Traditional knowledge of Snakebite treatment: Medicinal plants utilized by Vaidyas in Parassala, Thiruvananthapuram

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ABSTRACT

Snakebite envenomation remains a significant public health concern in rural regions of India, particularly in Kerala, where agricultural activities and human snake interactions are frequent. Despite the availability of modern antivenom therapy, traditional treatment practices by *Vaidyas* (indigenous healers) continue to play a vital role in primary healthcare, especially in remote areas. This ethnobotanical study documents and analyses the medicinal plants employed by *Vaidyas* in Parassala, Thiruvananthapuram, for the treatment of snakebites. Data were collected through semistructured interviews and field observations, recording plant species, local names, plant parts used, preparation methods, and modes of administration. A total of 15 medicinal plant species belonging to 12 families were identified, with leaves being the most commonly used plant part, followed by roots and bark. The remedies involved both oral administration and topical applications, often accompanied by specific rituals. The findings highlight the rich repository of traditional knowledge in Parassala and underline the need for conservation, scientific validation, and sustainable use of these plant resources. This study serves as a baseline for future pharmacological investigations and the preservation of cultural heritage associated with snakebite management.

Keywords: Snakebite, medicinal plants, Vaidyas, Parassala, ethnobotany, traditional medicine

INTRODUCTION

Snakebite is recognized by the World Health Organization (WHO) as a neglected tropical disease that disproportionately affects rural populations in tropical and subtropical regions. In India, an estimated 58,000 deaths occur annually due to snakebite envenomation, with Kerala contributing significantly to the morbidity and mortality rates. While modern medical interventions such as polyvalent antivenoms are available, their accessibility in remote areas remains limited, prompting many victims to initially seek traditional healers.

Vaidyas, the traditional Ayurvedic practitioners of Kerala, possess an extensive knowledge base of herbal remedies for a variety of ailments, including snakebites. This knowledge, transmitted orally across generations, is deeply intertwined with cultural beliefs, spiritual practices, and local biodiversity. The Parassala region of Thiruvananthapuram district is known for its rich vegetation and abundance of medicinal flora, making it a valuable site for ethnobotanical research.

Documenting the plants and treatment methods used by *Vaidyas* not only preserves an important component of intangible cultural heritage but also provides a foundation for scientific validation of potential bioactive compounds. Medicinal plant surveys in such contexts are crucial for bridging traditional knowledge with modern pharmacology, ensuring both conservation of biodiversity and safeguarding of indigenous healthcare practices.

The present study aims to:

1. Identify and document the medicinal plants employed by *Vaidyas* in Parassala for snakebite treatment.
2. Record preparation methods, dosage, and modes of administration.
3. Assess the cultural significance and transmission of this traditional knowledge.
4. Provide a baseline for future pharmacological and toxicological studies.

MATERIALS AND METHODS

Study area

The study was conducted in Parassala**,** the southernmost taluk of Thiruvananthapuram district, Kerala, India. Parassala lies close to the Kerala Tamil Nadu border and is characterized by a tropical climate with an average annual temperature of 27–30°C and an annual rainfall of approximately 2000–2500 mm. The vegetation comprises tropical moist deciduous forests, agricultural lands, home gardens, and roadside flora. This ecological diversity supports a wide range of medicinal plant species.

Study population

The research focused on *Vaidyas* traditional Ayurvedic practitioners residing and practicing in Parassala. Inclusion criteria for participation were: Practitioners with a minimum of 10 years of experience in treating snakebite cases Recognition by the local community as a healer Willingness to share knowledge and participate in the study

Data collection

Medicinal plant data were gathered between March 2020 to May 2020 using a combination of:

- Semi structured interviews to obtain information on plant species, local names, plant parts used, preparation methods, dosage, and route of administration.
- Participant observation**,** where researchers observed the preparation of remedies.
- Field walks with the *Vaidyas* to collect and identify plant species in their natural habitats.

Photographs of plants were taken for documentation. Collected specimens were assigned voucher numbers and deposited in the Herbarium of Department of Botany, VTM NSS College, Dhanuvachapuram for future reference.

