Evaluation of Antifungal Activity of *Asparagus racemosus* Extract against Selected Stains

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ABSTRACT

Asparagus is one of the most important medicinal plants. The genus asparagus has been recently moved from the subfamily asparagus in the family Liliaceae to a newly created family Asparagaceae. Asparagus racemosus Willd. (family-Asparagaceae) also known by the name "Shatavari" means "who possesses a hundred husbands or acceptable to many" has been used as a medicine. It is also used successfully for nervous disorders, inflammation, liver diseases and certain infectious diseases. The present study was conducted to evaluate the antifungal activity of methanolic extract of Asparagus racemosus extract. In vitro antifungal activity was tested by agar well diffusion assay against human pathogenic fungus which are Rhizopus oryzae, Alternaria alternate, Candida albicans and Penicillium griseofulvum were evaluated. This study shows that methanolic extract of Asparagus racemosus inhibits the growth of micro organism dose dependently. A significant correlation was observed between zone of inhibition and concentration of extract. These results confirm the antifungal activity of Asparagus racemosus and support the traditional use of the plant in therapy of bacterial infection. These promising findings suggest the presence of antifungal activity in the tested plant material, exhibited by its bioactive compounds, and serving them as an alternative antifungal agent. Thus, Asparagus racemosus could be considered as potential source of natural antifungal used for the treatment of various fungal infections.

***Key words**: Antifungal activity, Disk Diffusion method, fungus, Asparagus racemosus.*

INTRODUCTION

Asparagus racemosus (Wild) commonly known as ‘Shatavari’, it was previously included under the family Liliaceous, but now it has been shifted to a newly created family *i.e.* Asparagaceae [1].

It is an important monocot medicinal plant of tropical and subtropical countries like India [2]. This is a woody climber growing to 1-2 m in height. The leaves are linear with a stout conical spiny spur, straight or slightly curved and pine-needles, small and uniform. In recent years, a large number of plant products have been investigated for their antimicrobial properties against bacteria and fungi. The study will also confirm if there is a biological basis to the claim that the ethno medicinal plant has useful medicinal purposes [3].

Reports indicate that the pharmacological activities of root extracts include antiulcer, anti-tussive, antidiarrheal, antidiabetic, antioxidant, antifungal, antibacterial activities, adaptogenic activity, antiprotozoal activity, immunomodulatory activity and central nervous system stimulant activity. They are also useful in hypertension and in treatment of epilepsy [4]. A study of ancient classical Ayurveda literature claimed several therapeutic attributes for

the root of Asparagus racemosus and has been specially recommended in cases of threatened abortion and as a galactogogue as tonic.

It is a pharmacologically acclaimed phytoestrogen medicinal plant used for its immunomodulatory effects [5].

As there are many fungal diseases and a disease caused by fungus is called mycosis which is fatal but not all fungal diseases are hazardous in nature. Those which are fatal to human are somewhat incurable and there medicines which are currently present are costly. There are many herbal and Ayurveda plant which have been utilized in India since Vedic period but because of no scientific literature and research studies in these plants they are not internationally accepted as a medicine by WHO and UNESCO.

So, this research aims to study and verify the antifungal activity of common herbal plant Asparagus racemosus.

Also it opens new gateway for further research and develop innovative protocol for medicines against mycosal diseases. Based on the above fact, in the present study, various extracts of stem and leaf of *Asparagus racemosus* were screened for their antifungal activity. The results of this study may further strengthen the recommendation for the use of ethno medicine in the treatment and control of fungal infections.

MATERIALS AND METHOD

Plant Material

Plant of *Asparagus racemosus* was collected from nursery of Raipur (Chhattisgarh), India.

Chemicals and Reagent Samples

All solvent used were of HPLC grade. Methanol was acquired from Merck limited (Mumbai, India).

Extract Preparation

Dried powdered of Asparagus racemosus root (10 g) were extracted by continuous mixing in 100 ml 50% methanol, 24 h at room temperature. After the filtration process, methanol was evaporated until only water remained through evaporation on water bath at 60 -70℃ temperature. The final extract was kept in air tried box.

Microorganism

The tested microorganisms are *Rhizopus oryzae, Alternaria alternate, Candida albicans*, and *Penicillium griseofulvum.* These fungus's strains were procured from Pt. Ravishankar Shukla University, Raipur, India. The fungus were grown in the Potato Dextrose Agar (PDA) at 30℃ and maintained on Potato Dextrose Agar slant at 4℃.

Culture Media

The media used for the activation of the microorganisms was Potato Dextrose Broth. The Potato Dextrose Broth was used for the antimicrobial test. All the culture media were prepared and treated according to the manufacturer guidelines (Hi Media Laboratories Ltd., Mumbai, India).

