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Exploration and documentation of medicinal plants to treat diabetes mellitus in Rengamalai hills, Vedasanthur Taluk, Dindigul district, Tamil Nadu

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Abstract
The present study was conducted in the Rengamalai hills, located in the Vedasandur Taluk of the Dindigul district, to explore the extensive potential of medicinal plants in the treatment of diabetes mellitus. Through comprehensive surveys and investigations, a total of 67 plant species belonging to 40 different families that are utilized by local communities to manage glycemic levels were documented. This study meticulously highlights the plants, including their binomial nomenclature and local names, along with descriptions of the specific parts used for medicinal preparations. Notably, dominant families identified in the survey included Fabaceae, Euphorbiaceae, Cucurbitaceae, and Moraceae.

Keywords: Medicinal plants, diabetes mellitus, Rengamalai hills.

Introduction
Medicinal plants can be found distributed across various geographical regions, each with unique ecological characteristics that contribute to their therapeutic potentiaL. Traditional medical practices, which have evolved over millennia, play a pivotal role in the primary healthcare systems of many societies. According to Sheldon *et al*. (1997) [11], an immense portion of the global population relies on herbal remedies as their primary form of medical treatment. The World Health Organization (Azaizeh *et al*., 2003) [2] reports that around 80% of the world's citizens depend on traditional herbal medicine for their healthcare needs, particularly in developing countries.

In rural India, individuals frequently turn to herbal medicine for essential health services, which speaks to the cultural significance and efficacy of these practices. Among these, the Siddha system of medicine holds a prominent place, especially among the populace of Tamil Nadu, where many individuals seek the guidance of Siddha practitioners for various ailments (Abdollahi *et al*., 2010) [1]. Despite the widespread availability of modern medical practices, traditional herbal medicine continues to hold significant value, particularly for rural communities confronting diverse health challenges.

The indigenous wisdom regarding medicinal plants has been transmitted through generations, with traditional knowledge acting as a repository of biodiversity and healing properties. In India, both Ayurveda and Siddha systems rely heavily on plant-based products, and over 1,300 species are recognized in Ayurvedic pharmacopoeia for treating numerous health conditions. Documentation of this traditional knowledge plays a crucial role in not only understanding but also advancing synthetic and innovative therapeutic developments. It is estimated that approximately 35% of modern pharmaceuticals are derived from plant sources. Moreover, the ethnobotanical properties of these plants serve as alternative income sources for underprivileged communities, underscoring the importance of supporting and documenting traditional practices to enhance livelihoods.

The escalating incidence of diabetes mellitus represents a growing public health challenge, especially in countries like India (Sivaraj *et al*., 2009) [9]. Diabetes, if left poorly managed, can lead to severe complications such as fatigue, paralysis, and even mortality (Yirga *et al*., 2010) [12]. This condition is characterized by the body's impaired ability to produce or utilize insulin effectively, positioning diabetes alongside cancer and cardiovascular diseases as one of the leading threats to public health. The present study is aimed at uncovering the rich repository of

traditional plants utilized by the rural communities in the Rengamalai hills for the management of diabetes, thereby presenting safe and natural alternatives to synthetic pharmaceuticals.

Materials and Methods

Study Area

The Rengamalai hills are situated within Vedasandur Taluk of Dindigul district in Tamil Nadu, approximately 40 kilometers from the town of DindiguL. This region is characterized by an elevation of around 3,500 feet above sea level and is known for its rich biodiversity. The village of Rengamalai, often referred to in local contexts as Rengamalai forest, encompasses a geographical area of about 4.11 square kilometers and is governed under the Kalvarpatti village panchayat. A notable landmark within this area is the Maleeswarar temple, believed to have historical roots established by the Pandyas over a millennium ago. The hill presents a challenging trek, requiring about three hours to ascend and two hours to descend.

The study was executed from August 2024 to March 2025, during which extensive data collection was undertaken. Following the collection of plant specimens, the medicinal applications of the indigenous flora were validated by experienced local practitioners and traditional herbal users from the Rengamalai hills. During the field survey, we gathered information regarding the local nomenclature of medicinal plants, specific plant parts utilized in therapeutic preparations, and methods of administration. Ethnobotanical data was collected through structured surveys and informal discussions with local populations.

