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RESEARCH ARTICLE

Folk wisdom and traditional healing practices of the Kani tribe in Peppara Wildlife Sanctuary, Kerala, India

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Abstract

This ethnobotanical study documents the traditional healing practices of the Kani tribe within the Peppara Wildlife Sanctuary, Thiruvananthapuram district, Kerala, India. Through semi-structured interviews, community-based cluster sampling and participatory observations across 13 tribal set tlements (Altitudes 100–1717 m). The survey documented 81 medicinal species across 68 genera and 34 families, with Zingiberaceae emerging as the most dominant family (9.9 %), followed by Euphorbiaceae, Dioscoreaceae and Leguminosae (7.4 % each). Morphological analysis indicated a balanced exploitation of ecological strata, with herbs (31 %) being the primary source, followed by trees (25 %), shrubs (23 %) and climbers (21 %). Quantitative analysis of plant part utilisation revealed a high reliance on subterranean organs, specifically rhizomes/tubers (20 %) and roots (18 %), along with leaves (17 %) and fruits (12 %). The study identifies several novel regional applications, such as *Ensete superbum* (Roxb.) Cheesman for renal calculi and *Cynanchum annularium* (Roxb.) Liede & Khanum as a galactagogue, while corroborating established uses of *Wrightia tinctoria* (Roxb.) R. Br. and *Acorus calamus* L. Decoctions were the most prevalent preparation method, reflecting a sophisticated understanding of phytochemical extraction. However, the heavy extraction of roots, rhizomes and bark presents a long-term threat to floral sustainability. This research underscores the vital importance of the Kani pharmacopoeia and calls for urgent, structured conservation strategies and educational initiatives to safeguard this unique bio-cultural heritage against socioeconomic and environmental pressures.

Keywords: ethnobotany; Kani tribe; Peppara Wildlife Sanctuary; Western Ghats; Zingiberaceae; traditional knowledge; sustainability

Introduction

The Kani tribe is an indigenous community inhabiting the Western Ghats of Kerala, India. They possess significant traditional knowledge associated with the forest-based resources. For centuries, plants have played a central role in fulfilling the healthcare needs of human society (1). The Kani people have inherited an extensive body of ethnobotanical knowledge, transferred across generations, that continues to guide their food practices, healthcare approaches and spiritual beliefs (2) (Fig. 1). Historically, the 'Kanikar' followed a nomadic lifestyle. The native languages of the Kanikar tribes are Malayalam and Tamil. They are often dark-skinned and short people who depend on the forest for their livelihood. They used to reside in caves and rock shelters, which offered protection to the community. There is a tribal chief for each tribe. They currently reside in several tribal hamlets, each with 5–20 families. Most of the Kani tribal people have an extensive knowledge of folk plants and are still dependent on medicinal plants for their primary healthcare and treatment of various diseases. Kanis still supplement their food with *Dioscorea pentaphylla* L., *Entada rheedei* Spreng. etc by gathering wild plants from the nearby forest areas (Fig. 1). They are extremely demanding workers and can survive without the help of modern facilities. Most of them live in poverty and are socioeconomically poor. Additionally, they collect honey, beeswax and a few other small forest products on a seasonal basis. They cultivate food crops like pepper, coconut and other edible plants like tapioca, bananas and millets.

The Southern Western Ghats of Kerala represent one of India's most significant biodiversity hotspots, where unique geographical and climatic conditions have promoted the evolution of numerous endemic and native plant species, many of which are vital to human well-being, as nearly one-quarter of modern pharmaceuticals are plant-derived, a fact further reflected in ancient Indian medical systems such as Ayurveda (3). While more than 2500 species are officially recognised as medicinal in India, several thousand additional plants are utilised by tribal and rural communities for healing and subsistence (4). Recent pharmacological research further emphasises that bioactive compounds from plants can offer solutions for managing lifestyle-related disorders and other health challenges.

Fig. 1. *Dioscorea pentaphylla* L. (Tuber preparation for food).

