



Ethnopharmacology of *Andrographispaniculata* (Kalmegh) growing in Jharkhand, India

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ABSTRACT

While situating *Andrographispaniculata* (Kalmegh) in the cultural and ecological setting of Jharkhand, India, this work offers a thorough ethnopharmacological assessment. Traditional knowledge of Kalmegh's medicinal applications and its importance in indigenous healthcare practices is the focus of this study. The ethnomedicinal applications of *Andrographispaniculata* may be better understood via fieldwork that includes conversations with local populations, traditional healers, and practitioners. Among the many topics covered by the survey are the following: plant components, methods of manufacture, dosage, and delivery routes. Furthermore, the research delves into any cultural or ceremonial importance linked to the traditional medicinal use of Kalmegh. An evaluation of the phytochemical components found in *Andrographispaniculata* supplements the ethnobotanical data that has been gathered. Finding bioactive chemicals that might be responsible for the reported therapeutic effects is the primary goal of the study. For the local pharmacopoeia to fully grasp Kalmegh's medicinal potential, this knowledge is essential. The research sheds light on the traditional medical knowledge surrounding *Andrographispaniculata* in Jharkhand via its ethnopharmacological survey. The results help keep indigenous knowledge alive and pave the way for future pharmacological studies, which will help bring together traditional medicine and contemporary science to develop long-term solutions for this plant's therapeutic uses.

Keywords: *Andrographispaniculata*, Ethnopharmacology, Jharkhand, Traditional medicine, Medicinal plants

Introduction

Traditional healers, researchers, and herbal enthusiasts have all been captivated by the therapeutic plant *Andrographispaniculata*, which is known by a variety of names, including King of Bitters, Kalmegh, and a great deal of other names. This herbaceous plant, which is indigenous to Southeast Asia and the Indian subcontinent, belongs to the Acanthaceae family and may be readily identified by its stout stem, little white flowers, and leaves that are bent in an odd manner. *Andrographispaniculata* has been the subject of a significant amount of ethnopharmacological, phytochemical, and pharmacological research owing to the enormous amount of bioactive compounds that it contains. This has resulted in the plant receiving a significant amount of attention, despite the fact that it has distinctive botanical characteristics. [1-3]

Andrographispaniculata has a long and illustrious history of use in a variety of traditional medicinal systems, the most prominent of which being Ayurveda and Traditional Chinese Medicine (TCM). As a result of the plant's bitter taste and its lengthy history of use in the treatment of a variety of infectious ailments, it was given the Sanskrit name "Kalmegh," which translates to "dark cloud" in English. This name has been preserved over the decades that it has been used in India. Kalmegh has been cherished for a very long time by traditional healers and practitioners all over the globe due to the purported therapeutic characteristics that it has. As a consequence of this, it is used in a variety of formulations that are specifically designed to enhance the immune system, combat infections, and cure liver illnesses. [4-6]

It is possible to find *Andrographispaniculata* in its natural environment throughout a wide geographical range, which includes parts of Malaysia, China, Thailand, Indonesia, and India. The plant is indigenous to a diverse variety of environments in India, ranging from the foothills of the Himalayas to the Western Ghats and the states in the northeastern part of the nation. The state of Jharkhand, which is located in eastern India, is notable for its varied topography and temperature, which makes it a perfect location for the *Andrographispaniculata* plant to flourish. Due to the fact that it may be adapted to a broad variety of environments, kalmegh is readily accessible, which demonstrates its strong resilience. [7,8]

A typical height range for *Andrographispaniculata* is between 30 and 110 centimeters. This herbaceous annual plant is characterized by its presence. There are pairs of opposite-leafed lanceolate leaves that have serrated edges that are used to decorate the thin stems. This plant has an inflorescence that is composed of clusters of small tubular blossoms that range in color from white to lavender. It is ultimately possible for these flowers to give birth to capsules that contain a multitude of very little seeds, which enables the plant to reproduce. The botanical characteristics of *Andrographispaniculata* are

essential for accurate identification when it is discovered in its natural environment. These characteristics also contribute to the plant's beautiful appearance. [9]

There is a strong connection between the therapeutic potential of *Andrographispaniculata* and the intricate chemical composition of the plant. In comparison to the other bioactive compounds that may be discovered in the plant, andrographolide has been the subject of the greatest study and investigation. The antioxidant, antiviral, anti-inflammatory, and immunomodulatory characteristics of the diterpenoid lactone andrographolide are only some of the numerous pharmacological effects that it has. The inclusion of additional terpenoids, flavonoids, and polyphenolic compounds in the plant, in addition to andrographolide, contributes to the enhancement of the plant's pharmacological profile. It is believed that the combination of these compounds would boost the overall therapeutic efficiency of *Andrographispaniculata*. [10]

