



# An ethnobotanical study of medicinal plants used by Paniya community of Amarambalam Reserve Forest, Kerala, India

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## Research

### Abstract

**Background:** The major tribal communities in Kerala are Paniyar, Kattunayakkan, Aranadans, Paliyan, Irular and Adiyar. Each tribal group has their languages, cultural practices and also have their unique healing methods. Many ethnic communities are still unaware of the importance of documenting their knowledge, which is gradually disappearing with each passing generation.

**Methods:** The study area was located in part of Amarambalam Reserve Forest, which is under the Karimpuzha Wildlife Sanctuary. The objectives were to document indigenous plants used by the Paniya community for medicinal purposes, to record preparation methods, dosages, plant parts used, and additional ingredients. Information was collected among the eleven individuals of the Paniya tribes.

**Results:** Fifty-five plants representing 29 families were documented. Herbs were the most frequently used medicinal plants followed by shrubs, trees and climbers. Euphorbiaceae and Fabaceae members were predominant leaves and whole-plants were more abundantly used in their preparation methods. Additional ingredients included honey, coconut oil, turmeric, milk, salt, or various plant and non-plant-based powders. Paste was the most frequently used formulation method followed by extract, decoction, infusion, powder and juice. Novel medicinal uses for the documented plants were recorded.

**Conclusions:** The analysis of use values and the fidelity levels of plants for specific illness suggests the conservation priorities by identifying the most valuable plants of the community. The collection of ethnobotanical information and documentation of traditional knowledge has also gained prominence from the perspective of drug development.

**Keywords:** Paniya tribes, Kerala, Ethnobotany, Use Value, Fidelity, Ingredients

### Background

India possesses a wealth of ethnomedicinal knowledge that requires immediate attention through documentation, scientific validation and intellectual property protection. Concerted efforts are needed to convert this knowledge into “green medicines” for human benefit. Many ethnic communities remain unaware of the significance of systematically documenting their traditional knowledge, which is gradually vanishing with generations (Chithra *et al.* 2016).

India has more than 427 tribal communities with rich diversity of indigenous tradition. Kerala, a state of Southern India, is a homeland of a number of tribal communities inhabiting the western slope of the Western Ghats. In Kerala, the major tribal communities are Paniyar, Kattunayakkan, Aranadans, Paliyan, Irular and Adiyar. Each tribal group possesses a distinct language, cultural practices, and unique traditional healing methods. Although some groups use animal-based remedies to treat diseases, the majority rely on herbal or medicinal plants for healing. Additionally, in depth studies on ethnic knowledge can pave the way for advancements in modern science drug discovery, providing phylogenetic insights, and offering valuable data for modern taxonomy (Sahoo 2021).

Activities such as deforestation and industrialization, cause environmental degradation, which threatens the traditional way of life for tribal communities. These communities frequently encounter a range of challenges stemming from external intrusions and influences, including government policies, economic exploitation, and cultural disruption. As a result of such discrimination, tribal communities often hesitate to engage with outsiders, fearing the unauthorized appropriation and misuse of their cultural practices and traditional knowledge (Oyelude 2023). Traditional medicine and ethnobotanical information can provide valuable leads for the selection, preparation and indications for the use of herbal formulation in the field of scientific research especially for the discovery of plant-based drugs (Chaachouay & Zidane 2024).

Therefore, the collection of ethnobotanical information and documentation of traditional knowledge have gained prominence from the perspective of drug development. Documentation can be done in different methods such as direct interviews, questionnaires and guided conversations always preceded by familiarization and informant consent. These face-to-face interactions are crucial for gathering precise and detailed information. Through direct interaction, ethnobotanist can gain information about the parts used, their applications for different ailments, and their modes of administration. To preserve the plants and their cultural heritage, it is essential that this knowledge is shared beyond the community and with the rest of the world.

## Materials and Methods

### Study area

Nilambur is located in the eastern part of Malappuram district in the Indian state of Kerala (Fig. 1). The region is surrounded by the Western Ghats and bordered by Chaliyar River. Nilambur (latitude 11° 15'- 11° 29' N and longitude 76° 12'- 76° 16' E) is home to several tribal communities primarily the Kattunaikans, Cholanalians (both classified as Vulnerable Tribal groups), Paniyan, Aranadan, Malamuthan, and Muthuvans among others.

The study area was within a section of the Amarambalam Reserve Forest, which is under the Karimpuzha wildlife sanctuary. It covers an area of 265.72 km<sup>2</sup> and forms contiguous landscape with Silent Valley National Park in Palakkad, Kerala and the Nilgiri Biosphere Reserve in Nadugani, Tamil Nadu. The specific study site was a part of the reserve forest, spanning a few acres along the banks of Karimpuzha river, where the paniyan tribe is located. The selected paniyan tribe resides in Pallikkuth of Chungathara panchayath.

### Tribal Culture

The Paniyan tribal community has inhabited this region for generations, with descendants continuing to preserve and practice a rich indigenous cultural heritage. They maintain distinct traditional songs and folk dances, alongside rich oral traditions that include stories reflecting their hardships and resilience. Their ancestors performed folk dances such as "Kurumkali" during community gatherings.

### Key informants

The key informants were the local people of tribal community especially the traditional healers, elder individuals and common peoples. The selected people's occupation was gold filtering, and daily wage works such as field work or agricultural works. The information was collected among the Eleven individuals from Paniya tribes residing in a fringe of Amarambalam Reserve Forest (Table 1).



Figure 1. Study area and Informants of Paniya community in Amarambalam Reserve Forest. The study area focused Paniya community, Amarambalam Reserve Forest. The figure shows, India map focused on Kerala and Amarambalam Reserve Forest, vegetation structure of the area and people interacted in their residents.

Table 1. Name List and details of Informants among Paniya community, Amarambalam Reserve Forest.

Name of the Informants	Gender and Age	Occupation
Chaathen	Male; 61	Elephant keeper
Paalen	Male; 58	Field work
Maadha	Female, 72	Agricultural practices
Koran	Male; 69	Traditional healer
Chirutha	Female; 56	Gold filtering
Chakki	Female; 67	Gold filtering
Ayyan	Male; 74	Field work

Mundi	Female; 70	Home keeper
Vellani	Female; 57	Agricultural practices
Manti	Female; 63	Field work
Soman	Male; 56	Field work

### Ethical consent and Permissions

The region is rich in biodiversity including endemic flora and fauna, holds historical and cultural significance. Nilambur has a significant history from the British colonial era. In 2003, the area was officially designated as reserve forest. The informants reside along riverbanks and live on the fringes of the forest, where entry does not require formal permission due to the community's traditional habitation in the area.

### Ethnobotanical data collection

The study aims to document medicinally important plants used by the Paniyan ethnic community of the area. The objectives of the study were framed based on the rationale for selecting an underexplored area in Kerala, India, with the aim of engaging with a specific tribal community to document their use of indigenous medicinal plants. The study further sought to interpret the medicinal properties, preparation methods, dosages, plant parts used, and additional ingredients; to analyse the use value and fidelity level of the documented plants for specific illnesses; to recommend potential applications based on traditional knowledge; and to promote the conservation of medicinal plants traditionally used by the community. Several field visits were conducted among the Paniya tribes from May 2024 to February 2025.

Data collected comprises the local names of selected plants, life forms (e.g., herb, shrub, vines or tree species), botanical name, family, parts used, uses for different ailments, aliment category, mode of administration (oral or topical application), preparation method (e.g. oil, decoction, powder, or paste) and dosage (including frequency, duration and whether it is administered before or after food). Additionally, data on other plant or non-plant ingredients used in preparing the medications and the conservation status of selected medicinal plants were also recorded. As many of the specified plants were not in their flowering season during the study period, plant specimens are being collected for future identification and inclusion in the herbarium.

### Use value

The relative importance of each locally known plant species used as an herbal remedy is expressed as Use Value (UV), which was calculated using the formula provided by Barnert & Messmann (2008).

$$UV = \frac{\sum U}{n}$$

Where *UV* is the use value of species, *U* is the number of use reports cited by each informant for given a species and *n* is the total number of informants interviewed for a given plant. The UV helps identify the most frequently used plants in treatment of ailments. A high UV indicates a high number of use-reports for a plant, signifying its importance (Xavier *et al.* 2014).

### Fidelity level

The percentage of informants claiming the use of a certain plant species for the same major purpose was calculated as Fidelity Level (FL) for the most frequently reported diseases or ailments as:

$$FL (\%) = \frac{Np}{N} \times 100$$

where *Np* is the number of use-reports cited for a given species for a particular ailment category and *N* is the total number of use-reports cited for a given species (Zashim Uddin 2014).

### Challenges during documentation

During the field trials, being indigenous forest dwellers, the Paniyan tribes were initially reluctant to engage and hesitant to permit. Gaining their trust required multiple visits which eventually led to successful collaboration facilitated by a Medical Supervisor who was already a familiar and trusted figure in the community. They had spent the whole day with us in every visit either by bringing plant specimens or guiding us. Eventually, they anticipated receiving compensation for the daily wages they had forfeited.

## Results and Discussion

Ethnobotanical studies focus on the knowledge, traditions, and practices that indigenous communities have developed over centuries to harness the diverse plant resources available in the environment. In total, 55 plants among 29 families were identified and documented in this study.

#### Life forms

From the documented medicinal plants, herbs are the mostly used medicinal plants to treat various diseases followed by shrubs, trees and climbers. From this data, herbs are 42%, shrubs are 34%, trees are 13% and climbers are 11%. Traditional healers mainly use herbs most commonly as medicine because of their availability. The lower percentage of climbers might be due to their lower availability and the difficulty of harvesting them from their supporting trees (Singh *et al.* 2017). The study conducted by Prasad *et al.* (2013), found that out of 67 medicinal plants, trees were the most used life form followed by herbs, shrubs and climbers. Hence, such patterns of plant use are likely community- and location-specific and cannot be generalized across all tribes.

#### Family

The documentation of Cheruvathur *et al.* (2020), identified 53 plants across 33 families in the Muthanga region of Wayanad district, Kerala. In present study, among a total of 55 identified plants belonging to 29 families, Euphorbiaceae and Fabaceae were the most represented families, each accounting for 21% of the total. They were followed by Lamiaceae and Asteraceae (17%), Rutaceae and Apocynaceae (10%) and Poaceae, Piperaceae, Malvaceae and Solanaceae (7%) (Table 2).