Materials and methods

Study area and geolocation

The present study was conducted from January 2022 to March 2025 in the Peppara Wildlife Sanctuary, Thiruvananthapuram district, Kerala, covering altitudes ranging from 100–1717 m (Fig. 2). The major peaks within the sanctuary include Chemmunji Mottai (1717 m) and Athirumalai (1594 m). The area is geographically located at 77° 6' 50" and 77° 14' 5" E longitude and 8° 34' 30" and 8° 41' 25" N latitude. The study area encompasses approximately 53 sq. km, comprising the Palode Reserve (24 sq. km) and the Kottur Reserve (29 sq. km). The study was conducted as a community-based cluster sampling method. Fieldwork was focused on 13 Kani tribal settlements within the Peppara sanctuary, with 11 settlements located in the Athirumala section and 2 in the Thottiyar section. Data collection involved semi-structured interviews and participatory observations with traditional herbal practitioners and community elders. Information regarding plant vernacular names, medicinal applications, parts used and methods of preparation was meticulously documented *in situ*. The identification of documented species was authenticated by comparing field specimens with standard taxonomic keys and regional flora. Key reference works utilised for validation were also included (5–7).

Quantitative analysis was applied to the ethnobotanical data to determine the frequency of plant part utilisation, taxonomic distribution and habit classification. Percentages were calculated for each category, specifically for plant parts (e.g., roots, rhizomes, tubers) and treatment forms (e.g., decoction, paste, powder etc) for comparative discussion. In accordance with the ethnobotanical research ethics, prior informed consent was obtained from the Kani tribal healers before data collection commenced. The study adhered to the protocols regarding the documentation of traditional knowledge, ensuring that the Intellectual Property Rights of the indigenous community throughout the identification, collection and reporting process.

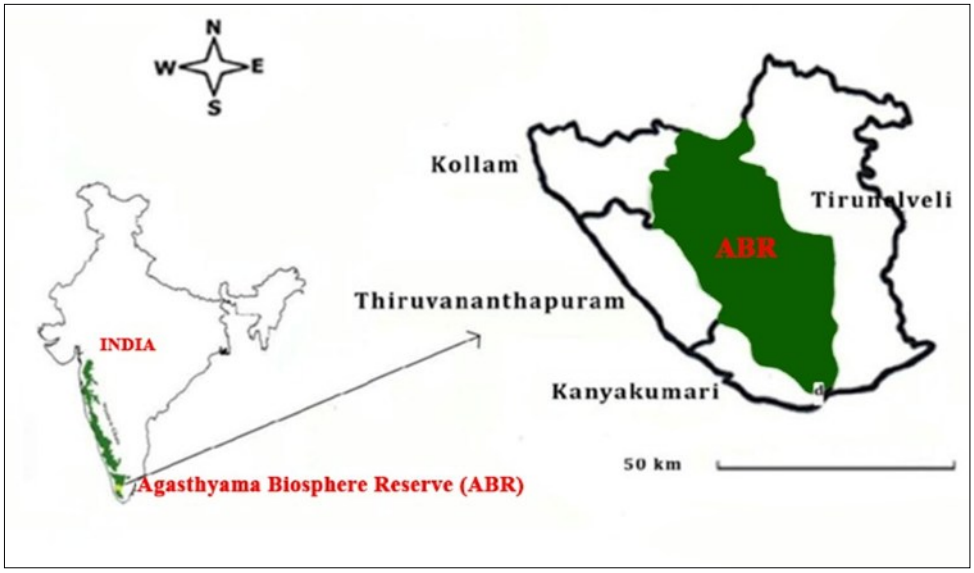

Fig. 2. Geographic orientation of the study area.

Results and Discussion

Floristic diversity and taxonomic composition

During the present study, a total of 81 medicinal plant species distributed across 68 genera and 34 botanical families. The taxonomic analysis reveals a significant diversity in the medicinal flora utilised by local folk practitioners. The family Zingiberaceae emerged as the most dominant family, represented by 8 species (9.9 %), which includes high -value medicinal plants such as *Curcuma longa* L. and *Zingiber officinale* Roscoe. This was followed by 3 families of equal abundance - Leguminosae, Euphorbiaceae and Dioscoreaceae, each contributing 6 species (7.4 %) to the total inventory. The moderate representation of families such as Asclepiadaceae (4.9 %), Amaranthaceae (3.7 %), Combretaceae (3.7 %), Aristolochiaceae (3.7 %) and Liliaceae (3.7 %) further underscores the breadth of the local pharmacopeia. Interestingly, a substantial portion of the medicinal diversity is held within the "minor" families; 25 distinct families were represented by only one or two species each, collectively accounting for 40.8 % of the total species count (Fig. 3).

The high abundance of Zingiberaceae and Dioscoreaceae indicates a traditional preference for rhizomatous and tuberous plants, which are often prioritised in folk medicine for their concentrated bioactive compounds and ease of preparation. Furthermore, the presence of woody families like Leguminosae and Combretaceae suggests a balanced reliance on both seasonal herbaceous flora and perennial forest resources. This distribution pattern reflects a highly evolved traditional knowledge system that optimises the use of locally available biodiversity for diverse therapeutic requirements, ranging from gastrointestinal disorders to complex dermatological treatments.

