



Traditional plant-based remedies in the Western Ghats region of Kodagu district: A recent survey of ethnomedicinal knowledge

Ashitha Ganesh B, Devi Prasad A G*

Department of Studies in Environmental Science, University of Mysore, Mysuru, Karnataka, India

Abstract

The ethnomedicinal survey was made in the unexplored regions of Western Ghats in Kodagu district during the period of September 2020 to April 2021 to document the diversity of medicinal plants and ethnomedicinal knowledge. The information and data related to these were obtained through interviews with traditional medicinal practitioners. A semi-structured questionnaire and a random sample technique were employed. A total of 145 species were documented, belonging to 57 families, and among them Fabaceae (17), Apocynaceae (9), and Malvaceae (8) were dominant. Of the total species recorded, herbs (32%) were used prominently, followed by shrubs (25%), trees (22%), and climbers (11%). The informant consensus factor was calculated for the quantitative study of the ethnobotanical data. The highest degree of informant consensus was reported for kidney problems (0.75), gastrointestinal disorders (0.74), liver disorders (0.60), and wound healing (0.66). Detailed information on ailments treated, habit, parts used, method of preparation, and mode of application was recorded. Leaves (45%) were predominantly used plant parts, and paste (34%) was the most used herbal preparation method. The demographic profile of the respondents has shown that the younger generation has a very meagre traditional knowledge in their vicinity. The present study emphasizes the importance of safeguarding traditional knowledge for a sustainable future.

Keywords: Ethnomedicine, medicinal plants, therapeutic uses, Western Ghats

Introduction

Interest in medicinal plants for their traditional utility and associated pharmacological research is intensifying all over the world in the past few decades. Plants that possess medicinal properties are an important component of healthcare for many local communities. Over 50,000 of the reported 422,000 flowering plant species worldwide are utilized for medicinal purposes. Traditional medicine remains a crucial healthcare modality for roughly 60% of the global population and 80% of those residing in developing countries. More than 4.5 billion people in developing countries depend on medicinal plants as part of their healthcare. These plants are particularly popular in rural areas where they are favoured due to their affordability compared to allopathic drugs, which may be prohibitively expensive, as well as the potentially harmful side effects of the latter [Giday *et al.* 2010, Heinrich 2016, Bhat *et al.* 2011] [6, 11, 13].

Ethnomedicine is the study of traditional medicinal practices that use plants and other natural materials to prevent and treat diseases. Ethnomedicinal plant studies have gained increasing attention from researchers, healthcare professionals, and policymakers in recent years due to their potential for developing new drugs and therapies, promoting sustainable healthcare, and preserving traditional knowledge and culture [Heinrich *et al.* 1998, Pieroni 2008] [12, 17]. Studies on ethnomedicinal plants have provided valuable insights into the traditional knowledge and practices of indigenous and local communities, as well as the potential uses of plant-derived compounds in drug discovery and development. These studies often involve interdisciplinary

approaches that integrate ethnobotanical, pharmacological, chemical, and ecological perspectives [Cunningham 2014] [9].

The objective of the present study was to examine and record the traditional use of plants found in the Kodagu District, located in the Western Ghats region of India. Though the study area has a vast potential for ethnomedicinal information, scientific exploration of this knowledge has not been unearthed significantly.

Various studies highlight the potential of ethnomedicinal plant studies for contributing to the development of safe, effective, and culturally appropriate healthcare solutions. However, it is important to recognize the need for ethical and sustainable research practices that respect the rights, knowledge, and interests of local and indigenous communities [Calixto 2000, Amjad *et al.* 2013] [1, 7].

Materials and methods

Study area

Kodagu, which is a small district located in southern India in the Karnataka State, spans an area of about 4,100 square kilometers and is situated on the eastern slopes of the Western Ghats, with its boundaries ranging from North latitude 11°56' to 12°56' and east longitude 75°22' to 76°11'. The highest peak in the region is Thadiyandamol, which reaches 1,750 meters above sea level, while the lowest elevation is 900 meters above sea level. Kodagu enjoys a temperate climate, with average temperatures around 15°C, varying from 11°C in December to approximately 28°C in April and May. The district receives

an average rainfall of 2,692 mm annually, with about 111 rainy days in a year. The area encompasses a range of forests, from evergreen to scrub forest, and is home to over ten different ethnic indigenous tribal groups known as 'Girijanas', including Yarvas, Jenukuruba, Bettakuruba,

Maratha, Kaadukuruba, and others [Ashitha *et al.* 2021] ^[3]. Due to scattered housing in Kodagu, modern medical facilities are far away, so people rely on traditional plant-based medicine passed down through generations for health care and food.