#### Parts used

The different parts of selected medicinal plants are used for treating different ailments, mainly consisting of bark, flower, fruit, seed, leaves, latex, and rhizome/ tuber, root, stem and whole-plant. Among these, the common parts which are highly used were leaves and whole-plant (27%) followed by roots (13%), stem (8%), flower and fruit (6%), seeds (5%), latex and bark (3%), rhizome/ tuber (2%) (Table 2). In this study, it is observed that latex is not widely used because of its poisonous content.

According to a study by Anju *et al.* (2024) in Kerala, leaves are the most commonly used plant part for treating diseases, while tubers and rhizomes are the least used. Their quantitative data shows that leaves accounted for 65.53 % of medicinal use reports, with stems and whole-plants each constituting 9.38 %. The findings of the present study are consistent with this pattern also demonstrating that leaves and whole-plants are the most frequently utilized parts, whereas rhizomes and tubers are the least utilized.

#### Ingredient information

Ingredient information is based on both plant and non- plant materials used in the preparation of herbal formulations to treat diseases. These materials are added to medicinal plants to enhance the effectiveness of the cure or to help active ingredients reach the problem site more easily and efficiently.

In most ethnobotany studies, the ingredients commonly used are honey, cow milk, sugar, ghee, salt, coconut water, coconut milk and various plant and non-plant powders. Similarly, in the present study, it was observed that plant-derived materials are used as ingredients more frequently than those from non – plant sources.

#### Mode of preparation

Methods of medicine preparation from plants are categorized based on their intended use, as most plants have both topical and oral applications. For topical and oral administration, the preparation categories differ, including pastes, extracts, infusions, juices, decoctions, powders, oils, steam applications, raw forms, lubricants, ashes and tablets. Among 55 plants, topical application was found in 48 plant reports while oral application was found in 47 plants. Forty plants were commonly used in both topical and oral applications, while the other 15 plants were used either only for topical or only for oral application. Oral application plants are *Desmodium trifolium* (L.) DC, *Pimenta dioica* (L.) Merr., *Curcuma angustifolia* Roxb., *Helicteres isora* L., *Solanum torvum* Sw., *Hemidesmus indicus* (L.) R.Br., *Justicia adhatoda* L. whereas plants which are commonly used only in topical application are *Murraya koenigii* L., *Peperomia pellucida* Kunth., *Morus alba* L., *Portulaca oleracea* L., *Clerodendrum paniculatum* L., *Ipomoea pes-tigridis* L., *Naregamia alata* Wight & Arn. and *Cleome viscosa* L. From a study conducted by Athira *et al.* (2023), it can be inferred that topical application was used more frequently than oral application. The current study also reveals the equivalent finding that topical application is higher than oral application among the 55 plants.

## Ethnobotany Research and Applications

Table 2. List of documented medicinal plants and conservation status of plants used by Paniya community in Amarambalam Reserve Forest.

Vernacular name	Scientific name of the plants	Family	Parts used	Conservation status
Adalodakam	<i>Justicia adhatoda</i> L.	Acanthaceae	Whole-plant	Critically endangered
Ponnamkanni cheera	<i>Alternanthera sessilis</i> (L.) R.Br. ex. DC.	Amaranthaceae	Leaves	Not evaluated
Nannari	<i>Hemidesmus indicus</i> (L.) R.Br.	Apocynaceae	Tuber, root	Not evaluated
Sarpagandhi	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Leaves & Roots	Least concern
Nandiyar vattam	<i>Tabernaemontana divaricata</i> R.Br. ex Roem. & Schult.	Apocynaceae	Leaves, flowers, root, latex	Least concern
Erukk	<i>Calotropis gigantea</i> R. Br.	Asclepiadaceae	Leaf, flower	Not evaluated
Communist pacha	<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob	Asteraceae	Leaf, stem	Least concern
Poovan kurunnaal	<i>Cyanthillium cinereum</i> (L.) H. Rob.	Asteraceae	Whole-plant	Least concern
Kayyonni	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Whole-plant	Least concern
Aanachuvadi	<i>Elephantopus scaber</i> L.	Asteraceae	Whole-plant	Least concern
Muyal chevian	<i>Emilia sonchifolia</i> (L.) DC. Ex. Wight	Asteraceae	Whole-plant	Vulnerable
Neelavela	<i>Cleome viscosa</i> L.	Capparaceae	Whole-plant	Not evaluated
Pulichuvadi	<i>Ipomea pestigridis</i> L.	Convolvulaceae	Leaves & Stem	Not evaluated
Muthanga	<i>Cyperus rotundus</i> Steud.	Cyperaceae	Stem, root	Least concern
Nilappaala	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Whole-plant	Least concern
Aattuvanji	<i>Homonoia riparia</i> Lour.	Euphorbiaceae	Leaf, root, stem, fruit	Endangered
Kadala aavanakku	<i>Jatropha curcas</i> L.	Euphorbiaceae	Latex, leaf, root	Least concern
Chuvanna avanakk	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Latex, leaf, root, seed	Least concern
Chorithanam	<i>Tragia involucrata</i> L.	Euphorbiaceae	Whole-plant	Near threatened
Shankupushpam	<i>Clitoria ternatea</i> L.	Fabaceae	Whole-plant	Not evaluated
Nilamparanda	<i>Desmodium triflorum</i> (L.) DC	Fabaceae	Roots, Leaves	Least concern
Neelamari	<i>Indigofera tinctoria</i> linn.	Fabaceae	Leaves, seeds, roots	Endangered
Thottavadi	<i>Mimosa pudica</i> L.	Fabaceae	Whole-plant	Near threatened
Ashokam	<i>Saraca asoca</i> (Roxb.) Willd	Fabaceae	Bark, Flower & Leaves	Endangered
Aanathakara	<i>Senna alata</i> (L.) Roxb.	Fabaceae	Leaf	Not evaluated
Nilappana	<i>Curculigo orchiodes</i> Gaertn.	Hypoxidaceae	Rhizome, leaf	Not evaluated
Krishnakeeridam	<i>Clerodendrum paniculatum</i> L.	Lamiaceae	Flowers & Leaves	Critically endangered
Panikkoorkka	<i>Coleus amboinicus</i> (Andrews) Benth. ex G. Don	Lamiaceae	Leaves	Not evaluated
Thumba	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Stem, Leaf, Flower	Critically endangered
Thulasi	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Leaves	Least concern
Karunochi	<i>Vitex negundo</i> L.	Lamiaceae	Leaves, flowers, roots, stem	Least concern
Kanjiram	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Seed, fruit, bark, root	Least concern

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<b>Mailanji</b>	<i>Lawsonia inermis</i> L.	Lythraceae	Whole-plant	Least concern
<b>Idampiri valampiri</b>	<i>Helicteres isora</i> L.	Malvaceae	Bark & Fruits	Least concern
<b>Kurunthotti</b>	<i>Sida cordifolia</i> L.	Malvaceae	Whole-plant	Not evaluated
<b>Nilanarakam</b>	<i>Naregamia alata</i> Wight & Arn.	Meliaceae	Whole-plant	Least concern
<b>Paadavalli</b>	<i>Cyclea peltata</i> Hook. fil. & Thoms	Menispermaceae	Whole-plant	Least concern
<b>Mulberry</b>	<i>Morus alba</i> L.	Moraceae	Fruit	Not evaluated
<b>Sarvasugandhi</b>	<i>Pimento dioica</i> (L) Merr.	Myrtaceae	Leaves	Least concern
<b>Mukkutti</b>	<i>Biophytum sensitivum</i> (L.) DC	Oxalidaceae	Whole-plant	Least concern
<b>Poodapazham</b>	<i>Passiflora foetida</i> L.	Passifloraceae	Whole-plant	Not evaluated
<b>Keezharnelli</b>	<i>Phyllanthus niruri</i> L.	Phyllanthaceae	Leaves, stem	Not evaluated
<b>Mashithandu</b>	<i>Peperomia pellucida</i> Kunth.	Piperaceae	Whole-plant	Not evaluated
<b>Kurumulaku</b>	<i>Piper nigrum</i> L.	Piperaceae	Fruits & Leaves	Least concern
<b>Kallurukki</b>	<i>Scoparia dulcis</i> L.	Plantaginaceae	Whole-plant	Least concern
<b>Karukapullu</b>	<i>Cyanodon dactylon</i> Pers.	Poaceae	Whole-plant	Least concern
<b>Pul thailam</b>	<i>Cymbopogon citratus</i> (DC.) Stapf.	Poaceae	Leaves	Least concern
<b>Kozhuppa</b>	<i>Portulaca oleracea</i> L.	Portulacaceae	Whole-plant	Not evaluated
<b>Parpadakapullu</b>	<i>Oldenlandia diffusa</i> (Willd.) Roxb.	Rubiaceae	Whole-plant	Not evaluated
<b>Paanal</b>	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Rutaceae	Roots & Leaves	Least concern
<b>Curryvepp</b>	<i>Murraya koenigii</i> L.	Rutaceae	Whole-plant	Not evaluated
<b>Arootha</b>	<i>Ruta chalepensis</i> L.	Rutaceae	Whole-plant	Not evaluated
<b>Neela ummam</b>	<i>Datura metel</i> L.	Solanaceae	Fruit, leaf, seed	Not evaluated
<b>Chunda</b>	<i>Solanum torvum</i> Sw.	Solanaceae	Whole-plant	Not evaluated
<b>Koova</b>	<i>Curcuma angustifolia</i> Roxb.	Zingiberaceae	Whole-plant	Endangered

Magendiran and Vijayakumar (2022) found that the highest mode of medicine preparation was the paste method followed by powder, decoction and juice. Similarly, the current study observed the paste method was the most used preparation method followed by the extract method. Ash, dish, tablet and lubricant preparations were least used methods (Fig. 2 & Table 3).

