Exploring folklore herbal knowledge: a compilation from Palakkad district, Kerala, India

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Research

Abstract

Background: In India, traditional medicine is frequently employed to treat a wide range of illnesses. One such practice that persists in many areas of Kerala is folk medicine. This study aims to document the plants and administration methods used for treating diseases in the folk medicine of various taluks in Palakkad district, Kerala, India.

Methods: Data collection involved conducting surveys among villagers in Chittur, Alathur, and Palakkad taluks through regular field visits from January 2022 to March 2023. Twenty informants, aged between 28 and 67 years, were interviewed (Photoplate 1) using pre-structured user-friendly questionnaire. Botanical and common names of plants, plant parts used, and modes of delivery for treatment were documented. Plants reported in the survey other than commercially available in the market were collected and authenticated using floras, and voucher specimens were deposited in the NSS College Herbarium, Nemmara, Palakkad, India. The Use Value (UV) of each therapeutic plant was calculated.

Results: The study reported 88 plant species belonging to 45 plant families. *Aloe vera* (L.) Burm.f. (0.60 UV), *Ocimum tenuiflorum* L., (0.50 UV) and *Zingiber officinale* Roscoe (0.50 UV) were the plants with high use value. Most plants were used individually in treatments, whereas 50 remedies were found using combination of different plant species. Common plant families cited in the study included Fabaceae, Lamiaceae, Acanthaceae, Solanaceae, etc. The most frequently used plant part to treat various diseases was the leaf, followed by seeds and rhizome.

Conclusion: Our findings contribute to documenting the folklore medicine with detailed formulations, preparation methods, dosage and administration mode that are prevalent in various villages of Palakkad district for a variety of diseases, which would be lost from people's knowledge. Further, more research on these plants could lead to develop one or more medication candidates.

Keywords: Folklore medicine, *Zingiber officinale* Roscoe, use value, Palakkad

Background

The field of medicine encompasses research, prevention, diagnosis, and treatment of health-related issues (Sharp *et al.* 2018). The primary medical approach, allopathic medicine, relies on scientific principles and focuses mainly on treating specific problems and alleviating their symptoms rather than providing comprehensive solutions. However, it has its limitations as certain medications may have adverse side effects that can potentially harm internal organs and jeopardize lives (Kumar and Roy, 2016). Common adverse effects include constipation, skin rashes or dermatitis, diarrhea, drowsiness, dry mouth, headaches, and sleeplessness. In some cases, these side effects can lead to severe complications such as kidney failure, stroke, diabetes, and other health issues (Balogun *et al.* 2019). Compared to modern medicine, folk medicine is often perceived as more accessible and easier to administer, and herbal remedies are favored for their minimal or nonexistent side effects and affordable cost (Yabesh *et al.* 2014).

Moreover, the reliance on natural remedies sourced from medicinal plants holds significant importance in developing nations (Novy, 1997), where medicinal plants serve as the primary source of primary healthcare (Razafindraibe *et al.* 2013). According to the World Health Organization (WHO), approximately 80% of the population in these countries primarily relies on traditional medicine for treating ailments. Over the past two decades, significant strides have been achieved in the domain of medicinal plants and their traditional utilization across various regions of India (Yabesh *et al.* 2014). And it was reported that over 70% of the Indian population relies on herbal medicine to address their health concerns (Samal, 2016). In India, approximately 6,000 species are estimated to be utilized in herbal and traditional medicine, meeting about 75% of the healthcare needs of the developing world. Among these, 3,000 plants have received official recognition for their medicinal effectiveness (Laldingliani *et al.* 2022).

Folk medicine, alternatively termed traditional or folkloric medicine, relies on the utilization of plants or botanical substances in its medicinal formulations. These treatments primarily utilize natural ingredients with purported healing and therapeutic properties, with plants being used either in their entirety, in formulations, or directly as medicines (Sofowora *et al.* 2008). It integrates raw medicinal herbs, decoctions, infusions, and syrups into its practice (Singh, 2005). It is utilized for maintaining health and addressing physical and mental illnesses through prevention, diagnosis, enhancement, or treatment. Unlike conventional medicine which is based on scientific evidence, folklore medicine system encompasses the customs, beliefs, experiences specific to diverse cultures and practices related to health and healing that have been transmitted through specific cultures or communities over generations (Che *et al.* 2017). Therefore, folk healers possess an understanding of the sociocultural context of the communities they serve. They command significant respect and boast extensive experience in their field. Economic factors also play a role in treatment, as do the enduring influence of traditional beliefs. Folk healers develop their expertise through dedicated pursuit of specialized knowledge, often through observation and imitation (Singh, 2005).

Nestled at the southernmost tip of the Indian subcontinent, Kerala showcases some of the most extensive rainforest-type vegetation. The native inhabitants have adeptly harnessed this plant diversity to address their healthcare requirements (Rajasekaran *et al.* 1994). The origins of Kerala's folklore medicine can be traced back to the 13th century AD, coinciding with the emergence of non-Brahmanical feudal chieftains who began to support lower castes, and subsequently, affluent families. This period saw the dissemination of knowledge in astronomy and Ayurveda beyond the confines of the Brahmanical social hierarchy (Srivastava *et al.* 2019). Eventhough, Ayurveda and Siddha has highly evolved in urban life, in traditional Kerala communities, every village typically hosts three or more folk healers. Some of these healers maintain such renowned status that individuals from urban areas seek their treatment even in this new century (Rajasekaran *et al.* 1994). Additionally, there exists a sincere curiosity within modern medicine regarding various traditional practices, often serving as a primary source for the development of significant drugs. For instance, notable examples include vincristine and vinblastine, potent anticancer medications derived from *Vinca rosea*, traditionally utilized for treating diabetes mellitus. As well as, compounds extracted from *Rauwolfia serpentina* have been developed to alleviate high blood pressure, with its roots traditionally used to pacify severely agitated patients (Singh, 2005). According to Che *et al*. (2017) certain traditional medicine systems are extensively documented with vast volumes of literature detailing theoretical principles and practical techniques, whereas others are transmitted orally from one generation to the next through verbal instruction. While, there is no authentic documentation exists regarding the folk medical history of Kerala, even though it remains to serve as a vital foundation for other medical systems, including Ayurveda, Unani, and medical herbalism (Rajasekaran *et al.* 1994). Therefore, this study was designed to delve deeper into the prevailing folkloric medicinal system in our locality.

The hilly uplands and highland zones, which are predominantly covered by forests, represent Kerala State's most abundant and relatively well-preserved areas in terms of plant diversity. In contrast, the coastal belt and midlands have undergone

significant disruption primarily due to human activities, resulting in adverse impacts on the natural flora. Despite these changes, people continue to depend on folk medicine, utilizing a combination of locally available plants specific to their region (Nair *et al.* 2000). According to Nair *et al*. (2000) and Remesh *et al*. (2016), the State's floristic data indicate a current estimation of 4465 taxa of flowering plants and 6235 species of non-flowering plants. Among the 14 districts, Palakkad district of Kerala ranks second in terms of tree species population and is renowned for its expansive paddy fields and abundant Palmyras. Consequently, it is not surprising that the flora of Palakkad offers a diverse array of medicinal plants (Remesh *et al.* 2016). While previous ethnobotanical surveys on medicinal plants have been conducted in Palakkad, only a few studies have concentrated on characterizing entire regions (Yesodharan & Sujana, 2009; Narayanan *et al.* 2011; Divya & Manonmani, 2013; Yabesh *et al.* 2014; Jayalekshmi *et al.* 2023a;), leaving several rural areas of Palakkad unexplored.

The research focuses on the Chittur, Alathur, and Palakkad Taluks situated in Palakkad, the southwestern district of Kerala. These regions are predominantly rural, with the local population relying on traditional methods rather than modern drugs for treating illnesses. Linguistic variations have led to miscommunication regarding the development, gathering, storage, diffusion, and research of folk medicine. Effective data communication and storage mechanisms are still in the developmental stage. Therefore, the primary aim of the project is to collect, translate, and preserve shared information regarding folk medicine. The study is designed with the following objectives in mind: (i) Designing a questionnaire for conducting surveys on folklore medicine. (ii) Collecting, translating, and documenting data on folklore medicine practiced in various localities of the Palakkad district using the designed questionnaire. (iii) Creating herbarium of common plants mentioned in the survey for further reference and documentation.

Materials and Methods

Study area

The research focused on the Taluks of Chittur, Alathur, and Palakkad (Figure 1) within the Palakkad district. Field visits were conducted from January 2022 to March 2023, covering various locations in Chittur (Nemmara, Vallanghy, Vithanassery, Koduvayur, and Chittur), Alathur (Alathur, Erimayur, Melarcode) and Palakkad (Olasseri and Palakkad) taluks. The GPS coordinates for each taluk are as follows:

Nemmara : Latitude: 10.59326, Longitude: 76.59987
Vallanghy : Latitude: 10.59569, Longitude: 76.60758
Vithanassery : Latitude: 10.59952, Longitude: 76.61617
Koduvayur : Latitude: 10.66319, Longitude: 76.64818
Chittur : Latitude: 10.69989, Longitude: 76.73897
Melarcode : Latitude: 10.60865, Longitude: 76.57313
Alathur : Latitude: 10.64475, Longitude: 76.54530
Erimayur : Latitude: 10.65926, Longitude: 76.57069
Olasseri : Latitude 10.72692, Longitude 76.70212
Palakkad : Latitude 10.78850, Longitude 76.65356

The district experiences a monsoon season from June to October. March marks the beginning of summer, which lasts until May, while winter extends from November to March.

Informants selection and questionnaire

The informants were chosen at random from individuals who were either born or had lived in the study area for most of their lives and who utilized local flora as a routine method to address health issues, both personal and communal. Moreover, the respondents were encouraged to freely discuss their own experiences, with interviews conducted in the local language, typically at the settler's place and medicinal plant collection field area where they could demonstrate the origin and cultivation of plants they owned or managed. These localities primarily relied on agriculture and cattle farming.

The survey instrument, a questionnaire, underwent multiple rounds of design and review, drawing from related research articles in reputable journals. The aim was to create a questionnaire that was user-friendly and easy to comprehend. It was initially tested in-house before being implemented in the field. The questionnaire was crafted in a manner that allowed for effective communication with respondents in the local language (Malayalam). The questionnaire comprised nine closed-ended questions, outlined below: (1) Name of the data provider. (2) Age of the data provider. (3) Permanent address of the data provider. (4) Taluk of the data provider. (5) Disease name. (6) Local name of plants used in medicine. (7) Plant materials required for preparation. (8) Method and dose of medicine preparation. (9) Mode of administering the medicine.

