

Anti-bacterial and anti-fungal activity of *Actiniopteris radiata* and *Caralluma adscendens*

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Abstract: The antibacterial activity of aqueous and ethanol extract of *Actiniopteris radiata* and *Caralluma adscendens* was screened using cup plate method. The ethanolic extract and aqueous extract shows antibacterial activity against *S. typhi* and *E.coli* and there is no antibacterial activity against other gram (+) and gram(-) organisms. The petroleum, benzene and acetone extracts did not show significant antibacterial activity. All extracts were found to be inactive against *Candida albicans*, *Aspergillus niger* and *Mucor*.

Key words: *Actiniopteris radiata*, *Caralluma adscendens*, *S. typhi* and *E.coli*.

Introduction

Actiniopteris australis (radiata) (Pteridaceae) is a tiny terrestrial fern, found throughout India and also in Burma, Sri Lanka, Afghanistan, Persia, Arabia, Yemen, South Eastern Egypt, Tropical Africa, Australia and Madagascar. It is of limited distribution, and in areas where it occurs, is restricted to depleted walls and rocky crevices of steep slopes of exposed hilly areas, up to the altitude of 1200 m.(1). This plant has been reported for various biological activities such as antifertility, styptic, anthelmintic, anti-tubercular etc (2). Major phytoconstituents reported in stems and leaves are hentriacontane, hentriacontanol, β -sitosterol palmitate, β -sitosterol, β -sitosterol-D-glucoside and quercetin-3-rutinoside (3).

The genus *Caralluma* (Asclipiadaceae), which comprises about 200 genera and 2500 species. The member of the genus is small plant, erect, fleshy. They have four grooved stems, round shape devoid of leaves and small flowers in several varieties of dark colors. The species of *Caralluma* found in India are edible and form part of the traditional medicine system of the country (4). The genus *Caralluma adscendens* is a

very variable herbs, up to 1 m. in height, with fleshy, almost leafless stems, deep purple-brown or yellowish white flowers, and 10-12 cm slender follicles, distributed in peninsular India from Andhra Pradesh and Maharashtra to Kerala upto 600 m. The herb contains hydrocarbon, n-pentatriacontane and a glycoside. In addition to *Caralluma* species commonly used in treatment of rheumatism, diabetes, leprosy, antipyretic and anthelmintic, for tumor, fungal diseases, snake, scorpion bite and antinociceptive activity (5,6).

Material and Methods

Plant Material:

The whole plant was collected from hills of tribal areas of Satara District with the help of local villagers in the month of June-July. The plant, *Actiniopteris radiata* was authenticated at Agharkar research institute, Pune, while the other plant, *caralluma adscendens*, was authenticated at Sadguru Gadge Maharaj College, Karad, Dist.Satara.

Preparation of Extract:

The whole plant was collected and dried under shade, powdered and sieved through sieve no.14 (Mesh size-1410 μ) and stored in air tight containers. The weighed quantity (200 gm) of dried powdered was subjected to successive solvent extraction method by using Petroleum ether (60-80^oc), Benzene, Chloroform, Acetone, Ethanol in Soxhlet extractor and lastly with water by maceration process. All the extracts were concentrated and last trace of solvent was removed by applying vacuum (7,8).

Antibacterial Activity

The anti bacterial activity of the different extracts of the *Actiniopteris radiata* and *caralluma adscendens* was studied by cup plate method. All the extracts at the concentration of 150 mg/ml and 300 mg/ml were tested against Gram (+) bacteria such *Escherichia coli*, *Shigella*, *salmonella typhi*, *Pseudomonas aeruginosa*, *Vibrio cholerae*, *bacillus subtilis*, *websiella pnemoniae*, *Proteus vulgaris* and *Staphylococcus aureus*. The plates were incubated at 37^o C for 48 hrs. The diameter of zone of inhibition was calculated after incubation .An average of three independent determinations was recorded (9,10,11).

Antifungal Activity:

The antifungal activity of *Actiniopteris radiata* and *caralluma adscendens* was evaluated against *Candida*

albicans, *aspergillus niger* and *Mucor* by Cup-plate method at the concentration of 150 mg/ml and 300mg/ml using Griseofulvin as standard drug. Diameters of the zones of inhibition were determined as an indication of activity after incubating the plates at 25^o C for 72 hrs. An average of three independent determinations was recorded.

Results

All the extracts obtained by successive solvent extraction method were studied for their antibacterial and anti fungal activity in different concentrations. The ethanolic extract of *Actiniopteris radiata* at conc. of 150 mg/ml and 300 mg/ml and aqueous extract at conc. of 300 mg/ml shown antibacterial activity against *S. typhi* and *E.coli* and there is no antibacterial activity against other gram (+) and gram(-) organisms. Whereas ethanolic extract and aqueous extract of *caralluma adscendens* shown prominent activity against *psedomonas aerugiosa* and *Escherichia coli*. The activity was comparable to that of chloramphenicol as a standard. The petroleum, chloropharm, benzene and acetone extracts did not shown antibacterial activity.

All extracts were found to be inactive against *Candida albicans*, *Aspergillus niger* and *Mucor* compared with Griseofulvin.

Table 1: Anti-bacterial activity of various extracts of *Actiniopteris radiata* in mg/ml

Test Microorganisms	Zone of inhibition (mm)*										
	Pet.ether		Chloroform		Acetone		Ethanol		Water		Chloramphenicol
	150	300	150	300	150	300	150	300	150	300	
<i>Escherichia coli</i>	-	-	-	-	-	-	15	17	-	18	19
<i>Shigella</i>	-	-	-	-	-	-	-	-	-	-	10
<i>salmonella typhi</i>	-	-	-	-	-	-	20	26	-	20	10
<i>Pseudomonas aeruginosa</i>	-	-	-	-	-	-	-	-	-	-	10
<i>Vibrio cholerae</i>	-	-	-	-	-	-	-	-	-	-	-
<i>bacillus subtilis</i>	-	-	-	-	-	-	-	-	-	-	10
<i>klebsiella pnemoniae</i>	-	-	-	-	-	-	-	-	-	-	18
<i>Proteus vulgaris</i>	-	-	-	-	-	-	-	-	-	-	-
<i>Staphylococcus aureus</i>	-	-	-	-	-	-	-	-	-	-	17

Indicates no zone of inhibition, *Average of three readings

Table2: Antibacterial activity of various extracts of *Caralluma adscendens* in mg/ml.

Test Microorganisms	Zone of inhibition (mm)*		
	Ethanol	Water	Chloramphenicol
	150	150	1
<i>Escherichia coli</i>	10	10	19
<i>salmonella typhi</i>	7	-	10
<i>Pseudomonas aeruginosa</i>	10	15	10
<i>Proteus vulgaris</i>	5	5	-
<i>Staphylococcus aureus</i>	-	5	17

Indicates no zone of inhibition * Average of three reading

Discussion

Both the plant extracts tested for antimicrobial activity have shown appreciable results. The ethanolic and aqueous extracts of *actiniopteris radiata* and *caralluma adscendens* were effective against *S. typhi*, *E-coli* and *psedomonas aeruginosa* respectively, where as both extracts of *Actiniopteris radiata* exhibited most prominent activity against *S.typhi* comparable to that of chloramphenicol as standard drug. Plants selected for anti-microbial activity have shown appreciable results due to the presence of tannins, flavonoids and sterols (12).

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