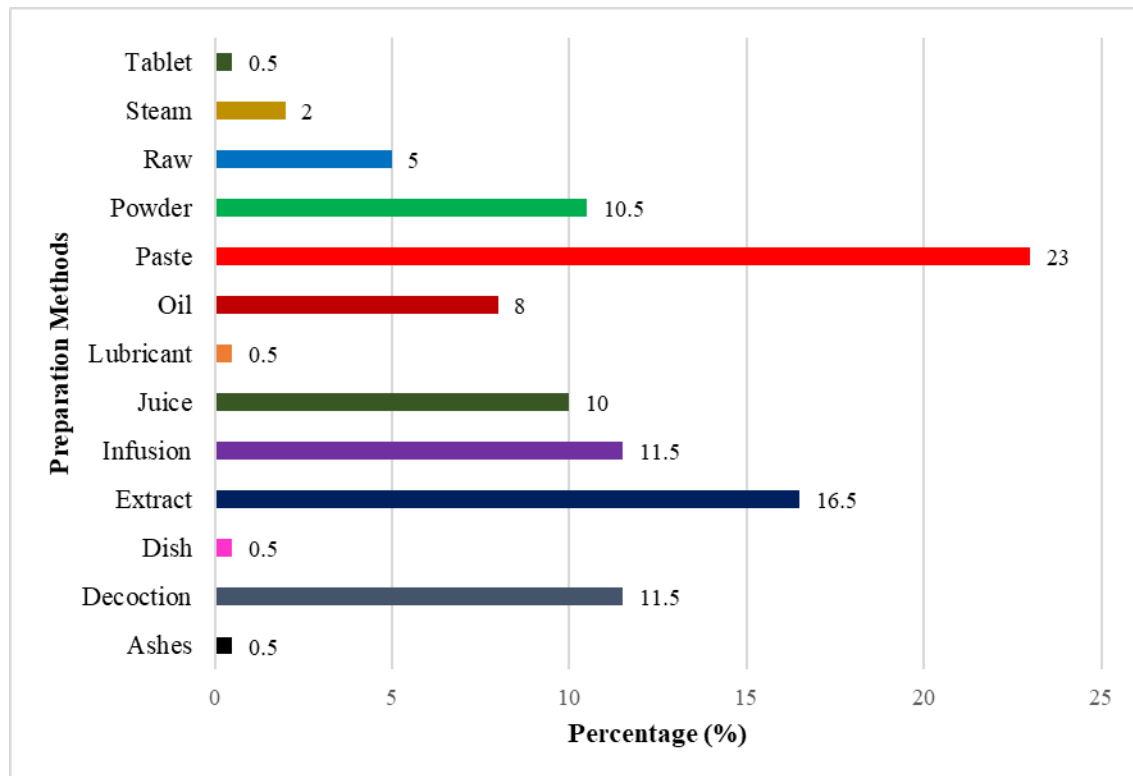


Figure 2. Preparation methods of plants used for various ailments by Paniya community in the Amarambalam Reserve Forest

#### Ailment categories

The collected medicinal reports were systematically classified into 21 distinct ailment categories (as detailed in Table 3) based on established ethnobotanical documentation and categorization frameworks. While some plants are commonly used to target specific diseases, others are utilized more broadly for improving general health across various ailments. The present documentation highlights that the majority of the selected plants are predominantly used for treating dermatological issues. These conditions include abnormal skin conditions, acne, agnail, cracked feet, dandruff, dry skin, hair loss, promoting hair growth, itching, melasma and warts. Dermatological treatments are the most frequent application, closely followed by remedies for skeleto-muscular system disorders and gastro-intestinal system disorders.

A subset of the documented plants is utilized exclusively for treating specific ailments such as **mukkutti** (*Biophytum sensitivum* (L.) DC.) used for treating sexually transmitted diseases (STD). The STD, injuries and accidents, endocrinal problems and Cardio-vascular diseases are least reported based on informant data.

An ethnomedicinal document of Revathi *et al.* (2013) reveals similar findings that, dermatological issues were one of the ailment categories which was most frequently treated using medicinal plants by the Hooralis tribe of Sathyamangalam forests in Tamil Nadu. Conversely, the study found that general health problems were among the least treated ailment using the traditional knowledge documented from this community.

Table 3. Preparation Methods of reported plants used by Paniya Tribes of Amarambalam Reserve Forest, Malappuram District, Kerala

Name of the Plants	Preparation methods and Ailments treated
<i>Elephantopus scaber</i> L. <b>(Aanachuvadi)</b>	Planter wart (Dermatological issues): Apply an equal amount of leaf and root paste to the portion of diseased foot.
	Insect biting infections (Poisonous bite problems): Apply whole-plant extract on insect bite portion to treat infections and to reduce swellings.
	Skin diseases, Eczema (Dermatological issues): <ul style="list-style-type: none"> <li>• Add equal parts of dry leaves and roots of <b>aanachuvadi</b> to the boiling water. Wash the affected portion of skin with this water.</li> <li>• Apply crushed paste of <b>aanachuvadi</b> fresh leaves and roots to the skin to treat infections.</li> </ul>
	Urinary infections (Renal & urinary infection): Consume decoction made of 100 gm of crushed whole-plant and 50 gm of coriander seeds. Drink half portion of decoction daily morning and other half at night.
	Bleeding piles (Gastro-intestinal system disorders): <ul style="list-style-type: none"> <li>• Roast small amount of brown rice. Add coconut jaggery and the root of <b>aanachuvadi</b>. Make powder of these ingredients. Eating a pinch of this powder before food twice a day will help to reduce bleeding piles problems.</li> <li>• Consume half glass of whole-plant juice mixed with buttermilk daily.</li> </ul>
	Hair growth (Dermatological issues): Apply crushed extract of 6-8 leaves of <b>aanachuvadi</b> by using water. It can be used as shampoo or thaali.
	Migraine (Neurological disorder): If migraine is on right side, take the whole-plant paste and tie on the big toe of right-side leg. Keep it for 12 hours. Continue this procedure for several days.
	Heart problems (CVD): Consume half teaspoon of dried whole-plant powder along with honey or half teaspoon of powder with half glass of warm water.
	Lymphatic filariasis (Infectious diseases): Apply whole-plant paste to the affected portions. Continue for many days based on the disease condition.
	Insect wound (Dermatological issues): Apply the paste of whole-plant and turmeric to the infected or wounded portion, it reduces the swelling and infections of the wounds and wounded area.
<i>Scoparia dulcis</i> L. ( <b>Kallurukki</b> )	Kidney stone (Renal & urinary infection): <ul style="list-style-type: none"> <li>• Consume 4 teaspoon of juice extract of whole-plants with warm milk in empty stomach. This can be served to eliminate kidney stone.</li> <li>• 2 glass of coconut water and add 4 teaspoon of plant extract. Mix it well and keep it for 10 minutes. Drink this water in early morning in empty stomach. This should be followed for 7 to 10 days.</li> <li>• Mix 2 teaspoon of cumin seeds, 4 teaspoon of plant extract along with 2 glass of water and boil it until it reduced into 1 glass. Drink this water in empty stomach.</li> </ul>
	Skin problem – itching (Dermatological issues): Apply whole-plant paste to the portion of itching.
	Blood purification (Immunity & general healthcare) : Prepare tea using leaf powder and consume this daily once. It helps in blood purification.
<i>Cyperus richardii</i> Steud. <b>(Muthanga)</b>	Purification of breast milk (Gynaecological issues): Apply the whole-plant extract juice on breast for 30 minutes and wash it to increase the breast milk and purification of milk.
	Wart on neck (Dermatological issues): Apply stem paste along with buttermilk to the neck portion for several days.
	Ingestion problems in children (Gastro-intestinal system disorders): Prepare paste of 15 grams of <b>muthanga</b> stem with 1 glass of milk and water. Boil

	<p>this mixture and keep it for cool. It reduces ingestion problems and constipation in children.</p> <p>Fever (Pyrexia problems) : Drink 1 teaspoon of decoction using <b>Muthanga</b> roots and <i>Cyanadon dactylon</i> leaves daily until fever stops.</p>
<i>Vitex negundo</i> L. <b>(Karunochi)</b>	<p>Back pain (Skeleto-muscular system disorders):</p> <ul style="list-style-type: none"> <li>• Consume the extract of leaf about 15ml along with 5ml of castor oil daily in empty stomach about 15 days.</li> <li>• Consume half glass of leaf and root decoction(warm) along with half spoon of castor oil.</li> </ul> <p>Rheumatoid arthritis (Skeleto-muscular system disorders):</p> <ul style="list-style-type: none"> <li>• Apply <b>karunochi</b> leaf paste on the pain portions.</li> <li>• Equal amount or each 15 ml of extracts from <b>karunochi</b> leaves, holy basil leaves and false daisy leaves. Add 5 gram of carom seed powder into it. Drink this daily in morning and it will help to reduce the pain and problems related to rheumatoid arthritis.</li> </ul> <p>Epilepsy (Neurological disorder): Drip 2 drops of crushed leaf extract into nostrils before sunrise to reduce epilepsy and seizures.</p> <p>Viral fever (Pyrexia problems): Consume decoction made up of crushed <b>karunochi</b> leaves, holy basil leaves and pepper, about 30 ml daily morning before sunrise and night after sunset.</p> <p>Kidney stone (Renal &amp; urinary infection): Consume young leaf powder 10 gram daily in morning.</p> <p>Mouth ulcer (Gastro-intestinal system disorders): Gargle with decoction using bark, leaves and stem daily twice to avoid mouth ulcer.</p> <p>Knee joint pain (Skeleto-muscular system disorders): Apply roots and leaf decoction along with 10ml of castor oil</p>
<i>Indigofera tinctoria</i> linn. <b>(Neelamari)</b>	<p>Jaundice (Liver related): Consume 10 ml of leaf extract along with 1 teaspoon of honey daily twice.</p> <p>Poison insect biting (Poisonous bite problems): Apply whole-plant paste on insect bites.</p> <p>Natural hair dye (Dermatological issues): Hand full of indigo leaves powder along with 250 ml of coconut oil and 4 spoons of henna powder. Apply to hair before 2 hours of hair wash. This mix will act as natural hair dye.</p> <p>Wound healing (Dermatological issues): Apply fresh indigo leaf juice with 1 teaspoon of honey and ghee on wounds.</p> <p>Diarrhoea (Gastro-intestinal system disorders): Boil 20 grams of fresh indigo leaves with 400 ml of water about 10-15 minutes and filter it. Consume 150 ml of this decoction along with 2 teaspoon of honey and 2 gram of fresh ginger paste twice a day.</p> <p>Fever (Pyrexia problems): Consume equally diluted leaf extract with water and <b>tulsi</b> leaf extract twice a day.</p> <p>Stomach pain (Gastro-intestinal system disorders): Consume decoction of 100 ml from dried leaf powder with 2 pinch of cumin seed powder twice a day.</p>
<i>Desmodium trifolium</i> (L.) DC <b>(Nilamparanda)</b>	<p>Fever (Pyrexia problems): Consume 15 grams of dried root powder and 5 grams of turmeric powder which is mixed in 200 ml of water.</p> <p>Menstrual pain relief (Gynaecological issues): Consume paste of fresh leaves along with small amount of ginger.</p> <p>Acne (Dermatological issues): Apply fresh leaf paste along with neem powder.</p>
<i>Emilia sonchifolia</i> (L.) DC. ex Wight <b>(Muyal cheviyan)</b>	<p>Stomach disorders (Gastro-intestinal system disorders): Consume half teaspoon of whole-plant extract juice continuously for 3 days.</p> <p>Fever (Pyrexia problems): Consume 15 ml of extract along with 1 spoon of honey for twice a day to reduce fever.</p> <p>Cooling agent of eyes (Ophthalmological problems): Drip few drops of filtered extract of fresh leaves without adding water.</p>