Habit analysis

The morphological analysis of the documented medicinal plants revealed a diverse distribution of growth habits, indicating that folk practitioners utilise various ecological strata of the local flora. Among the 81 species surveyed, Herbs were found to be the most predominant habit, representing 31 % (n=25) of the total inventory. This was followed by trees at 25 % (n=20), shrubs at 23 % (n=19) and climbers at 21 % (n=17) (Fig. 4). The relatively balanced distribution across these 4 categories suggests a comprehensive exploitation of the available vegetation, ranging from the forest floor to the upper canopy.

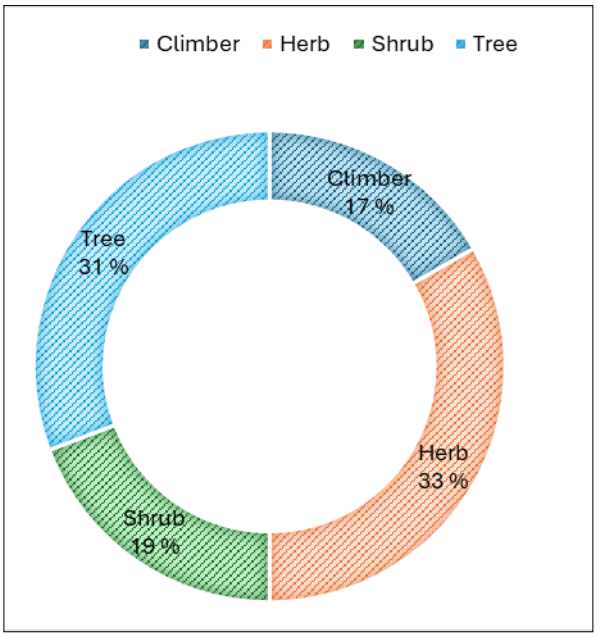

Fig. 4. Habit form of folk plants used by the herbal practitioner.

The dominance of herbaceous species (31 %) is a common trend in ethnobotanical studies, often attributed to their high availability, rapid growth cycles and the presence of potent secondary metabolites such as alkaloids and glycosides. The high frequency of herbs like *Andrographis paniculata* (Burm. f.) Wall. ex-Nees and various *Curcuma* species highlights their role as primary sources for immediate therapeutic needs. Meanwhile, the significant representation of trees (25 %) and shrubs (23 %) such as *Saraca asoca* (Roxb.) W.J.de Wilde and *Adhatoda vasica* Nees reflect the importance of perennial woody species, which provide a stable, year -round supply of medicinal bark, roots and fruits.

Furthermore, the substantial contribution of climbers (21 %), particularly species from the *Dioscoreaceae* and *Aristolochiaceae* families, underscores the specialised knowledge of forest-dwelling communities in identifying and utilising lianas and vines. This habit-wise diversity is indicative of a resilient traditional healthcare system that does not rely on a single plant group but rather integrates various biological forms to address a wide spectrum of ailments. The inclusion of all growth forms suggests that the conservation of medicinal plants in this region must involve the protection of diverse habitats, from open grasslands to dense forest ecosystems.