Preparation of stock solution:

1) 100%: 0.1gm drug + 1 ml ddw (Stock solution)
2) 75%: 150µl stock solution + 50µl ddw
3) 50%: 100µl stock solution + 100µl ddw
4) 25%: 50µl stock solution + 150µl ddw

Antifungul Assay

Antifungal activity of *Asparagus racemosus* root extract was determined by agar disk diffusion method Antibacterial activity of at four concentrations *i.e.*, 10%, 75%, 50% and 25%.

Potato Dextrose agar was prepared according to the manufacturer's

instructions and the plates were seeded with appropriate microorganisms *(Rhizopus oryzae, Alternaria alternata, Candida albicans, Penicillium griseofulvum).* Discs of 6 mm diameter were prepared from Whatmann filter paper No.24 and sterilized. The discs were then impregnated with the extracts Antibiotics (Miconazole, Clotrimazole, Itraconazole, and luconazole) fungus was used as standard. The plates were incubating at 30º C for 24 hrs and the zones of inhibition were measured with a measuring scale. Above experiment was carried out in triplicate for their confirmation.

Statistical Analysis

To evaluate association between variables (antibiotic profile); the data were analyzed statistically using mean + standard deviation and standard error.

RESULTS

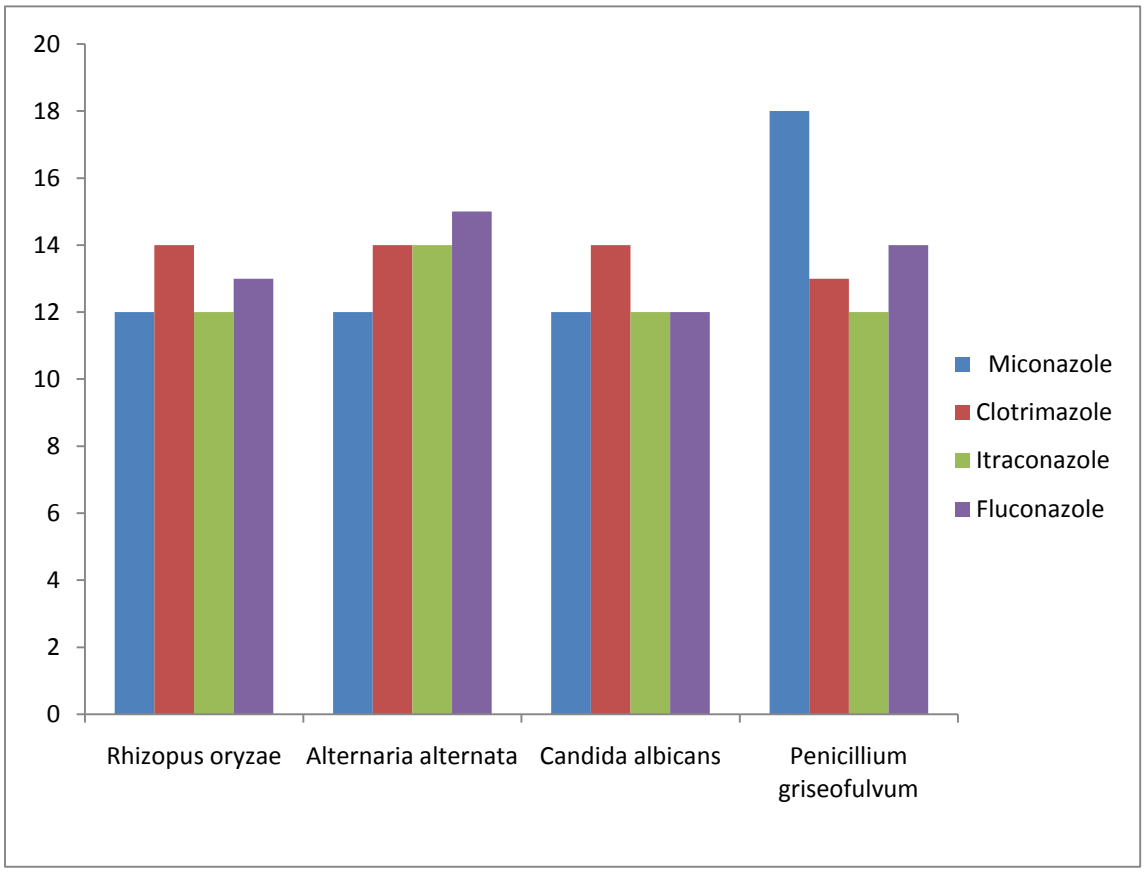
The initiation of fungus growth was considered as zero hour and further accordingly reading were taken. Our present shows the antifungal activity of extract of *Asparagus racemosus* (Shatavari) against four different types of fungus. The above observation suggests the different concentration (25%, 50%, 75%, 100%) were having good antifungal activities against *Rhizopus oryzae*. Thus, the extract is showed varying activity against all *Rhizopus oryzae* types of fungus.

