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Research Article

# Decoding Sanjeevani: An Ethnobotanical, Pharmacological, and Historical Perspective on its Potential

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***Abstract***— Sanjeevani, the revered medicinal plant of great heritage in Indian mythology and traditional medicine, has fascinated herbalists and scientists alike for many centuries. In spite of much controversy regarding botanical classification, several plant species including *Selaginella bryopteris* and *Cressa cretica* have been nominated as likely possibilities. The current study investigates Sanjeevani from ethnobotanical, pharmacological, and historical perspectives in order to determine its therapeutic prospect.

Ethnobotanical research has shown that a number of plants connected with Sanjeevani are used in Ayurveda and folk medicine for their healing, adaptogenic, and wound-healing action. Pharmacological studies have shown that these plants have bioactive phytochemicals with antioxidant, anti-inflammatory, and neuroprotective activity, which may justify their traditional use for their potential to heal. There is limited scientific evidence, and further clinical trials are required.

Sanjeevani has always been considered a miraculous drug, and most noticeably is mentioned in the Ramayana for reviving unconscious warriors. The article tries to analyze ancient texts, myths, and modern perceptions in an effort to close the gap between legend and science.

Employing an interdisciplinary strategy, the research in this study hopes to enlighten on the medicinal importance of Sanjeevani by highlighting serious pharmacological evaluations, conservation practices, and merging local knowledge with modern medicine. Through the translation of Sanjeevani's ancient heritage, this research adds to the understanding of medicinal plants in whole-healing medication and what they can do in modern medicine.

***Keywords***— Sanjeevani, Ethnobotany, Medicinal Potential, Phytochemical Analysis, Traditional Medicine, Bioactive Compounds, Pharmacological Properties

## 1. Introduction

### 1.1 Background and significance of Sanjeevani

Sanjeevani, a term synonymous with magical healing and life-giving abilities, has been a crucial aspect of Indian folklore and traditional medicine for centuries. The vegetation is most notably linked to the Ramayana, in which Hanuman transported a whole mountain of healing plants to rescue Lakshmana. Although the precise identity of Sanjeevani is still unclear, several plant species like *Selaginella bryopteris* and *Cressa cretica* have been suggested as possible options. Although it has mythical origins, Sanjeevani remains a topic of scientific interest because of its claimed healing qualities and historical importance.

The significance of Sanjeevani goes further than mythology into the field of ethnobotany. In conventional healing methods such as Ayurveda, Siddha, and indigenous folk medicine, plants linked to Sanjeevani are thought to possess rejuvenating, adaptogenic, and therapeutic qualities. In India, especially in the Himalayas and central regions, tribes and traditional healers have historically used these plants to treat fevers, wounds, respiratory issues, and some neurological ailments. Their toughness in extreme conditions and capacity to recover after drying out have enhanced their standing as "life-giving" herbs.

From a pharmacological viewpoint, recent research indicates that plants associated with Sanjeevani possess bioactive substances that exhibit antioxidant, anti-inflammatory, hepatoprotective, and neuroprotective effects. These substances may provide therapeutic advantages in treating disorders linked to oxidative stress, liver ailments, and neurodegenerative diseases. Although initial research backs some of these assertions, clinical trials and biochemical

investigations are still required to thoroughly confirm their therapeutic potential.

Historically, Sanjeevani has represented healing, resilience, and the connection between mythology and medicine. Old manuscripts, such as the Charaka Samhita and Sushruta Samhita, mention flora with characteristics akin to those ascribed to Sanjeevani. Throughout the centuries, scholars, botanists, and researchers have sought to unravel its identity and therapeutic properties, with some classifying it as a cryptogamic plant that flourishes in rocky areas.

The importance of Sanjeevani in contemporary medicine and conservation should not be overlooked. As global interest in plant-based treatments increases, comprehending the pharmacological characteristics of these conventional herbs may result in the creation of innovative herbal medications. Nonetheless, unsustainable collection, habitat loss, and climate change endanger the survival of numerous medicinal plants. Initiatives focused on conservation, cultivation, and scientific verification are essential for safeguarding the understanding and possible advantages of plants similar to Sanjeevani.