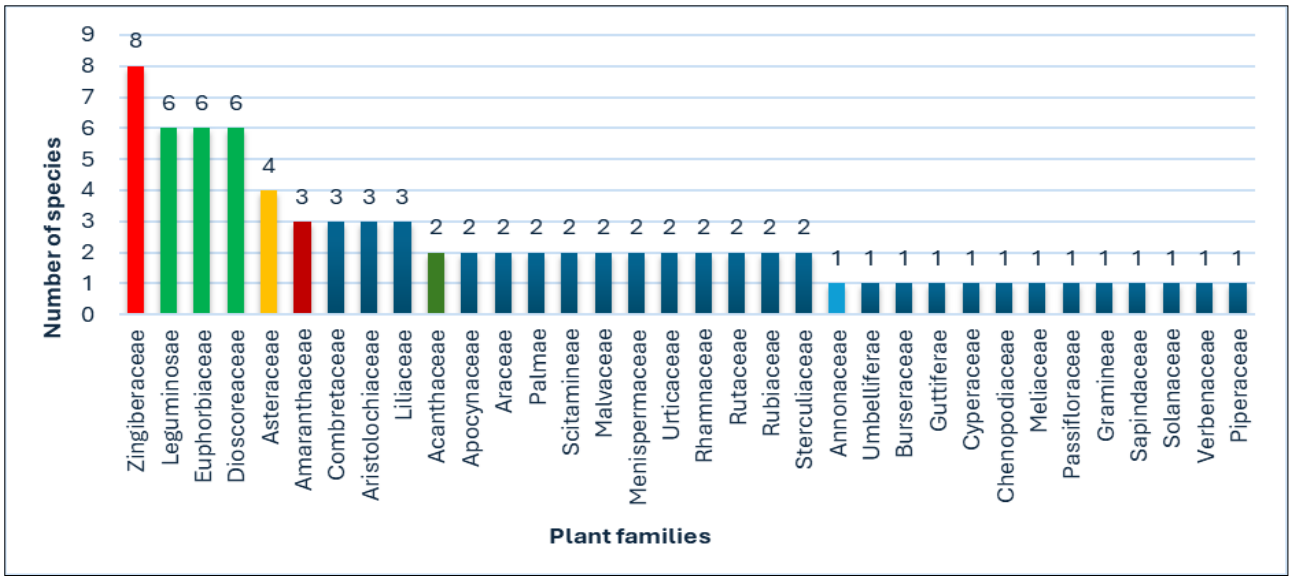

Fig. 3. Family abundance.

Plant part utilisation and harvesting sustainability

Analysis of plant parts used for food and medicinal purposes revealed diverse utilisation patterns. Among the 81 documented species, rhizomes and tubers were most frequently used (n = 20), followed by roots (n = 18) and leaves (n = 17). Fruits (n = 14), whole plants (n = 10) and stem/bark (n = 10) were moderately used, whereas seeds (n = 6) and flowers/latex/resin (n = 5) were less commonly employed (Fig. 5).

The predominance of underground plant parts (rhizomes, tubers and roots), accounting for nearly 38 % of total usage, reflects their high therapeutic value, particularly in families such as Zingiberaceae and Dioscoreaceae, where these organs are rich in bioactive secondary metabolites. The frequent use of leaves (n = 17) and whole plants (n = 10) indicates a preference for non-destructive harvesting practices in treating common ailments, whereas stem and bark use (n = 10) is mainly associated with tree-based remedies. Fruit utilisation (n = 14), especially from Combretaceae members, underscores reliance on tannin-rich materials for digestive applications. Overall, this pattern demonstrates a well-developed traditional understanding of phytochemical distribution within plant tissues and highlights the need for sustainable harvesting strategies, particularly for roots and rhizomes.

Ethnomedicinal applications and comparative analysis

The present study documents several ethnomedicinal applications (Table 1) that constitute novel records for the region, as many of these therapeutic uses have not been previously reported in the literature. Notably, the use of *Ensete superbum* (Roxb.) Cheesman rhizome juice for renal calculi, *Cynanchum annularium* (Roxb.) Liede & Khanum as a galactagogue and *S. asoca* for oncological and diabetic management represent significant additions to the regional ethnopharmacopoeia. Furthermore, the present findings corroborate with earlier reports on the use of *W. tinctoria* and *A. calamus* for dermatological conditions and *Cardiospermum halicacabum* L. for cardiac ailments, indicating the persistence of a robust and time-tested traditional knowledge system within the Kani community (8–10).

Mode of preparation

Regarding the folk food and medicinal preparation of these botanicals, decoction was the most prevalent method, followed by juice extraction, paste formation and powders (Fig. 6). The preference for decoctions likely relates to the effective extraction of polar active compounds from hardy plant parts like roots and bark, which were the primary materials used in this study.