Table 1: The Study of Anti-Fungal Activities of Some Antibiotic against Human Fungal Pathogens

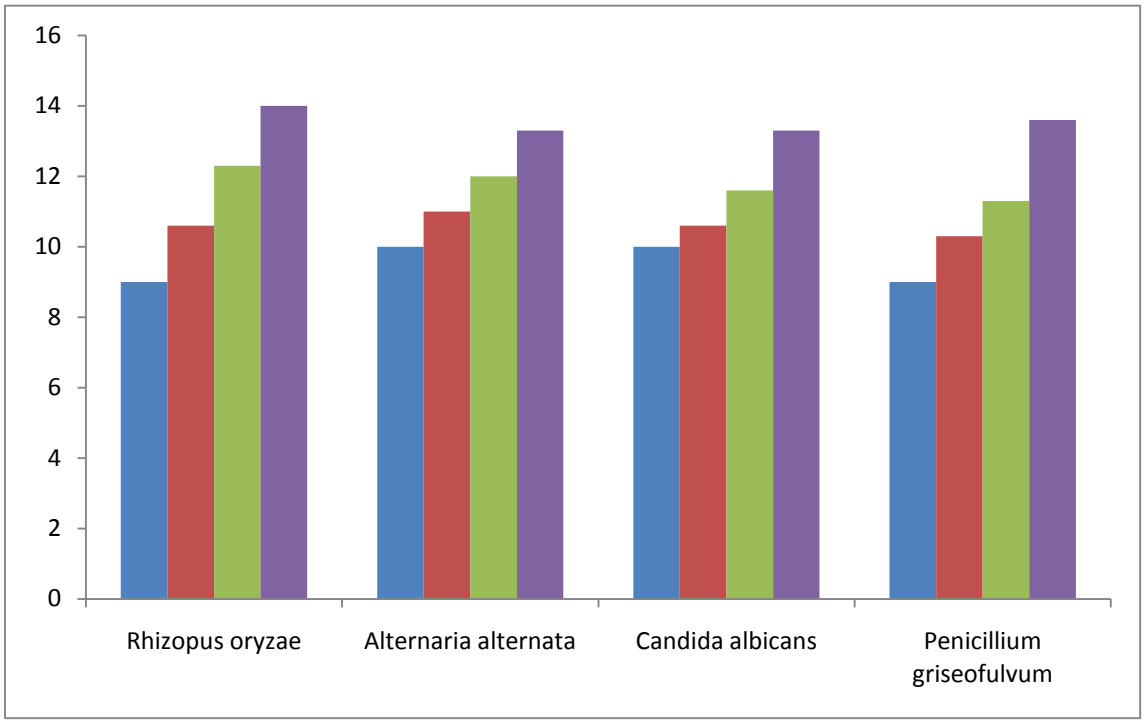
Sl	FUNGUS Use	ZONE OF INHIBITION (IN MM)			
		Miconazole	Clotrimazole	Itraconazole	Fluconazole
1.	***Rhizopus oryzae***	12	14	12	13
2.	***Alternaria alternata***	12	14	14	15
3.	***Candida albicans***	12	14	12	12
4.	***Penicillium griseofulvum***	18	13	12	14

Table 2: The Study of Antifungal Activity of *Asparagus racemosus* Root Extract Using Disk Diffusion Method (Mean ± SE)

Sl	FUNGUS USE	ZONE OF INHIBITION (IN MM)			
		25%	50%	75%	100%
1.	***Rhizopus oryzae***	09.00±0.46	10.6±0.38	12.3±0.36	14.00±0.46
2.	***Alternaria alternata***	10.00±0.66	11.00±0.81	12.00±0.66	13.3±0.66
3.	***Candida albicans***	10.00±0.46	10.6±0.53	11.6±0.60	13.3±0.60
4.	***Penicillium griseofulvum***	09.00±0.46	10.3±0.06	11.3±0.60	13.6±0.61



Graph 1: Showing the Zone of Inhibition of Standard Antibiotic



Graph 2: Showing the Zone of Inhibition of Asparagus racemosus root extract against the Different strains of fungus

Asparagus racemosus root

DISCUSSION

In traditional medicine system of India has been widely used as remedy for a variety of disorders such as emetic, stomachic, dyspepsia, colic, remittent fevers, bronchitis, dysentery of children and snakebite and as nerve tonic and insectifuge. The term medicinal plant includes various types of plants used in herbalism (herbal medicine). It is the use of plants for medicinal purposes, and study of such uses. The word 'herb' has been derived from the Latin word;*"herba"* and an old French word *"herbe"*. Now a day, herb refers to any part of the plant like fruit, seed, stem, bark, flower, leaf, stigma or a root, as well as a non-woody plant. Earlier, the term "herb" was only applied to non-woody plants, including those that come from tree and shrubs.