Around 50 individuals, comprising 22 men and 28 women who utilize plants for their medicinal needs, were randomly interviewed to deepen the understanding of traditional healing practices. The identification and verification of plant species were conducted using reference texts such as the "Flora of Presidency of Madras" and "An Excursion Flora of Central Tamil Nadu." This comprehensive data included the botanical name, family, and common names of the plant species documented.

Results and Discussion

Traditional healing embodies a holistic approach that interweaves the well-being of the body, mind, and spirit. Practitioners, commonly known as traditional healers, employ a diverse array of herbs, roots, and natural components to address various illnesses. Their practices are deeply anchored in ancestral knowledge passed down through generations, reflecting a commitment to utilizing botanical resources for therapeutic purposes. The skills and efficacy of these healers are acknowledged and respected within their communities, signifying a legacy built on trust and competence.

This comprehensive survey of the indigenous knowledge surrounding the medicinal applications of native plants from the Rengamalai hills has led to the meticulous documentation of traditional wisdom. The investigation yielded a compilation of various medicinal plants employed in diabetes treatment. Local healers typically prepare herbal remedies using specific parts of individual plants or concocting blends from multiple species. The ethnomedicinal insights derived from this research encompass around 67 angiosperms categorized across 63 genera from 40 distinct families. Random interviews with 50 residents consisting of 22 men and 28 women provided deep insight into the community's reliance on these traditional remedies.

The local practitioners, identified as Maruthuvar and Vaithiyar, imparted invaluable knowledge concerning the medicinal flora, including local names, applications of plant parts, and tailored methods for treating diabetes. Documenting this entire survey process systematically, we corroborated the collected data with existing literature to ensure reliability.

The botanical identification of the medicinal plants was conducted utilizing the "Flora of Presidency of Madras" (Gamble, 1935) [4] and the "Flora of Tamil Nadu Carnatic" (Mathew, 1983). The authenticity of the plant specimens was verified through comparative analysis with curated specimens at the Herbarium of the Botanical Survey of India (BSI), Southern Circle, Coimbatore, India.

Among the findings, the Fabaceae family emerged as the preeminent source of plants utilized for diabetes treatment, showcasing approximately 34 ethnomedicinal applications. The most prevalent preparation method was infusion either from fresh or dried herbs practiced by around 56% of the local population. This method aligns with conventional anti-diabetic ethnomedicinal practices observed in regions such as South Africa and India (Rituparna G *et al*., 2013; 555–560) [7].

The analysis revealed that the most heavily utilized plant parts consisted of leaves (29%), fruits (7%), roots (4%), seeds (7%), flowers (4%), bark (6%), whole plants (2%), tubers (1%), rhizomes (3%), bulbs (1%), leaf gel (1%), and stems (1%).

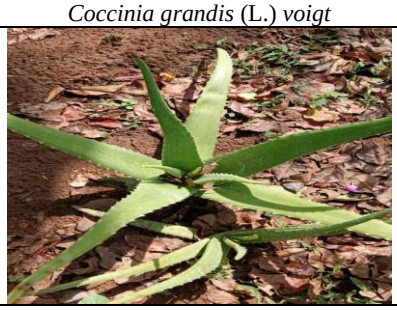
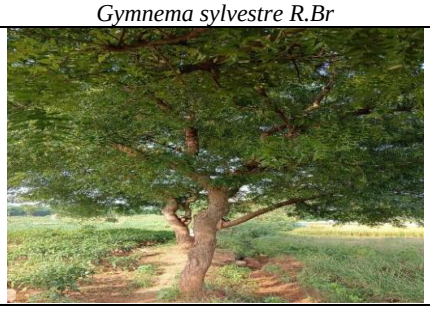
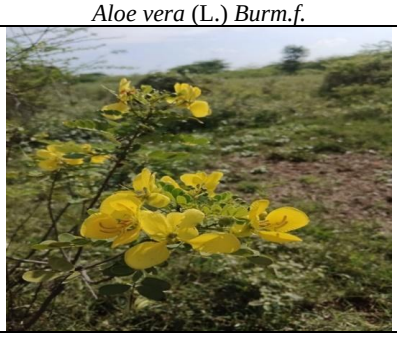
The results of this intricate study accentuate the critical role of various plant species in managing diabetes. The prominent families identified included Fabaceae (8 species), Euphorbiaceae (4 species), and Moraceae (3 species), alongside other notable families like Amaryllidaceae (2), Cucurbitaceae (4 species), and Acanthaceae (2 species). Additionally, families such as Apiaceae (2 species), Apocynaceae (2 species), Rutaceae (2 species), and Myrtaceae (2 species) were noted, underscoring the impressive diversity and richness of the region’s ethnomedicinal heritage.