	Bleeding piles (Gastro-intestinal system disorders): Consume 5 gram of whole-plant paste along with half glass of butter milk.
	Joint pains (Skeleto-muscular system disorders): Bond the leaf paste on joint using cloth and keep it for 2 hours
	Snake bite (Poisonous bite problems) : Apply 40 grams of fresh leaf paste on snake bites. Additionally, 4 spoon of root decoction should be consumed orally for two times a day.
<i>Leucas aspera</i> (Willd.) Link ( <b>Thumba</b> )	Vomiting (Immunity & general healthcare): Consume leaves and flowers extract along with 2 pinch of asafoetida powder three times a day.
	Scorpion poison / bite (Poisonous bite problems): Apply leaf paste on infected area.
	Severe headache (Neurological disorder): Apply crushed leaf paste on forehead.
	Cold (Pyrexia problems): Consume extract of leaf and flower along with 1 teaspoon of ginger juice and 1 teaspoon of honey thrice a day.
	Toothache (Dental and oral ailment): <ul style="list-style-type: none"> <li>• Apply dried root powder paste along with a pinch of turmeric powder on infected teeth</li> <li>• Boil 20 grams of sliced stem in water for 10 minutes. Use this as mouthwash.</li> </ul>
<i>Cyanthillium cinerum</i> (L.) H.Rob. ( <b>Poovan kurunnal</b> )	Conjunctivitis (Ophthalmological problems): <ul style="list-style-type: none"> <li>• Extract the leaf without adding water and drip into the eyes.</li> <li>• Extract 10 g leaf and 5 g sandal using raw milk. Filter this and drip into the eyes.</li> <li>• Crush and Extract 10 to 15 leaves using breast milk. Filter this solution and drip into the eyes for conjunctivitis.</li> </ul>
	Fever (Pyrexia problems): Consume 2 spoon of leaf extract along with equal amount of honey daily twice.
	Migraine (Neurological disorder): Apply gently heated 10 ml of leaf extract with 8 ml of coconut oil on the head before 2 hours of bathing.
	Nasal polyps (ENT problems): Apply 10 whole-plants and <b>mukkutti</b> plant along with 1 spoon of coconut oil on the head continuously for 8 to 10 days.
	Scorpion poison (Poisonous bite problems): Consume whole-plant decoction about 25 ml daily twice
	Baby fever (Pyrexia problems): Paste and make tablet from whole-plants of <b>poovan kurunnal, thumba, tulsi</b> leaf, pepper, <b>adaloda</b> leaves. Dry the tablet in a cool area and store. Give this tablet to baby for fever.
<i>Phyllanthus niruri</i> L. ( <b>Keezhar nelli</b> )	Jaundice (Liver related): <ul style="list-style-type: none"> <li>• Consume whole-plant extract of 10 ml daily twice for three days.</li> <li>• Consume filtered extract of whole-plant paste (1 spoon) with 30 ml milk daily.</li> </ul>
	Bleeding and stomach pain (Gynaecological issues): Consume half glass of 3 g to 6 g of whole-plant paste with rice water daily twice.
	Liver problems (Liver related): Consume 15 whole-plants paste along with a glass of raw milk or coconut milk daily thrice.
	Hair growth (Dermatological issues): Apply gently heated and filtered 30 whole-plant extract along with coconut oil and <b>Tulasi</b> leaves to hair before 1 hour of hair wash
	Strengthening of teeth (Dental and oral ailment): Chew the cleaned leaves.
	Stomach problems (Gynaecological issues): Consume whole-plant paste without adding water along with butter milk daily once.
	Edema (Skeleto-muscular system disorders): Consume Crushed 3 g of fruits and 5 g of cumin seeds along with rice porridge.
<i>Eclipta prostrata</i> (L.) L. ( <b>Kayyonni</b> )	Liver swellings (Liver related): Consume 8 ml of whole-plant extract thrice a day.

	Jaundice (Liver related): Consume 2 table spoon of leaf juice with 2 spoon of coconut milk daily twice.
	Leprosy (Infectious diseases): Consume filtered mix of 30 ml of whole-plant extract, 6 garlic and 3 g of castor leaves after gently heated in butter. Drink 1 spoon daily.
	Intestinal problems (Gastro-intestinal system disorders): Consume half glass of <b>kayyonni</b> juice along with 1 glass of castor oil once in alternate days.
	Ear pain (ENT problems): Extract small amount of <b>kayyonni</b> leaf juice. Drip 2 drops into the ear.
	Cold (Pyrexia problems): Consume equal amount of <b>kayyonni</b> extract and honey daily twice while having cold.
	Piles (Gastro-intestinal system disorders): Steam the leaves of <b>kayyonni</b> . Apply this warm leaves on the piles.
<i>Clitoria ternatea</i> L. <b>(Shanku pushpam)</b>	Memory power (Immunity & general healthcare): <ul style="list-style-type: none"> <li>• Consume 3 g paste of cleaned roots along with 1 spoon of butter daily.</li> <li>• Consume a decoction made by boiling 5 g of flowers in 1 glass of water. After cool, add 1 spoon honey and drink this daily.</li> </ul>
	Snake bite (Poisonous bite problems): Consume 3 g of <b>shanku pushpam</b> roots in milk daily twice.
	Sleeping problems (Sleeping disorders): Consume half glass decoction of whole-plant of blue flowered <b>shanku pushpam</b> daily.
	Bleeding (Gynaecological issues): Consume mix of 1 g flowers with honey daily two times.
	Skin glow (Dermatological issues): Apply 6 to 7 flowers as paste with 1 spoon of coconut oil on the skin.
	Blood purification (Immunity & general healthcare): Consume half glass of decoction made of 25 g of roots in 5 glass of water. Make it into 2 ½ glass of decoction. Drink half glass of this decoction daily before breakfast.
	Melasma (Dermatological issues): Grind 6 flowers of <b>shanku pushpam</b> . Add little amount of water, 1 teaspoon of curd and 2 teaspoon of green gram powder. Mix it well and apply to face for 15 minutes.
	Epilepsy (Neurological disorder): Apply paste of grinded and extracted whole-plant juice with equal amount of coconut oil and butter to the body.
	Wheezing (Respiratory system diseases): Take a hand full of leaves and dry it. Burn these dried leaves and inhale the fumes of burned leaves. It will reduce the wheezing problems in children.
	Respiratory problems (Respiratory system diseases): Consume 2 teaspoon of <b>arootha</b> leaf juice to reduce respiratory problems.
<i>Ruta chalepensis</i> L. <b>(Arootha)</b>	Digestion problems (Gastro-intestinal system disorders): Consume mix of powdered <b>arootha</b> leaves with cardamom powder, nutmeg powder and cloves powder along with honey twice a day.
	Back pain (Skeleto-muscular system disorders): Consume equal amount of <b>karuka</b> juice with honey can reduce back pain.
	Constipation (Gastro-intestinal system disorders): Consume 2 teaspoon of <b>karuka</b> leaf extract.
<i>Cynodon dactylon</i> Pers. <b>(Karuka pullu)</b>	Fungal infections (Infectious diseases): Apply paste of <b>karuka</b> leaves and turmeric to the infected portion.
	Bleeding nose (ENT problems): Apply dried powder of <b>karukapullu</b> to the nose.
	Digestion problems (Gastro-intestinal system disorders): Gently heat the 5- 8 leaves in water. Consume this water after cooled.
<i>Pimenta dioica</i> (L.)Merr. <b>(Sarva sugandhi)</b>	Digestion problems (Gastro-intestinal system disorders): Gently heat the 5- 8 leaves in water. Consume this water after cooled.
<i>Ocimum tenuiflorum</i> L. <b>(Thulasi)</b>	Headache (Neurological disorder): Apply paste of 20 to 25 <b>tulsi</b> leaves and sandalwood to the forehead for the relief of headache.
	Throat pain (ENT problems): Prepare a hand full of leaves and boil in water. Drink this water daily.

	Hair growth (Dermatological issues): Apply hair oil made of <b>thulasi</b> leaves, aloe vera, rose petals, curry leaves. Good for hair growth and hair related problems.
<i>Mimosa pudica</i> L. <b>(Thottavadi)</b>	Asthma (Respiratory system diseases): Consume 7 to 10 ml <b>thottavadi</b> whole-plant extract with half glass of tender coconut water continuously for 1 week.
	Immunity (Immunity & general healthcare): Consume whole-plant extract about 10 ml which is diluted with porridge.
	Wound healing (Dermatological issues): Apply a paste of <b>thottavadi</b> whole-plant to the portions of wounds.
	Diabetics (Endocrinal diseases): Consume ¼ glass of plant leaf extract on morning before food.
	Allergy repellent (Immunity & general healthcare): Apply hair oil using <b>thottavadi</b> plant extract and coconut oil to the head ½ an hour before hair wash.
<i>Murreya koenigii</i> L. <b>(Curryvepp)</b>	Burning (Dermatological issues): Apply paste <b>curryvepp</b> leaves to the portions of burned skin.
	Hair oil and premature graying (Dermatological issues): Apply hair oil using 20 to 30 leaves to hairs before hair wash.
	Bad breath (Dental and oral ailment): Chewing the leaves of <b>curryvepp</b> will reduce the bad breath
<i>Tabernaemontana divaricata</i> R.Br. ex Roem. & Schult. <b>(Nanthiyar vattam)</b>	High pressure (Immunity & general healthcare): Consume 2 leaves which boiled in 200 ml of water daily upto 30 days.
	Body pain (Skeleto-muscular system disorders): Apply 10 to 15 flowers grinded paste to body parts where pain occurs.
	Wound healing (Dermatological issues): Apply plant latex to the wounds.
	Darkness under eye (Dermatological issues): Apply the extract from 5 leaves to the lower side of eye.
	Conjunctivitis (Ophthalmological problems): Soak 2 to 3 flowers in 2 glass of water and keep it for 1 day. Wash the eyes with this water for 1 week.
<i>Peperomia pellucida</i> Kunth. <b>(Mashithandu)</b>	Skin glow and face pack (Dermatological issues): Apply face mask made of paste of <b>mashithandu</b> with ¼ spoon of turmeric and rice powder.
	Body pain (Skeleto-muscular system disorders): Boil the whole-plant in water. Dip the cotton in the water and apply the heat to the pain parts.
	Headache (Neurological disorder): Apply a paste of the whole-plant to the forehead.
<i>Tragia involucrata</i> L. <b>(Chorithanam)</b>	Body immunity boosting (Immunity & general healthcare): Consume 1 glass of tea prepared by boiled whole-plant water along with 1 spoon of honey.
	Dandruff and hair fall (Dermatological issues): Washing the hair with hot water which is boiled with <b>chorithanam</b> leaves.
	Cracked foot (Dermatological issues): Apply paste of crushed <b>chorithanam</b> flowers with little amount of ghee to the cracked foot and keep it for 1 hour daily.
	Urinary infections (Renal & urinary infection): Consume 200 ml of <b>chorithanam</b> root decoction twice a day.
	Cough and cold (Pyrexia problems): Consume a decoction of <b>chorithanam</b> roots along with <b>chukku</b> powder and little amount of ginger juice.
<i>Curcuma angustifolia</i> Roxb. <b>(Koova)</b>	Diarrhea (Gastro-intestinal system disorders): Consume 1 spoon of well dried powder of <b>koova</b> plant with 1 spoon of honey which will reduce the diarrhea.
	Dehydration (Immunity & general healthcare): Prepare hot water using cleaned <b>koova</b> plant. Give this water to children and it will prevent