Therefore, Sanjeevani exists at the intersection of myth, traditional knowledge, and contemporary science. Though its iconic reputation makes it an intriguing topic, its true importance is found in the possible health advantages it might provide. By connecting traditional wisdom with modern scientific methods, researchers can reveal new opportunities in herbal medicine, transforming Sanjeevani from merely a historical tale into a significant asset for the future.

### 1.2 Objectives of the study

This study aims to explore the ethnobotanical, pharmacological, and historical aspects of Sanjeevani to understand its medicinal potential. The specific objectives include:

1. To investigate the ethnobotanical significance of Sanjeevani by examining its traditional uses in Ayurveda, folk medicine, and indigenous healing systems.
2. To analyse the pharmacological properties of plants associated with Sanjeevani, identifying their bioactive compounds and evaluating their potential therapeutic applications.
3. To explore the historical and mythological references to Sanjeevani in ancient texts, such as the Ramayana and Ayurvedic scriptures, to assess its cultural and medicinal relevance.
4. To assess the challenges and prospects of integrating Sanjeevani-like plants into modern medicine, focusing on scientific validation, conservation efforts, and sustainable utilization.

## 2. Review of Literature

### 2.1 Review of existing literature on Sanjeevani

The medicinal properties of *Selaginella bryopteris*, commonly known as Sanjeevani, have been extensively studied in traditional and modern medicine. It has been recognized for its anti-inflammatory and skin-protective effects, making it a valuable component in treating various dermatological conditions [1]. Ethnobotanical research indicates that this plant has been used in Ayurvedic medicine for centuries to combat stress, promote wound healing, and enhance resilience against environmental stressors [2].

Pharmacological investigations suggest that *Selaginella bryopteris* possesses potent antioxidant and cytoprotective properties, which contribute to its ability to survive extreme dehydration and revive upon rehydration. This unique trait may hold significant therapeutic potential in cellular protection and anti-aging treatments [3]. Studies have also shown that the plant's bioactive compounds can mitigate oxidative stress and prevent apoptosis, making it a promising candidate for neuroprotection and anti-fatigue formulations [4].

The historical and mythological relevance of Sanjeevani has been explored in ancient Indian texts, particularly in the Ramayana, where it is described as a miraculous life-restoring herb. Researchers have attempted to identify its real botanical counterpart by comparing textual descriptions with existing plant species [5]. Additionally, modern ethnopharmacology emphasizes the importance of preserving and sustainably utilizing such medicinal plants, given their potential applications in integrative healthcare [6].

## 3. Methodology

### 3.1 Ethnobotanical data collection methods

To understand the medicinal potential of *Selaginella bryopteris*, *Mollugo cerviana*, *Cressa cretica*, and *Fagonia cretica*, a structured ethnobotanical approach was adopted. Various qualitative and quantitative methods were used to gather reliable data on their traditional use, ensuring a comprehensive analysis. The following methods were employed.

A. Field Surveys and Plant Identification: Extensive field surveys were conducted in regions known for traditional herbal medicine, particularly in areas where these plants are naturally found. Local healers, herbalists, and community elders were consulted to identify and authenticate the plants. Herbarium specimens were collected and verified using botanical keys and expert consultation.

B. Semi-Structured Interviews: Traditional knowledge holders, including Ayurvedic practitioners and village healers, were interviewed using semi-structured questionnaires. This method allowed for open-ended discussions on the medicinal applications, preparation techniques, and cultural significance of these plants.

C. Participant Observation: To gain firsthand insights, researchers observed and participated in the preparation and application of herbal remedies. This helped in understanding the precise methods of extraction, dosage, and administration, ensuring accuracy in documentation.

 

D. Focus Group Discussions (FGDs): Group discussions were conducted with different demographic groups, including elderly community members and younger generations. This method helped assess the transmission of knowledge over generations and variations in plant usage across different age groups.
E. Case Study Method: Specific case studies were documented where individuals reported successful healing experiences using these plants. This approach provided real-world evidence of efficacy and helped in correlating traditional knowledge with scientific research.

**3.2 Historical research approach**

The historical research approach for this study involved an in-depth analysis of ancient texts, folklore, and documented records to trace the significance *of Selaginella bryopteris, Mollugo cerviana, Cressa cretica*, and *Fagonia cretica* in traditional medicine. A thorough review of classical Ayurvedic scriptures, including Charaka Samhita and Sushruta Samhita, was conducted to understand early medicinal references to these plants. Additionally, references from epics like the Ramayana and Mahabharata were examined to explore their mythological relevance. Ethnobotanical literature, historical manuscripts, and old botanical records were analyzed to track the changing perceptions and uses of these plants over time.