Table 1: Medicinal plants used for the treatment of Diabetes mellitus by local people

S.no	**Botanical name**	**Family**	**Common name**	**Parts used**
1	*Andrographis paniculata (Burm.F.) News*	Acanthaceae	Nilavembu	Leaves
2	*Azadirachta indica A.juss.*,	Meliaceae	Vembu	Leaves
3	*Aegle marmelos* (L.) *Correa*	Rutaceae	Vilvam	Leaves
4	*Aristolochia bracteolata Lam.*	Aristolochiaceae	Adutha Kodi	Leaves
5	*Abrus precatorius* L.	Fabaceae	Kudumani	Leaves
6	*Acalypha indica* L	Euphorbiaceae	Kuppaimeni	Leaves
7	*Aloe vera* (L.)*Burm.F.*	Asphodelaceae	Katrazhai	Leaves gel
8	*Allium sativum* L.	Amaryllidaceae	Vellai Poondu	Leaves
9	*Allium cepa* L.	Amaryllidaceae	Vengayam	Bulb onion

10	*Acorus calamus* L.,	Acoraceae	Vasambu	Rhizome
11	*Annona squamosa* L.	Annonaceae	Sugar apple	Roots
12	*Asparagus racemosus Willd.*	Liliaceae	Thaneervittan kizhangu	Tuber
13	*Brassica juncea* (L.)	Brassicaceae	Kadugu	Seed
14	*Caesalpinia pulcherrima* (L.)	Fabaceae	Mayil Kondrai	Flowers
15	*Cajanus cajan* (L.) *Huth*	Fabaceae	Thovaray	Seed
16	*Cassia fistula* L.	Fabaceae	Konrai	Seed
17	*Catharanthus roseus* (L.)	Apocynaceae	Nithyakalyani	Leaves
18	*Centella asiatica* (L.)*urban*	Apiaceae	Vallarai	Whole plant
19	*Cinnamomum verum J. Presel*	Lauraceae	Ilevakam	Bark
20	*Cinnamomum zeylanicum J.Presl*	Lauraceae	Carob tree	Bark
21	*Citrullus colocynthis* (L.)	Cucurbitaceae	Kummatti	Fruit and seeds
22	*Coccinia grandis* (L.) *J. Voigt*	Cucurbitaceae	Kovakkai	Fruit
23	*Colocasia esculenta* (L.). *Schott*	Araceae	Seppankizhangu	Leaves
24	*Costus igneus N.E. Br*	Costaceae	Kostum	Leaves
25	*Cuminum Cyminum* L.	Apiaceae	Cheeragam	Seed
26	*Curcuma longa* (L.)	Zingiberaceae	Manjal	Rhizome
27	*Euphorbia hirta* L.	Euphorbiaceae	Amman Pacharisi	Leaves
28	*Eclipta alba* (L.)	Asteraceae	Karisalankanni	Leaves
29	*Eugenia jambolana* (L.)	Myrtaceae	Naval	Seed
30	*Enicostemma malittorale Blume*	Gentianaceae	Vellarugu	Leaves
31	*Ficus benghalensis* L.	Moraceae	Alamaram	Bark
32	*Ficus racemosa* L.	Moraceae	Atthi	Root
33	*Ficus religiosa* L.	Moraceae	Arasamaram	Bark
34	*Gymnema sylvetre R. Br*	Apocynaceae	Sakkarai kolli	Leaves
35	*Hibiscus rosa sinensis* L.	Malvaceae	Semparuthi	Leaves
36	*Justicia adhatoda* L..	Acanthaceae	Adhatoda	Leaves
37	*Lawsonia inermis* L.	Lythraceae	Maruthani	Leaves
38	*Leucas aspera spreng.*	Lamiaceae	Thumbai	Whole plant
39	*Momordica charantia* L.	Cucurbitaceae	Pavakkai	Seed
40	*Mangifera indica* L.	Anacardiaceae	Maa	Leaves
41	*Mirabilis jalapa* L.	Nyctaginaceae	Anthimanthaarai	Tuber
42	*Moringa oleifera Lam*	Moringaceae	Murungai	Leaves
43	*Morus alba* L.	Moraceae	Kambli chedi	Leaves, fruit and Root
44	*Murraya koenigii* (L.) *Spr.*	Rutaceae	Karuveppilai	Leaves
45	*Nelumbo nucifera Gaertn*	Nelumbonaceae	Thamarai	Flower
46	*Ocimum sanctum* L.	Lamiaceae	Tulsi	Leaves
47	*Phyllanthus amarus Schumach& Thonn.*	Phyllanthaceae	Kilanelli	Leaves
48	*Phyllanthus emblica* L.	Euphorbiaceae	Nelli	Fruit
49	*Piper betle* L.	Piperaceae	Vetrilai	Leaves
50	*Psidium guajava* L.	Myrtaceae	Koya	Leaves
51	*Pterocarpus marsupium Roxburgh*	Fabaceae	Vengai	Bark and Resin
52	*Punica granatum* L.	Punicaceae	Madhulai	Fruit
53	*Ricinus communis* L.	Euphorbiaceae	Amanaku	Seed
54	*Rubia cordifolia* L.	Rubiaceae	Sevalaikodi	Root
55	*Senna auriculata* (L.) *Roxb.*	Fabaceae	Avaram poo	Flowers
56	*Solanum nigrum* L.	Solanaceae	Manattakkali	Leaves
57	*Tamarindus indicus* L.	Fabaceae	Puli	Flower
58	*Tephrosia purpurea pers.*	Fabaceae	Kozhunchi	Root
59	*Terminalia arjuna (Roxb.) Wight & Aron*	Combretaceae	Marutham	Bark
60	*Terminalia chebula Retz.*	Combretaceae	Kadukkai	Fruit
61	*Tinospora cordifolia (Thunb.)*	Menispermaceae	Seenthil kodi	Stem
62	*Tribulus terrestris* L.	Zygophyllaceae	Nerunjil	Fruit
63	*Trigonella foenum-graecum* L.	Fabaceae	Vendhaya keerai	Leaves
64	*Vitex negundo* L.	Lamiaceae	Nochi	Leaves
65	*Withania somnifera* (L.)	Solanaceae	Amukkuram	Leaves
66	*Zingiber officinale Roxb.*	Zingiberaceae	Inegi	Rhizome
67	*Zizyphus jujuba* (L.)	Rhamnaceae	Illanthai	Fruit