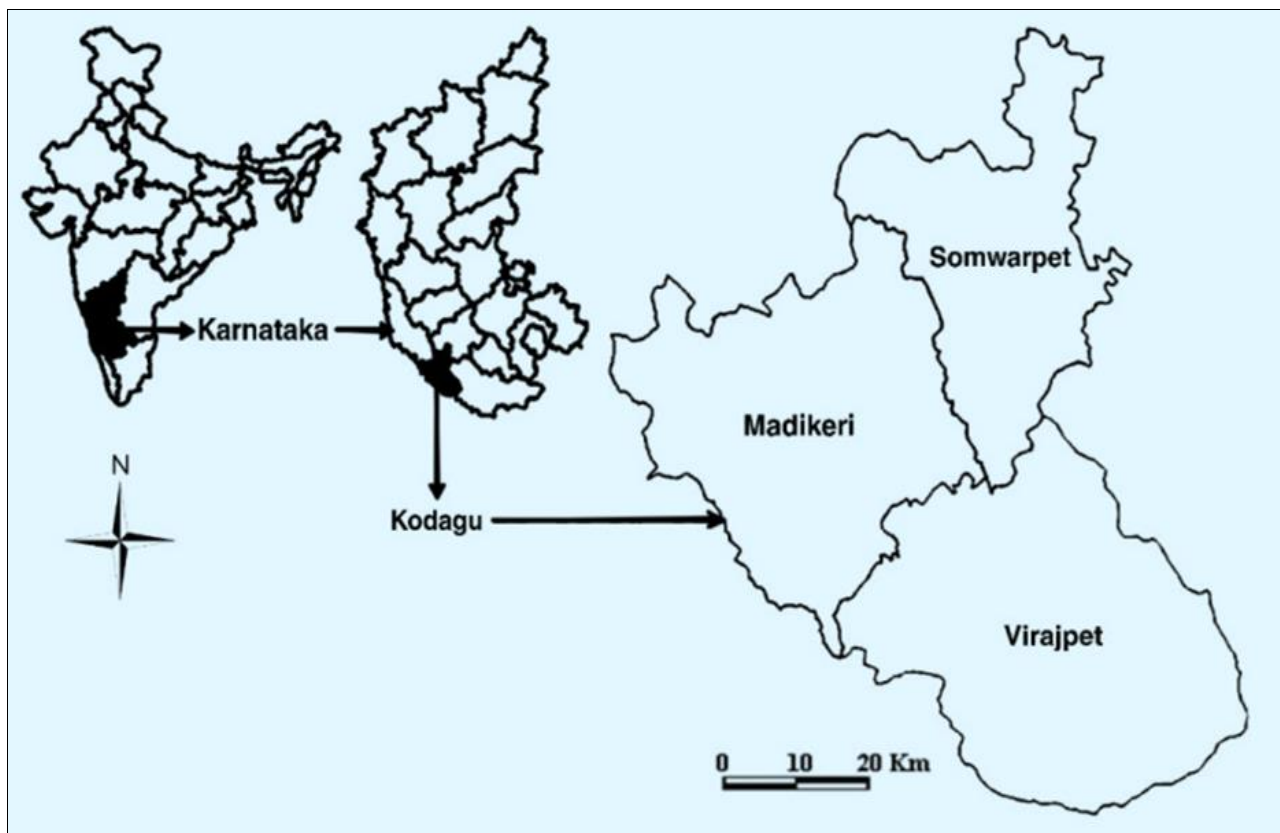


Fig 1: Map showing the study area.

Data collection

Periodic field exploration was undertaken from September 2020 to April 2021 in different bioregions of Kodagu district. The survey was focused on the documentation, identification, and collection of medicinal plants. A semi-structured questionnaire was prepared, which included information like vernacular name, parts used, ailment treated, mode of preparation, and application. To understand the demographic profile of the respondents' questions pertinent to it were also queried. Each plant specimen was photographed in its natural habitat. Specimen identification and confirmation were undertaken using local flora, available field keys, authentic literature, and with the help of taxonomists at the University of Mysore.

