

ISSN: 0976-3031

*International Journal of Recent Scientific  
Research*

**Impact factor: 5.114**

**PHYTO-CHEMICAL ANALYSIS AND ANTI-MICROBIAL  
ACTIVITY OF SELAGINELLA BRYOPTERIS**



**Nirmala Babu Rao and Sita Kumari O**

**Volume: 6**

**Issue: 10**

**THE PUBLICATION OF  
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH**

**<http://www.recentscientific.com>**

**E-mail: [recentscientific@gmail.com](mailto:recentscientific@gmail.com)**



**RESEARCH ARTICLE**

**PHYTO-CHEMICAL ANALYSIS AND ANTI-MICROBIAL ACTIVITY OF  
*SELAGINELLA BRYOPTERIS***

**Nirmala Babu Rao<sup>1</sup> and Sita Kumari O<sup>2</sup>**

<sup>1</sup>Department of Botany, University College for Women, Koti, Hyderabad, Telangana, India

<sup>2</sup>Department of Botany, R.B.V.R.R. Women's College, Narayanaguda, Hyderabad, Telangana, India

**ARTICLE INFO**

**Article History:**

Received 06<sup>th</sup> July, 2015  
Received in revised form  
14<sup>th</sup> August, 2015  
Accepted 23<sup>rd</sup> September, 2015  
Published online 28<sup>st</sup>  
October, 2015

**ABSTRACT**

*Selaginella bryopteris* is a plant grows on hills and can sustain droughts. It is used as a medicinal herb from ancient times. It shows good activity against microbes. The Phyto-Chemical analysis is also done for this plant. It acts as good anti microbial agent against many microbes. We tested its anti microbial activity against *E.coli*, *Staphylococcus aureus*, *Bacillus subtilis*, *Salmonella typhi*, *Aspergillusniger*, *Candida parapsilosis*, *Trichophyton rubrum* these organisms and got good results with different parts of plant extracts like Leaf and Roots.

**Key words:**

**Copyright © Nirmala Babu Rao and Sita Kumari O. 2015**, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

**INTRODUCTION**

Plants are becoming more known to the Humans with their uses. The plants discovered by our ancients are still in use by us even now a days. As human life could not be sustained without plants as the microbes are growing stronger the use of medicinal herbs also increased. As the use of plants increased we are gaining more knowledge about plants. As the researchers started studying the uses of herbs it was already late and we lost many medicinal plants in deforestation due to lack of awareness of the plants. One of such herbal plant is *Selaginella bryopteris*

The *Selaginella bryopteris* also known as Devanagari or Sanjeevani. It has many medicinal uses and it depends on decaying plants and rain water for its nutrients. They grow on rocks. Sanjeevani refers to "One that Infuses Life".

The name given to it because of its medicinal uses. This plant is used to treat several health problems like Heart stroke, Jaundice, Dysuria, Irregular Menstruation etc. Although it is used from ancient times these are not validated scientifically. Even now these are used by tribals in India.

It is considered to be the divine plant in India as it is used to cure Lakshmana in the war of Ramayana. Various studies conducted on the plant by many researchers and found that is

has high resistance towards drought conditions. The agricultural scientists started studying this character and are trying to transfer this gene to the agricultural plants to get good yield. It has a series of eleven biflavonoids containing amentoflavone and hinokiflavone.

**Micro organisms**

The test organisms *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Trichophyton rubrum*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Candida parapsilosis* and *Aspergillus niger* were cultured onto nutrient agar in order to determine their viability [6]. The identity of each test organism was confirmed using standard cultural, morphological and biochemical techniques. Stock cultures were maintained as Glycerol stocks at 4°C checking their viability time to time.

**Evaluation of antimicrobial activity**

The experiment was done with care and perfect handling in aseptic conditions. Nutrient agar medium (25 ml) was taken in a sterile petridish and broth cultures of the test isolate (0.1 ml) containing  $1.0 \times 10^5$  CFU/ml of organisms were added [8]. The extracts were dissolved in Ethyl alcohol and used. The concentrations used for the test are 10, 20, 40 and 50 mg/ml.

\*Corresponding author: **Nirmala Babu Rao**

Department of Botany, University College for Women, Koti, Hyderabad, Telangana, India

Ampicilin (10µ g/ml) was used as standard antibacterial agent and Griseofulvin was used as standard antifungal agent [9].

## MATERIALS AND METHODS PHYTOCHEMICAL ANALYSIS

Plant material was collected from the hilly areas. Chemicals such as wagner reagent, chloroform, 2% H<sub>2</sub>SO<sub>4</sub>, Concentrated sulphuric Acid, 10% Lead acetate, Benedict's reagent, 0.1% ferric chloride, Fehling's solution, dilute NaOH, 2% HCL, 10% Ammonia, 10% HCL, distilled water, Ethyl Alcohol are provided by the management of the college.