It's important to note that the implicit condition for this research relates to ethnobotanical remedies, which are predominantly utilized as folklore treatments. These remedies are not formally documented but are instead passed down orally through generations for the treatment of common ailments. Hence the diseases mentioned by the local people were reported as such in this study considering the 'emic' approach of disease classification for discussing ethnomedicine (Heinrich *et al.* 2009).

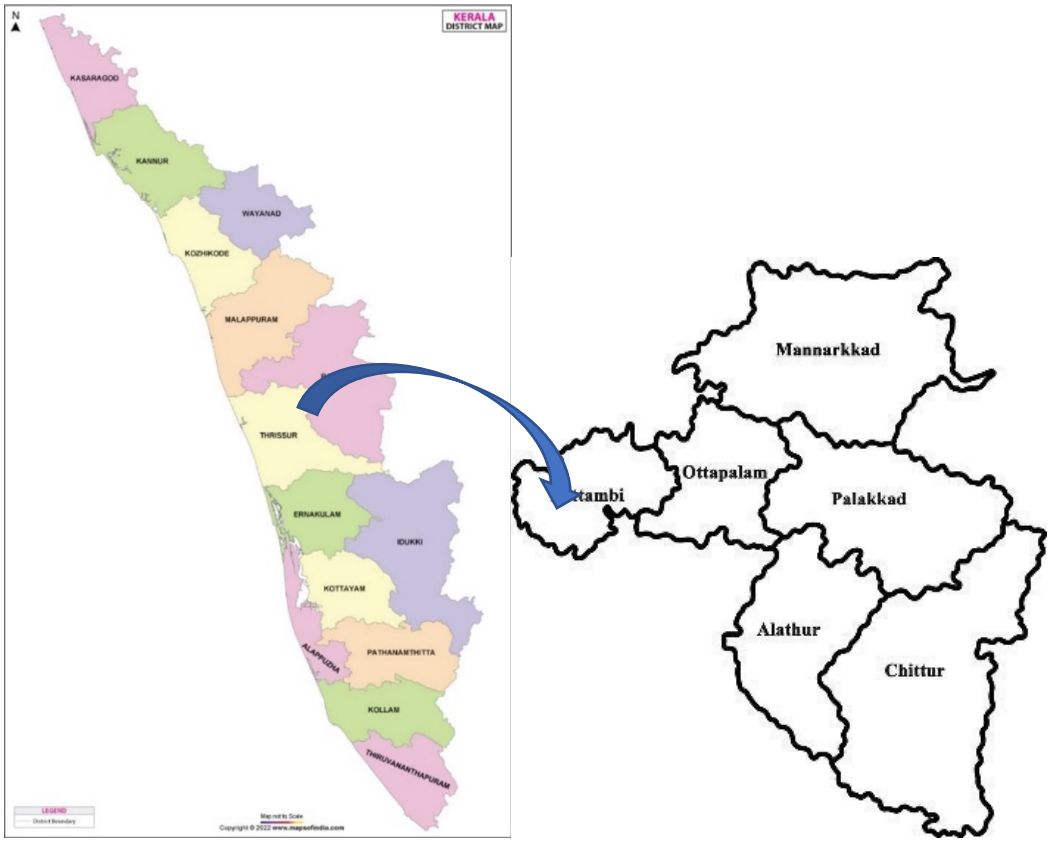

Figure 1. A map depicting the study area features Kerala state, India, on the left side, with various taluks including Chittur taluk, Alathur taluk, and Palakkad taluk, on the right side.

Plant collection and identification

The traditionally valuable plants with medicinal properties collected from various areas including Nemmara, Vallanghy, Vithanassery, Koduvayur, Chittur, Alathur, Erimayur, Melarcode, Olasseri, and Palakkad were processed by drying, pressing, and mounting them on herbarium sheets. These voucher specimens were then deposited in the Herbarium of Botany Department at NSS College, Nemmara, Palakkad. The plants were identified using floras and assistance from Dr. Zereena Viji and Dr. Rekha PS, Assistant Professors in the Botany Department at NSS College, Nemmara, Palakkad. However, the plant parts that are commonly available from market were not made into herbarium. To authenticate the plant names and create an index and list of plants, http://www.worldfloraonline.org was utilized. For taxonomic verification of the plants, http://powo.science.kew.org was consulted. Each herbarium plant was accompanied by relevant data including family, scientific name, local name, date of collection, and the name of the collector.

Use value (UV)

The Use Value (UV) method serves to highlight the relative significance of local inhabitants' use of therapeutic plants. In applying the traditional folklore approach to assess a plant's use value, a specific equation introduced by Sharafatmandrad & Khosravi (2020) is employed:

$$UV = \Sigma U/N,$$

Here, "U" represents the total number of use citations made by all informants for a particular species, while "N" symbolizes the number of informants utilizing the plant species. The value of "N" reflects user feedback regarding a specific plant, though it may not encompass all potential benefits associated with the plant.

Table 1. Folklore medicinal knowledge of plant species in Chittur, Alathur and Palakkad Taluks, Palakkad district, Kerala, India.

Botanical name	Family name	Vernacular name	Voucher number	Plant parts	Mode of preparation	Dosage	Mode of use	Disease
Azadirachta indica A. Juss	Meliaceae	Neem	NSS-2024-013	Leaf of neem and pudina and fleshy turmeric rhizome	Take leaves of plant then turmeric rhizome and mix well	Apply night	Apply on the face and other part	Acne and pimple
Mentha × piperita L.	Lamiaceae	pudina (Mint)						
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)						
Ocimum tenuiflorum L.	Lamiaceae	Holy basil (Tulsi)	NSS-2024-027	Leaf of Tulsi and Fleshy rhizome of Turmeric	Crush the ingredients	Apply morning	Apply to the acne area	Acne and pimple
Curcuma longa L.	Zingiberaceae	turmeric (Manjal)						
Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel of *Aloe vera*	Gel of *Aloe vera*	Twice in a day	Applied on pimples	Acne and pimple
Carica papaya L.	Caricaceae	Papaya	NSS-2024-019	Fruits	Fleshy pulp mixed with honey or rosewater	Twice in a month	Apply on clean face	Acne and pimple
Cyanthillium cinereum (L.) H.Rob.	Asteraceae	Little iron weed (poovamkurunnila)	NSS-2024-058	Root of iron weed and sida, onion bulb, leaves of other plants	Ingredients boil in coconut oil	Twice in a day with hand full of oil Twice in a day with hand full of oil	Apply scalp of head	After bath headache
Ocimum tenuiflorum L.	Lamiaceae	basil (Tulsi)	NSS-2024-027					
Sida cordifolia L.	Malvaceae	Kurunthotti	NSS-2024-030					
Allium oschaninii O.Fedtsch.	Amaryllidaceae	pearl onion	NSS-2024-032					
Eclipta prostrata L.	Asteraceae	false daisy (Bhringraj or kanjunni)	NSS-2024-040					
Cardiospermum halicacabum L.	Sapindaceae	ballon vine (uzhinja)	NSS-2024-063					
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)		Cocnut Oil and Flesh turmeric rhizome	Take turmeric powder, salt and coconut oil and make paste	Apply 0.5g paste	Apply on the skin	Allergy of skin
Cocos nucifera L.	Arecaceae	Coconut	NSS-2024-006					
Justicia adhatoda L.	Acanthaceae	Adalaodakam	NSS-2024-022	Whole plant	Plant is dried and powdered and mix with honey	Thrice in a day	Oral consumption	Asthma
Zingiber officinale Roscoe	Zingiberaceae	Inji (Ginger)		Rhizomes	Rhizome boiled with milk	Use according to need	Drink after cooled	Asthma
Boerhavia diffusa L.	Nyctaginaceae	Thazhuthama	NSS-2024-033	Root	Root is boiled with water	Drink the water	Oral consumption	Blood Pressure
Aristolochia indica L.	Aristolochiaceae	Eeshvaramooli (karlakam)	NSS-2024-008	Leaf	Leaf is smashed to paste	Apply twice in a day	Apply on skin	Blotches

Datura stramonium L.	Solanaceae	Datura (ummam)	NSS-2024-045	Flower	Flower is dried and crushed to fine powder. This powder is covered in a paper and burnt to smoke	Once in a day	Inhale the smoke	Breathing trouble
Zingiber officinale Roscoe	Zingiberaceae	Chukku (Dried ginger)		Dry Rhizome of ginger, leaves of other plants	All the Ingredients crushed and boil in water.	Twice in a day	Drink or Inhale	Breathing trouble
Tinospora cordifolia (Willd.) Hook.f. & Thomson	Menispermaceae	heart loved moonseed (Chittamrith)	NSS-2024-014					
Justicia adhatoda L.	Acanthaceae	Adalodagam	NSS-2024-022					
Coleus amboinicus Lour.	Lamiaceae	coleus (pani koorkka)	NSS-2024-028					
Ocimum tenuiflorum L.	Lamiaceae	holy basil (Tulsi)	NSS-2024-027					
Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel (Leaf)	The gel is separated from leaf	Once in a day	Apply on skin	Burns (fire burn wound)
Terminalia chebula Retz.	Combretaceae	Kadukka	NSS-2024-043	Fruit	Syrup is made with all plant fruits and filtered	Apply gently in the eye (with body temperature) once in a day	Apply in eye	Cleaning eye
Terminalia bellirica (Gaertn.) Roxb.	Combretaceae	Thanni	NSS-2024-052					
Phyllanthus emblica L.	Phyllanthaceae	Nellikka (gooseberry)	NSS-2024-031					
Physalis peruviana L.	Solanaceae	njottanodiyan	NSS-2024-047					
Cinnamomum verum J. Presl.	Lauraceae	Karuvappatta		Karuvappatta bark powder and Fruit juice	Take lemon juice 1ml, honey and then add cinnamon powder and mix to form paste	Drink it morning and night 2ml	Drink	Common Cold
Citrus × limon (L.) Osbeck.	Rutaceae	Lemon						
Coleus amboinicus Lour.	Lamiaceae	Panikkoorkka	NSS-2024-028	Leaf	squeeze the leaves	1 tsp twice in a day	Syrup	Common cold
Cuminum cyminum L.	Apiaceae	jeerakam (Cumin seeds)		Seeds	Jeerakam grind into juice	Twice in a day	Oral consumption	Common cold
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)		Swollen Manjal rhizome and seed of pepper	Take turmeric powder, black pepper in crushed form and mix honey to make paste	Drink it morning and evening 2ml	Drink	Common cold
Piper nigrum L.	Piperaceae	Black pepper	NSS-2024-017					
Leucas aspera (Wild.) Link.	Lamiaceae	Luecas	NSS-2024-037	Leaves	Leaves of luecas and tulsi are boiled in water	Twice in a day	Inhale the vapor	Common cold
Ocimum tenuiflorum L.	Lamiaceae	Holy basil (Tulsi)	NSS-2024-027					
Piper nigrum L.	Piperaceae	Black pepper	NSS-2024-017	Seeds	Crush pepper with honey	Multiple times	Oral consumption	Common Cold

Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Leaf gel/ Pulp	Aloe gel diluted with water	Consume as per need	Consume orally	Constipation
Biophytum sensitivum (L.) DC.	Oxalidaceae	Mukkutti	NSS-2024-034	Mukkutti whole Plant and Pepper seed	5 plants and 5 pepper are grinded	whole once in a day	Oral consumption	Cough
Piper nigrum L.	Piperaceae	Pepper	NSS-2024-017					
Borassus flabellifer L.	Arecaceae	Toddy Palm neera (palm nectar)	NSS-2024-007	Nectar	Panankalkandu made from neera is grind into powder form	Thrice in a day	Oral consumption	Cough
Coleus amboinicus Lour.	Lamiaceae	Panikkoorkka	NSS-2024-028	Leaves	Leaves are grind into juice	Thrice in a day	Oral consumption	Cough
Justicia adhatoda L.	Acanthaceae	Adalodagam	NSS-2024-022					
Justicia adhatoda L.	Acanthaceae	Adalodagam	NSS-2024-022	Leaves	Take tulsi leaves ,Adhatoda leaves and panikkoorka leaves, mix 1ml of honey and make paste	Drink it morning and evening, 2ml	Drink	Cough
Ocimum tenuiflorum L.	Lamiaceae	Holy basil (Tulsi)	NSS-2024-027					
Coleus amboinicus Lour.	Lamiaceae	Panikkoorkka	NSS-2024-028					
Ocimum tenuiflorum L.	Lamiaceae	Karuntulasi (Tulasi)	NSS-2024-027	Leaf	Leaves are crushed into juice	1 tsp thrice in a day	Oral consumption	Cough
Justicia adhatoda L.	Acanthaceae	Adalodakam	NSS-2024-022					
Psidium guajava L.	Myrtaceae	Guava	NSS-2024-016	Fruit	Young guava, made into juice with salt and starch water	Twice in a day	Oral consumption	Cough
Cocos nucifera L.	Arecaceae	Karikinvellam	NSS-2024-006	liquid endosperm	Leaves are crushed into juice in karikinvellam	Twice in a day	Oral consumption	Cough (sputum)
Mimosa pudica L.	Fabaceae	Thottavadi	NSS-2024-059	Leaf				
Coleus amboinicus Lour.	Lamiaceae	Panikoorkka	NSS-2024-028	Leaf	Leaves are crushed into juice with Honey	1 tsp twice in a day	Oral consumption	Cough (sputum)
Biophytum sensitivum (L.) DC.	Oxalidaceae	Mukkutti	NSS-2024-034	Root	Boil the root and steamed	Twice in a day	Steam	Cough & cold
Oryza sativa L.	Poaceae	Kanjhi vellam	NSS-2024-018	Grain	Left over rice water after taking rice	Water applies on the scalp	apply on the scalp	Dandruff
Coffea arabica L.	Rubiaceae	Coffee		Coffee Beans and vegetable part (stem tuber) of Potato	Take coffee powder and potato juice and then mix to paste	Apply at night before sleep	Apply around the eye	Dark circle around eye
Solanum tuberosum L.	Solanaceae	Potato						
Carica papaya L.	Caricaceae	Papaya	NSS-2024-019	Papaya Fruit and Aloe Leaf gel	Take ripen papaya, Honey and gel of	Apply morning and night	Apply on the body part	Dark spot on the body
Aloe vera (L.) Burm. f.	Asphodelaceae	Kattarvazha	NSS-2024-042					

					aloe then mix to make paste			
Carica papaya L.	Caricaceae	Pappaya		Leaves	The juice is made by grinding tender leaves	After breakfast (15ml)	Oral consumption	Decreased platelet count
Hibiscus × rosa-sinensis L.	Malvaceae	Hibiscus (Chembarathi)	NSS-2024-029	Bud of Hibiscus and Garlic clove	5 Hibiscus buds and 5 clove of garlic is grinded well	Once in a day	Oral consumption	Delayed menses and menses cramps
Allium sativum L.	Amaryllidaceae	Garlic (veluthulli)						
Biophytum sensitivum (L.) DC.	Oxalidaceae	Mukkutti	NSS-2024-034	Leaf, flower	Ingredients are boiled with water	Drink the water	Oral consumption	Diabetes
Andrographis paniculata (Burm.f.) Wall. ex Nees	Acanthaceae	Kiriyath	NSS-2024-025	Leaves and inflorescence	Ingredients are boiled in water.	Once a day	Oral consumption	Diabetes
Ocimum tenuiflorum L.	Lamiaceae	basil (Tulsi)	NSS-2024-027					
Mimosa pudica L.	Fabaceae	Thottavadi	NSS-2024-059	Leaf	Leaf of thottavadi and neem fruit, gooseberries, rhizome of turmeric are grinded into slurry	For half glass water add 1 teaspoon and have for 3 days on early morning	Oral consumption	Diabetes
Phyllanthus emblica L.	Phyllanthaceae	Gooseberry (Nellikka)	NSS-2024-031	Fruit				
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)		Rhizome				
Azadirachta indica A.Juss.	Meliaceae	Neem	NSS-2024-013	Fruit				
Momordica charantia L.	Cucurbitaceae	Bitter gourd		Fruit	Fruit Boiled in water	5 days in morning	Oral consumption	Diabetes
Psidium guajava L.	Myrtaceae	Guava	NSS-2024-016	Leaves	Leaves boiled in water	Twice a day	Oral consumption	Diabetes
Allium sativum L.	Amaryllidaceae	Garlic (veluthulli)		Bulb	Garlic cloves are Boiled in coconut oil	3 drops Twice in a day	drop into ear	Ear pain
Borassus flabellifer L.	Arecaceae	Toddy palm	NSS-2024-007	Young meristematic stem	lant part is slightly grinded and dipped in coconut oil	2 drops	Drops into ear	Ear pain
Ocimum tenuiflorum L.	Lamiaceae	Karuntulasi (Tulasi)	NSS-2024-027	Leaf	Leaves are crushed into juice	2 drops twice in a day	Drops into ear	Ear pain
Mimosa pudica L.	Fabaceae	Thottavadi	NSS-2024-059	Leaf	Leaves are made into paste	Once in a day	Apply on skin	edema
Tabernaemontana divaricata (L.) R. Br. Ex Roem. & Schult	Apocynaceae	Pinwheel flower (nandyarvattam)	NSS-2024-057	Flower	Crush the flowers and extract juice	During irritation	Apply as eye drops	Eye irritation
				Flower	Flower is crushed to juice	Twice in a day during irritation	Apply in eye	Eye redness
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)		Rhizome	Turmeric is grind into paste	Apply once in a day	Applied on face	Face glow (brightening)
Curcuma longa L.	Zingiberaceae	turmeric (Manjal)		Rhizome		Once in a day		

Curcuma zedoaria (Christm.) Roscoe	Zingiberaceae	White turmeric (Kachuram)			Rhizome crushed to fine powders		Apply on face, avoid eyes and eyebrows	Face glow (brightening)
Coffea arabica L.	Rubiaceae	Coffee		Coffee powder, gram flour and gel of Aloe	Mix coffee powder and Aloe gel with 1 spoon of gram flour to make paste in honey	Apply before night sleep 1ml	Apply on the body part	Face or body tan
Cicer arietinum L.	Fabaceae	Gram flour						
Aloe vera (L.) Burm. f.	Asphodelaceae	Kattarvazha	NSS-2024-042					
Piper nigrum L.	Piperaceae	Black pepper	NSS-2024-017	Cumin and pepper Seeds and Dry ginger rhizome (chukku)	Put black pepper, jeerakam (cumin) and dry ginger in water and bring to boil	Twice in a day	Oral consumption	Fever
Cuminum cyminum L.	Apiaceae	jeerakam (cumin)						
Zingiber officinale Roscoe	Zingiberaceae	Ginger (Inji)						
Zingiber officinale Roscoe.	Zingiberaceae	Chukku		Dry rhizome	Chukku mixed with thippili and pepper then crushed into juice	1 tsp thrice in a day before meal	Oral consumption	Fever
Piper longum L.	Piperaceae	Thippili		Fruit				
Piper nigrum L.	Piperaceae	Pepper	NSS-2024-017	Seed				
Piper nigrum L.	Piperaceae	Black pepper	NSS-2024-017	Seeds, Dry rhizome (Chukku or Dry ginger)	Put black pepper, Chukku in black coffee and bring to a boil	Twice in a day	Oral consumption	Fever
Zingiber officinale Roscoe	Zingiberaceae	Ginger (Inji)		Seeds, Dry rhizome (Chukku or Dry ginger)				
Artocarpus heterophyllus Lam.	Moraceae	Jackfruit tree	NSS-2024-038	Soft root of jackfruit tree and whole parts of other plant	All ingredients are Powdered and boil in oil for long time	Apply thrice in a day	Apply on burnt skin	Fire burn wound
Clitoria ternatea L.	Fabaceae	Shankupushppam	NSS-2024-041					
Tectona grandis L. f.	Lamiaceae	Teak (Thekku)	NSS-2024-012	Leaves	Young leaves are boiled in coconut oil	Thrice in a day	Oral consumption	Fire burn wound
Acalypha indica L.	Euphorbiaceae	Kuppameni		Leaves	Crushed the leaves into paste	Twice in a day	Oral consumption	Fungal disease
Leucas aspera (Wild.) Link.	Lamiaceae	Thumba	NSS-2024-037					
Allium sativum L.	Amaryllidaceae	Veluthulli (Garlic)		Bulb	chew and eat onion bulb	once in a day	Chew & eat	Gas trouble
Zingiber officinale Roscoe	Zingiberaceae	Inji (Ginger)		Rhizome	Ginger rhizome crushed into juice and mixed with honey	One spoon in a day	Drink	Gastric acidity