Data analysis

Informant Consensus Factor (F_{ic}): Information from the informants was gathered for different ailments and was grouped into 16 use categories. The results obtained from the Informant Consensus Factor (F_{ic}) calculation could prove to be useful in selecting and prioritizing medicinal plants for further scientific evaluation, as plants with higher F_{ic} values are more likely to have pharmacologically effective remedies. F_{ic} is a measure of user agreement on the

use of medicinal plants, with values ranging from 0.00 to 1.00. High F_{ic} values are observed when a few plant species are consistently used by a significant proportion of informants for treating a particular ailment, while low F_{ic} values indicate a lack of agreement among informants on which plant to use. Identifying plant species with high F_{ic} values can help narrow down the search for bioactive compounds [Tariq *et al.* 2015, Mussarat *et al.* 2014] ^[16, 19]. F_{ic} is calculated using the following formula: $F_{ic} = N_{ur} - N_t / N_{ur} - 1$, Where, N_{ur} is the number of use reports in each category, and N_t is the number of species used.

Results

Medicinal plants diversity and their uses

The current research provides information on the traditional medicinal uses of 145 plant species that belong to 57 different families (Table 1). The Fabaceae family has the highest number of medicinal plants (17), followed by Apocynaceae (9), Malvaceae (8), Rutaceae, and Acanthaceae, each with 6 species. The healers in the area mostly use herbs (32.5%), followed by shrubs (25.6%) and trees (22.5%) for medicinal purposes (Figure 2).

Table 1: Ethnomedicinal plants documented and their therapeutic uses.

Sl. No.	Scientific Name	Vernacular Name	Family	Plant Habit	Parts Used	Therapeutic Use/Mode of administration
1	<i>Abelmoschus moschatus</i> Medik.	Jenu kaai	Malvaceae	Herb	Seeds	Food Poison: Seeds are ground and taken with water.
2	<i>Acacia concinna</i> (Willd.) DC.	Seege	Fabaceae	Climbing Shrub	Sap	Cough in Children: Sap is mixed with honey and consumed two times a day for three days.
3	<i>Achyranthes aspera</i> L.	Utharani	Amaranthaceae	Herb	Leaves	Urinary tract infection: Leaves are ground along with castor oil and drank two times a day. Libido: Boil 2kg leaves in 5ltr water until it becomes 1ltr. Grind the leftover leaves to make 28 balls and take them along with one lid of liquid extract every morning on an empty stomach for 28 days.
4	<i>Adhatoda zeylanica</i> Medic.	Aadu sogge	Acanthaceae	Shrub	Leaves	Asthma: Make a paste of the leaves and raw ginger and consume it with honey on an empty stomach every morning for 7 days. Body Ache: Boil 300g of leaves, 25g of camphor, 30g of cinnamon, and Aloe vera gel in half a liter of coconut oil, and apply it to the affected area. Then, provide hot water steam.
5	<i>Aegle marmelos</i> (L.) Correa	Bilvathre	Rutaceae	Tree	Leaves	Diabetes: Dry and powder 500g of these leaves with 500g of <i>Murraya koenigii</i> leaves. Take one spoonful of this powder with two spoons of milk and water regularly in the evening.