### Preparation of solutions

**Fehling's solution:** - A mixture of equal volume of copper sulphate, sodium potassium tartar ate and sodium hydroxide is prepared in a beaker.

**Wagner's Reagent:-** Mixing 2gm of Iodine, 6gm of potassium iodide in 100ml of water.

**Collection of sample:** Healthy leaves of Selaginella bryopteris were taken and washed under running water to remove the dust and other external pollutants. The plant leaves, roots and flowers were air dried for few days. Normally it takes 15 to 21 days for drying.

**Grinding the sample:** The dried leaves are grinded to a fine powder in a mixer and the powder is collected in clean polythene bags.

**Preparation of plant extract with Ethyl Alcohol:** Taken 10gms of leaf powder and added 50ml of ethyl alcohol stirred it constantly for 30 minutes and the solution was kept at room temperature for 24 hours (minimum) and then filtered. The filtered solution is again filtered with whatman filter paper No.3 and then it was stored at 4 degrees centigrade (in a freezer) until use.

**Table** showing results of Phyto Chemical Analysis Selaginella bryopteris (Sanjeevani Plant)

Sl. No	Phytochemicals	Distilled Water	Methanol	Acetone	Ethanol
1	Tanins	Negative	Positive	Positive	Negative
2	Antraquinones	Positive	Positive	Positive	Positive
3	Flavanoides	Positive	Positive	Positive	Positive
4	Alkaloides	Positive	Positive	Positive	Positive
5	Terpenoids	Positive	Positive	Positive	Positive
6	Saponins	Positive	Positive	Positive	Positive
7	Cardiac glycosides	Negative	Positive	Positive	Positive
8	Glycosides	Negative	Negative	Negative	Negative
9	Reducing Sugars	Negative	Positive	Positive	Negative
10	Phlobatanins	Negative	Positive	Positive	Negative
11	Steroids	Positive	Positive	Positive	Positive
12	Phenolic	Positive	Positive	Positive	Positive
13	Aminoacids	Negative	Positive	Positive	Positive
14	Proteins	Positive	Positive	Positive	Positive
15	Quinones	Positive	Positive	Positive	Positive

### Antimicrobial activity

#### Leaves and Roots Collection

The leaves, flowers and roots for the present study from the plant *Selaginella bryopteris* were collected from Hilly areas.

And were allowed to dry under shade and made into a fine powder. The powder (100grams) was Soxhlet extracted with methanol and dried under rotavapor at 40-50°C for 3-4 hours. This measure was taken in order to evaluate the antimicrobial activity.

### Equipment preparation

To conduct the experiment, the nutrient agar media was prepared by dissolving 28g of nutrient agar in 1000ml distilled water. It was sterilized in autoclave along with the petri-dishes, forceps, spreader, cotton balls and 25ml conical flasks. The sterilized agar was then transferred into the petri-dishes and was allowed to solidify. Thereafter, the procedure was executed in laminar air flow to ensure proper aseptic conditions.

### Preparation of Paper Discs

The mode of anti microbial activity of the above medicinal plant leaves were performed using the whatman no.1 paper. The fine round paper discs were obtained and were sterilized.

## RESULTS AND DISCUSSION

### Antimicrobial activity

The antimicrobial activity of all the three leaf extracts was examined against Gram positive and Gram-negative bacteria and fungal strains by measuring zone of inhibition.

The antimicrobial activity was performed by Agar disc diffusion method at concentration level of 2.5, 5.0, 7.0, 10µg/ml respectively.

Ampicillin (antibacterial), Itraconazole (or) Griseofulvin (antifungal) as the standard drug at a concentration of 200µg/ml. LB Agar was used as the culture media for antibacterial and potassium dextrose agar was used as culture media for the antifungal activity. The results of the antimicrobial activity are shown in figures and tables.

### Selaginella bryopteris leaves

Organism/conc <sup>n</sup> of extract	2.5µg/ml	5µg/ml	7.5µg/ml	10µg/ml
<i>E.coli</i>	1.0cm	1.2 cm	1.3 cm	1.2 cm
<i>Staphylococcus aureus</i>	1.2 cm	1.2cm	1.3 cm	1.4 cm
<i>Bacillus subtilis</i>	1.0 cm	1.2 cm	1.2 cm	1.5 cm
<i>Salmonella typhi</i>	1.0 cm	1.1 cm	1.3 cm	1.1 cm
<i>Aspergillusniger</i>	0.8cm	0.9 cm	0.9cm	1.0 cm
<i>Candida parapsilosis</i>	1.2 cm	1.3 cm	1.3 cm	1.3 cm
<i>Trichophyton rubrum</i>	1.1 cm	1.1 cm	1.2 cm	1.0 cm

The *Selaginella bryopteris* leaf extract showed high activity against *Staphylococcus aureus* at very low concentration (2.5µg/ml) compared to *E.coli*, *Bacillus subtilis*, leaf extract showed high activity against *Candida parapsilosis* at a very low concentration (2.5µg/ml) compared to *Aspergillus niger*. The zone of inhibition is calculated in cm.