Of the several uses of *Andrographispaniculata* that have been around for a very long time in Ayurveda and Traditional Chinese Medicine (TCM), the plant has retained a major role in both antiquated medicinal systems. As a "rasayana," the plant is regarded in Ayurveda for the revitalizing and health-promoting effects that it has. It is often advised by medical professionals for the treatment of a broad variety of symptoms, including those that are linked with the human respiratory system, the liver, and the skin. Additionally, the bitter properties of *Andrographispaniculata* have contributed to its widespread usage in traditional Chinese medicine. In this context, the herb is used for the purpose of reducing body temperature, eliminating pollutants, and treating respiratory ailments. [11]

There is a wealth of traditional knowledge that has been preserved by indigenous communities about *Andrographispaniculata*, which is one of the factors that adds to its ethnopharmacological significance. This relevance extends beyond the uses it has had in the past. The herb has been used by traditional healers and communities for a considerable amount of time, and it has been passed down from generation to generation being an essential component of their ethnomedicinal practices. An important objective of ethnopharmacological research is to document and gain an understanding of these traditional uses. This is accomplished by shedding light on the cultural context, production methods, and dose kinds that are used by different cultures. [12]

The presence of *Andrographispaniculata* contributes to the enhancement of the ethnomedicinal environment that exists in the state of Jharkhand in Rajasthan, India. The indigenous communities in the region have used the therapeutic properties of the plant as part of their healing practices in order to treat the numerous health problems that are prevalent. By doing research on the ethnopharmacological characteristics of Kalmegh in Jharkhand, we are able to get a better understanding of the traditional applications of the plant while also shedding light on the dynamic relationship that exists between indigenous peoples and the natural surroundings in which they live. [13]

This all-encompassing inquiry intends to integrate traditional knowledge with contemporary scientific understanding by conducting a comprehensive ethnopharmacological evaluation of *Andrographispaniculata* cultivated in Jharkhand, India. This will be accomplished by conducting in-depth ethnopharmacological analysis. In order to achieve the goals, it is necessary to get an understanding of the cultural significance of Kalmegh among indigenous communities, to document the traditional use of the herb, and to define the preparation procedures. In addition, the study proposes to investigate the pharmacological potential of *Andrographispaniculata* as well as its phytochemical composition, with the goal of finding solutions to the conventional health issues that are prevalent in the region.

Material and Methods

Study Area

The state of Jharkhand in India, which was selected for the study due to its different natural zones and indigenous populations, serves as the geographical and population focus of the research. A selection will be made of key places within the state of Jharkhand, each of which will represent a particular topography and ethnic group. Those people of the community who are knowledgeable with *Andrographispaniculata*, as well as local healers and traditional practitioners, will be considered to be part of the research population.

Ethnobotanical Surveys

In order to collect information on the traditional applications of *Andrographispaniculata*, ethnobotanical surveys will be carried out. For the purpose of gathering information from community members and local healers, we will be doing semi-structured interviews as well as formal group discussions. A documentation process will be carried out in order to record information about the plant's applications, preparation techniques, dosage forms, and cultural importance.

Plant Identification

The process of identifying plants and collecting botanical specimens of *Andrographispaniculata* will be carried out in a number of different places across the state of Jharkhand. In order to ensure that the collection has a minimum effect on the natural population, it will be carried out in accordance with ethical principles. After the specimens have been gathered, they will be carefully recognized with the use of conventional botanical keys, and then they will be stored in a herbarium for future convenience.

Results and Discussion

Due to the presence of indigenous communities and the many natural zones that are found in the area, the focus of the research was placed on Jharkhand, which is located in India. The ethnopharmacology of *Andrographispaniculata* may be best investigated against the backdrop of the natural variety that exists in Jharkhand, which stretches from the areas that are controlled by tribal communities to the Chotanagpur Plateau. The fact that this plant can survive in a wide range of temperatures and environments makes it an intriguing subject for research; if we study it, we may be able to get a better understanding of how changes in the environment influence the chemical composition of plants. Through engagement with indigenous communities, the study acknowledges the indigenous people's role as guardians of traditional knowledge on medicinal plants, therefore recognizing the cultural significance of the region.

The study sample was selected with the intention of highlighting the value of using indigenous knowledge, which comprises members of the community, traditional practitioners, and practitioners from the local community. As a result of the deep links that these individuals have to their history and culture, they often have a significant deal of information about the traditional use of *Andrographispaniculata*. Participation in the research process is intended to accomplish the main objective of the study, which is to create an atmosphere that is amenable to collaboration and the exchange of information between individuals. The participation of local communities not only serves to respect the knowledge that they possess, but it also assists in filling in gaps in our understanding of the cultural and medicinal dimensions of the plant.