Herbal plants have been identified and used throughout human history. Plants make many chemical compounds that are for biological function, including defense against insect, fungi and herbivorous mammals. Chemical compounds in plants mediate their effect on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to have beneficial pharmacology, but also gives them the same potential as conventional pharmaceutical drugs to cause harmful side effects.

Our result shows that the initiation of fungus growth was considered as zero hour and further accordingly reading were taken. Our present shows the antifungal activity of extract of *Asparagus racemosus* (Shatavari) against four different types of fungus. The above observation suggests the different concentration (25%, 50%, 75%, 100%) were having good antifungal activities against *Rhizopus oryzae*. Thus, the extract is showed varying activity against all *Rhizopus oryzae* types of fungus.

The present investigation showed that stem and root extract of *Asparagus racemosus* is quite effective against various funguses. Therefore, it can be concluded that it may be used as natural antimicrobial agent to control the infection caused by the

pathogens which otherwise becomes resistant to synthetic antibiotics.

SUMMARY

Medicinal plants have provided mankind a large variety of potent drugs to alleviate or eradicate infections and suffering from diseases in spite of advancement in synthetic drugs, some of the plant-derived drugs still retained their importance and relevance. The use of plant-based drugs all over world is increasing. There have been records of advances made in the modern (synthetic) medicine there are still a large number of ailments or infection (diseases) for which suitable drugs are yet to be found. These have brought an urgent need to develop safer drugs (both for man and his environment) for the treatment of inflammatory disorders, diabetes, liver diseases, and gastrointestinal disorder. Through recent researches on herbal plants or medicine, there have been great developments in the pharmacological evaluation of various plants used in traditional systems of medicine. Consequently, plants can be described as a major source of medicines, not only as isolated active principles to be dispensed in standardized dosage form but also as crude drugs for the population.

Asparagus racemosus is a plant used in traditional Indian medicine (Ayurveda). The root is used to make medicine. The plant Asparagus racemosus (Wild) is widely distributed in the tropical and sub-tropical regions of South Asia. A study of ancient classical Ayurveda literature claimed several therapeutic attributes for the root of *Asparagus racemosus* and has been specially recommended in cases of threatened abortion and as a galactogogue as tonic. It is a pharmacologically acclaimed phytoestrogen medicinal plant used for its immunomodulatory effects. As there are many fungal diseases and a disease caused by fungus is called mycosis which is fatal but not all fungal diseases are hazardous in nature. Those which are fatal to human are somewhat incurable and there medicines which are currently present are costly. There are many herbal and Ayurveda plant which have been utilized in India since Vedic period but because of no scientific literature and research studies in these plants they are not internationally accepted as a medicine by WHO and UNESCO. So this research aims to study and verify the antifungal activity of common herbal plant Asparagus racemosus. Also it opens new gateway for further research and develop innovative protocol for medicines against mycosal diseases.

Based on preliminary reports, there is a lot of interest in using the roots and leaves of this plant for treating so many disorders. Present investigation initiated with the aim of Antifungal activity of the medicinal plant *Asparagus racemosus*. In this study roots of the plant were collected from natural environment, washed, shade dried pulverized and extracted with methanol. The initiation of fungus growth was considered as zero hour and further accordingly reading were taken. Our present shows the antifungal activity of extract of *Asparagus racemosus* (shatavari) against four different types of fungus.

The above observation suggests the different concentration (25%, 50%, 75%, 100%) were having good antifungal activities against Rhizopus oryzae. Thus, the extract is showed varying activity against all *Rhizopus oryzae* types of fungus. The present research reveals that the plant is used in treating various ailments. It elicits on all the aspects of the herbs and throws the attention to set the mind of the researchers to carry out the work for developing its various formulations, which can ultimately be beneficial for the human being as well as animals. Furthermore, detailed studies on

the isolation and characterization of the active plant compound of will be necessary for discovering the biological agent. Hence in the present study show the methanolic extract of the roots of *Asparagus racemosus* Willd. Possess should be screened further for active constituents.

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