THE MEDICINAL PLANT SELAGINELLA BRYOPTERIS (SANJEEVANI BOOTI) IS USED IN PHYTOCHEMICAL SCREENING.

Ashish Jaiswal[1], Shikha Rangra Chandel[2]

[1*]Division of Microbiology, Career Point University, Hamirpur, Himachal Pradesh-176041, India.
[2]Division of Microbiology, Career Point University, Hamirpur, Himachal Pradesh-176041, India.

***Corresponding Author:** Email Id: ashishjaiswal12492@gmail.com, shikha777rangra@gmail.com

ABSTRACT: ***Selaginella bryopteris*** is a medicinal plant known for its rich content of secondary metabolites, including alkaloids, phenols, tannins, flavonoids, and terpenoids. These compounds contribute to its diverse pharmacological properties, enabling it to function as an antioxidant, anti-inflammatory, anticancer, antimicrobial, antifungal, antibacterial, and antiallergic agent. Additionally, ***Selaginella bryopteris*** is used as a tonic to enhance overall fitness and extend lifespan. The phytochemical analysis of ***Selaginella bryopteris*** provides essential insights into the significant chemical constituents of the plant. The study detected the presence of alkaloids, saponins, tannins, phenols, and steroids in the plant samples, underscoring its potential therapeutic applications.

Key Words: Phytochemical Screening, *Selaginella plants,* antimicrobial, antifungal.

1. INTRODUCTION

Selaginella bryopteris, commonly known as spiny moss, is a pteridophyte belonging to the family Selaginellaceae. Pteridophytes are a diverse group of vascular plants, with approximately 1200 species found in India alone. Many of these species have been traditionally used as herbal medicines in both India and China. The medicinal use of Selaginella in India dates back to ancient times, notably to the era of the Ramayana. **Sanjeevani booti**, as it is traditionally known, is famed for its miraculous properties and is believed to have the power to revive life. This herb typically grows in the hills of tropical areas across India, stretching from the eastern to the western regions and is predominantly found along mountainous terrains.

Selaginella bryopteris is widely distributed across tropical hill regions in India. It is highly valued for its medicinal properties and is commonly sold in various Indian markets under the name **Sanjeevani booti**. Its significant role in traditional medicine has made it a sought-after herb in many local and regional markets. (Ali Ghasemzadeh et al., 2018). *Selaginella bryopteris* possesses a large quantity of bioactive compounds such as bioflavonoids, alkaloids, lignans, quinoids, benzenoids, carbohydrates, chromones coumarins, and steroids attributed to its disease curative potency (Dakshayani et al., 2019). *Selaginella* sp. Contains various types of bioactive compounds or phytoconstituents mostly belonging to the class of flavonoids (Bilobetin, Sumaflavone, Taiwaniaflavone), alkaloids (Paucine3-β-Dglucopyranoside, Hordenine, Paucine, Hordenine-*O*-α-rhamnopyranoside), lignans (Lirioresinol A, Syringaresinol, Matairesinol, Wikstromol, Styraxlignolide B), Pigments (Selaginellin, Selaginellin A, Selaginellin M, Selaginellin G), tannins, terpenoids (Linalool, Cedrol, Nerolidol, Germacrene D, β-elemene, Gibberellin A4), phenylpropanoids, coumarins, chromones, quinoids, steroids, benzenoids, carbohydrates, and oxygen heterocycle (Adnan et al., 2021). *Selaginella* sp. has effective pharmacological applications and possesses chemo-preventive and memory enhancement anti-carcinogenic properties, anti-stress, anti-diabetic activity, anti-depressant activity and antibacterial, antiprotozoal, antifungal and antiviral activity etc. (Paswan et al., 2020).

Table 1: Showing the Coordinates of the collected sample from Chamoli District, Uttarakhand.