Psidium guajava L.	Myrtaceae	Guava	NSS-2024-016	Leaves	Crushed leaf is placed on infected area	Apply according to need	Apply on gum	Gum pain
Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel of *Aloe vera* leaves, Hibiscus Flower, Henna leaves	Add ingredients in coconut oil and bring to boil	Once in a day	Applied on hair	Hair fall
Hibiscus × rosa-sinensis L.	Malvaceae	Chembarathi	NSS-2024-029					
Lawsonia inermis L.	Lythraceae	Henna	NSS-2024-067					
Bergera koenigii L.	Rutaceae	Curry leaves	NSS-2024-062	Leaf	Leaves are boiled in coconut oil	Apply once in a day	Hair oil	Hair fall
Aloe vera (L.) Burm. f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel of *Aloe*, Bhringraj whole plant, Henna leaves, Hibiscus flower bud	Crush the plant parts and extract is mixed and boiled in oil	Apply on before bath	Apply on hair	Hair fall
Eclipta prostrata (L.) L.	Asteraceae	Bhringraj (kanjunni)	NSS-2024-040					
Hibiscus × rosa-sinensis L.	Malvaceae	Chembarathi	NSS-2024-029					
Lawsonia inermis L.	Lythraceae	Henna	NSS-2024-067					
Allium cepa L.	Amaryllidaceae	Small onion		Bulb	Onion Grind into paste	Once in a week	Apply on hair before bath	Hair fall & hair growth
Hibiscus × rosa-sinensis L.	Malvaceae	Chembarathi	NSS-2024-029	Hibiscus Flower and leaves, Curry Leaves, and Coffee bean	Take flower and leaves of Chembarathi, curry leaves and coffee powder and make paste	Apply before bath 1ml	Apply on the hair and scalp	Hair fall and dandruff
Bergera koenigii L.	Rutaceae	Curry leaves	*NSS-2024-062*					
Coffea arabica L.	Rubiaceae	Coffee						
Eclipta prostrata (L.) L.	Asteraceae	Bhringraj (kanjunni)	NSS-2024-040	Leaves	Grinded leaves mix with coconut oil	Once in a day	Apply on scalp before bath	Hair fall and dandruff
Aloe vera (L.) Burm. f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel of Aloe, Chembarathi flower, Bhringraj leaves, Banana Fresh fruit	Take plant parts and mix well with egg.	Apply before bath	Apply on the scalp	Hair fall with split ends
Hibiscus × rosa-sinensis L.	Malvaceae	Chembarathi	NSS-2024-029					
Eclipta prostrata (L.) L.	Asteraceae	Bhringraj (kanjunni)	NSS-2024-040					
Musa acuminata Colla.	Musaceae	Banana						
Hibiscus × rosa-sinensis L.	Malvaceae	Chembarathi	NSS-2024-029	Leaf, flower	Ingredients are boiled with oil	Once in a day	Apply on hair	Hair growth
				Leaf	Leaves are crushed into paste	Apply once in a week	Apply on hair before bath	
Sesamum indicum L.	Pedaliaceae	Gingelly seed		Seed	Make gingelly oil from the seed	Once in a day	Apply on hair	Hair growth
Sida cordifolia L.	Malvaceae	Kurunthotti	NSS-2024-030	Leaf	Leaves are grind into paste	Apply once in a week	Apply on hair before bath	Hair growth & maintain hair color

Cocos nucifera L.	Arecaceae	Mechinga (baby coconut)	NSS-2024-006	Small tender Fruit	It is rubbed and make paste	Once in a day	Apply on head	Headache
Hyptis suaveolens (L.) Poit.	Lamiaceae	American mint (nattapoochedi)	NSS-2024-060	Whole plant	Whole plant crushed and squeezed to juice	Once in a day	Oral consumption	Headache
Mimosa pudica L.	Fabaceae	Thottavadi	NSS-2024-059	Leaf	Leaves are Smashed to paste	Apply whenever feel pain	Apply on forehead	Headache
Brassica juncea (L.) Czern.	Brassicaceae	Mustard seed		Seed	Seeds are crushed into juice	Once in a day (little bit)	Apply on head	Headache
Vigna mungo (L.) Hepper	Fabaceae	Uzhunnu		Seed	Seeds are crushed into powder	Bath with this powder	Apply on skin during bath	Heat rash
Anacardium occidentale L.	Anacardiaceae	Kasumavu (Cashew)	NSS-2024-004	Leaves of kasumavu and cumin seeds	Tender Leaf of cashew is grinded well and mixed with cumin seed powder	After dinner (no water)	Oral consumption	High creatinine level
Cuminum cyminum L.	Apiaceae	cumin seeds (jeerakam)						
Azadirachta indica A. Juss	Meliaceae	Neem	NSS-2024-013	Neem bark	Bark boiled in water	Once in a day	Use water for bathing	Hip pain
Commiphora caudata (Wight & Arn.) Engl.	Burseraceae	Idinjil	NSS-2024-061	Idinjil bark	Grind the bark with rice	Thrice in a week	Oral consumption	Hip pain
Pterocarpus marsupium Roxb.	Fabaceae	Venga	NSS-2024-051	Venga bark	Bark is Crushed into paste & boiled in rice water	Thrice in a week	Oral consumption	Hip pain
Citrus × limon (L.) Osbeck	Rutaceae	Lemon		Fruit	Ginger rhizome is crushed into in lemon juice and Salt	1 tsp thrice in a day before meal	Oral consumption	Indigestion problem
Zingiber officinale Roscoe	Zingiberaceae	Ginger		Rhizome				
Allium sativum L.	Amaryllidaceae	(Garlic) Veluthulli		Bulb of Allium, rhizome of Ginger	Grind the ingredients into paste	once in a day	Oral consumption	Indigestion problem
Zingiber officinale Roscoe	Zingiberaceae	Inji (Ginger)						
Cuminum cyminum L.	Apiaceae	cumin seeds (jeerakam)		Phyllanthus Whole plant and cumin Seeds	Ingredients are grind in cow milk.	Twice in a day	Oral consumption	Jaundice
Phyllanthus amarus Schumach. & Thonn.	Phyllanthaceae	Stone breaker	NSS-2024-066					
Justicia gendarussa Burm.f.	Acanthaceae	vathamkolli	NSS-2024-024	Leaves of J*usticia* and coral tree, stem of toddy palm and whole parts of others	Boil the ingredients in water and take bath in that	Twice in a day	Water bath	Joint pain (Rheumatoid arthritis)
Erythrina variegata L.	Fabaceae	indian coral tree (murukke)	(NSS-2024-064)					
Borassus flabellifer L.	Arecaceae	toddy palm	NSS-2024-007					
Tinospora cordifolia (Willd.) Hook.f. & Thomson	Menispermaceae	chittamrith	NSS-2024-014					
Tiliacora acuminata (Lam.) Miers	Menispermaceae	valli kanjiram	NSS-2024-036					

Plumbago indica L.	Plumbaginaceae	plumbago (koduveli)	NSS-2024-065					
Antidesma sp L.	Phyllanthaceae	Cheruthali	NSS-2024-035	Leaves	Leaves are crushed to slurry	Twice in a day	Apply on skin few hours before bathing	Eczema (Karappan)
Carum carvi L.	Apiaceae	Black seed		Seed of black seed, bark of karuvapatta, leaves of shankum kuppa, leaves of henna, young leaves of teak	Ingredients are grinded and boiled in coconut oil prolong	Twice in a day	Apply on skin few hours before bathing	Eczema (Karappan)
Cinnamomum verum J. Presl.	Lauraceae	Karuvapatta						
Acalypha indica L.	Euphorbiaceae	Shankum kuppa	NSS-2024-046					
Lawsonia inermis L.	Lythraceae	Henna	NSS-2024-067					
Tectona grandis L.f.	Lamiaceae	Teak (Thekku)	NSS-2024-012					
Kalanchoe pinnata (Lam.) Pers.	Crassulaceae	Ranakalli plant	NSS-2024-053	Leaf	Leaves are Crushed to juice and add whey	Once in a day	Drink	Kidney stone
Scoparia dulcis L.	Plantaginaceae	Kallurukki (goat weed)	NSS-2024-015	Leaves	Leaves are crushed into a paste and is mixed with milk or tender coconut	After meal	Oral consumption	Kidney stone
Pergularia daemia (Forssk.) Chiov.	Apocynaceae	Trellis vein (velli paruthi)	NSS-2024-054	Leaf of trellis and willow, pod of tamarind,	Ingredients are smashed to slurry	Once in a day	Apply on knees	Knee pain
Tamarindus indica L.	Fabaceae	tamarind (Puli)	NSS-2024-011					
Justicia gendarussa Burm.f.	Acanthaceae	willow leaved justica (vathamkolli)	NSS-2024-024					
Grona triflora (L.) H.Ohashi & K.Ohashi	Fabaceae	Nilamparanda	NSS-2024-049	Whole plant	Whole plant grinded and juice extracted	After breakfast (15ml)	Oral consumption	Liver damage
Curcuma longa L.	Zingiberaceae	Turmeric (Manjal)		Turmeric Rhizome and Munja stem and leaves	Ingredients are smashed to slurry	Once in a day	Oral consumption	Loose motion in children
Premna serratifolia L.	Lamiaceae	Munja	NSS-2024-044					
Trigonella foenum-graecum L.	Fabaceae	Fenugreek		Seeds	Seed is boiled in water	Twice a day	Oral consumption	Menses cramps
Asparagus racemosus Willd.	Asparagaceae	Asparagus (shatavari)	NSS-2024-009	Rhizomes	Dried and powdered rhizome is mixed with milk or honey	Twice in a day during periods	Oral consumption	Menstrual health
Asparagus racemosus Willd.	Asparagaceae	Asparagus (shatavari)	NSS-2024-009	Rhizomes	Dried rhizome is powdered and mix with honey	Once in a day	Oral consumption	Milk secretion in delivered mother (Lactation)
Cardiospermum halicacabum L.	Sapindaceae	Uzhinja	NSS-2024-063	Leaves	Leaves are crushed to juice	Drink once in a day	Drink	Mouth ulcer