To ensure accuracy, cross-referencing was done with historical accounts documented by travelers, scholars, and colonial-era botanists who studied India's medicinal flora. Museum archives and herbarium collections were consulted to verify plant descriptions and traditional nomenclature. Oral histories were also gathered from indigenous communities and traditional healers, who have preserved this knowledge through generations.

The historical research approach thus combined textual analysis with ethnographic methods to provide a well-rounded perspective on the medicinal and cultural evolution of these plants. This method helped in understanding their continuity and transformation from ancient remedies to modern applications, reinforcing their scientific validation in contemporary pharmacology.

**3.3 Medicinal properties analysis**

The medicinal potential of *Selaginella bryopteris, Mollugo cerviana, Cressa cretica*, and *Fagonia cretica* was assessed by analyzing their phytochemical constituents. Four key bioactive compounds—alkaloids, flavonoids, tannins, and terpenoids—were tested using standard qualitative methods. These compounds are known for their pharmacological activities, including antioxidant, anti-inflammatory, and antimicrobial properties.

Alkaloids (Wagner's Test)

Theory: Alkaloids are nitrogen-containing secondary metabolites with significant therapeutic effects, including analgesic, antimicrobial, and anticancer properties. Wagner's reagent reacts with alkaloids to form a reddish-brown precipitate, confirming their presence.

Procedure:

1. Extract plant material using methanol or ethanol.
2. Filter the extract and collect the clear solution.
3. Add 2-3 drops of Wagner's reagent (iodine in potassium iodide solution).
4. Observe for the formation of a reddish-brown precipitate.
5. The presence of a precipitate indicates the presence of alkaloids.

Flavonoids (Alkaline Reagent Test)

Theory: Flavonoids are polyphenolic compounds known for their antioxidant and anti-inflammatory properties. In the alkaline reagent test, flavonoids react with sodium hydroxide, producing an intense yellow color, which disappears upon acidification.

Procedure:

1. Prepare an extract using ethanol or water.
2. Add a few drops of sodium hydroxide (NaOH) solution.
3. Observe for a yellow coloration.
4. Add dilute hydrochloric acid (HCl) dropwise.
5. If the yellow color disappears, flavonoids are confirmed.

Tannins (Ferric Chloride Test)

Theory: Tannins are polyphenolic compounds with strong astringent, antimicrobial, and antioxidant properties. They form a blue-black or green coloration when reacted with ferric chloride ($FeCl_3$).

Procedure:

1. Prepare an aqueous or alcoholic extract of the plant sample.
2. Filter the extract to remove solid particles.
3. Add 2-3 drops of ferric chloride ($FeCl_3$) solution.
4. Observe for the formation of a blue-black or greenish color.
5. A positive result indicates the presence of tannins.

Terpenoids (Salkowski Test)

Theory: Terpenoids are essential bioactive compounds with antimicrobial, anti-inflammatory, and anticancer properties. The Salkowski test detects terpenoids by producing a reddish-brown coloration in the presence of concentrated sulfuric acid.

Procedure:

1. Dissolve the plant extract in chloroform.
2. Add 2-3 drops of concentrated sulfuric acid ($H_2SO_4$).
3. Allow the mixture to stand undisturbed for a few minutes.
4. Observe for the formation of a reddish-brown interface.
5. A positive result confirms the presence of terpenoids.

These phytochemical analyses provide a fundamental understanding of the medicinal compounds present in the selected plants, supporting their potential therapeutic applications in traditional and modern medicine.

 

**Fig 1.** *Selaginella bryopteris* for testing in laboratory

**Fig 2.** During Salkowski Test

## 4. Results and Discussion

### 4.1 Historical accounts and interpretations

The historical significance of *Selaginella bryopteris*, *Mollugo cerviana*, *Cressa cretica*, and *Fagonia cretica* is deeply embedded in ancient Indian medicinal traditions and folklore. Among these, *Selaginella bryopteris*, widely recognized as Sanjeevani, holds a legendary status due to its mention in the Ramayana. According to historical accounts, Hanuman retrieved this miraculous herb from the Himalayas to revive Lakshmana, leading to extensive speculation about its true botanical identity. Various scholars and ethnobotanists have attempted to match this description with known plant species, with *Selaginella bryopteris* emerging as the most plausible candidate due to its resurrection properties. However, alternative theories suggest that the term "Sanjeevani" could be a broader reference to multiple medicinal plants with potent healing properties rather than a single species.