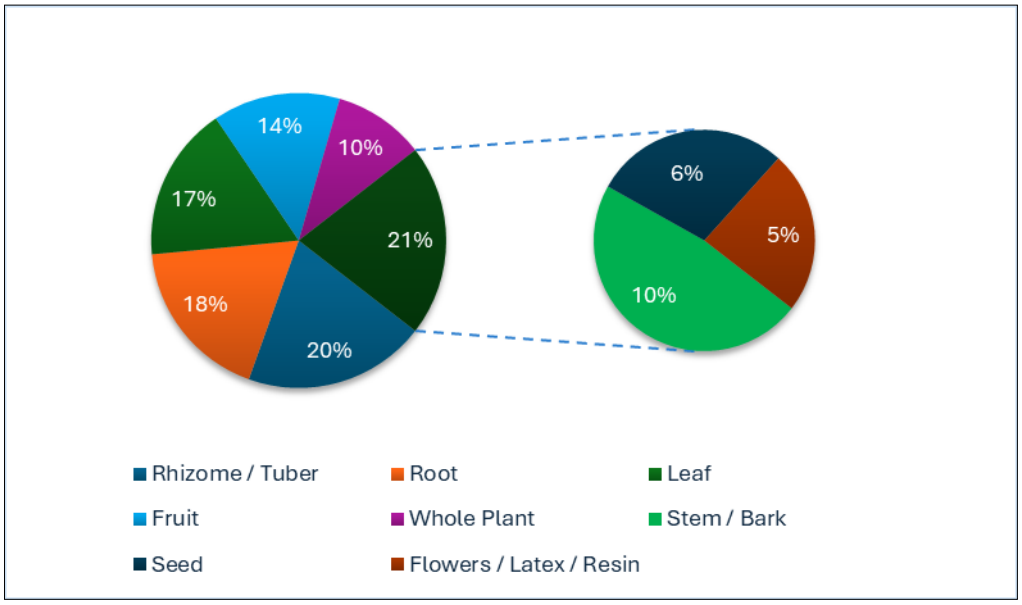

Fig. 5. Plant parts used.

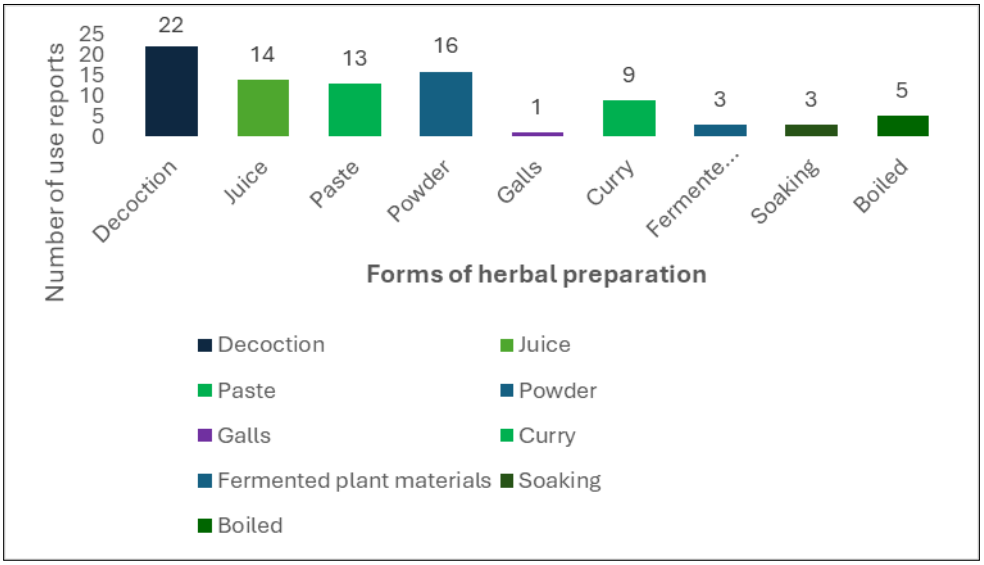

Fig. 6. Different forms of treatments for different diseases.