Ocimum tenuiflorum L.	Lamiaceae	Holy basil (Tulsi)	NSS-2024-027	Leaves of basil, betal, kurumthotti and karunochi; fruit of nutmeg, gall nut and milk of coconut	Grind all ingredients into juice	Once in a day	Oral consumption	Mouth ulcer in children
Piper betle L.	Piperaceae	Betal leaf (Vettila)						
Sida cordifolia L.	Malvaceae	Kurumthotti	NSS-2024-030					
Vitex negundo L.	Lamiaceae	chinese chaste tree (karunochi)	NSS-2024-039					
Myristica fragrans Houtt.	Myristicaceae	nutmeg (jaathi)	NSS-2024-055					
Quercus infectoria G.Olivier.	Fagaceae	gall nut,						
Cocos nucifera L.	Arecaceae	Coconut	NSS-2024-006					
Drimia indica (Roxb.) Jessop	Asparagaceae	Wild onion (kaattu vengayam)	NSS-2024-056	Bulb	Wild Onion bulb and table salt crushed and boiled in coconut oil	Thrice in a day	Apply on infected nail	Nail infection
Jatropha curcas L.	Euphorbiaceae	Veliyada kota	NSS-2024-010	Bark	Bark and salt crushed to paste	Twice in a day	Apply on infected nail	Nail infection
Allium cepa L.	Amaryllidaceae	small onion		Bulb	crush onion into paste	Thrice in a week	Apply on nails	Nail pain
Coleus amboinicus Lour.	Lamiaceae	Panikkoorkka	NSS-2024-028	Leaf	squeeze the leaves of both plants	1 tsp twice in a day	Syrup	Phlegm
Ocimum tenuiflorum L.	Lamiaceae	Holy basil (Tulsi)	NSS-2024-027					
Amorphophallus muelleri Blume	Araceae	Kattu chena		Tuber	Dried and powdered tuber (yam) mix with milk or water	Once in a day	Oral consumption	Piles
Biophytum sensitivum (L.)	Oxalidaceae	Little tree plant (mukkutti)	NSS-2024-034	Whole plant	9 or 11 plants are washed and crushed to make slurry	For one week at early morning at veggie diet	Oral consumption	Piles
Aloe vera (L.) Burm.f.	Asphodelaceae	kattarvazha	NSS-2024-042	Gel	Gel of *Aloe vera*	Apply once in a day	Applied on pimples	pimples
Terminalia chebula Retz.	Combretaceae	Kadukka	NSS-2024-043	Seed	Seeds are boiled with water and bath with this	Once in a day	Wash with this water	Rashes
Trigonella foenum-graecum L.	Fabaceae	Fenugreek (uluva)		Dried seeds	Grind seeds	Once in a week	Apply on scalp and hair before bathing	Scalp protection
Nerium oleander L.	Apocynaceae	Oleander (arali poov)	NSS-2024-005	Flower	Flower is crushed to paste.	Apply once in a day	Apply on acne	Scratches and acne
Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Gel (Leaf)	Mix one spoon of lemon juice and *Aloe vera* gel	Twice in a day	Apply on skin	Skin allergy

Curcuma longa L.	Zingiberaceae	Manjal (turmeric)		Rhizomes	Rhizomes grinded into paste with coconut oil or honey	Apply till infection disappear	Apply on skin	Skin irritation
Piper longum L.	Piperaceae	Thippili		Dry Ginger rhizome, Dried thippili fruit	Ingredients are Crushed to fine powder and boil	Once in a day	Drink	Sore Throat
Zingiber officinale Roscoe	Zingiberaceae	Chukku (Dry Ginger)						
Lantana camara L.	Verbenaceae	West Indian lantana (poochedi poov)	NSS-2024-048	Leaf	Leaves are Crushed and squeezed into juice	One table spoon at time of pain	Oral consumption	Stomachache
Trigonella foenum-graecum L.	Fabaceae	Uluva		Seeds	Put Uluva in water and bring to boil	Once in a day	Oral consumption	Stomachache
Leucas aspera (Wild.) Link.	Lamiaceae	Thumba	NSS-2024-037	Leaf	Leaves are Crushed to juice	One table spoon	Oral consumption	Stomachache
Mentha × piperita L.	Lamiaceae	Mint (Pudina)		Leaf	Mint leaf used to make tea or coffee	Drink once or twice in a day	Oral consumption	Stomach diseases
Aloe vera (L.) Burm.f.	Asphodelaceae	kattarvazha	NSS-2024-042	Aloe Gel, Lemon Fruit	Crushed Gel in Lemon juice	1 table spoon once in a day	Oral consumption	Stomach pain
Citrus × limon (L.) Osbeck	Rutaceae	lemon						
Trigonella foenum-graecum L.	Fabaceae	Uluva (Fenugreek),		Seeds	Seeds are Boiled in water	1 glass twice in a day	Oral consumption	Stomach pain
Cuminum cyminum L.	Apiaceae	jeerakam (Cumin seeds)						
Trigonella foenum-graecum L.,	Fabaceae	Uluva (Fenugreek),		Seeds	Seeds are Boiled in water	Drink twice in a day	Drink	Stomach pain
Cuminum cyminum L.	Apiaceae	jeerakam (Cumin)						
Piper longum L.	Piperaceae	Thippili		Pepper seed, Thippili Leaf, dry ginger rhizome	Take pepper, 2 leaf of thippili, 2 chukku , 4 panankalkandu and mixed with honey to make paste	Drink it morning and evening 2 ml	Drink	Throat pain
Piper nigrum L.	Piperaceae	Black pepper	NSS-2024-017					
Zingiber officinale Roscoe	Zingiberaceae	Chukku (Dry Ginger)						
Allium sativum L.	Amaryllidaceae	Veluthulli		Bulb	Grind the ingredient	Once in a day	Bite with tooth	Tooth pain
Psidium guajava L.	Myrtaceae	Guava	NSS-2024-016	Leaf	Leaf is boiled & steamed	Twice in a day	Steam	Tooth pain
Solanum virginianum L.	Solanaceae	Kandakarichunda	NSS-2024-050	Fruit	Heat the fruit and apply on teeth	Twice in a day	Apply on teeth	Toothache
Allium cepa L.	Amaryllidaceae	Onion		Bulb of onion	Onion is cut into pieces and added with curd	Twice a day	Oral consumption	Urinary infection
Maranta arundinacea L.	Marantaceae	Arrow root (koova)		Rhizomes	Dried and powdered rhizome mix with	Multiple times in a day	Oral consumption	Urinary infection

					water or milk or honey			
Scoparia dulcis L.	Plantaginaceae	Kallurikki	NSS-2024-015	Leaf	Take the kallurikki leaves and crushed to form liquid	2 ml every day	Drink	Urinary infection
Asparagus racemosus Willd.	Asparagaceae	Shathavari kizhangu	NSS-2024-009	Rhizome	Tuber is grinded and mixed with cow milk or goat milk	After meal	Oral consumption	Urinary infection
Tamarindus indica L.	Fabaceae	Tamarind (Puli) seed	NSS-2024-011	Seeds	Soak tamarind seed in water	Thrice in a day	Oral consumption	Urinary infection
Scoparia dulcis L.	Plantaginaceae	Goat weed (kallurukki)	NSS-2024-015	Leaves	Crushed leaves with milk	Thrice in a day	Oral consumption	Urine stone
Tamarindus indica L.	Fabaceae	Tamarind	NSS-2024-011	Bark of tree	Bark dried in sunlight and crushed into fine powders. Mixed with coconut oil and apply on wound	Twice in a day	Apply on wound	Wound of bed patient
Aloe vera (L.) Burm.f.	Asphodelaceae	Kattarvazha	NSS-2024-042	Leaf gel	Fresh leaf gel	Twice in a day	Apply on wounds	Wounds
Biophytum sensitivum (L.) DC.	Oxalidaceae	Mukkutti	NSS-2024-034	Leaves	leaves are grind into paste	Twice in a day	Applied on wound	Wounds
Chromolaena odorata (L.) R.M.King & H.Rob.	Asteraceae	Appa chedi	NSS-2024-021	Leaf and flower	Ingredients are crushed to juice	Apply twice in a day until wound heals	Apply on wound	Wounds
Chromolaena odorata (L.) R.M.King & H.Rob.	Asteraceae	Siam weed (communist pacha)	NSS-2024-021	Leaf	Leaves are crushed into paste	Apply on wounds	Applied on wounds	Wounds
Drimia indica (Roxb.) Jessop			NSS-2024-056	Mimosa Leaves and Wild Onion bulb	Leaves and onion are crushed to paste	Twice in a day	Apply on skin	Wounds
Mimosa pudica L.	Fabaceae	Thottavadi,	NSS-2024-059					
Jatropha multifida L.	Euphorbiaceae	Churakalli	NSS-2024-020	Leaf gum	Gum of Churakalli	Apply on wounds	Applied on wounds	Wounds
Strobilanthes alternata (Burm.f.) Moylan ex J.R.I.Wood	Acanthaceae	Murikootti	NSS-2024-023	Leaf	Leaves are crushed into paste	Apply on wounds	Applied on wounds	Wounds
Cyanthillium cinereum (L.) H.Rob.	Asteraceae	Little iron weed (poovamkurunnila)	NSS-2024-058	Leaf of iron weed, petiole of betel, onion bulb and seed of black cumin	Ingredients are smashed and filled in a cotton bag	Once in a day	Apply as eye drop	Wounds in eye
Piper betle L.	Piperaceae	betel (Vettila)						
Allium oschaninii O.Fedtsch.	Amaryllidaceae	pearl onion	NSS-2024-032					
Nigella sativa L.	Ranunculaceae	black cumin						

Results and Discussion

The Western Ghats of Kerala, situated in the Palakkad district, harbor numerous therapeutic plants rich in medicinal and nutritional properties. In the recent folklore medicinal field study, a total of 135 remedies were investigated across the Chittur, Alathur, and Palakkad Taluks (Figure 1) of Kerala's Palakkad district. The study was conducted between January 2022 and March 2023, gathering information from twenty informants (3 males and 17 females) aged between 28 and 67 years, residing in various locations within the Chittur, Alathur, and Palakkad taluks. Prior to publication, explicit verbal consent for sharing the data was obtained from all informants. Table 1 presents the comprehensive findings of the field study, including the botanical names of medicinal plant species utilized, the plant components employed for treatment, and the mode and dosage of administration. Total of 88 distinct plant species belonging to 45 families were reported in this study. During the field visits with the informants, the plants were collected and identified using floras and the voucher specimens were deposited in Botany Department Herbarium. In a similar way Jayalekshmi *et al.* (2023b) have documented the medicinal usage of folklore, focusing specifically on Chittur taluk and reported approximately 212 plant species. Our study also observed nearly 48 of these medicinal plants, though only a few of them had comparable uses. For instance, *Aloe vera* is used for burns, *Asparagus racemosus* for urinary infections, *Azadirachta indica* for pimples, *Chromolaena odorata* for wounds, *Eclipta prostrata* for hair fall and *Citrus limon* for diarrhea, among other diverse applications.

Most of the medicinal plants described in this field study report are herbaceous, although some are shrubs and trees, with a smaller number being creepers. Jayalekshmi *et al.* (2023b) also reported similar findings in their study. The widespread use of herbs for medicinal purposes remains often due to their rich concentration of pharmacologically active compounds (Tugume *et al.* 2016). It was observed during the study period that while herbs tend to disappear during the dry season, shrubs and trees are able to survive. Additionally, medicinal plants tend to grow taller and appear more vibrant green during the rainy season. Hence, healers select different plants for treatment based on the season, possessing a deep understanding of their availability in various locales. In Kerala, folk healers frequently specialize in treating particular ailments using medicinal plants endemic to specific regions (Rajasekaran *et al.* 1994).