SAMPLE	GPS READING
Selaginella bryopteris **(Sanjeevani Booti)**	**Latitude : 30º 24' 14.778" N** **Longitude : 79º 19' 54.3684" E**

Figure 1: Showing the Collection of Selaginella bryopteris (Sanjeevani Booti) in the collection site of Chamoli District, Uttarakhand.

2. MATERIAL & METHODS

Phytochemical Screening Methods

The phytochemical screening of alkaloids, steroids, phenols, saponins, and tannins in plant samples was conducted following the methods outlined by Sinha (1980) and Mahadevan (1982). The detailed procedures for each test are described below:

Phytochemical screening of the medicinal plant *Selaginella bryopteris* (Sanjeevani booti).

Preparation of Samples:

1. The plant parts were thoroughly washed with distilled water.
2. These parts were then dried at 40°C for 72 hours. 3. The dried samples were powdered and stored separately in polyethylene bags for further analysis.

1. Alkaloids:

Procedure:

a) 2 g of the powdered sample was extracted and filtered.
b) The filtrate was made acidic by adding 1% HCl.
c) The acidic extract was then made alkaline using 28% ammonium hydroxide and extracted with an equal volume of chloroform.
d) The chloroform-soluble fraction was tested using Dragendorff's, Mayer's, and Wagner's reagents. **Observation:**

a) The presence of alkaloids was indicated by the formation of turbidity or precipitation.

a) 1 g of the powdered sample was homogenized with 15 ml of petroleum ether and filtered.
b) The ether was evaporated, and the residue was treated with acetic anhydride and a few drops of concentrated sulfuric acid.

Observation:

a) The presence of steroids was indicated by the appearance of pink and blue colors.

Fig. 2. Test for Steroids (Precipitate shows pink and blue color the presence of Alkaloids).

3. Phenols:

Procedure:

a) A small amount of the powdered sample was homogenized with 80% ethanol and centrifuged.
b) About 5 ml of the supernatant was treated with a freshly prepared mixture of 0.3% FeCl3 in NH4Cl and 0.3% potassium ferricyanide.

Observation:

a) The presence of phenols was indicated by the appearance of a bluish-green or pink color.

Fig. 3. Test for Phenols (Precipitate shows bluish-green or pink color in the presence of Alkaloids).

4. Tannins:

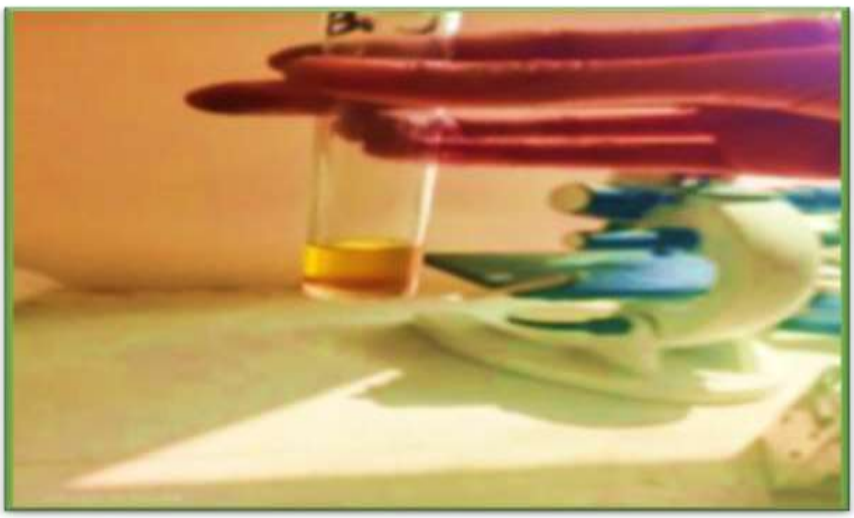
Procedure:

a) The ethanolic extract of the sample was evaporated to dryness.
b) The residue was dissolved in distilled water and added to 5% lead acetate.

Observation:

a) The presence of tannins was indicated by milky turbidity or white precipitation.

Fig. 4. Test for Tannins (Precipitate shows milky turbidity or white presence of Alkaloids).