6	<i>Aerva lanata</i> (L.) Juss. ex Schult.	Vishamadhari	Amaranthaceae	Herb	Leaves	Psoriasis, Ringworms, Dermatitis: Make a paste of these leaves along with <i>Achyranthes aspera</i> L. leaves and <i>Azadirachta indica</i> leaves, and apply it to the affected area for two days.
7	<i>Ageratum conyzoides</i> L.	Appengale	Asteraceae	Herb	Leaves	Cut wounds: The leaves are crushed and made into a paste with lime. It is applied on the wound and bandaged.
8	<i>Alangium salviifolium</i> ssp. hexapetalum	Nakkole mara	Cornaceae	Tree	Bark	Food poison: Ground and powder 10g of the bark, mix it with 900ml of raw milk, and consume it orally on an empty stomach early in the morning.
9	<i>Aloe vera</i> (L.) Burm.f.	Lolisara	Xanthorrhoeaceae	Herb	Leaves	Rhinorrhea: Fleshy part of the leaf is mixed with honey and taken orally for two days.
10	<i>Alpinia galanga</i> (L.) Willd.	Rasna	Zingiberaceae	Herb	Tuber	Asthma, Phlegm: Tuber is mashed and the extract obtained is taken along with honey for a few days.
11	<i>Andrographis paniculata</i> (Burm. fil.) Nees	Nela bevu	Acanthaceae	Herb	Leaves	Diabetes: Few leaves are consumed orally every day. Convulsions: Make a paste of these leaves along with <i>Centella asiatica</i> leaves, and take it orally with water on an empty stomach two times a day for two days.
12	<i>Ardisia solanacea</i> (Poir.) Roxb.	Pottiche	Primulaceae	Shrub	Leaves	Gastritis: Leaves are infused in boiling water and consumed orally for three days on an empty stomach.
13	<i>Aristolochia indica</i> L.	Eshwari beru	Aristolochiaceae	Climber	Root	Snakebite: Grind the root and apply it to the bitten area.
14	<i>Asparagus racemosus</i> Willd.	Shathavari	Asparagaceae	Climber	Leaves	Liver disease: Consume the leaf extract along with cumin seeds, red rock sugar, and raw milk orally on an empty stomach for three days, while maintaining a specific diet.
15	<i>Asparagus racemosus</i> Willd.	Taaki balli/Perkodiballi	Asparagaceae	Climber	Root	Lactagogue: The root is ground and given to the lactating mother until the condition improves.
16	<i>Ayapana triplinervis</i> (Vahl) R.M.King & H.Rob.	Rathna gida	Asteraceae	Herb	Leaves	Diabetes: Few leaves are eaten regularly to keep in check.
17	<i>Azolla rubra</i> R.Br.	Ajola	Salviniaceae	Fern	Leaves	Weight gain: Leaves are dried, powdered, and given to babies for gaining weight.
18	<i>Benincasa hispida</i> (Thunb.) Cogn.	Boodhu kumbala	Cucurbitaceae	Climber	Fruit	Weight loss: One glass of fruit juice along with honey is taken for 30 days early in the morning on empty stomach. Consumption of non-veg or fatty substances is avoided.
19	<i>Breynia vitis-idaea</i> (Burm.f.) C.E.C.Fisch.	Palli thoppu	Phyllanthaceae	Shrub	Leaves	Dermatitis: These leaves along with <i>Achyranthes aspera</i> L. leaves, <i>Azadirachta indica</i> leaves, and <i>Ocimum sanctum</i> leaves are made into a paste and boiled in oil, filtered,