Table 1. List of species used by the local population of the studied region

Sl. No.	Botanical name	Family	Local name	Habit	Parts used	Principal therapeutic use
1	*Ensete superbum* (Roxb.) Cheesman	Musaceae	Kallu vazha	Shrub	Fruit, seed, rhizome	Urinary stones, diabetes and leucorrhoea.
2	*Andrographis paniculata* (Burm.f.) Nees	Acanthaceae	Kiriyathu	Herb	Whole plant	Malarial fever, liver disorders and jaundice.
3	*Justicia adhatoda* L.	Acanthaceae	Adalodakam	Shrub	Stem, leaf, root	Asthma, bronchitis and chronic cough.
4	*Aloe vera* (L.) Burm.f.	Liliaceae	Kattarvazha	Herb	Leaf	Skin burns, constipation and menstrual issues.
5	*Achyranthes aspera* L.	Amaranthaceae	Kadalady	Herb	Whole plant	Renal dropsy, piles and as a diuretic.
6	*Aerva lanata* (L.) Juss. ex Schult.	Amaranthaceae	Balippoovu	Herb	Whole plant	Dissolving kidney stones and inflammation.
7	*Amaranthus spinosus* L.	Amaranthaceae	Kuppacheera	Herb	Leaves	Anemia, eczema and as a cooling laxative. And used as food
8	*Gluta travancorica* Bedd.	Anacardiaceae	Chengurinji	Tree	Stem	Blood purification and skin infections.
9	*Heracleum candolleanum* (Wight & Arn.) Gamb.	Umbelliferae	Vathamparathi	Herb	Whole plant	Rheumatoid arthritis and nerve pain.
10	*Alstonia scholaris* (L.) R. Br.	Apocynaceae	Mukkampala	Tree	Bark, latex	Malarial fever, diarrhea and dysentery.
11	*Wrightia tinctoria* (Roxb.) R. Br.	Apocynaceae	Danthappala	Tree	Leaf	Psoriasis, dandruff and skin rashes.
12	*Acorus calamus* L.	Aroideae (Araceae)	Vayambu	Herb	Whole plant	Memory enhancement, epilepsy and flatulence.
13	*Colocasia esculenta* (L.) Schott	Aroideae (Araceae)	Chembu	Herb	Rhizome	Alopecia, constipation and nutrient tonic.
14	*Calamus travancoricus* Bedd. ex Becc.	Palmae	Vally chooral	Climber	Stem	Dyspepsia, biliousness and ear ailments.
15	*Phoenix loureiroi* Kunth	Palmae	Eanthy	Shrub	Root, fruits	General debility and stomachache.
16	*Aristolochia indica* L.	Aristolochiaceae	Garudakkodi	Climber	Root	Snake bite antidote and skin diseases.
17	*Aristolochia acuminata* Lam.	Aristolochiaceae	Valiya arayan	Climber	Root	Gastric disorders, Snake bite and wound healing.
18	*Cynanchum annularium* (Roxb.) Liede & Khanum	Asclepiadaceae	Adapathiyan	Climber	Rhizome	Eye diseases, rejuvenating tonic and cough.
19	*Gymnema sylvestre* (Retz.) R. Br. ex Sm.	Asclepiadaceae	Chakkarakkolly	Climber	Leaves	Diabetes mellitus (blood sugar control).
20	*Thottea siliquosa* (Lam.) Ding Hou	Aristolochiaceae	Kuttil vayana	Shrub	Whole plant	Skin diseases and snake bite antidote.
21	*Calotropis gigantea* (L.) Dryand.	Asclepiadaceae	Vella-erikku	Shrub	Leaf, flower	Joint pain (Rheumatism) and toothache.
22	*Canarium strictum* Roxb.	Burseraceae	Kunthirikkam	Tree	Resin	Chronic skin diseases and asthma.
23	*Bauhinia acuminata* L.	Leguminosae	Veluthamandaram	Tree	Root, bark	Skin lesions and bladder stones.
24	*Bauhinia purpurea* L.	Leguminosae	Chuvannamandaram	Tree	Bark	Diarrhea and glandular swellings.
25	*Calophyllum inophyllum* L.	Guttiferae	Punna	Tree	Seeds, stem	Sciatica, rheumatism and skin infections.
26	*Terminalia bellirica* (Gaertn.) Roxb.	Combretaceae	Thanni	Tree	Fruit	Indigestion, cough and eye ailments.
27	*Terminalia chebula* Retz.	Combretaceae	Kadukka	Tree	Fruit	Chronic constipation and mouth ulcers.
28	*Terminalia paniculata* Roth	Combretaceae	Maruthu	Tree	Branches	Leucorrhoea and diabetes.
29	*Hellenia speciosa* (J.König) S.R.Dutta	Costaceae	Channakoova	Herb	Whole plant	Intestinal worms and rash.
30	*Cyperus rotundus* L.	Cyperaceae	Muthanga	Herb	Rhizome	Fever reduction and digestive gas.
31	*Dioscorea oppositifolia* L.	Dioscoreaceae	Kavalan	Climber	Tuber	Internal burns and physical weakness, food.
32	*Dioscorea pentaphylla* L.	Dioscoreaceae	Nooran	Climber	Tuber	Anemia, boils and nutritional tonic.
33	*Dioscorea spicata* Roth	Dioscoreaceae	Cheru kavalan	Climber	Tuber	Rheumatism and flatulence.
34	*Dioscorea tomentosa* Roxb.	Dioscoreaceae	Nooly	Climber	Tuber	Dysentery, piles and as a diuretic.
35	*Dioscorea bulbifera* L.	Dioscoreaceae	Nukappa	Climber	Tuber	Piles, dysentery and syphilis.
36	*Aporosa cardiosperma* (Gaertn.) Merr.	Euphorbiaceae	Vitty	Tree	Fruit	Liver tonic and nutritional supplement.
37	*Baccaurea courtallensis* (Wight) Müll.Arg.	Euphorbiaceae	Mootty	Tree	Fruit	Digestive health and treating diarrhea.
38	*Breynia retusa* (L.) Alston	Euphorbiaceae	Mulluvenga	Tree	Fruit, stem	Limb fractures and chronic diarrhea.
39	*Phyllanthus emblica* L.	Euphorbiaceae	Nellikka	Tree	Fruit	Acidity, low immunity and hair loss.
40	*Ricinus communis* L.	Euphorbiaceae	Aavannakku	Shrub	Seed, leaf	Purgative and for joint inflammation.