	dehydration in body.
<i>Helicteres isora</i> L. <b>(Idampiri valampiri)</b>	Body pain (Skeleto-muscular system disorders): <ul style="list-style-type: none"> <li>• Consume 2 teaspoon of bark extract which diluted in half glass of water daily to get relief of body pains.</li> </ul> Consume 250 ml of decoction of <b>idampiri valampiri</b> fruits daily twice.
<i>Saraca asoca</i> (Roxb.) Willd. <b>(Ashokam)</b>	Bleeding piles (Gastro-intestinal system disorders): Apply mix of 2 teaspoon dried flower powder with 1 spoon of curd to the piles region.
	Intestinal problems (Gastro-intestinal system disorders): Consume <b>ashokam</b> leaves along with mustard in a size of amla ball as daily once.
	Mouth ulcer (Gastro-intestinal system disorders): Consume 150 ml of dried bark decoction daily once.
	Over bleeding (Gynaecological issues): Consume half glass decoction of <b>ashokam</b> bark with milk daily twice
	Blood purification (Immunity & general healthcare): Consume hot water of dried bark with jaggery.
	Hair oil (Dermatological issues): Apply hair oil of <b>ashokam</b> flowers, curry leaves, onion, <b>thulasi</b> leaves, and pepper to hair and scalp 1 hour before hair wash.
<i>Oldenlandia diffusa</i> (Willd.) Roxb. <b>(Parpadaka pullu)</b>	Wound healing (Dermatological issues): Apply the juice of the plant to the wounds.
	Itching on heads (Dermatological issues): Apply a mix of filtered paste of <b>parpadaka pullu</b> and turmeric with coconut oil to the scalp before 30 minutes of washing
	Fever (Pyrexia problems): Boil decoction of each 10g paste of nut sedge grass, <b>parpadaka pullu</b> and vetiver plant root in 400 ml of water until it becomes 100 ml. Consume 50 ml of decoction daily two times.
	Dysentery (Gastro-intestinal system disorders): Consume 25 ml of decoction with equal amount of <b>parpadaka pullu</b> , sweet flag plant root, Indian hog plant, dried ginger ( <b>chukku</b> ) and nut sedge plant daily twice along with honey.
	Abnormal skin conditions (Dermatological issues): Apply gently heated oil with turmeric and <b>parpadaka pullu</b> to the skin.
<i>Alternanthera sessilis</i> (L.) R.Br. ex. DC. <b>(Ponnamkanni cheera)</b>	Hair growth (Dermatological issues): Apply filtered oil made of <b>ponnamkanni cheera</b> leaves by boiling in coconut oil to hair before bath.
	Eye power (Ophthalmological problems): Consume a food dish by adding <b>ponnamkanni cheera</b> leaves, grinded coconut, garlic and onion.
	Edema (eyelids) (Ophthalmological problems): Apply the leaf extract to the eyelids to reduce edema or swellings.
<i>Coleus barbatus</i> (Andrews) Benth. ex G.Don <b>(Panikoorkka)</b>	Fever in infants (Pyrexia problems): Steam the leaves of <b>panikoorkka</b> . Extract the juice from leaves and give 2 drops to infants.
	Body pain (Skeleto-muscular system disorders): Boil a hand full of <b>panikoorkka</b> leaves in water. Dip in a cotton cloth apply to the body parts where the pain occurs.
	Swellings (Skeleto-muscular system disorders): Consume 1 spoon of <b>panikoorkka</b> leaves extract daily before meal.
	Headache (Neurological disorder): Apply the mix of 10 – 15 leaves extract of <b>panikoorkka</b> , 1 teaspoon of lemon and 2 pinches of <b>rasnadi</b> powder to the forehead.
	Cough and cold (Pyrexia problems): Steam <b>panikoorkka</b> leaves and inhale it.
<i>Euphorbia hirta</i> L.	Urinary problems (Renal & urinary infection): Consume whole-plant paste in a size of gooseberry.

<b>(Nila paala)</b>	Skin problems (Dermatological issues): Apply paste of <b>nila paala</b> plant on the skin.
	Wart (Dermatological issues): Apply the latex or stain from the plant to the wart for few days.
	Agnail (Dermatological issues): Apply the paste of <b>nila paala</b> to nails for few days continuously.
	Stomach ulcer (Gastro-intestinal system disorders): Gently boil <b>nila paala</b> leaves with green gram in ghee. Keep on low flame for 10 minutes. Consume this daily after it cooled.
	Breast milk increasing (Gynaecological issues): Consume the mix of grinded flowers and leaves of <b>nila paala</b> and milk on alternate days for increasing breast milk.
	Constipation (Gastro-intestinal system disorders): Consume the mix of <b>nila paala</b> leaves and 3 to 4 garlic along with food.
<i>Lawsonia inermis</i> L. <b>(Mailanji)</b>	Hair fall problems (Dermatological issues): Apply hair oil using coconut oil, <i>Aloe vera</i> , <b>mailanji</b> leaves, curry leaves before half an hour of hair wash.
	Jaundice (Liver related): Consume 100 ml of decoction prepared by 50 g of whole-plant in 800 ml of water daily twice.
	Sleeping problems (Sleeping disorders): Consume 5g of <b>mailanji</b> leaf powder in 1 teaspoon of honey before going to bed daily.
	Dandruff (Dermatological issues): Apply paste of <b>mailanji</b> leaves to hair for 2 hours and wash with warm water.
	Blood purification (Immunity & general healthcare): Consume decoction of 30 – 45 leaves of <b>mailanji</b> leaves daily once
<i>Cymbopogon citratus</i> (DC.) Stapf. <b>(Pul thailam)</b>	Cold (Pyrexia problems): Gently steam 20 - 25 leaves in water and inhale for the relief of cold.
	Body pain (Skeleto-muscular system disorders): Boil the water with lemon grass and use this water to bath.
	Sprain (Injuries & accidents): Apply a paste of 10 leaves of lemon grass, aloe vera, 30 gm of turmeric to sprain area.
	Toothache (Dental and oral ailment): Extract the juice from 10 – 15 leaves. Dip a cotton in extracted juice and keep on infected teeth.
	Fatigue (Immunity & general healthcare): Consume tea made of 2 spoon lemon grass extract, 2 spoons jaggery, 2 spoon tea powder in water.
<i>Morus alba</i> L. <b>(Mulberry)</b>	Dry skin (Dermatological issues): Keep 10 – 15 leaves in olive oil or coconut oil for several days. Apply to dry skin regions.
<i>Portulaca oleracea</i> L. <b>(Kozhuppa)</b>	Headache (Neurological disorder): Apply a paste of <b>kozhuppa</b> leaves and gin berry leaves to forehead.
	Wound healing (Dermatological issues): Apply paste of <b>kozhuppa</b> leaves and turmeric to the wounded region.
	Skin problems (Dermatological issues): Apply paste of <b>kozhuppa</b> leaves, turmeric and <b>thulasi</b> extract to the affected skin conditions.
<i>Glycosmis pentaphylla</i> (Retz.) DC. <b>(Paanal)</b>	Headache (Neurological disorder): Apply a paste of 10 gm of <b>paanal</b> root with milk to the forehead for 30 mins.
	Dandruff (Dermatological issues): Apply mix of 1 spoon leaf extract with 2 spoons of coconut oil to the scalp before washing.
	Swellings (Skeleto-muscular system disorders): Apply paste of tender leaves to swelling regions.
	Worm diseases (Worm problems): Consume 1 spoon of gently boiled gingelly oil with half number of leaf extract daily.
<i>Piper nigrum</i> L. <b>(Kurumulaku)</b>	Fever (Pyrexia problems): Consume 20 ml of decoction made of 10g <b>kurumulaku</b> , 10g <b>thippali</b> , 20g <b>chukku</b> in water daily twice.