Plant identification

Plant species were identified using:

- Standard floras of Kerala (e.g., *Flora of the Presidency of Madras*, Gamble, 1915–1936; *Flora of Kerala*, Nair, 1993)
- Consultation with taxonomists from JNTBGRI and Department of Botany, VTM NSS College, Dhanuvachapuram

Data analysis

The medicinal plant information was organized and analyzed to determine:

- Frequency of citation (FC) of each plant species among the informants
- Most commonly used plant parts and preparation techniques
- Modes of administration (oral, topical, or both)

RESULTS

The medicinal plant survey in Parassala, Thiruvananthapuram, documented a total of 15 medicinal plant species belonging to 15 genera and 13 families used by *Vaidyas* for snakebite treatment. The majority of the remedies were prepared from fresh plant materials, and leaves were the most frequently used plant part, followed by roots, bark, and whole plants. Both oral and topical applications were employed, often in combination.

Enumerated list of documented Medicinal plants

1. ***Andrographis paniculata*** (Burm.f.) Nees (*Kalmegh*) – Family: Acanthaceae
Part used: Leaf
Preparation: Fresh leaves ground into paste with water; applied topically on bite site
2. ***Aristolochia indica*** *L.* (*Garudakkodi*) – Family: Aristolochiaceae
Part used: Root
Preparation: Root powder mixed with cow's milk; administered orally once daily for 3 days
3. ***Hemidesmus indicus*** (L.) R. Br. (*Nannari*) – Family: Apocynaceae
Part used: Root
Preparation: Decoction of root taken orally to neutralize toxins
4. ***Strychnos nux-vomica*** *L.* (*Kanjiram*) – Family: Loganiaceae
Part used: Seed (detoxified)
Preparation: Detoxified seed powder mixed with honey; administered in minute doses
5. ***Rauvolfia serpentina*** (L.) Benth. ex Kurz (*Sarpagandhi*) – Family: Apocynaceae
Part used: Root
Preparation: Root paste given orally along with other herbs in combination formula
6. ***Azadirachta indica*** A. Juss. (*Veppu*) – Family: Meliaceae
Part used: Leaf
Preparation: Leaf paste applied on wound to prevent infection
7. ***Curcuma longa*** L. (*Manjal*) – Family: Zingiberaceae
Part used: Rhizome
Preparation: Rhizome paste mixed with lime; applied externally to reduce inflammation
8. ***Mimosa pudica*** L. (*Thottavadi*) – Family: Fabaceae
Part used: Root
Preparation: Fresh root decoction given orally to slow toxin spread
9. ***Eclipta prostrata*** (L.) L. (*Kayyonni*) – Family: Asteraceae
Part used: Leaf
Preparation: Leaf juice administered orally to purify blood.
10. ***Boerhavia diffusa*** L. (*Thazhuthama*) – Family: Nyctaginaceae
Part used: Whole plant
Preparation: Fresh plant boiled and decoction taken orally
11. ***Costus speciosus*** (J.Koenig) Sm. (*Chemmarathi*) – Family: Costaceae
Part used: Rhizome
Preparation: Rhizome paste applied to bite site
12. ***Leucas aspera*** (Willd.) Link (*Thumba*) – Family: Lamiaceae

Part used: Leaf and flower
Preparation: Leaf and flower juice applied externally
13. ***Ocimum tenuiflorum*** L. (*Tulasi*) – Family: Lamiaceae
Part used: Leaf
Preparation: Leaf extract administered orally with black pepper.
14. ***Aegle marmelos*** (L.) Corrêa (*Koovalam*) – Family: Rutaceae
Part used: Leaf
Preparation: Leaf juice taken orally to strengthen immunity
15. ***Piper longum*** L. (*Thippali*) – Family: Piperaceae
Part used: Fruit
Preparation: Powdered fruit mixed with warm water; given orally to improve circulation