Medicinal plant parts used in Folklore practices of Palakkad District

Throughout the year, an abundance of green leaves remains accessible. Leaves have long been utilized in the preparation of herbal medicines across tribal cultures and traditional medical practices worldwide. Traditional practitioners, however, are well aware of the varying therapeutic effects of different parts of medicinal plants, though according to Kadirvelmurugan *et al.* (2014), the widespread use of leaves in medicinal preparations may be attributed to their extensive availability, ease of gathering, its efficiency and also attention on conservation aspects. Furthermore, leaves are employed more frequently than other plant components due to their higher production of secondary metabolites and greater photosynthetic activity, as indicated by Yabesh *et al*. (2014). Similarly, in our current study, the leaves of various plant species were the most commonly utilized part for medicinal purposes. Likewise, it has been found that the least used parts for folklore medicine in the selected study region were whole plant as well as root and bark which lights to the plant conservation thoughts of ancestors of the study area.

Ailment categories reported in the folklore medicine system at Palakkad district

The results of diseases treated using folklore medicine of the study area is presented in Figure 2. The present study utilized an emic perspective to classify diseases and illnesses, acknowledging the influence of diverse cultural perceptions and values on medicine across different populations (Heinrich *et al.* 2009). Villagers rely heavily on locally available plants for treating common ailments such as the common cold, wounds, stomach aches, urinary infections, headaches, etc., as well as for various cosmetic purposes like hair care, treating pimples, enhancing skin complexion, etc.

The informants informed in our field research that the most frequently treated diseases were infectious and gastro-intestinal diseases among the local people. Though, according to this study, the most commonly treated diseases in the Palakkad locality through folklore medicine are coughs and wounds, for which multiple alternative remedies exist. Moreover, these ailments are perceived as the most prevalent, particularly when other cosmetic concerns are set aside, as treatments for hair health were frequently mentioned. Consequently, coughs and wounds are the primary focus of treatment in the study area, followed by the common cold, urinary infections, and stomach-related issues. Additionally, similar emphasis is placed on cosmetic concerns such as hair health, treating pimples, and enhancing skin glow.

It was observed from information provided by various informants that local people continue to rely on folklore medicine for ailments such as urinary/kidney stones, menstrual problems, arthritis, and even diabetes. This reliance could be attributed to the side effects experienced from allopathic medicinal treatments and the recurrence of ailments even after expensive treatments.

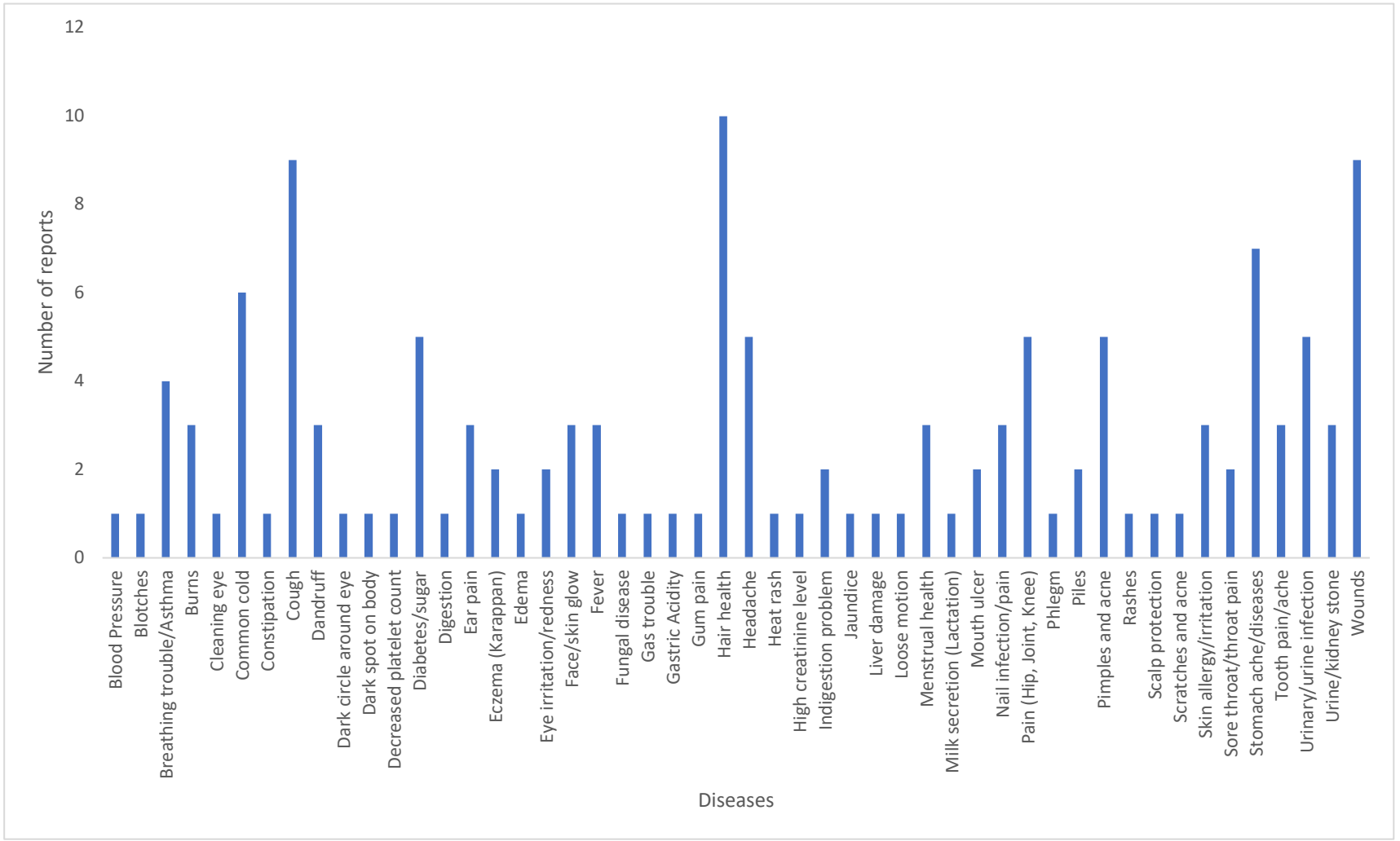

Figure 2. The disease categories associated with the medicinal plants used by the local people of Palakkad district, Kerala, India.

Despite variations in localities, different plants are utilized in treatment procedures due to their easy availability in specific areas. Interestingly, the survey revealed instances where the same plant and treatment methods were reported across different regions and by different informants. For example, two informants from separate regions reported using garlic with coconut oil for treating ear pain. Similarly, *Tabernaemontana divaricata* flowers were used for eye irritation, *Hyptis suaveolens* for headaches, and *Scoparia dulcis* for kidney and urinary stone. The similar or diverse ethnomedicinal purposes of a plant species may likely be due to its genuine and strong bioactivity potential (Tugume *et al.* 2016; Gonfa *et al.* 2020). Therefore, the pharmacological evidence supports the documented therapeutic potential of these plants (Sasidharan *et al.* 2018; Shanmugapriya *et al.* 2021; Gayathri *et al.* 2021).

Conversely, different plants were observed being used for treating the same ailments in different areas. For instance, nail infections were treated with *Drimia indica* in the Alathur region and with *Jatropha curcas* in Chittur taluk. This might be likely due to the plant's availability in the healers' surroundings. Even within the same area, different informants employed varying plant combinations and treatment methods for the same condition. For example, acne and pimples were treated in Chittur taluk with a combination of *Ocimum tenuiflorum* and *Curcuma longa* by one informant, while another informant used neem, mint, and turmeric, albeit both treatments included turmeric. The herbal remedy, prepared using a combination of plants to treat a specific ailment, demonstrates the synergistic effects of these plants, particularly their antimicrobial and anti-inflammatory properties which were pharmacologically evidenced (Yamani *et al.* 2016; Nayak *et al.* 2020; Reddy and Neelima, 2022). Moreover, traditionally, turmeric has been included in treatments for a wide range of diseases, as evidenced by its experimentally documented therapeutic properties, such as antimicrobial and antidermatophytic activities. These benefits are attributed to its active constituent, curcumin, which exhibits antioxidant, free radical scavenging, and anti-inflammatory properties. Additionally, curcumin provides protective effects against respiratory disorders by influencing inflammatory cells and mediators, lung pathological alterations, airway responsiveness, and immunomodulatory responses (Fuloria *et al.* 2022). Moreover, it was observed that informants relied on different plants for treating the same ailment based on the availability of the plant during a particular season. For instance, *Jatropha multifida*, *Strobilanthes alternata*, and *Chromolaena odorata* were used at different times for treating wounds in the Koduvayur region.

Furthermore, this study discovered that certain plants, including *Sida cordifolia* L. and *Tinospora cordifolia* (Willd.) Hook.f., as well as several others, were employed to treat multiple diseases either individually or in combination with other key plants. This was also reported by Jayalekshmi *et al*. (2023b) and this phenomenon is probably due to its year-round availability and its high healing potential attributed to the presence of multiple metabolites and the effectiveness of certain molecules against different disease conditions (Tugume *et al.* 2016). For instance, the high levels of flavonoids and alkaloids in *Sida cordifolia* are responsible for its antiulcer, analgesic, anti-inflammatory properties, and its antifungal activity against various Candida strains (Biswanath *et al.* 2015). Similarly, numerous studies have documented the role of active compounds, including terpenoids, alkaloids, lignans, and steroids, in *Tinospora cordifolia* for its antimicrobial properties against a variety of microbes. Notably, it has been experimentally shown to offer protective effects against Parkinsonism by reducing neuroinflammation in mice (Sharma *et al.* 2019).

Use value and usage of the plant species in folklore medicine

The results of this study (Supplementary file Table S1) indicate that *Aloe vera* possesses a higher use value (0.60) compared to other reported plants. In this study, *Aloe vera* was primarily utilized for cosmetic purposes such as promoting hair growth, treating skin allergies, and managing pimples. Additionally, it was employed for treating wounds, burns, stomach aches, and constipation. Sánchez *et al.* (2020) have also reported the traditional usage of *Aloe vera* for burns, cuts, and digestive problems. These ethnobotanical applications align with bioactivity studies that demonstrate its antifungal, wound and burn healing, immunomodulatory, gastro-protective, and anti-inflammatory properties (Maan *et al.* 2018).

Furthermore, *Aloe vera* was found to be used in combination with other plants such as *Carica papaya*, *Hibiscus × rosa-sinensis*, *Cocos nucifera*, *Lawsonia inermis*, and *Eclipta prostrata* for various cosmetic conditions like dark spots, facial tanning, hair fall, and split ends. The synergistic effects of the plants involved in herbal remedy combination illustrated in its treatment effect for an ailment (Tugume *et al.* 2016). For instance, Koul *et al.* (2022) reported the high vitamin content of Papaya fruit whereas, the significant role of *Eclipta prostrata* in hair growth by promoting the induction of anagen was demonstrated by Lee *et al*. (2019). The experimental evidence thus supports the traditional use of these plants for treatment.