						and applied on the affected area until it heals. Smallpox: These leaves along with <i>Coleus amboinicus</i> leaves and turmeric is ground and applied on the body and consumed as well.
20	<i>Butea monosperma</i> (Lam.) Taub.	Muthuga	Fabaceae	Tree	Bark	Herpes: Half a cup of bark paste mixed with lemon juice is taken two times a day for 7 days on empty stomach. Snakebite: Make a paste of the east-facing bark with lemon juice, betel leaf, turmeric tuber, and leaves of <i>Ocimum tenuiflorum</i> . Cut open the wound, apply the paste around it, and keep some on top of the head. Take it orally 2 to 3 times.
21	<i>Caesalpinia bonduc</i> (L.) Roxb.	Chittikodi	Fabaceae	Shrub	Leaves/ Seeds	Antipyretic: Tender leaves or seeds are ground along with 2-3 pepper seeds, garlic, and lemon juice and boiled in water. Hot iron rod is dipped into it and half a cup is taken 2 to 3 times a day. Tonsils/Mumps: Take 8-10 leaves, apply castor oil to them, and press them on the affected area. Repeat this process 6-7 times for 2-3 days until the leaves fall off on their own.
22	<i>Caesalpinia mimosoides</i> Lam.	Kenjigi	Fabaceae	Climber	Leaves	Phlegm: Grind tender leaves along with Bird's eye chili, garlic, and cumin seeds. Infuse the mixture in boiling water and consume it 2-3 times.
23	<i>Calotropis gigantea</i> (L.) W. T. Aiton	Ecca	Apocynaceae	Shrub	Leaves	Pitta Dosh: Tender leaves are eaten for 7 days.
24	<i>Calotropis procera</i>	Ecca	Apocynaceae	Shrub	Leaves, Latex	Carbuncles: Dry and powder the leaves, mix them with castor oil, and apply the mixture on the affected area. Stone bruise: Latex is applied on the affected area.
25	<i>Canna indica</i> L.	Kuiya kande	Cannaceae	Herb	Tuber	Immunity: Tuber is boiled and consumed.
26	<i>Cassia fistula</i> L.	Kakke mara	Fabaceae	Tree	Root	Postpartum hemorrhage: Make a paste of the root and consume it orally with water three times a day for two days.
27	<i>Cassia occidentalis</i> L.	Aane thathe	Fabaceae	Small Shrub	Leaves	Anti-rabies: Leaves are ground and taken along with buttermilk on an empty stomach early in the morning for 3 days.
28	<i>Celtis timorensis</i> Span.	Elmbukatti	Cannabaceae	Tree	Bark	Bone fracture: Make a paste of the bark with boiled black gram and egg white, apply it thickly on the affected area, and tie it tightly with sticks and rope.
29	<i>Centella asiatica</i> (L.) Urb.	Brahmi, Elikemi thoppu	Apiaceae	Herb	Leaves	Convulsion/Fit: Leaves along with cumin seeds are made into a paste and taken with raw milk, twice a day for 15 days in an empty stomach. Jaundice: Leaves are dried and powdered and fed with half a cup of raw milk every morning in an empty stomach for 3 days. Specific diet has to be maintained. Dandruff: Leaves are crushed and the extract obtained is applied on the scalp for an hour.
30	<i>Chenopodium ambrosioides</i> L.	Kaad hingu	Amaranthaceae	Herb	Leaves	Menstrual problems: Leaves are ground, infused in water, and consumed.
31	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Gandhi gulabi	Asteraceae	Shrub	Leaves	Gastric ulcer: These leaves along with leaves of <i>Phyllanthus amarus</i> and <i>Andrographis paniculata</i> is ground and the juice is consumed. Cut Wounds: Leaves are crushed and the juice is applied to the wound.
32	<i>Cinchona pubescens</i> Vahl.	Quina mara	Rubiaceae	Tree	Bark	Brain fever: Bark is ground with cow's urine and applied on the head.
33	<i>Cinnamomum malabratrum</i> (Burm. f.) Presl	Naru mara	Lauraceae	Tree	Bark	Bone fracture: Bark is ground along with black gram and <i>Pterocarpus santalinus</i> bark, applied on the fractured part, and bandaged tightly.
34	<i>Cissus javana</i> DC.	Jone balli	Vitaceae	Climber	Leaves	Wound healing/ Carbuncles: Leaves are squeezed and the juice is applied onto the affected area and tied.
35	<i>Citrus aurantifolia</i>	Kaad chorange	Rutaceae	Shrub	Leaves	Nipple eczema: Grind one fist of these leaves with 5-6 tender leaf parts of <i>Leucas aspera</i> and half a cup of raw milk. Filter and consume the mixture orally for three days, and rub it on the nipples. Menopausal bleeding: Leaves are ground into a paste and consumed along with an alcoholic drink from paddy on an empty stomach until symptoms reduce.
36	<i>Citrus aurantium</i> L.	Kaipuli	Rutaceae	Tree	Leaves	Sinus: Boil tender leaves of <i>Citrus aurantium</i> , <i>Ocimum tenuiflorum</i> , and <i>Citrus limon</i>