5. Saponins:

Procedure:

a) The ethanolic extract was evaporated and then dissolved in water, followed by vigorous shaking.
b) Confirmatory test: 2 g of the powdered sample was crushed in chloroform, and a few drops of concentrated sulfuric acid were added to the filtrate. Subsequently, 1 ml of acetic anhydride was added to 1 ml of the iced filtrate.

Observation:

a) The presence of saponins was indicated by persistent honeycomb froth for half an hour.
b) The confirmatory test showed the presence of saponins with the formation of blue, bluish-green, or reddish-brown color, accompanied by the formation of a pink ring.

Fig. 3. Test for Saponins (Precipitate shows the formation of blue, bluish-green or reddish brown colour, formation of a pink ring in the presence of Saponins).

These tests confirm the presence of various phytochemicals in the plant samples, providing valuable information for further studies on their medicinal properties and potential applications.

Phytochemical screening of the medicinal plant *Selaginella bryopteris* (Sanjeevani booti).

3. RESULTS AND DISCUSSIONS

The preliminary phytochemical testing results are presented in Table 2. The results indicate that the concentrations of alkaloids, steroids, phenols, tannins, and saponins varied in the Selaginella plants. The concentration of alkaloids, steroids, and phenols was notably higher compared to tannins, while saponins were detected in trace amounts. **Table 2:** Preliminary Phytochemical Screening Results for *Selaginella bryopteris*

Compound	Concentration
Alkaloids	High
Steroids	High
Phenols	High
Tannins	Moderate
Saponins	Trace

Comparative Analysis with Previous Studies

Similar findings have been reported in various studies:

Kapoor et al. (1975), **Kumari (1997)**, **Prasad et al. (1995)**, and **Singh et al. (2014)**: These studies also reported the presence of alkaloids, steroids, phenols, tannins, and saponins in different medicinal plants. The concentrations varied, but the trends were consistent with the current findings, showing higher levels of alkaloids, steroids, and phenols, and lower levels of tannins and saponins.

Kashyap et al. (2020): Conducted phytochemical estimation on Katarni rice grown in the Bhagalpur and Banka districts of Bihar, which supports the present findings, indicating a similar profile of phytochemical constituents.

Ali et al. (2018), **Rimal et al. (2012)**, **Kibe et al. (2017)**, and **Emmanuel et al. (2017)**: These researchers have also conducted extensive studies on phytochemical screening in various plant species and observed similar results, reinforcing the trends observed in this study.

The results underline the richness of *Selaginella bryopteris* in key phytochemicals, particularly alkaloids, steroids, and phenols, which are known for their medicinal properties. The lower concentrations of tannins and trace amounts of saponins suggest that while these compounds are present, they may not be the primary active constituents in this plant. The detection of these phytochemicals suggests potential medicinal uses of Selaginella bryopteris, aligning with its

traditional use in treating various disorders. Further detailed quantitative analysis and bioactivity studies are recommended to explore the full therapeutic potential of these phytochemicals.

4. CONCLUSION

The phytochemical screening of *Selaginella bryopteris* confirms the presence of several active compounds, with high concentrations of alkaloids, steroids, and phenols, and lower concentrations of tannins and saponins. These findings are consistent with previous research, supporting the potential medicinal value of this plant. Future research should focus on the quantitative estimation of these compounds and their pharmacological effects to validate their traditional medicinal uses.

5. DATA AVAILABILITY

No data were used to support this study.

6. FINANCIAL SUPPORT

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

7. ACKNOWLEDGMENT

The author is thankful to the Division of Microbiology, Career Point University, Hamirpur, Himachal Pradesh for providing essential facilities.

8. CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

9. REFERENCES:

1. Adnan, M., Siddiqui, A.J., Arshad, J., Hamadou, W.S., Awadelkareem, A.M., Sachidanandan, M. & Patel, M. (2021) Evidence-based medicinal potential and possible role of *selaginella* in the prevention of modern chronic diseases: Ethnopharmacological and ethnobotanical perspective. *Records of Natural Products*. 15(5), 330-355. Available from: doi: http://doi.org/10.25135/rnp.222.20.11.1890.
2. Adnan, M., Siddiqui, A.J., Hamadou, W.S., Patel, M., Ashraf, S.A., Jamal, A., Awadelkareem, A.M., Sachidanandan, M., Snoussi, M. & De Feo, V.(2021) Phytochemistry, bioactivities, pharmacokinetics and toxicity prediction of Selaginella repanda with its anticancer potential against human lung, breast and colorectal carcinoma celllines. Molecules.26 (3), 768789. Available from: doi: https://doi.org/10.3390 /molecules 26030768.
3. Ali Ghasemzadeh, Mohammad Taghi Karbalaii, Hawa Z.E. Jaafar and Asmah Rahmat Phytochemical constituents, antioxidant activity and antiproliferative properties of black, red, and brown rice bran. Ghasemzade. et.al. Chemistry Central Journal (2018).
4. Dakshayani, S.S., Marulasiddeshwara, M.B., Kumar, S., Golla, R., Devaraja, S.R.H.K. & Hosamani, R. (2019) Antimicrobial, anticoagulant and antiplatelet activities of green synthesized silver nanoparticles using *Selaginella* (Sanjeevini) plant extract. *International journal of biological macromolecules*. 131, 787-797. Available from: doi: https://doi.org/10.1016/j.ijbiomac.2019.01.222.
5. Emmanuel Idehen, Yao Tang, Shengmin Sang, Bioactive phytochemical in barley. Journal of Food and Drug Analysis 25 (2017) 148 e 161. 6. Kapoor L.D., Singh A, Kapoor S.L. and Srivastava, S.N. Survey of Indian plants for saponins alkaloids and flavonoids IV.1975.38:221.
7. Kashyap R, Verma, R.K., Das D.K.AND Singh HNP Phytochemical Estimation of Katarina Rice grown in Bhagalpur and Banka District.International Journal of Research Culture Society. 2020.Page 140-145.
8. Mahadevan, A. Biochemical aspects of plants disease resistance" Part-I Today & tomorrows Printers and Publishers, Delhi, 1982, pp110-164.
9. Paswan, S.K., Gautam, A., Verma, P., Rao, C.V., Sidhu, O.P., Singh, A.P. and Srivastava, S. (2017) The Indian Magical Herb 'Sanjeevni'(*Selaginella bryopteris* L.)-A Promising Anti-inflammatory Phytomedicine for the Treatment of Patients with Inflammatory Skin Diseases. *Journal of pharmacopuncture*. 20(2), 93-99. Available from: doi: https://doi.org/10.3831/KPI.2017.20.012.
10. Paswan, S.K., Srivastava, S. & Rao, C.V. (2020) Wound healing activity of ethanolic extract of *Selaginella bryopteris* on rats. *Pharmacognosy Journal*. 12(2), 335-341. Available from: doi:10.5530/pj.2020.12.53.
11. Prasad, M.M. Singh, HNP., Roy, A.K.Sinha, R.K. Microbial spoilage of Silk cocoons in storage centres of Bihar and their control.Final Technical Report, U.G.C.Code No.3-22/91(RBB-I),(1992-95) Page-15-16 and 73.
12. R.S. Rimal Isaac, Aparna S.Nair, Elize Varghese, and Murthy Chavali, Phytochemical, Antioxidant and Nutrient Analysis of Medicinal Rice (Oryza Sativa L.) Varieties Found in South India. Advanced Science Letters Vol.5,1-5,201`2.
13. Singh HNP, known Sunita, Prasad M.M. Phytochemical Screening of Medicinal Plant. Asian Resonance Vol.III, issue-I January 2014,47-48.

14. Sinha, S.K.P. Physiological and Biochemical studies on certain medicinal of Euphorbiaceae. Ph.D. Thesis, Bhagalpur University, 1980.