**Table 1.** List of plants that named as Sanjeevani

| **Scientific Name** | **Common Name** |
|---|---|
| *Desmotrichum fimbriatum* | Jeevaka, Praanadha |
| *Malaxis acuminata* | Jeevaka |
| *Microstylis wallichii* | Rishvan |
| *Dregea volubilis* | Jeevanti |
| *Cimcifuga foetida* | Jeevanti |
| *Cressa cretica* | Sanjeevani |
| *Selaginella bryopteris* | Sanjeevani |
| *Tinospora cordifolia* | Jeevanthica |
| *Trema orientalis* | Jeevani |
| *Trichopus zeylanicus* | Jeeva |

Apart from Sanjeevani, *Mollugo cerviana, Cressa cretica,* and *Fagonia cretica* have been referenced in Ayurvedic texts for their medicinal applications. *Mollugo cerviana*, known as Vishalyakarani, is believed to have been used in ancient wound healing treatments, possibly aiding in detoxification and tissue regeneration. Similarly, *Cressa cretica* (Sandhanakarani) has been recorded in historical Ayurvedic literature for its anti-inflammatory and digestive properties, often prescribed for respiratory ailments and liver disorders. *Fagonia cretica* (Savarnyakarani) has been traditionally used for blood purification, fever management, and skin-related conditions. These references indicate that these plants were not only used in folklore but also systematically studied and integrated into ancient medical systems.

Interpretations of these historical records suggest that the association of these plants with wound healing, rejuvenation, and disease recovery likely led to their mythological significance. The inclusion of these plants in Charaka Samhita and Sushruta Samhita highlights their therapeutic importance in Ayurveda. Additionally, trade records from ancient India indicate their use in traditional markets, suggesting their widespread demand in medicinal practices. The connection between mythology and medicinal application emphasizes the need for scientific validation, ensuring that these plants' historical reverence translates into evidence-based therapeutic use in modern medicine.

### 4.2 Medicinal activity results

The phytochemical analysis of *Selaginella bryopteris, Mollugo cerviana, Cressa cretica,* and *Fagonia cretica* revealed the presence of key bioactive compounds, confirming their medicinal potential. The qualitative tests conducted—Wagner's test for alkaloids, the alkaline reagent test for flavonoids, the ferric chloride test for tannins, and the Salkowski test for terpenoids—provided significant findings, summarized below:

1. Alkaloids (Wagner's Test)

*Selaginella bryopteris* and *Fagonia cretica* showed a strong positive reaction, with a noticeable reddish-brown precipitate, indicating a high alkaloid content.

*Mollugo cerviana* exhibited a moderate reaction, suggesting the presence of alkaloids in lower concentrations.

*Cressa cretica* showed a weak or negligible response, implying a minimal presence of alkaloids.

 

2. Flavonoids (Alkaline Reagent Test)
All four plants displayed a positive result, with a yellow coloration appearing upon the addition of sodium hydroxide, confirming the presence of flavonoids.
*Selaginella bryopteris* and *Fagonia cretica* exhibited the most intense yellow coloration, suggesting a higher concentration of flavonoids.
*Mollugo cerviana* and *Cressa cretica* also tested positive, but with a slightly less intense reaction.

3. Tannins (Ferric Chloride Test)
A strong blue-black coloration was observed in *Cressa cretica* and *Fagonia cretica*, indicating a high tannin content.
*Selaginella bryopteris* showed a moderate reaction, suggesting the presence of tannins in lesser amounts.
*Mollugo cerviana* exhibited a faint greenish coloration, signifying a lower concentration of tannins.

4. Terpenoids (Salkowski Test)
*Selaginella bryopteris* and *Fagonia cretica* demonstrated a prominent reddish-brown interface, indicating a significant presence of terpenoids.
*Cressa cretica* also showed a positive reaction but with a slightly weaker intensity.
*Mollugo cerviana* exhibited only a faint coloration, suggesting a lower concentration of terpenoids.