						with half a litre of ghee. Apply one teaspoon on top of the head, one drop in each ear, and some residue between the teeth. Repeat for 3 days without showering, and then again for 5 to 7 days.
37	<i>Clematis zeylanica</i> (L.) Poir.	Eerche Balli	Ranunculaceae	Liana	Root, Leaves	Fever/Headache: Leaves are made into a chutney and consumed. Crush the root and mix its juice with three drops of lemon juice, then apply it into one nostril for one-sided headache relief. Fits: Leaves are ground and tied onto the arm.
38	<i>Clerodendrum infortunatum</i> L.	Vidurapatra / Kaipakepookuthi	Lamiaceae	Shrub	Leaves	Wound healing: Tender leaves are crushed and the juice is applied to the wound. Gangrene: Leaves are ground along with turmeric tuber and applied.
39	<i>Clitoria ternatea</i> L.	Shanka Pushpa/ Krishnapushpa	Fabaceae	Vine	Flower, Leaves	Immunity tonic for kids: The flower petals are soaked in warm water and the extract obtained is taken with milk or honey. Stomach ache or related complications: These leaves along with leaves of <i>Phyllanthus amarus</i> and <i>Andrographis paniculata</i> are ground together and the extracted juice is consumed.
40	<i>Commelina diffusa</i> Burm.f.	Kolike thoppu	Commelinaceae	Herb	Whole plant	Boosts immunity/ Increases body strength: Whole plant is crushed and the juice obtained is consumed.
41	<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Bollakka Balli	Menispermaceae	Climber	Leaves	Swelling: Leaves are squeezed and the juice is applied to the affected area.
42	<i>Crinum asiaticum</i> L.	Paambale, Vishamangali	Amaryllidaceae	Herb	Leaves, Root	Phlegm: Dried leaf is squeezed and mixed with honey and pepper powder, then consumed on empty stomach 2-3 times. Anti-poison: Root is ground and the juice is consumed which leads to vomiting. Chronic cough: The leaves are heated over a flame and then squeezed. The resulting juice is mixed with honey and taken regularly.
43	<i>Crotalaria pallida</i> Aiton	Chigate beru/Thathe gida	Fabaceae	Herb	Leaves	Insect sting: Leaves are ground along with turmeric tuber and applied on the affected area.
44	<i>Cyclea peltata</i> Hook. f. & Thoms.	Paavade balli/ Punje mott balli	Menispermaceae	Climber	Root, Leaves	Food poison: Root is ground with betel leaves and raw milk and consumed orally, early morning in empty stomach for 7 days. Hyperthermia: Squeeze a fistful of leaves with half cup of water, let it harden, slice it and put it on top of the head. Consume some of it too. Repeat twice on alternate days.
45	<i>Cyperus rotundus</i> L.	Bhadra	Cyperaceae	Sedge	Root	Fever: Root is ground along with <i>Nyctanthes arbor-tristis</i> leaves, <i>Piper longum</i> , and <i>Zingiber officinale</i> . Infused in water and consumed three times a day.
46	<i>Dendrophthoe falcata</i> (L.f.) Ett.	Bandhalakki	Loranthaceae	Parasitic subshrub	Leaves	Food poison: Leaves along with a few rice grains are ground together with water and consumed for 7 days with a strict diet.
47	<i>Dracaena terniflora</i> Roxb.		Asparagaceae	Shrub	Root	Fever: Root is smashed and infused in boiling water along with ginger and consumed.
48	<i>Drymaria cordata</i> Willd	Pana thoppu	Caryophyllaceae	Herb	Leaves	Improving memory and body weight in small babies: A mixture of shade-dried and powdered leaves and rice that is fried and powdered is mixed with milk or water and butter, then fed to babies in the morning for a few months.
49	<i>Eclipta alba</i>	Bringaraja(Rare)	Asteraceae	Herb	Leaves	Jaundice: Tender leaves are infused in boiling water along with salt, pepper and lemon juice and consumed two times a day for 3 days in empty stomach.
50	<i>Equisetum hyemale</i> L.	Neervaate	Equisetaceae			Joint pain: Whole plant is infused in boiling oil and applied.
51	<i>Erythrina suberosa</i> Roxb.	Pangare mara	Fabaceae	Tree	Bark	Fever and body ache: Make a paste by grinding the bark and garlic, and apply it to the body.
52	<i>Euphorbia nivulia</i> Buch.-Ham.	Mullu kalli	Euphorbiaceae	Tree	Sap	Varicose Veins: Sap is mixed with lime and applied on the affected area.
53	<i>Euphorbia prostrata</i> Aiton	Isubu thoppu	Euphorbiaceae	Herb	Whole Plant	Eczema: Boil ten stems of the plant with <i>Vernonia anthelmintica</i> seeds, garlic, and coconut oil. Apply the mixture to the affected area for three days without washing, then repeat on days 5-7 and as needed.
54	<i>Fagraea ceilanica</i>	Booneballi	Gentianaceae	Shrub	Leaves	Keratosis pilaris: Leaves are wilted in fire, squeezed and rubbed over the body. As well they are consumed along with curd.
55	<i>Ficus drupacea pubescens</i> (Roth)	Goli mara	Moraceae	Tree	Sap	Cough: Sap is mixed along with honey and a spoon of it is consumed.