	Cold (Pyrexia problems): Consume decoction made of <b>kurumulaku</b> and jaggery, daily twice.
	Paralysis (Injuries & accidents): Boil 20 ml of coconut oil with 10g of <b>kurumulaku</b> , let it cool and apply to the body.
	Scabies (Dermatological issues): Boil 10-15 <b>kurumulaku</b> in coconut oil apply before bathing.
	Malaria (Infectious diseases): Consume decoction of equal amount of vitex leaves and <b>kurumulaku</b> leaves daily twice.
<i>Solanum torvum</i> Sw. <b>(Chunda)</b>	<p>Cough and cold (Pyrexia problems):</p> <ul style="list-style-type: none"> <li>• Consume gooseberry size whole-plant paste daily at once.</li> <li>• Consume 1 teaspoon of extract with 1 teaspoon of honey.</li> </ul> <p>Respiratory problems (Respiratory system diseases): Consume decoction of 10-20 g roots daily once.</p> <p>Vomiting problems (Immunity &amp; general healthcare): Consume 1 teaspoon of grinded <b>chunda</b> fruits along with 1 glass milk and 1 spoon of honey.</p>
<i>Passiflora foetida</i> L. <b>(Pooda pazham)</b>	Worm problems in childrens (Worm problems): Consume boiled whole-plant water daily.
	Wound healing (Dermatological issues): Apply leaf extract to the wounds.
<i>Clerodendrum paniculatum</i> L. <b>(Krishna kireedam)</b>	Burning (Dermatological issues): Gently boil 400 ml neem oil with 100 gm of <b>krishna kireedam</b> flowers, let it cool and apply to the burned portions.
	Wound healing (Dermatological issues): Apply a paste of 10-15 leaves with 1 spoon of salt to the wounds.
	Eczema (Dermatological issues): Boil equal amount of <b>krishna kireedam</b> leaves with bottle guard leaves in water. Use this water for bathing.
<i>Ipomoea pes-tigridis</i> L. <b>(Pulichuvadi)</b>	Burning (Dermatological issues): Boil equal amount of leaf and stem in coconut oil, let it cool and apply to the burned portions.
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz <b>(Sarpagandhi)</b>	<p>Sleeping disorders (Sleeping disorders): Consume 2 spoon of powdered <b>sarpagandhi</b> leaves and roots along with 1 glass of milk daily night before going to bed.</p> <p>Itching (Dermatological issues): Apply paste of this plant to the itching regions</p> <p>Agnail (Dermatological issues): Apply <b>sarpagandhi</b> root paste to the agnail.</p> <p>High BP (Immunity &amp; general healthcare): Consume the mix of 1 g dried root powder and 1 g <b>triphala</b> powder in half glass of water daily once.</p>
<i>Curculigo orchioides</i> Gaertn. <b>(Nilappana)</b>	<p>Jaundice (Liver related): Consume 10 g of grinded <b>nilappana</b> rhizome in 250 ml of milk daily twice.</p> <p>Cough (Respiratory system diseases): Consume decoction of 20-25gm of <b>nilappana</b> rhizome daily twice.</p> <p>Urinary infection (Renal &amp; urinary infection):</p> <ul style="list-style-type: none"> <li>• Consume 6 gm of <b>nilappana</b> rhizome dried powder with hot water daily once for few days.</li> <li>• Consume <b>nilappana</b> rhizome paste with raw milk continuously for 21 days.</li> </ul> <p>Skin diseases (Dermatological issues): Apply paste of <b>nilappana</b> rhizome about 25g with 2 pinches of turmeric to skin.</p>
<i>Hemidesmus indicus</i> (L.) R.Br. <b>(Nannari)</b>	<p>Mouth infection (Dental and oral ailment): Consume grinded roots of <b>nannari</b> with 1 glass coconut milk daily once.</p> <p>Urinary infection (Renal &amp; urinary infection):</p> <ul style="list-style-type: none"> <li>• Consume 100 ml <b>nannari</b> root decoction of 30 gm of <b>nannari</b> roots daily twice.</li> </ul>

	<ul style="list-style-type: none"> <li>Consume <b>nannari</b> root milk decoction by adding milk to 25gm of roots daily twice.</li> </ul>
	Urinary stone (Renal & urinary infection): Consume paste of 10g of cleaned <b>nannari</b> roots and raw milk daily for 21 days.
	Stomach pain (Gynaecological issues): Consume 1 spoon of <b>nannari</b> root powder with coconut milk daily after food.
	Blood purification (Immunity & general healthcare): Consume 3gm of powdered root with honey daily once.
	Poisson repellent (Poisonous bite problems) and Skin diseases (Dermatological issues): Consume 3 gm of <b>nannari</b> root powder daily.
	Blood vomiting (Immunity & general healthcare): Consume decoction made of 125gm of <b>nannari</b> roots, 250gm of nut sledge plants and 120 gm of <b>nayakurana</b> plant roots along with 4 bottles of water and 300gm of sugar. Keep this in earthen pot for 1 month. After 1 month, filter this solution and dilute 15 ml of decoction with 50 ml of water. Drink this daily twice in alternate days.
<i>Naregamia alata</i> Wight & Arn. <b>(Nila narakam)</b>	Migraine (Neurological disorder): Apply gently boiled coconut oil with equal amount of leaf extract to forehead.
	Insect repellent (Poisonous bite problems): Apply <b>nila narakam</b> juice extract to the skin.
	Dizziness (Neurological disorder): Apply paste of whole-plant without adding water to forehead for 30 min.
	Eczema (Dermatological issues): Apply oil of whole-plant extract to skin.
<i>Biophytum sensitivum</i> (L.) DC. <b>(Mukkutti)</b>	Rheumatic diseases (Skeleto-muscular system disorders): Consume 10 ml of plant extract in half glass of water daily twice.
	Purification of uterus after delivery (Gynaecological issues): Consume porridge of 30 ml of whole-plant extract with jagger and rice for 20-30 days.
	Dysentery (Gastro-intestinal system disorders): Consume 20 gm of grinded leaves in 1 glass of buttermilk.
	Wound healing (Dermatological issues): Apply grinded seed paste of <b>mukkutti</b> to the wounds.
	Gonorrhoea (STD): Consume 50-60 g of grinded <b>mukkutti</b> roots daily twice.
	Cough (Respiratory system diseases): Consume 15 ml of whole-plant extract along with 1 spoon of honey.
	Asthma (Respiratory system diseases): Consume grinded 5 whole-plant with 5 pepper daily once.
	Over bleeding (Gynaecological issues): <ul style="list-style-type: none"> <li>Extract the juice from 6- 10 whole-plant. Drip this into head daily before washing.</li> <li>Consume 1 spoon of dried powder and 1 spoon of honey into 1 glass of milk daily once.</li> </ul>
	Frequent cough (Respiratory system diseases): Consume extract from 8 whole-plants with 8 pepper continuously for 21 days.
	Immunity power (Immunity & general healthcare): Consume 20g of powdered <b>mukkutti</b> with 10 g of pepper powder and 15 g of turmeric daily along with 1 teaspoon of honey.
	Diabetes (Endocrinal diseases): Consume 20 g of <b>mukkutti</b> leaf powder, 20 g of turmeric powder, 10 g of amla powder and 1 spoon of lemon extract daily on empty stomach.
	Insect bitten swelling (Poisonous bite problems): Apply paste of 2-3 <b>mukkutti</b> whole-plant with half spoon of butter to insect bitten portion.
<i>Cyclea peltata</i> Hook. fil. & Thoms <b>(Paadavalli)</b>	Leech repellent (Poisonous bite problems): Boil 100 ml of <b>paadavalli</b> tuber extract in 200 ml of coconut oil. Keep it for 3 days and apply to skin after 3 days.
	Piles (Gastro-intestinal system disorders): Consume decoction of stinging nettle plant root, stone plant root, cumin seeds, <b>chukku</b> powder and <b>paadavalli</b> tuber daily once.

	Hair shampoo & Dandruff problems (Dermatological issues): Apply crushed <b>paadavalli</b> stem and root on head by diluting with water.
	Ulcer (Gastro-intestinal system disorders): Consume 1 spoon of <b>paadavalli</b> leaf extract daily.
	Dysentery (Gastro-intestinal system disorders): Consume the paste of <b>paadavalli</b> tuber along with honey.
	Vitiligo (Dermatological issues): Consume dried powder of <b>paadavalli</b> tuber with butter daily once.
<i>Jatropha curcas</i> L. <b>(Kadalavanakku)</b>	Body pain (Skeleto-muscular system disorders): Boil water with 10- 15 leaves of <b>kadalavanakku</b> plant and use this water for bathing daily.
	Toothache (Dental and oral ailment): Apply the latex of <b>kadalavanakku</b> plant with small amount of salt to the toothache portion using a cotton (Latex is highly poisonous, make sure it doesn't enter into the digestive tract).
	Wound healing (Dermatological issues): <ul style="list-style-type: none"> <li>• Apply paste of leaves to the wounds.</li> <li>• Apply latex to the wound.</li> </ul>
	Rheumatism (Skeleto-muscular system disorders): Apply <b>kadalavanakku</b> leaf paste to the pain parts and tie the region with cotton cloth for 2 hours.
	Dysentery (Gastro-intestinal system disorders): Consume 2 tablespoon of root extract along with buttermilk.
<i>Jatropha gossypifolia</i> L. <b>(Kaattavanakk)</b>	Varicose ulcer: Drip the latex to the affected portion.
	Face acne (Dermatological issues): Apply paste of abutilon roots, <b>kattavanakku</b> leaves and latex with lemon extract to face for 20 minutes.
	Eye problems (Ophthalmological problems): Apply and tie the paste of <b>kattavanakku</b> leaves and drumstick leaves on right hand point finger (if left eye have problem) which heated in an iron pan.
	Knee pains (Skeleto-muscular system disorders): Apply paste of <b>kattavanakku</b> leaf, dried <i>Aloe vera</i> gum and cumin seeds overnight in knee.
	Jaundice (Liver related): Consume <b>kattavanakku</b> leaf extract, cumin seeds, jaggery with edible camphor and a little amount of water daily once.
	Vitiligo (Dermatological issues): Consume 2 teaspoon paste of <b>kattavanakku</b> roots with fresh butter daily twice.
	Wart (Dermatological issues): Apply <b>kattavanakku</b> seed paste to the wart till it left.
<i>Sida cordifolia</i> L. <b>(Kurunthotti)</b>	Rheumatism (Skeleto-muscular system disorders): Consume 2 spoon of extract of <b>kurunthotti</b> leaves and roots along with honey.
	Toothache (Dental and oral ailment): Chew the cleaned roots of <b>kurunthotti</b> .
	Fatigue of pregnant women (Gynaecological issues): Consume 50 ml decoction of 100 g of <b>kurunthotti</b> roots, 500 ml of water and 100 ml of milk daily.
	Heart problems (CVD): Consume boiled water with 6-8 whole-plants once it has cooled.
	Tuberculosis (Infectious diseases): Consume 1 tablespoon of <b>kurunthotti</b> powder with honey and butter daily once.
	Cooling agent for head: Apply <b>kurunthotti</b> leaf paste to forehead about 30 min.
	Immunity booster (Immunity & general healthcare): Consume 1 spoon of crushed extract <b>kurunthotti</b> plant weekly once.
	High bp (Immunity & general healthcare): Consume 2 spoonful of whole-plant extract in half a glass of milk once daily.
	Hair problems (Dermatological issues): Apply paste of tender leaves and stem made in rice water to the scalp and hair for 10 min before washing.
	Migraine (Neurological disorder): Apply the paste of powdered <b>kurunthotti</b> roots with little amount of water to the forehead for 20 mins.

