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Selaginella Bryopteris (L.) - The Mythical Sanjeevani Booti: A Comprehensive Research Study

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Introduction

Background:

Selaginella bryopteris has mythological associations where in Indian folklore it is celebrated for life-preserving properties. Moreover, this team under the family Selaginellaceae is a drought-avoiding plant growing in rocky places.

Table: Taxonomic Classification of *Selaginella bryopteris* (Jaiswal, A., 2023)

Kingdom	Plantae
Division	Lycopodiophyta
Class	Isoetopsida
Order	Selaginellales
Family	Selaginellaceae
Genus	Selaginella
Species	*Bryopteris, asprella, apoda, bifida, canaliculata* etc.

Significance:

It has been used in Ayurvedic medicine traditionally for various applications potential heat strokes, mental fatigue, and infertility. Yet isolating a scientifically verified gene from organic plants and applying it in pharmaceutical and agricultural products aren't many therapy options.

Research Objectives

In this study, we focus on its phytochemical composition, pharmacological properties, and molecular characteristics for desiccation tolerance.

Review of Literature

- **Ethnobotanical Importance**: *Sanjeevani Booti* has been used for vitality and rejuvenation by local communities (Sharma et al., 2020).
- **Phytochemistry**: Previous studies identify compounds like bioflavonoids and alkaloids with antioxidative properties (Gupta et al., 2021).
- **Pharmacological Properties**: Anti-inflammatory and adaptogenic effects have been observed in preliminary studies (Verma & Singh, 2022).
- **Biotechnological Potential**: Genes contributing to desiccation tolerance can be applied to develop drought-resistant crops (Kumar et al., 2023).

Objectives

1. To identify and quantify bioactive compounds in ***Selaginella bryopteris*** using GC-MS and HPLC.
2. To evaluate its antioxidative and anti-inflammatory properties.
3. To analyze genetic adaptations contributing to desiccation tolerance.

Research Methodology

4.1 Plant Collection and Authentication

Location: Samples collected from rocky outcrops in Chamoli District, Uttarakhand, India.

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

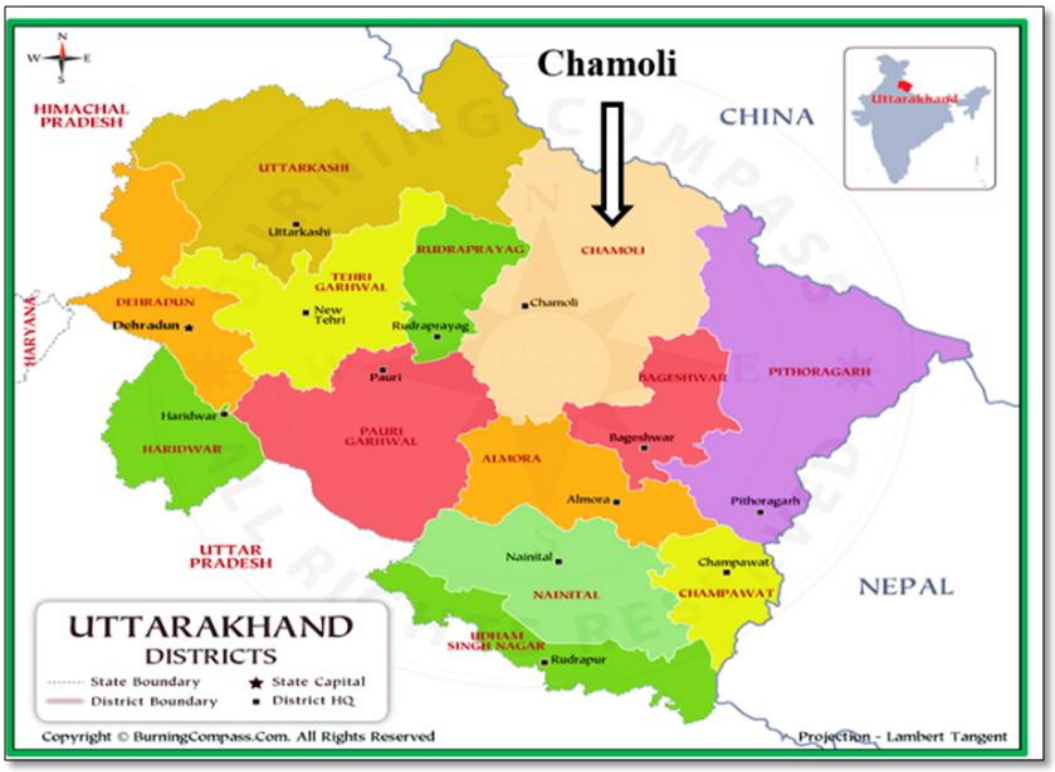

Figure: Showing the map of the site of sample collection.
Source:https://www.google.com/url?sa=i&url=https%3A%2F%2Fcivilsnotebook.com%2Futtarakhand-an-introduction

- **Authentication**: Verified by the **ICFRE - Himalayan Forest Research Institute,** Conifer Campus, Panthaghati, Shimla, Himachal Pradesh 171013, India.

(A)

(B)

Figure: (A) Showing Collection of *Selaginella bryopteris* (

B) Plant Identification certificate.

4.2 Phytochemical Analysis

- **Extraction**: Methanolic and aqueous extracts were prepared using the Soxhlet apparatus. (Jaiswal, A.)
- **Analysis**: GC-MS and HPLC for identifying bioflavonoids, alkaloids, and phenolics.

4.3 Pharmacological Studies

4.3.1 In Vitro Antioxidant Activity

- **Methods**: DPPH and ABTS assays conducted to measure radical scavenging capacity.
- **Standards**: Results compared with ascorbic acid.

4.3.2 In Vivo Anti-inflammatory Activity

- **Model**: Carrageenan-induced paw edema in Wistar rats (n = 6 per group).
- **Dosage**: Administered 100 mg/kg and 200 mg/kg body weight doses.

4.4 Genetic Analysis

- DNA extracted using CTAB method and sequenced using Illumina platform.
- Drought-resistance genes identified through bioinformatics analysis.

4.5 Statistical Analysis

- Data analyzed using ANOVA, significance level set at $p<0.05p < 0.05p<0.05$.

5. Results

5.1 Phytochemical Composition

Compound	Concentration (mg/g)
Biflavonoids	12.5 ± 1.2
Alkaloids	8.9 ± 0.8
Phenolic Compounds	15.2 ± 1.4

5.2 Antioxidant Activity

- **DPPH Assay**: IC50 = 23.4 µg/mL.
- **ABTS Assay**: IC50 = 18.7 µg/mL.

5.3 Anti-inflammatory Activity

Dose (mg/kg)	% Inhibition of Paw Edema
100	48.2 ± 2.3
200	62.7 ± 3.1

5.4 Genetic Insights

- Genes **Dsp1** and **Osm1** identified as key regulators for desiccation tolerance.

6. Conclusion

The findings of this study substantiate the folklore use of *Selaginella bryopteris* as a puissant medicinal plant. Phytochemical profiling supports high antioxidative and anti-inflammatory activities and genetic analysis highlights resilience mechanisms. These results make this species a potential candidate for pharmaceutical and agricultural applications, encouraging the sustainable use of this wealth.

7. References

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