41	*Abrus precatorius* L.	Leguminosae	Kunni	Climber	Leaf, seed	Tetanus, leukoderma and cough.
42	*Senegalia caesia* (L.) Maslin	Leguminosae	Eancha	Climber	Root, bark	Skin diseases and poisonous stings.
43	*Desmodium triquetrum* (L.) DC.	Leguminosae	Adakkapaanal	Shrub	Root, leaf	Piles, internal worms and dyspepsia.
44	*Mimosa pudica* L.	Leguminosae	Thottavady	Herb	Whole plant	Uro-genital disorders and piles.
45	*Saraca asoca* (Roxb.) Willd.	Leguminosae	Asokam	Tree	Bark, flower	Menstrual disorders (uterine tonic). tumorous growth
46	*Salacia beddomei* Gamble	Celastraceae	Korandy	Climber	Fruits	Diabetes and liver health.
47	*Asparagus racemosus* Willd.	Liliaceae	Sathavari	Climber	Tuber	Boosts lactation and treats gastric ulcers.
48	*Gloriosa superba* L.	Liliaceae	Menthonny	Climber	Tuber	Facilitating childbirth and gout.
49	*Abelmoschus moschatus* Medik.	Malvaceae	Kasthoori venda	Herb	Leaf, seed	Cystitis, kidney stones and bad breath.
50	*Sida acuta* Burm.f.	Malvaceae	Kurunthotti	Shrub	Root	Nervous disorders and facial paralysis.
51	*Azadirachta indica* A. Juss.	Meliaceae	Veppu	Tree	Leaf, root	Broad-spectrum antimicrobial and acne.
52	*Coscinium fenestratum* (Gaertn.) Colebr.	Menispermaceae	Maramanjal	Climber	Stem	Skin diseases, ulcers and jaundice.
53	*Cyclea peltata* (Lam.) Hook.f. & Thomson	Menispermaceae	Padathaly	Herb	Rhizome, leaf	Urinary infections and stomachache.
54	*Antiaris toxicaria* Lesch.	Urticaceae	Maravuri	Tree	Bark	Skin sores and cardiac toxin (diluted).
55	*Ficus hispida* L.f.	Urticaceae	Earuma nakku	Tree	Stem, leaf	Skin disorders, jaundice and anemia.
56	*Adenia hondala* (Gaertn.) W.J.de Wilde	Passifloraceae	Karimuthukku	Climber	Rhizome	Skin infections and external swellings.
57	*Decalepis arayalpathra* (J.Joseph & V.Chandras.)	Asclepiadaceae	Amrithapala	Shrub	Tuber	Immune-modulator and peptic ulcers.
58	*Chrysopogon zizanioides* (L.) Roberty	Gramineae	Ramacham	Herb	Root	Burning sensation, fever and skin itching.
59	*Ziziphus oenoplia* (L.) Mill.	Rhamnaceae	Thodaly	Shrub	Plant, root	Hyperacidity and wound healing.
60	*Ziziphus rugosa* Lam.	Rhamnaceae	Vanthodaly	Shrub	Fruits	Diarrhea and high blood pressure.
61	*Aegle marmelos* (L.) Corrêa	Rutaceae	Koovalam	Tree	Fruit, leaf	Chronic dysentery and heart tonic.
62	*Glycosmis pentaphylla* (Retz.) DC.	Rutaceae	Panji	Shrub	Leaf, stem	Facial inflammation and jaundice.
63	*Mussaenda frondosa* L.	Rubiaceae	Vellila	Shrub	Root, leaf	Leucoderma and chronic cough.
64	*Morinda citrifolia* L.	Rubiaceae	Manjanathi	Tree	Root, leaf	Gout and arthritis pain.
65	*Cardiospermum halicacabum* L.	Sapindaceae	Uzhinja	Herb	Whole plant	Nervous diseases and piles.
66	*Smilax zeylanica* L.	Smilaceae	Kareeelanchi	Climber	Roots	Venereal diseases and rheumatism.
67	*Solanum torvum* Sw.	Solanaceae	Chunda	Shrub	Leaf, root	Sore throat and intestinal worms.
68	*Helicteres isora* L.	Sterculiaceae	Edampirivalampiri	Shrub	Stem, root	Colic, flatulence and infant diarrhoea.
69	*Sterculia villosa* Roxb.	Sterculiaceae	Vakka	Tree	Stem fibre	Physical weakness and body cooling.
70	*Baliospermum solanifolium* (Burm.f.) Suresh	Euphorbiaceae	Nagadhandhi	Shrub	Root	Severe constipation and jaundice.
71	*Trichopus zeylanicus* Gaertn.	Dioscoreaceae	Arogyappacha	Herb	Plant, fruits	Anti-fatigue and immune vitality.
72	*Vitex negundo* L.	Verbenaceae	Karinochi	Shrub	Plant, Rroot	Sinusitis and inflammatory swellings.
73	*Alpinia calcarata* (Haw.) Roscoe	Zingiberaceae	Chittaratha	Herb	Rhizome	Respiratory disorders and indigestion.
74	*Alpinia galanga* (L.) Willd.	Zingiberaceae	Kolinji	Herb	Rhizome	Chronic bronchitis
75	*Curcuma amada* Roxb.	Zingiberaceae	Manga inchi	Herb	Rhizome	Skin allergies and sprains.
76	*Curcuma aromatica* Salisb.	Zingiberaceae	Kasthurymanjal	Herb	Rhizome	Skin complexion and acne.
77	*Curcuma longa* L.	Zingiberaceae	Turmeric	Herb	Rhizome	wounds and inflammation.
78	*Curcuma zanthorrhiza* Roxb.	Zingiberaceae	Manjakoova	Herb	Rhizome	Liver congestion and skin rash.
79	*Elettaria cardamomum* (L.) Maton	Zingiberaceae	Ealakka	Herb	Fruits	Nausea, gas and bad breath.
80	*Zingiber officinale* Roscoe	Zingiberaceae	Inchi	Herb	Rhizome	Indigestion, nausea and common cold.
81	*Piper nigrum* L.	Piperaceae	Kurumulaku	Climber	Fruits	Fever, throat infections and cough.