	Piles (Gastro-intestinal system disorders): Apply crushed extract of <b>kurunthotti</b> with <b>triphala</b> to the affected portion.
	Urinary infections (Renal & urinary infection): Consume crushed extract of <b>kurunthotti</b> root skin along with honey daily.
<i>Calotropis gigantea</i> R. Br. <b>(Erukk)</b>	Heel pain (Skeleto-muscular system disorders): Heat ripened <b>erukk</b> leaves on hearth and stand it in for 10 minutes.
	Ear pain (ENT problems): Burn or dry the ripened leaves and extract the juice from leaves. Drip the extract to ear.
	Rheumatism (Skeleto-muscular system disorders): <ul style="list-style-type: none"> <li>• Bathe in water boiled with <b>erukk</b> leaves.</li> <li>• Apply paste of leaves with pink salt to the portion of skin then apply gentle heat.</li> </ul>
	Back pain (Skeleto-muscular system disorders): Apply gently boiled coconut oil with 4-5 leaves of <b>erukk</b> . Take a cotton cloth and dip this oil with leaves and tie this warm cloth to the painful portion.
	Skin diseases (Dermatological issues): Apply 8-10 <b>erukk</b> leaves extract and half glass of coconut milk to skin after keep it in sunlight for few hours.
	Over weight (Immunity & general healthcare): Consume water which is boiled with <b>erukk</b> leaves.
	Constipation (Gastro-intestinal system disorders): Consume boiled water with <b>erukk</b> leaves and cumin seeds daily, once it cooled.
	Muscle pain (Skeleto-muscular system disorders): Apply paste of 200g <b>erukk</b> leaves with half litre of gingelly oil and half litre of water on muscles. Boil till water get fully evaporated and filter it.
	Asthma/ breathing difficulties (Respiratory system diseases): Consume 2 pinch of powdered <b>erukk</b> flowers and 1 pinch of pink salt.
<i>Datura metel</i> L. <b>(Neela ummam)</b>	Dandruff and hair fall (Dermatological issues): <ul style="list-style-type: none"> <li>• Apply oil with datura leaves to hairs.</li> <li>• Apply oil with datura fruit, fenugreek and false daisy to scalp and hair for 30 mins.</li> </ul>
	Toothache (Dental and oral ailment): Apply small amount of datura fruits powder to pain portion.
	Back pain (Skeleto-muscular system disorders): Apply lubricant of grinded datura leaves and seeds with gingelly oil to pain regions.
	Knee pain (Skeleto-muscular system disorders): Apply filtered paste of datura leaves, calotropis leaves, tamarind leaves, drumstick leaves and coral tree leaves after gently boiled with oil and bee wax to the knee.
	Hair growth (Dermatological issues): Apply boiled oil with datura leaves extract and licorice powder to the scalp.
	Ear pain (ENT problems): Drip oil of datura leaves and gingelly oil gently into ears.
	Piles (Gastro-intestinal system disorders): Consume 5 drops of datura leaf extract with butter milk daily twice.
<i>Strychnos nux-vomica</i> L. <b>(Kanjiram)</b>	Body pains (Skeleto-muscular system disorders): Bath with water which is boiled with <b>kanjiram</b> leaves.
	Cataract (Ophthalmological problems): Drip mix of extracts from <b>kanjiram</b> stem, ixora flowers and drumstick tender leaves with breast milk into eyes daily continuously for 10 to 15 days.
	Rheumatism (Skeleto-muscular system disorders): Consume 1 spoon of dried powder of <b>kanjiram</b> seeds along with 1 glass of milk daily once.
	Snake poison (Poisonous bite problems): Consume ash along with milk, which prepared by placing <b>amikkuram</b> root and locked by cotton in the hole made in <b>kanjiram</b> tree for 6 months. This will turn into ashes.
	Wound cleaning (Dermatological issues): Boil the water with <b>kanjiram</b> leaves and bark. Wash the wound with the water when it is cooled.

<i>Senna alata</i> (L.) Roxb. <b>(Aanathakara)</b>	Respiratory diseases (Respiratory system diseases): Consume 1 spoon of <b>thakara</b> leaf extract along with 1 teaspoon of honey, daily twice.
	Skin diseases (Dermatological issues): Apply paste of <b>thakara</b> leaves and turmeric to the portions of skin diseases.
	Ringworm diseases (Worm problems): Apply leaves paste with curd after leave it for one night in bronze plate to the affected portions.
	Versicolor (Dermatological issues): Apply <b>thakara</b> leaves paste with buttermilk to the versicolor portion.
	Dandruff (Dermatological issues): Apply paste of <b>thakara</b> leaves and hibiscus flowers with water to the scalp before washing head.
<i>Cleome viscosa</i> L. <b>(Neela vela)</b>	Swelling (Skeleto-muscular system disorders): Apply paste of whole-plant on it.
	Ear pain (ENT problems): Drip 2-3 drops of mix made from 100 ml of whole-plant extract, 25 ml of goat urine and 250 ml of coconut oil on ear at the time of pain.
<i>Homonium riparia</i> Lour. <b>(Aattuvanji)</b>	Bladder stone (Renal & urinary infection)/ piles (Gastro-intestinal system disorders): Consume 1 spoon decoction of <b>aattuvanji</b> roots daily once.
	Itching (Dermatological issues): Apply leaf decoction or paste to the portion of itching
<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob <b>(Communist pacha)</b>	Wound healing (Dermatological issues): <ul style="list-style-type: none"> <li>• Apply crushed leaf extract to the wounds.</li> <li>• Apply leaf extract and <b>kadalavanakku</b> latex to wounds.</li> </ul>
	Urinary stone (Renal & urinary infection): Consume root extract and fresh milk daily once about 15 days.
	Pain during chikungunya (Immunity & general healthcare): Bathe in water boiled with <b>communist pacha</b> leaves.
	Bad cholesterol (Immunity & general healthcare): Consume water with leaves which boiled in it.
	Back pain (Skeleto-muscular system disorders): Bathe with water which is boiled with vitex leaves and <b>communist pacha</b> leaves.
	Swelling (Skeleto-muscular system disorders): Apply paste of whole-plant to the portion of swelling.
<i>Justicia adhatoda</i> L. <b>(Adalodakam)</b>	Cough (Respiratory system diseases): <ul style="list-style-type: none"> <li>• Consume 1 teaspoon of leaf extract and 1 teaspoon of honey daily thrice.</li> <li>• Consume 1 teaspoon of leaf extract, 1 teaspoon of ginger juice and 1 teaspoon of honey daily twice.</li> <li>• Consume 40 ml decoction of whole-plant 900g, <b>thippali</b> 100g in 4 litres of water and make it into 1 litre with 250 ml of ghee daily once.</li> </ul>
	Asthma (Respiratory system diseases): Consume gently heated leaf extract with honey daily continuously.
	Over bleeding (Gynaecological issues): Consume 15 ml leaf extract and 15 ml jaggery twice in alternate days.
	Respiratory problems (Respiratory system diseases): Consume 25 ml of decoction daily twice prepared by 30 g of whole-plant in 750 ml of water along with 20 g of <b>thippali</b> powder to it.

### Conservation status

The study assessed the conservation status of medicinal plants used by the Paniya tribes, utilizing categorization based on IUCN Red list data. Typically, conservation efforts prioritize "Least Concern" species over those that are "Not Evaluated." Within this study, the majority of documented plants were identified as being in the 'Least Concern' category. This was followed in frequency by species classified as 'Endangered', 'Critically Endangered', 'Vulnerable' and 'Near Threatened'.

From the analysis, the least represented category was 'Vulnerable,' comprising only 2% of the species. 'Critically Endangered' species accounted for 5%, while 'Endangered' species made up about 7%. The 'Least Concern' category included 46% of the documented species" (Fig. 3). The data on the conservation status documented in this study emphasises the urgency of implementing protective measures to prevent further population decline and the loss of biodiversity in this region.

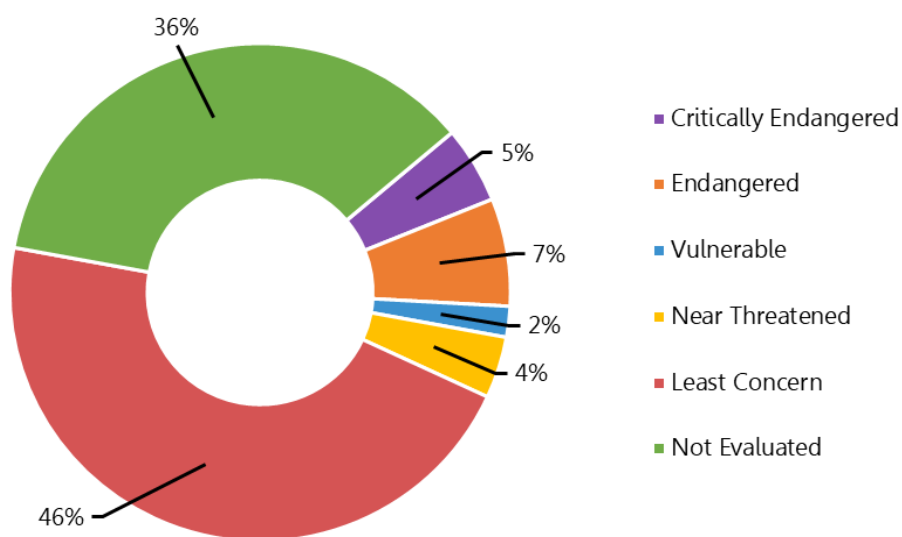


Figure 3. Conservation status of medicinal plants used by Paniya community in the Amarambalam Reserve Forest: the percentage of plants under different categories of conservation status.

### Use Value (UV)

The most commonly used plants were *Emilia sonchifolia* (L.) DC. Ex. Wight and *Cyanthillium cinereum* (L.) H. Rob. scores (use value 3) 6 use reports by 2 informants. These two plants commonly documented for their use in managing fever. *Ocimum tenuiflorum* L. and *Peperomia pellucida* Kunth. (use value 3) with 3 use reports by 1 informant gives the highest use value, both the plants used commonly in treating headache. Other highest use value is reported in *Mimosa pudica* L. and *Coleus amboinicus* (Andrews) Benth. ex G. Don with use value of 2.5 from 2 informants given 5 use reports (Table 4). The high use value of these plants indicates their widespread application within the local community for managing common ailments such as fever and headaches. This extensive utilization underscores the significant and ongoing role of these species in the local traditional healthcare system. Among the tribal reports collected in this study, the use of *Naregamia alata* Wight & Arn. for treating migraine and dizziness is novel and exclusive, as these specific applications have not been widely documented elsewhere in ethnobotanical literature.

The lowest use values documented were for *Curcuma angustifolia* Roxb. (UV 0.66) used for treating diarrhoea and body dehydration and *Helicteres isora* L. (UV 0.50) which is applied as a remedy for body pain. A low Use Value (UV) suggests that a plant may be employed for highly specific or rare conditions, or perhaps for a single purpose, irrespective of its perceived efficacy.