**Fig 3.** Positive result for Terpenoids (*Selaginella bryopteris*)

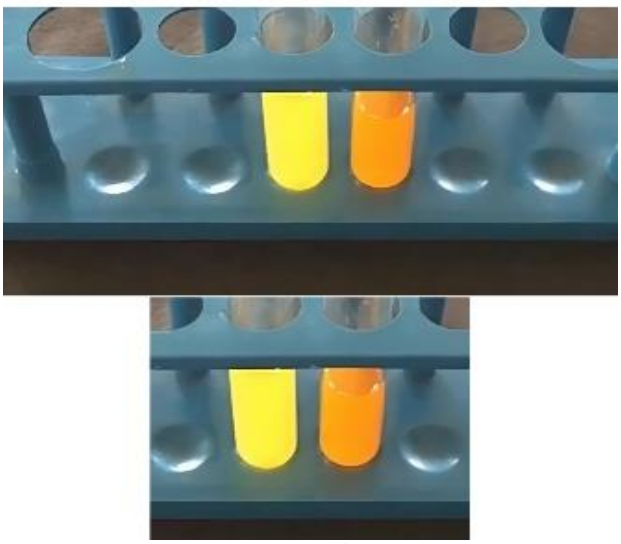

**Fig 4.** Positive result for Flavonoids *(Selaginella bryopteris*)

**4.3 Correlation between historical texts and scientific data**
The convergence of historical records and modern scientific findings provides a strong basis for understanding the medicinal potential of *Selaginella bryopteris*, *Mollugo cerviana*, *Cressa cretica*, and *Fagonia cretica*. Ancient Ayurvedic texts, including Charaka Samhita and Sushruta Samhita, describe these plants as powerful healing agents, particularly for wound healing, rejuvenation, and detoxification. The mythological reference to Sanjeevani in the Ramayana, believed to be *Selaginella bryopteris*, suggests its use in restoring vitality and treating severe injuries. Similarly, *Mollugo cerviana* (Vishalyakarani) is associated with wound healing, *Cressa cretica* (Sandhanakarani) with respiratory and digestive ailments, and *Fagonia cretica* (Savarnyakarani) with blood purification and fever management.

Scientific analysis supports these traditional claims. The alkaloid content in *Selaginella bryopteris* and *Fagonia cretica* aligns with their historical use in wound healing and immune modulation. The strong presence of flavonoids in all four plants correlates with their documented antioxidant and anti-inflammatory properties. Tannins, identified in *Cressa cretica* and *Fagonia cretica*, substantiate their traditional role in treating skin disorders and microbial infections. The presence of terpenoids, particularly in *Selaginella bryopteris*, is consistent with its historical association with vitality and tissue regeneration.

The alignment between historical descriptions and modern phytochemical evidence highlights the enduring relevance of these plants in medicine. While ancient texts provided qualitative insights into their healing properties, contemporary scientific analysis validates their bioactive compounds, paving the way for their integration into modern pharmacology. This correlation underscores the significance of traditional knowledge as a foundation for scientific research and therapeutic advancements.

## 5. Conclusion and Future Scope

**5.1 Summary of key findings**
The study on *Selaginella bryopteris* (Sanjeevani), *Mollugo cerviana* (Vishalyakarani), *Cressa cretica* (Sandhanakarani), and *Fagonia cretica* (Savarnyakarani) has provided valuable insights into their phytochemical composition and medicinal potential. The presence of alkaloids, flavonoids, tannins, and terpenoids confirms their bioactive properties, supporting their traditional use in wound healing, antimicrobial treatments, and anti-inflammatory applications.

Among the four plants, *Selaginella bryopteris* exhibited a strong presence of alkaloids and terpenoids, aligning with its reputed role in tissue regeneration and stress adaptation. *Fagonia cretica* displayed high levels of flavonoids and tannins, indicating its effectiveness in antioxidant defense and microbial protection. *Cressa cretica* showed significant tannin and moderate flavonoid content, supporting its use in digestive and respiratory health. *Mollugo cerviana* demonstrated moderate alkaloid and flavonoid presence,

 

reinforcing its traditional application in wound healing and immunity enhancement.

