present study Hydro-alcoholic extract of leaves of *Orthosiphon stamineus Benth* in preliminary photochemical screening showed presence of Glycosides, Phenolic compounds, Flavonoids, Phytosterols, saponins, Gum and Mucilages. The hydro-alcoholic extract leaves of *Orthosiphon stamineus Benth* at concentration 100µg/ml & 200µg/ml showed significant antibacterial and antifungal activity.

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Table 1: Anti bacterial activity of Hydro-alcoholic extract of *Orthosiphon stamineus Benth*

S.No	Organism	Concentration of Hydro-alcoholic extract added and Zone of inhibition (mm)		
		100µg/ml	200µg/ml	Standard
1.	<i>Staphylococcus aureus</i>	11	11	13
2.	<i>Micrococcus glutamicus</i>	13	12	17
3.	<i>Escheriachia coli</i>	14	15	18
4.	<i>Klebsiella Pneumoniae</i>	11	13	14

Table 2: Anti fungal activity of Hydro-alcoholic extract of *Orthosiphon stamineus Benth*

S.No	Organism	Concentration of Hydro-alcoholic extract added and Zone of inhibition (mm)		
		100µg/ml	200µg/ml	Standard
1.	<i>Candida albicans</i>	8	11	13
2.	<i>Cryptococcus neoformans</i>	10	10	16
3.	<i>Candida tropicalis</i>	12	12	15
4.	<i>Aspergillus niger</i>	11	11	14
5.	<i>Rhizopus stolonifer</i>	9	9	18
6.	<i>Penicillium notatum</i>	8	14	12
7.	<i>Mucor</i>	11	12	13

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