Conclusion

The ethnobotanical survey conducted within the Peppara Wildlife Sanctuary documented 81 significant food and medicinal plant species distributed across 34 distinct families. Taxonomic analysis reveals that Zingiberaceae is the most predominant family represented by 8 species. These are followed by Euphorbiaceae, Dioscoreaceae, Leguminoceae (n=6) and Asclepiadaceae (n= 4), while 13 families are represented by a single species each.

The study highlights that herbal healers of the sanctuary utilise 10 different plant parts for therapeutic formulations. Quantitative analysis confirms that rhizomes are the most utilised part (20 %), followed by the root (18 %), leaf (17 %), fruit (12 %) and whole plant (9 %). The Kani tribe's preference for subterranean organs - roots, rhizomes and tubers is attributed to their localised availability and convenient collection process. However, the heavy reliance on these parts, alongside the extraction of bark, presents a significant threat to the long-term sustainability of the local flora.

The present study emphasises the urgent need for systematic documentation and conservation of indigenous traditional knowledge to prevent its irreversible loss. The findings highlight the importance of education and awareness programmes involving Kani tribal healers and 'Moottu Kani' to encourage sustainable utilisation of plant resources. Ongoing socio-cultural changes, habitat degradation and declining interest among younger generations continue to threaten this knowledge system. Therefore, targeted conservation initiatives are essential to protect both valuable botanical resources and the biocultural heritage of the Peppara Wildlife Sanctuary for future generations.

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Authors' contributions

SLA conceptualised the study, developed the research framework, designed the methodology, coordinated fieldwork, conducted ethnobotanical surveys, compiled and analysed the data, prepared species documentation, tables and figures and drafted the manuscript. GR guided the research approach, contributed to scientific structuring, critically revised the manuscript, improved the discussion and assisted in language editing and proofreading. AN conducted field surveys, interacted with indigenous informants, documented ethnobotanical knowledge, contributed to primary data collection and plant documentation and assisted in drafting relevant sections. All authors have read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interest to declare.

Ethical issues: None

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author used Gemini and other generative AI tools to assist with language editing and grammatical refinement. After using these tools, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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