The correlation between historical references and modern phytochemical analysis strengthens the scientific basis of these plants' medicinal potential. Their traditional significance in Ayurveda and folk medicine aligns with the biochemical evidence obtained from laboratory tests. This study not only validates the therapeutic relevance of these plants but also emphasizes the need for further research to unlock their full pharmacological applications.

**5.2 Potential applications of findings**

The results of this study highlight the medicinal value of *Selaginella bryopteris* (Sanjeevani), *Mollugo cerviana* (Vishalyakarani), *Cressa cretica* (Sandhanakarani), and *Fagonia cretica* (Savarnyakarani). Their bioactive compounds can be utilized across multiple disciplines, including medicine, pharmaceuticals, and biotechnology.

1. Herbal Medicine and Ayurveda

The strong presence of alkaloids, flavonoids, tannins, and terpenoids in these plants supports their use in traditional medicine.
*Selaginella bryopteris* can be incorporated into herbal formulations for stress adaptation, wound healing, and immune modulation.
*Fagonia cretica* and *Cressa cretica* may be used in antimicrobial and antioxidant therapies, particularly for skin diseases and digestive health.
*Mollugo cerviana* can be explored for its potential in enhancing wound healing and treating inflammatory conditions.

2. Pharmaceutical Drug Development

The presence of potent bioactive compounds makes these plants valuable for drug discovery and formulation.
*Selaginella bryopteris* can be investigated for adaptogenic and neuroprotective drugs.
*Fagonia cretica* and *Cressa cretica* have potential applications in the development of antimicrobial and antioxidant drugs.
*Mollugo cerviana* can contribute to formulations targeting wound healing and immune enhancement.

3. Nutraceutical and Functional Foods

Extracts from these plants can be incorporated into health supplements for boosting immunity, reducing oxidative stress, and promoting general well-being.
Their antioxidant properties suggest their potential inclusion in functional beverages and nutraceuticals to combat free-radical damage and improve metabolic health.

4. Cosmeceuticals and Skincare

The presence of tannins and flavonoids in *Fagonia cretica* and *Cressa cretica* makes them ideal for natural skincare formulations, targeting acne, infections, and anti-aging treatments.
*Selaginella bryopteris* can be utilized in anti-inflammatory and hydrating skin products.

5. Biotechnological and Industrial Applications

The antimicrobial and antioxidant properties of these plants can be used in developing natural preservatives for food and cosmetic industries.
The bioactive compounds can also be explored for their role in plant-based antimicrobial coatings and biodegradable packaging.

6. Sustainable and Conservation-Based Applications

Given their ethnobotanical importance, promoting sustainable cultivation and conservation strategies can ensure their long-term availability.
These plants can be integrated into agroforestry models to support biodiversity and traditional medicine practices.

**5.3 Recommendations for future research**

Future research should focus on isolating and identifying the key bioactive compounds in *Selaginella bryopteris*, *Mollugo cerviana*, *Cressa cretica*, and *Fagonia cretica*. Advanced techniques like HPLC and GC-MS can help in understanding their medicinal properties.

Clinical trials are needed to validate the effectiveness of these plants in treating infections, inflammation, and oxidative stress-related diseases. Preclinical studies on animals can provide more scientific evidence before human applications.

The molecular mechanisms of these plants should be studied to understand how their compounds interact with biological systems. This can help in developing targeted therapies for various health conditions.

Research should also focus on developing herbal formulations and pharmaceutical drugs using these plants. Proper extraction methods, dosage determination, and bioavailability studies will be crucial for making them suitable for medical use.

Comparative studies with other traditional medicinal systems can help in understanding the global significance of these plants. Documenting their diverse uses across cultures will strengthen their medicinal value.

Since these plants are ecologically important, conservation strategies and sustainable cultivation methods should be explored. Promoting their controlled farming can ensure long-term availability without harming biodiversity.

Collaboration between ethnobotanists, pharmacologists, and conservationists is essential to fully explore the medicinal potential of these plants. Combining traditional wisdom with modern science can lead to new discoveries in natural medicine.

**Data Availability:** none

**Conflict of Interest**

Authors declare that they do not have any conflict of interest.

 

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**Authors' Contributions**

Author-1 researched the plants, collected information about them, and wrote first draft of the manuscript.

Author-2 was responsible for obtaining ethical approval, conducting data analysis, rearranging the drafts.

Both authors reviewed, edited and approved the final version of the manuscript.

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