Table 2: Some important enthnobotanical plants used by the Rengamalai local people

	
Coccinia grandis (L.) *voigt*	*Gymnema sylvestre R.Br*
	
Aloe vera (L.) *Burm.f.*	*Azadirachta indica A.Juss.,*
	
Senna auriculata (L.) *Roxb.*	*Zingiber officinale Roscoe.*
	
Trigonella foenum-graecum L.	*Morus alba* L.
	
Tinospora cordifolia (Thunb.)	*Cinnamomum verum J. Presel*
	
Senna auriculata (L.) *Roxb.*	*Citrullus colocynthis* (L.)

Conclusion

The remarkable potential of traditional medicinal plants serves as the foundation for countless pharmaceutical drugs developed to treat a wide array of diseases. This study underlines the critical role played by the diverse medicinal flora within the Rengamalai hills in the effective management of diabetes a condition afflicting millions globally. These plants, rich in distinctive phytochemical compounds, contribute significantly to both established and emerging therapeutic strategies.

However, the degradation of these invaluable genetic resources poses a serious risk to entire communities. This decline is further exacerbated by a host of environmental challenges, including climate change, which disrupts the habitats of these essential ecosystems, forest fires that devastate plant life, and urbanization that encroaches upon traditional lands. Given the urgency of this situation, there is an immediate need for meticulous documentation of the extensive knowledge surrounding these medicinal plants a task crucial not only for preserving species and their therapeutic applications but also for safeguarding the cultural heritage entwined with traditional healing customs.

It is imperative to gather and disseminate this invaluable information from all corners of the globe to ensure that future generations can continue to benefit from the profound wealth of traditional medicine. By championing these efforts, we contribute to the preservation of both biodiversity and the invaluable wisdom embedded within indigenous practices, paving the way for sustainable health solutions in the face of escalating global health challenges.

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