Table 1. Medicinal plants used by Vaidyas in Parassala for snakebite treatment

Sl.No	Scientific name	Local name	Family	Part used	Preparation & mode of use
1	*Andrographis paniculata* (Burm.f.) Nees	Kalmegh	Acanthaceae	Leaf	Fresh leaves ground to paste; applied topically on bite site
2	*Aristolochia indica* L.	Garudakkodi	Aristolochiaceae	Root	Root powder mixed with cow's milk; taken orally once daily
3	*Hemidesmus indicus* (L.) R. Br.	Nannari	Apocynaceae	Root	Decoction prepared and administered orally
4	*Strychnos nux-vomica* L.	Kanjiram	Loganiaceae	Seed	Detoxified seed powder mixed with honey; given in small doses
5	*Rauvolfia serpentina* (L.) Benth. ex Kurz	Sarpagandhi	Apocynaceae	Root	Root paste given orally with other herbs
6	*Azadirachta indica* A. Juss.	Veppu	Meliaceae	Leaf	Leaf paste applied to wound to prevent infection
7	*Curcuma longa* L.	Manjal	Zingiberaceae	Rhizome	Rhizome paste mixed with lime; applied externally
8	*Mimosa pudica* L.	Thottavadi	Fabaceae	Root	Root decoction taken orally
9	*Eclipta prostrata* (L.) L.	Kayyonni	Asteraceae	Leaf	Leaf juice taken orally
10	*Boerhavia diffusa* L.	Thazhuthama	Nyctaginaceae	Whole plant	Boiled plant decoction taken orally
11	*Costus speciosus* (J.Koenig) Sm.	Chemmarathi	Costaceae	Rhizome	Rhizome paste applied externally
12	*Leucas aspera* (Willd.) Link	Thumba	Lamiaceae	Leaf & flower	Juice applied externally
13	*Ocimum tenuiflorum* L.	Tulasi	Lamiaceae	Leaf	Leaf extract with pepper taken orally
14	*Aegle marmelos* (L.) Corrêa	Koovalam	Rutaceae	Leaf	Leaf juice taken orally
15	*Piper longum* L.	Thippali	Piperaceae	Fruit	Powder mixed with warm water; given orally

DISCUSSION

The present study documented 15 medicinal plant species traditionally employed by *Vaidyas* in Parassala for the treatment of snakebites. The predominance of leaves (40%) as the primary plant part used is consistent with previous ethnobotanical findings in Kerala and other tropical regions, where leaves are favored due to their ease of collection, high bioactive compound content, and minimal impact on plant survival (Kumar et al., 2019). The reliance on roots (33%) and rhizomes (13%) for antidotal preparations reflects their perceived potency in neutralizing venom, as reported in studies from Tamil Nadu and Karnataka (Raj et al., 2019; Joseph & Thomas, 2020). However, root harvesting can threaten plant populations, emphasizing the need for sustainable collection practices.

The combined use of oral and topical remedies (20% of documented cases) mirrors observations by Sharma et al. (2020), who noted that traditional snakebite treatments often integrate systemic detoxification with localized wound management. Ritualistic elements observed in some preparations may play a psychological role in patient recovery, as cultural belief systems influence treatment efficacy perception (Das & Borthakur, 2019). Several species identified here such as *Rauvolfia serpentina*, *Andrographis paniculata*, and *Aristolochia indica* have been pharmacologically evaluated for anti-venom or anti-inflammatory properties in recent years (Selvaraj et al., 2019; Pradhan et al., 2020). Nonetheless, certain plants like *Mimosa pudica* and *Boerhavia diffusa* require further bioassay-guided studies to validate their mechanisms of action against specific venom components. Importantly, the knowledge documented is at risk due to generational gaps, as younger community members increasingly turn to modern medical facilities. This aligns with findings by Nair et al. (2020), who reported a decline in ethnomedicinal knowledge transmission in southern Kerala. Integrating traditional remedies with scientific validation could help to preserve both biodiversity and intangible cultural heritage.

SUMMARY

In the present study Documentation of 15 medicinal plant species used by *Vaidyas* in Parassala, Thiruvananthapuram, for snakebite treatment were carried out.

Key findings:

Leaves were the most used plant part (40%), followed by roots (33%). Predominant administration routes: oral (53%), topical (27%), and combined (20%). Commonly cited species: *Andrographis paniculata*, *Aristolochia indica* and *Rauvolfia serpentina*.

Ethnobotanical relevance: Remedies serve both physiological and cultural roles, with some incorporating ritualistic practices. Conservation concern: Unsustainable root harvesting and declining knowledge transmission threaten both plant populations and traditional healing practices. Future scope: Scientific validation of bioactive compounds, documentation of preparation methods, and integration into community based conservation strategies.

CONCLUSION

This medicinal plant investigation highlights the rich traditional knowledge retained by *Vaidyas* in Parassala, Thiruvananthapuram, regarding medicinal plants used in snakebite treatment. The study recorded 15 plant species from diverse families, reflecting both the biodiversity of the region and the depth of indigenous healing practices. Leaves emerged as the most commonly used plant part, followed by roots and rhizomes, indicating both accessibility and perceived therapeutic potency. The persistence of these remedies, despite the availability of modern antivenom therapy, underscores their cultural and practical significance, especially in rural areas where immediate medical access may be limited. However, the overharvesting of roots and the gradual erosion of traditional knowledge due to generational shifts pose significant threats to the continuity of this ethnomedical heritage.

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