Zingiber officinale and *Ocimum tenuiflorum* emerge as the second most commonly utilized plant species by informants in the study area, with a use value of approximately 0.50. *Zingiber officinale*, commonly known as ginger, was employed in two main forms: fresh rhizome for addressing issues like acidity, indigestion, and asthma, and in dried form for treating ailments

such as fever, respiratory difficulties, throat infections, and digestive issues. Additionally, *Zingiber officinale* was used either alone or in combination with other plants such as *Allium sativum*, *Citrus limon*, *Tinospora cordifolia*, *Justicia adhatoda*, *Ocimum tenuiflorum*, *Plectranthus amboinicus*, *Piper nigrum*, *Cuminum cyminum*, and *Piper longum* in various treatments. Additionally, numerous researchers have reported the traditional use of *Aloe vera* and *Z. officinale* in various regions worldwide.

Similarly, *Ocimum tenuiflorum*, commonly known as holy basil or Tulsi, was consistently employed in conjunction with other plants to address respiratory ailments such as coughs, the common cold, post-bath headaches, breathing difficulties, and phlegm. Furthermore, it was utilized in the management of diabetes, the treatment of mouth ulcers, and even employed alone for alleviating ear pain in the form of drops.

Singh and Singh (2009) have documented the usage of plants in combination with others for treatments by tribals in Chandauli, India. Similar practices of combining plants with others such as *Allium cepa, A. sativum*, and *Piper nigrum* have also been reported by Silalahi *et al.* (2021) in traditional medicine among the Karo ethnic people in Indonesia, alongside their solitary usage. In numerous traditional societies, same plants are employed for different purposes, such as enhancing athletes' performance or safeguarding infants from evil spirits and same for addressing concerns like diarrhea or sore eyes. Often, a single plant serves both functions, reflecting the emic categories, which encompass indigenous concepts about these phenomena (Heinrich et al. 2009).

Wahidah *et al.* (2021) and Inta *et al.* (2023) described the ethnobotanical use of ginger by Colo villagers and ethnic groups in Thailand for ailments including fever, muscular pain, carminative, antitussive, and galactic issues. These traditional uses are supported by the antibacterial and antifungal activities, relaxant, analgesic, immunomodulatory, anti-inflammatory, anti-ulcer, and warming effects of ginger in experimental and preclinical studies (Mahboubi, 2019).
Though, in this survey among the 135 treatment forms, the usage of plants individually was seen as most preferable with 85 preparations while the medicine preparations as combinations was found for only 50 cases.

Following *Zingiber officinale* and *Ocimum tenuiflorum*, *Curcuma longa* exhibited the next highest use value of 0.40, followed by *Allium sativum* and *Piper nigrum* with 0.35, and *Coleus amboinicus* (Photo plate 1) and *Cuminum cyminum* with 0.30. Conversely, plants such as *Acalypha indica*, *Amorphophallus mulleri*, *Anacardium occidentale*, *Aristolochia indica*, *Brassica juncea*, *Commiphora caudata*, *Jatropha curcas*, *Nerium oleander*, and *Vitex negundo* reported the lowest use values.

A **B** **C**

D **E** **F**

Photoplate 1: A, B, C : Students are conducting interviews with informants; D, E, F : Some of the plants in field area; D - *Leucas aspera* (Wild.) Link.; E - *Lantana camara* L.; F - *Coleus amboinicus* Lour.

Families of the plant species reported during the ethnobotanical investigation in Palakkad district

Figure 3 illustrates the family importance graph, depicting the number of species reported in each family. Our findings highlight that plant species from the Fabaceae family are predominantly utilized for medicinal purposes in this locality, with nine different plants included in treatments. Following closely, the Lamiaceae family is represented by eight plant species used in treatments.

Notably, plants such as *Vigna mungo*, *Trigonella foenum-graecum*, *Tamarindus indica*, and *Cicer arietinum* from the Fabaceae family are commonly used, with parts often incorporated into daily life, while plants like *Mimosa pudica* and *Clitoria ternatea* are available year-round.

The Lamiaceae family emerges as one of the most significant herbal families, containing a diverse array of plants with biological and medical uses, as noted by Uritu *et al.* (2018). Aromatic herbs and spices such as thyme, mint, oregano, basil, sage, rosemary, self-heal, hyssop, and lemon balm are among the most popular members of this family, each with its own distinct uses.

Furthermore, other prominently used plant families include Solanaceae, Acanthaceae, Apocynaceae, and Piperaceae, while families such as Rubiaceae, Meliaceae, and Myrtaceae are less frequently reported.

Mode of administration of herbal remedy in the folklore medicine system

Figure 4 illustrates that oral consumption is the most common method of administration, accounting for 50% of usage for various diseases. Other modes of administration are also depicted in Figure 4. Oral administration is favored for its practicality, affordability, and convenience, as highlighted by Kim and De Jesus (2021). This method offers advantages such as non-invasiveness, ease of administration, and improved patient adherence to medication regimens. Most drug absorption occurs in the small intestine, where the bioavailability of medication is determined by the extent of absorption through the intestinal epithelium. Various factors, including environmental stability, drug solubility, and mucosal permeability in the gastrointestinal tract, influence the efficiency of oral medication absorption (Alqahtani *et al.* 2021). Furthermore, traditional oral medications are often taken with food, enhancing convenience and acceptance among individuals (Ingersoll and Cohen, 2008).

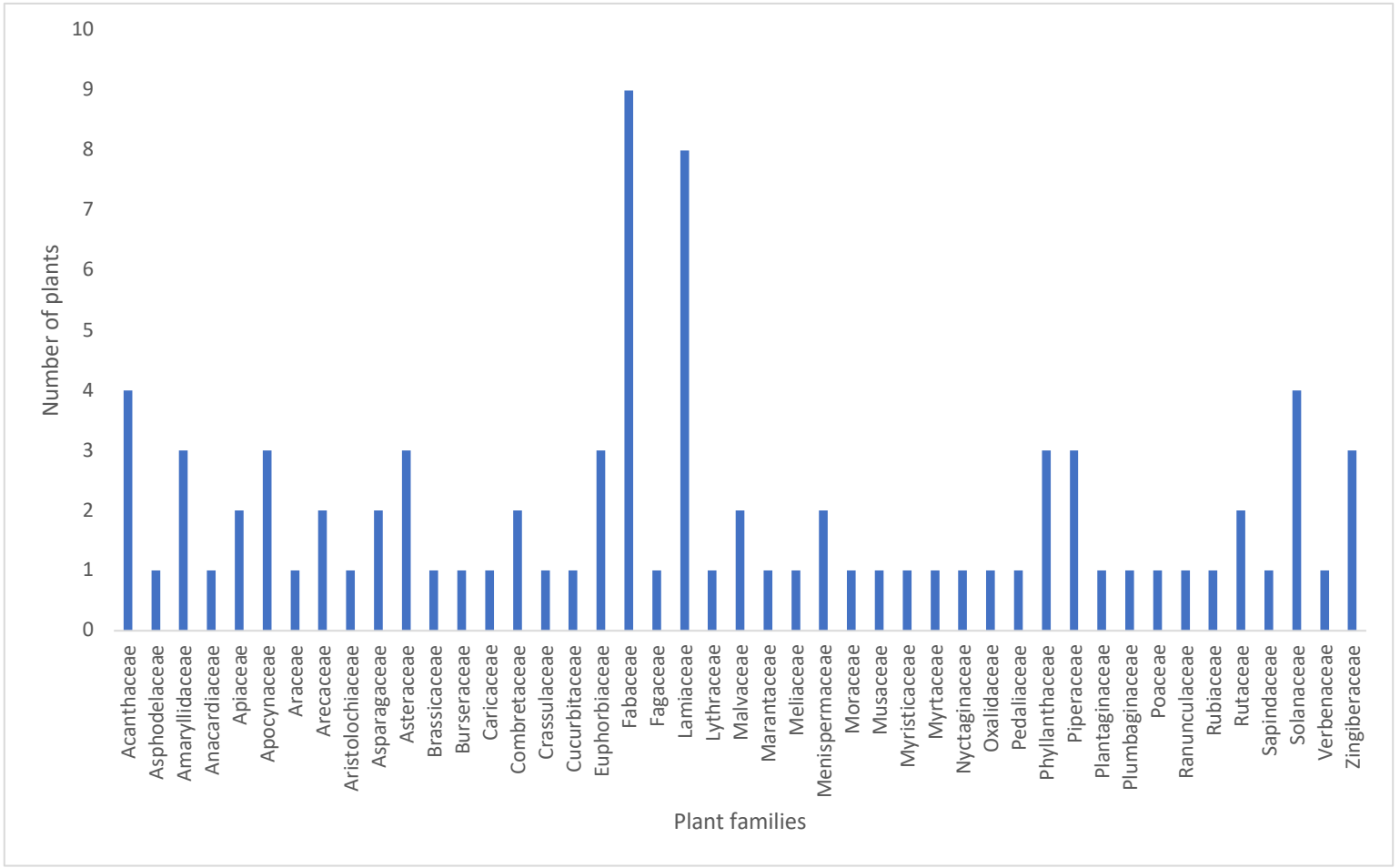

Figure 3. Number of plant species reported in its family during the ethnobotanical investigation Palakkad district, Kerala, India.

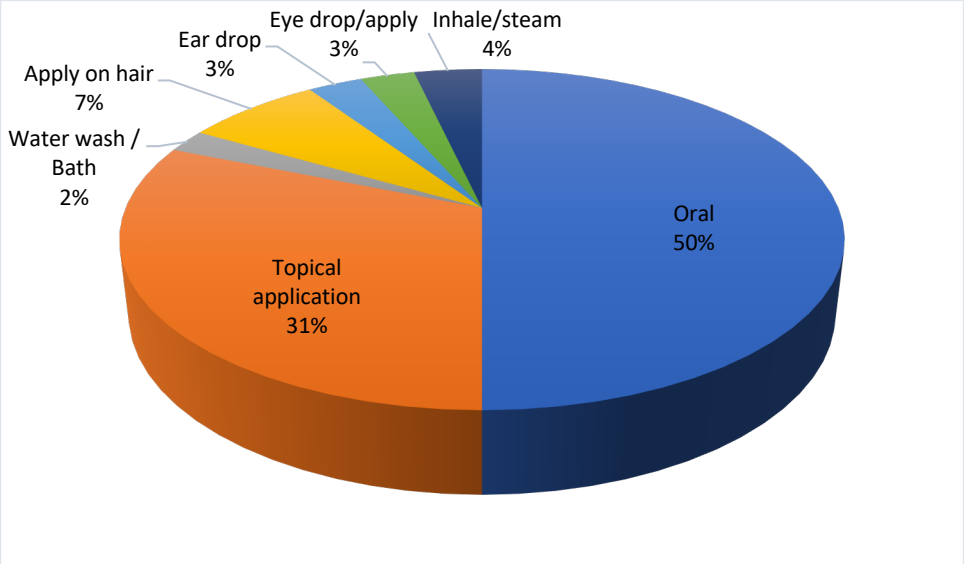

Figure 4. The various methods of administering traditional medicinal plants utilized by the local people of Palakkad district, Kerala, India.