**Selaginella bryopteris roots**

Organism/conc <sup>n</sup> of extract	2.5µg/ml	5µg/ml	7.5µg/ml	10µg/ml
<i>E.coli</i>	1.1cm	1.3cm	1.5cm	1.5 cm
<i>Staphylococcus aureus</i>	1.1 cm	1.3cm	1.5cm	1.5cm
<i>Bacillus subtilis</i>	1.0 cm	1.2 cm	1.3 cm	1.2 cm
<i>Salmonella typhi</i>	0.8 cm	1.0cm	1.0 cm	0.9 cm
<i>Aspergillus niger</i>	1.0cm	1.0 cm	1.2cm	1.1 cm
<i>Candida parapsilosis</i>	1.0cm	1.2cm	1.3cm	1.5cm
<i>Trichophyton rubrum</i>	0.9cm	1.0 cm	1.0 cm	1.1 cm

The *Selaginella bryopteris* root extract showed high activity against *E.coli* and *Staphylococcus aureus* very low concentration (2.5µg/ml) when compared and root extract showed high activity against *Aspergillus niger* and *Candida parapsilosis* at a very low concentration (2.5µg/ml) compared to *Trichophyton rubrum*. The zone of inhibition is calculated in cm.

**References**

1. A mini review on medicinal properties of the resurrecting plant *Selaginella bryopteris* (Sanjeevani) Reena Antony<sup>1</sup>\* and Rini Thomas<sup>2</sup> 1, Department of Microbiology, Career College, B.H.E.L Govindpura, Bhopal, (M.P) – India 2, School of Pharmacy, KLE University, Belgaum, (Karnataka) – India
2. A review on endemic indian resurrecting herb *selaginella bryopteris* (L.) Bak. ‘sanjeevani’ Shweta Singh\* and Rita Singh
3. An Overview on Properties, Therapeutic Efficacy of the Indian Magical Herb- “SANJEEVANI” Sunita Lahkar<sup>\*1</sup>, Pallab Kalita<sup>1</sup>, Arpita Chakraborty<sup>1</sup> 1. Department of Pharmacy, Assam DOWNTOWN University, Panikhatti, Guwahati 781026, Assam.

4. Antimicrobial activity of Some Ethno-medicinal Plants used by Baiga Tribes from Amarkantak, India Jitendra Malviya<sup>1</sup>\* Vaibhavi Joshi<sup>2</sup> Kiran Singh<sup>3</sup> Vol 4, 2012
5. Antioxidant properties of aqueous extracts of *Selaginella willdenowii* Tsun-Thai Chai\* and Fai-Chu Wong Department of Chemical Science, Faculty of Science, Universiti Tunku Abdul Rahman, 31900 Kampar, Malaysia. Accepted 12 December, 2011
6. Indian herb ‘Sanjeevani’ (*Selaginella bryopteris*) can promote growth and protect against heat shock and apoptotic activities of ultra violet and oxidative stress Nand K Sah<sup>†</sup>, Shyam Nandan P Singh<sup>1</sup>, Sudhir Sahdev, Sharmishta Banerji\*, Vidyanath Jha<sup>#</sup>, Zakir Khan And Seyed E Hasnain\* Department of Biotechnology, Madhav Institute of Technology and Science, Gwalior 474 005, India
7. Preliminary Phytochemical Screening Of Desiccated Fronds Of *Selaginella Bryopteris* (L) Baker (Pittakalu) 1P. Rupa\* and 1N.Lakshmi Bhavani. Plant Tissue Culture and Plant Molecular Genetics Lab Department of Botany, University College of Science, Saifabad, Osmania University, Hyderabad 500004, India.
8. Sah N K *et al.*, 2005, Indian herb ‘Sanjeevani’ (*Selaginella bryopteris*) can promote growth and protect against very heat shock and apoptotic activities of ultra violet and oxidative stress. Journal of Bioscience, 30, 499–505.
9. Sah, P. (2008). Does the magical Himalayan Herb “Sanjeevani Booti” really exist in Nature. The Journal of American Science, 4(3), 2008, ISSN, 1545-1003.

\*\*\*\*\*

**How to cite this article:**

Nirmala Babu Rao and Sita Kumari O.2015, Phyto-Chemical Analysis and Anti-Microbial Activity of *Selaginella Bryopteris*. *Int J Recent Sci Res* Vol. 6, Issue, 10, pp. 6785-6787.

*International Journal of Recent Scientific  
Research*

ISSN 0976-3031



9

770576

303009