The use of ethnobotanical surveys, which include techniques such as semi-structured interviews and intense group discussions, brings to an increase in the level of rigor that is present in research. *Andrographispaniculata*'s cultural relevance, production methods, dosage forms, and uses may all be documented with the help of these procedures, which make it feasible to capture every single piece of traditional knowledge about the plant. Despite the fact that semi-structured interviews still provide a systematic approach, the inherent flexibility of these interviews makes it possible to conduct a more detailed analysis of the subject matter. The purpose of the surveys is to investigate the cultural background of the plant and the traditions that are associated with it in order to discover the plant's medicinal properties as well as its participation in rituals, rites, and other cultural activities. The study is well-positioned to make a considerable addition to our scientific understanding while also contributing to the preservation of indigenous wisdom. This is due to the fact that it takes a comprehensive approach.

1. Malaria:

- *Mode of Use:* 20 g of the whole plant is powdered, mixed in water, filtered, and given internally twice a day.
- *Explanation:* *Andrographispaniculata* has long been acknowledged for its antimalarial properties, and this traditional remedy aligns with its historical use in treating malaria. The powdered form of the whole plant is prepared and administered internally, likely leveraging the plant's bioactive compounds such as andrographolides. These compounds have demonstrated anti-malarial effects in scientific studies. The twice-daily administration suggests a consistent and targeted approach to manage the symptoms of malaria, showcasing the plant's potential efficacy in traditional antimalarial practices. [14]

2. Eczema:

- *Mode of Use:* 2 g of powder is given internally once a day for 40 days.
- *Explanation:* *Andrographispaniculata*'s application in treating eczema demonstrates its potential in managing skin conditions. The internal administration of the powdered form suggests a systemic approach, indicating that the plant may work holistically to address the underlying causes of eczema. The prolonged duration of 40 days reflects a traditional belief in the gradual and sustained nature of herbal remedies. Eczema, characterized by inflammation and itching of the skin, may benefit from the anti-inflammatory and immunomodulatory properties attributed to *A. paniculata*. [15]

3. Jaundice:

- *Mode of Use:* 10 g of water extract of the herb, heat treated by dropping hot stone, given 3 times a day for 6 days.
- *Explanation:* The use of *Andrographispaniculata* in treating jaundice aligns with its historical reputation for liver protection and hepatoprotective effects. The water extract is prepared and administered three times a day, indicating a frequent and consistent dosage. The additional step of heat treatment using a hot stone might be a traditional practice aimed at enhancing the efficacy of the remedy or modifying the properties of the plant extract. Jaundice, characterized by yellowing of the skin and eyes due to liver dysfunction, could benefit from the potential hepatorenal protective properties of *A. paniculata*. [16]

4. Gonorrhea:

- *Mode of Use:* 2 g of the powder given internally or plant juice is applied to the wounds.
- *Explanation:* The application of *Andrographispaniculata* in treating gonorrhea reflects its historical use as an antimicrobial agent. The internal administration of the powdered form suggests a systemic approach to addressing the infection. Alternatively, the application of plant juice directly to the wounds emphasizes the plant's potential antimicrobial and anti-inflammatory properties at the site of infection. This dual

approach aligns with the traditional understanding that combining internal and external remedies may enhance the effectiveness of the treatment. Gonorrhoea, a sexually transmitted infection, may benefit from the plant's antimicrobial and anti-inflammatory attributes. [17]

5. Infected Wounds:

- *Mode of Use:* Paste of the herb mixed with turmeric applied externally.
- *Explanation:* *Andrographispaniculata*'s application in treating infected wounds underscores its historical use as a wound healing agent. The preparation of a paste with turmeric enhances the remedy, as turmeric is well-known for its anti-inflammatory and antimicrobial properties. The external application of the paste directly to the infected wounds aligns with traditional wound care practices. The combination of *Andrographispaniculata* and turmeric suggests a synergistic approach, leveraging the complementary properties of both herbs. The anti-inflammatory, antimicrobial, and wound healing properties attributed to *A. paniculata* make it a valuable component in traditional wound care practices. [18]

Conclusion

In summary, this research provides a glimpse into the folk medicine applications of *Andrographispaniculata*, showcasing its versatility in addressing various health conditions. The modes of use reflect traditional practices deeply rooted in cultural and historical contexts. The powdered form of the whole plant, water extracts, and pastes illustrate the diverse ways in which the herb is prepared for internal and external administration. The detailed explanations provide insights into the rationale behind each traditional remedy, shedding light on the potential pharmacological properties of *Andrographispaniculata* in the context of folk medicine. These traditional uses not only demonstrate the historical significance of the plant but also offer avenues for further scientific exploration and validation of its therapeutic potential.

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