During the survey, informants revealed that the plants used in treatments were typically collected from the patients' localities. This practice ensures convenience and continuity of treatment, as the plants are readily accessible to the patients. Additionally, most patients prefer sourcing medicinal plants from their immediate surroundings rather than purchasing them from herbal medicine shops. Moreover, the process of preparing medicines was often taught to the patients' companions, enabling them to prepare the remedies at home using plants available in their locality. Only a few medicines were prepared and provided directly by the informants themselves. This approach allows for greater autonomy and self-sufficiency in managing healthcare needs within the community.

The survey investigation revealed an interesting finding (Table 1) regarding the preparation of folklore medicine for treating burnt skin wounds and scars. One of the informants residing at Alathur taluk, shared that he prepares this medicine using the plants *Clitoria ternatea* and *Artocarpus heterophyllus* in oil which has garnered significant attention with patients from various regions of Kerala state and all over India seeking treatment from him. He noted that individuals from distant regions approached him after hearing about the effectiveness of the medicine from those who had been successfully get treated. On his experience he used to prepare this medicine at the time of treatment only, but for a rare and serious case he prepared and sent this oil for a patient at distant state, and they had acknowledged him for its effective cure made to that patient. The detailed interview video with him explaining his experiences was included as supplementary file (S 2). This observation underscores the strong and enduring belief in folklore medicine among people, particularly for certain ailments. In this survey, healers reported successfully treating certain ailments that were considered incurable by other medical systems.

The accessibility and affordability of natural medicine have rendered it highly popular, particularly among rural communities. Throughout the survey, we discovered that informants primarily acquired knowledge about the use of medicinal herbs in treatments from older resource people, often their ancestors. However, a concerning trend emerged as we observed a lack of interest among the younger generation in learning these traditional treatments, largely due to the influence of modern societal advancements and people search for immediate and easy way to cure disease. This results in lack of transmission of this folklore medicinal knowledge from present generation to the next and that has emerged as the primary cause of the decline of folklore medicinal practices. Typically, information regarding folklore is commonly passed down to successive generations orally and this was evidenced from the field interview with the informants also. Though, it came to known in the study that some of their ancestors used to note down some of the treatment formulations and plant collection details but unfortunately the documents were in old language script (vatteluttu script) and in deteriorated format, making preservation impossible. As a result, the invaluable wisdom and heritage associated with these traditional treatments are at risk of being lost. Moreover, the dwindling availability of plant resources along with the loss of historical events, colonization and cultural assimilation efforts also have contributed to the suppression or distortion of folklore traditional system (Gakuya *et al.* 2020). The documentation and publishing of these medicinal treatments through detailed survey and interviews with informants in village areas would only help to preserve and popularize the folklore medicine system.

Conclusion

The survey conducted in Alathur, Chittur, and Palakkad Taluks in Kerala state, India meticulously documented 135 treatment formulations for nearly 50 types of disease conditions, utilizing 88 plant species from 45 families. It was observed that most of the plant species were employed individually in remedies though around 50 formulations were found using combination of different plant species, with leaves being the most commonly utilized plant part. This documentation effort marks a small but significant step towards preserving traditional knowledge in these areas. However, there is a pressing need for further investigations to comprehensively document and conserve our traditional medicine systems, particularly folklore medicine. The accessibility and widespread availability of medicinal plants in these localities underscore their importance in healthcare practices. Yet, despite the preference for natural medicine due to its minimal side effects and cost-effectiveness, there is a noticeable decline in interest among the younger generation to learn and practice these traditional treatments. Given these challenges, it is imperative to undertake detailed documentation of indigenous traditional knowledge about medicinal plants from all regions before it becomes lost. By doing so, we can contribute to the conservation and perpetuation of our rich heritage of natural healing practices for future generations.

Declarations

Ethics approval and consent to participate:

Approval for ethics and consent to participate: We diligently adhered to the ethical principles outlined by the International Society of Ethnobiology for conducting surveys in rural and indigenous communities. Before conducting interviews, we obtained formal verbal consent from each participant regarding the collection and potential publication of their data.

Consent for publication: All persons shown in images provided their prior informed consent to have their images publisged.

Availability of data and materials: All data produced or examined during this investigation are incorporated within this published article.

Competing interests: The authors declare that they have no relevant financial or non-financial conflicts of interest to disclose.

Funding: No funding has been received for the study.

Conflict of Interest

The authors have declared no conflict of interest.

Authors contribution

Jasseera K, **Princy R**, **Bhadra S**, **Shalom S**, **Sunitha S**, **Akshatha P**, **Anusree S**, and **Praveena K** conducted the field survey and plant collection. **Sreeja Puthanpura Sasidharan** oversaw the project, designed it, wrote the manuscript, and participated in result interpretation. **Zereena Viji** and **Rekha Palakkal Sankaran** assisted in authenticating collected plants and analyzed the data. **Swathi Muraleedharan** aided in drafting the manuscript. **Karuppusamy Arunachalam** supervised result interpretation and contributed to the manuscript's final version. All authors contributed to the final manuscript through result discussion and input.

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Supplementary file

Table S 1. Use value of the plant species in folklore medicine at Alathur, Chittur and Palakkad Taluks

Species Name	No. of Report	Informants number	Use value
Acalypha indica L.	1	20	0.05
Allium cepa L.	3	20	0.15
Allium oschaninii O.Fedtsch	2	20	0.10
Allium sativum L.	7	20	0.35
Aloe vera (L.) Burm.f.	12	20	0.60
Amorphophallus muelleri Blume	1	20	0.05
Anacardium occidentale L.	1	20	0.05
Antidesma sp. L.	1	20	0.05
Andrographis paniculata (Burm.f.) Wall. ex Nees	1	20	0.05
Aristolochia indica L.	1	20	0.05
Artocarpus heterophyllus Lam.	1	20	0.05
Asparagus racemosus Willd.	3	20	0.15
Azadirachta indica A.Juss.	3	20	0.15
Biophytum sensitivum (L.) DC.	5	20	0.25
Bergera koenigii L.	2	20	0.10
Boerhavia diffusa L.	1	20	0.05
Borassus flabellifer L.	3	20	0.15
Brassica juncea (L.) Czern.	1	20	0.05
Cardiospermum halicacabum L.	2	20	0.10
Carica papaya L.	3	20	0.15
Carum carvi L.	1	20	0.05
Chromolaena odorata (L.) R.M.King & H.Rob.	2	20	0.10
Cicer arietinum L.	1	20	0.05
Cinnamomum verum J. Presl	1	20	0.05
Citrus × limon (L.) Osbeck	3	20	0.15
Clitoria ternatea L.	1	20	0.05
Cocos nucifera L.	5	20	0.25
Coffea arabica L.	3	20	0.15
Commiphora caudata (Wight & Arn.) Engl.	1	20	0.05
Coleus amboinicus Lour.	6	20	0.30
Cuminum cyminum L.	6	20	0.30
Curcuma longa L.	8	20	0.40
Curcuma zedoaria (Christm.) Roscoe	1	20	0.05
Cyanthillium cinereum (L.) H.Rob.	2	20	0.10
Datura stramonium L.	1	20	0.05
Drimia indica (Roxb.) Jessop	2	20	0.10
Eclipta prostrata (L.) L.	4	20	0.20
Erythrina variegata L.	1	20	0.05
Grona triflora (L.) H.Ohashi & K.Ohashi	1	20	0.05
Hibiscus × rosa-sinensis L.	7	20	0.35
Hyptis suaveolens (L.) Poit.	2	20	0.10
Jatropha curcas L.	1	20	0.05
Jatropha multifida L.	1	20	0.05
Justicia adhatoda L.	5	20	0.25
Justicia gendarussa Burm.f.	2	20	0.10
Kalanchoe pinnata (Lam.) Pers.	1	20	0.05
Lantana camara L.	1	20	0.05
Lawsonia inermis L.	3	20	0.15

Leucas aspera (Wild.) Link.	3	20	0.15
Maranta arundinacea L.	1	20	0.05
Mentha × piperita L.	2	20	0.10
Mimosa pudica L.	5	20	0.25
Momordica charantia L.	1	20	0.05
Musa acuminata Colla.	1	20	0.05
Myristica fragrans Houtt.	1	20	0.05
Nerium oleander L.	1	20	0.05
Nigella sativa L.	1	20	0.05
Ocimum tenuiflorum L.	10	20	0.50
Oryza sativa L.	1	20	0.05
Pergularia daemia (Forssk.) Chiov.	1	20	0.05
Phyllanthus emblica L.	2	20	0.10
Phyllanthus amarus Schumach. & Thonn.	1	20	0.05
Piper betle L.	2	20	0.10
Piper longum L.	3	20	0.15
Piper nigrum L.	7	20	0.35
Plumbago indica L.	1	20	0.05
Psidium guajava L	4	20	0.20
Physalis peruviana L.	1	20	0.05
Premna serratifolia L.	1	20	0.05
Pterocarpus marsupium Roxb.	1	20	0.05
Quercus infectoria G. Olivier.	1	20	0.05
Scoparia dulcis L.	3	20	0.15
Sesamum indicum L.	1	20	0.05
Sida cordifolia L.	3	20	0.15
Solanum tuberosum L.	1	20	0.05
Solanum virginianum L.	1	20	0.05
Strobilanthes alternata (Burm.f.) Moylan ex J.R.I.Wood	1	20	0.05
Tabernaemontana divaricata (L.) R.Br.ex Roem.& Schult	2	20	0.10
Tamarindus indica L.	3	20	0.15
Tectona grandis L.f.	2	20	0.10
Terminalia bellirica (Gaertn.) Roxb.	1	20	0.05
Terminalia chebula Retz.	2	20	0.10
Tiliacora acuminata (Lam.) Miers	1	20	0.05
Tinospora cordifolia (Willd.) Hook.f. & Thomson	2	20	0.10
Trigonella foenum-graecum L.	5	20	0.25
Vigna mungo (L.) Hepper	1	20	0.05
Vitex negundo L.	1	20	0.05
Zingiber officinale Roscoe	10	20	0.50