Therefore, it is crucial to meticulously evaluate the efficacy and safety of all reported ethnomedicinal plants through comprehensive phytochemical and pharmacological research for further applications. This concept is underscored by ethnobotanists and recommend prioritizing species that exhibit a high Informant Consensus Factor (ICF), Use Value (UV), and Fidelity Level (FL) for consequent biological screening and toxicity assessments (Ayyanar & Ignacimuthu 2011).

Table 4. Use value of documented medicinal plants used by Paniya community in Amarambalam Reserve Forest

Name of the Plants	No. of Use Reports	No. of Informants	Use value
<i>Elephantopus scaber</i> L.	10	7	1.43
<i>Scoparia dulcis</i> L.	5	3	1.67
<i>Cyperus rotundus</i> Steud.	4	2	2
<i>Vitex negundo</i> L.	7	5	1.4
<i>Indigofera tinctoria</i> linn.	7	3	2.33
<i>Desmodium triflorum</i> (L.) DC	3	2	1.50
<i>Emilia sonchifolia</i> (L.) DC. Ex. Wight.	6	2	3
<i>Leucas aspera</i> (Willd.) Link.	5	3	1.66
<i>Cyanthillium cinereum</i> (L.) H. Rob.	6	2	3
<i>Phyllanthus niruri</i> L.	4	3	1.33
<i>Eclipta prostrata</i> (L.) L.	7	4	1.75
<i>Clitoria ternatea</i> L.	7	5	1.40
<i>Ruta chalepensis</i> L.	4	2	2
<i>Cyanodon dactylon</i> Pers.	4	2	2
<i>Pimento dioica</i> (L) Merr.	1	1	1
<i>Ocimum tenuiflorum</i> L.	3	1	3
<i>Mimosa pudica</i> L.	5	2	2.5
<i>Murraya koenigii</i> L.	3	2	1.5
<i>Taberneamontana divaricate</i> R.Br. ex Roem. & Schult.	5	3	1.67
<i>Peperomia pellucida</i> Kunth.	3	1	3
<i>Tragia involucrata</i> L.	5	5	1
<i>Curcuma angustifolia</i> Roxb.	2	3	0.66
<i>Helicteres isora</i> L.	1	2	0.50
<i>Saraca asoca</i> (Roxb.) Willd	6	5	1.20
<i>Oldenlandia diffusa</i> (Willd.) Roxb.	5	3	1.66
<i>Alternanthera sessilis</i> (L.) R.Br. ex. DC.	3	3	1
<i>Coleus amboinicus</i> (Andrews) Benth. ex G. Don	5	2	2.5
<i>Euphorbia hirta</i> L.	7	5	1.4
<i>Lawsonia inermis</i> L.	5	4	1.25
<i>Cymbopogon citratus</i> (DC.) Stapf.	5	3	1.67
<i>Morus alba</i> L.	1	1	1
<i>Portulaca oleracea</i> L.	3	2	1.5
<i>Glycosmis pentaphylla</i> (Retz.) DC.	4	4	1
<i>Piper nigrum</i> L.	5	4	1.25
<i>Solanum torvum</i> Sw.	3	4	0.75
<i>Passiflora foetida</i> L.	2	1	2
<i>Clerodendrum paniculatum</i> L.	3	2	1.5
<i>Ipomea pestigridis</i> L.	1	1	1
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	4	2	2
<i>Curculigo orchioides</i> Gaertn.	4	5	0.80
<i>Hemidesmus indicus</i> (L.) R.Br.	7	9	0.77
<i>Naregamia alata</i> Wight & Arn.	4	2	2
<i>Biophytum sensitivum</i> (L.) DC	12	8	1.50
<i>Cyclea peltata</i> Hook. fil. & Thoms	6	7	0.86
<i>Jatropha curcas</i> L.	5	5	1
<i>Jatropha gossypifolia</i> L.	7	5	1.4
<i>Sida cordifolia</i> L.	13	9	1.44
<i>Calotropis gigantea</i> R. Br.	9	6	1.50
<i>Datura metel</i> L.	7	4	1.75

<i>Strychnos nux-vomica</i> L.	5	6	0.83
<i>Senna alata</i> (L.) Roxb.	5	3	1.66
<i>Cleome viscosa</i> L.	2	2	1
<i>Homonoia riparia</i> Lour.	2	1	2
<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob	6	7	0.86
<i>Justicia adhatoda</i> L.	4	6	0.66

#### Fidelity level (FL)

Generally, high Fidelity Levels (FLs) are observed when multiple use-reports for a single plant, all refer to the same ailment purpose (Heinrich *et al.* 1998). Conversely, a lower FL indicates a wider variety of uses reported for that species. In the present study, analysis revealed that the plant *Clerodendrum paniculatum* L. (**krishna kireedam**) (FL 100%) obtained a high FL, indicating consistent application for a specific ailment category within the studied community. This plant has been using for the dermatological problems and belongs to Lamiaceae family which is second highest family recorded in this study.

Low Fidelity Levels (FLs) were observed for *Sida cordifolia* L. (**kurunthotti**) (15%) and *Biophytum sensitivum* (L.) DC. (16%) (Table 5). This low fidelity may be attributed to the fact that these plants are often mentioned for a wide variety of uses rather than a single, specific primary ailment. Alternatively, their low FL might also be linked to their presence within less frequently recorded plant families in the region, suggesting that limited overall documentation or a less frequent use by the specific tribal community in this particular study contributes to the varied or less consistent reporting of their application.

In literature, the highly cited medicinal plants in each group with high FL value were *Pongamia pinnata* (antiseptic), *Aerva lanata* (antidote and snakebite), *Blepharis maderaspatensis* (cuts and wounds), *Abutilon indicum* (hemorrhoids), *Ruta graveolens* (spiritual medicine), *Ocimum tenuiflorum* (cough), and *Solanum trilobatum* (pulmonary ailments). *Phyllanthus spp.*, was the most culturally significant species according to this index, followed by *Borassus flebellifer* (Pandikumar *et al.* 2011) which also be compared with their frequency of occurrence, as a relationship between a plant's availability and their frequent use is often evident.

Table 5. Fidelity level of documented medicinal plants used by Paniya community in Amarambalam Reserve Forest

Ailment Category	Name of the Plants	Fidelity level (%)
Dermatological issues	<i>Elephantopus scaber</i> L.	40
	<i>Indigofera tinctoria</i> linn.	28
	<i>Clitoria ternatea</i> lin.	28
	<i>Murreya koenigii</i> L.	50
	<i>Tabernaemontana divaricata</i> R.Br. ex Roem. & Schult.	40
	<i>Peperomia pellucida</i> Kunth.	50
	<i>Tragia involucrata</i> L.	50
	<i>Oldenlandia diffusa</i> (Willd.) Roxb.	60
	<i>Euphorbia hirta</i> L.	43
	<i>Lawsonia inermis</i> L.	40
	<i>Portulaca oleracea</i> L.	66
	<i>Clerodendrum paniculatum</i> L.	100
	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	50
	<i>Cyclea peltata</i> Hook. fil. & Thoms	43
	<i>Jatropha gossypifolia</i> L.	43
<i>Datura stramonium</i> Lin.	37	
<i>Senna alata</i> (L.) Roxb.	60	
Fever/ Pyrexia problems	<i>Cyanthillium cinerum</i> (L.) H.Rob.	33
	<i>Coleus barbatus</i> (Andrews) Benth. ex G. Don	40
	<i>Piper nigrum</i> L.	40
Gastro intestinal systems disorders	<i>Indigofera tinctoria</i> linn.	28
	<i>Emilia sonchifolia</i> (L.) DC. ex Wight	33

	<i>Eclipta prostrata</i> (L.) L.	28
	<i>Saraca asoca</i> (Roxb.) Willd	50
	<i>Euphorbia hirta</i> L.	28
	<i>Cyclea peltata</i> Hook. fil. & Thoms	33
Gynaecological issues	<i>Phyllanthus niruri</i> L.	25
	<i>Biophytum sensitivum</i> (L.) DC.	16
Immunity & General health problems	<i>Mimosa pudica</i> L.	40
	<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob	33
	<i>Clitoria ternatea</i> lin.	28
	<i>Hemidesmus indicus</i> (L.) R.Br.	25
	<i>Sida cordifolia</i> L.	15
Liver related problems	<i>Phyllanthus niruri</i> L.	25
	<i>Eclipta prostrata</i> (L.) L.	28
Neurological disorders	<i>Naregamia alata</i> Wight & Arn.	50
Ophthalmological problems	<i>Alternanthera sessilis</i> (L.) R.Br.ex.DC.	66
Renal and Urinary infections	<i>Hemidesmus indicus</i> (L.) R.Br.	25
Respiratory system diseases	<i>Biophytum sensitivum</i> (L.) DC.	16
	<i>Calotropis gigantea</i> R. Br.	22
	<i>Justicia adhatoda</i> L.	75
	<i>Solanum torvum</i> Sw.	66
	<i>Ruta chalepensis</i> L.	50
Skeleto-muscular system disorders	<i>Vitex negundo</i> L.	42
	<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob	33
	<i>Calotropis gigantea</i> R. Br.	44
	<i>Datura stramonium</i> Lin.	25
	<i>Jatropha curcas</i> L.	40
	<i>Strychnos nux-vomica</i> L.	40
	<i>Coleus barbatus</i> (Andrews) Benth. ex G. Don	40

## Conclusion

Formulations used by the paniya tribal community include *Tragia involucrata* L. employed in the management of cracked foot, *Glycosmis pentaphylla* (Retz.) DC. used in the treatment of headache, dandruff and swellings, *Clerodendrum paniculatum* L. traditionally applied in alleviating burning and irritation, *Rauvolfia serpentina* (L.) Benth. ex. Kurz used to treat agnail, *Naregamia alata* Wight & Arn. commonly used for migraine and dizziness are novel and exclusive among the tribal reports. Further research on these novel formulations could pave the way for new drug development. In addition, the conservation status documented in this study underscores the urgency of implementing protective measures to prevent further population decline and loss of biodiversity.

## Declarations

**Ethics approval and consent to participate:** The data were collected with respect to confidentiality and consent. All the informants were informed about the aim of this study.

**Consent for publication:** Consent received from all eleven informants including to give their names and show theot images.

**Availability of data and materials:** All data is available within the article.

**Competing interests:** The authors declare no conflict of interest.

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**Author contributions:** A.MS. Ethnobotanical surveys, Data Analysis, Interpretation of Results and Review editing. P.R. Study design, Methodology, Manuscript Writing, Supervising, Manuscript improving and Review editing. All authors read, reviewed and approved the final version of manuscript.

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