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56	<i>Ficus exasperata</i> Vahl	Ara mara	Moraceae	Tree	Leaves	Asthma: Powdered dried leaves are mixed with pepper powder and honey, and one tablespoon of the mixture is consumed on an empty stomach for three mornings.
57	<i>Ficus racemosa</i> L.	Atthi mara	Moraceae	Tree	Bark	Diabetes: Bark is infused in water and consumed orally in empty stomach.
58	<i>Glycosmis pentaphylla</i> (Retz.) Correa	Pandi pann, Muri madh	Rutaceae	Shrub	Leaves, Bark	Mumps: Grind the leaves of <i>Sida cordifolia</i> , tuber of wild potato, banana along with these leaves. Mix with rice extract and apply 4-5 times a day on the affected area until cured. Wounds: Bark is ground into a paste and applied on the wound until it heals.
59	<i>Gmelina arborea</i> Roxb. ex Sm.	Kumbli mara	Lamiaceae	Tree	Bark	Toothache: Bark is infused in boiling water and the steam is taken inside the mouth.
60	<i>Gnetum ula</i> Brongn.	Both balli	Gnetaceae	Liana	Sap	Eye irritation: Sap is poured into the eyes.
61	<i>Graptophyllum pictum</i> (L.) Griffith		Acanthaceae	Shrub	Leaves	Kidney stone: Leaves are crushed and the juice obtained is mixed with sour buttermilk and consumed.
62	<i>Grewia nervosa</i> (Lour.) G. Panigrahi	Puthari Naar	Malvaceae	Shrub	Bark	Leukorrhea, Urine infection: Take one cup of bark extract and mix it with red rock sugar water. Consume this mixture two times a day for five days.
63	<i>Gymnema sylvestre</i> (Retz.) Schult.	Madhunashini/Sakkare kolli	Apocynaceae	Woody Vine	Leaves	Diabetes: These leaves are smashed along with <i>Syzygium cumini</i> bark and the juice obtained is consumed.
64	<i>Hemidesmus indicus</i> (L.) R. Br.	Konnari, Nannari ber	Apocynaceae		Root	Body odour: Paste of the root is infused in water and taken orally for few days. Food poison: Root is chewed along with betel leaves for 3 days in empty stomach.
65	<i>Hibiscus hispidissimus</i> Griff.	Kaad dasavaala	Malvaceae	Climber	Root	Piles/ Leucorrhoea: Soak the root in 1 liter of water with cumin seeds for 8 days, strain it and consume the extract with powdered red rock sugar on an empty stomach in the morning for 3 to 4 days.
66	<i>Hibiscus rosa-sinensis</i> L.	Kempu dasavala	Malvaceae	Shrub	Flowers	Body coolant: Unbloomed flowers are eaten without pistil for few days.
67	<i>Holigarna grahamii</i> (Wight) Kurz	Kaad ger mara	Anacardiaceae	Tree	Bark	Cut wounds: Shreds of bark is boiled in coconut oil and applied on the wound until it heals. Leucorrhoea: Bark is boiled with water and crushed, and then rice is cooked with the extract and consumed for three days along with the same water. During this time, nothing else should be consumed. Additionally, two buds of <i>Hibiscus rosa-sinensis</i> (Dainty White) should be eaten daily for a week.
68	<i>Hygrophila auriculata</i> Schumach.	Kola thoppu, Kolavaliike thoppu	Acanthaceae	Herb	Whole Plant	Kidney stone: Boil a fistful of tender plant part with salt and pepper in water, add a few drops of lemon juice and drink the infusion three times a day until symptoms subside. Edema: The plant is boiled to make a decoction, and then pepper powder, salt, and lemon juice are added to it. This mixture is taken orally three times a day.
69	<i>Ipomoea alba</i> L.	Pattayya balli	Convolvulaceae	Climber	Seeds	Sexual problem in men: 2-3 seeds are crushed and consumed with milk for 14 days.
70	<i>Ipomoea hederifolia</i> L.	Pattayya balli	Convolvulaceae	Climber	Seeds	Piles: Seeds are used in the treatment.
71	<i>Ixora finlaysonianana</i> Wall. ex G.Don	Kepala/Bili Chikki	Rubiaceae	Shrub	Leaves	Leucorrhoea: Leaves are dried, powdered and consumed with milk.
72	<i>Jasminum coarctatum</i> Roxb.	Mulleballi	Oleaceae	Climbing Shrub	Sap	Eye irritation: The sap from the plant's branches is used as eye drops to provide a cooling effect.
73	<i>Jatropha curcas</i> L.	Kaachi	Euphorbiaceae	Shrub	Latex	Vomiting, Stomach ache, Bloody diarrhea: Drink 5-10ml of latex mixed with 3-4 times water on an empty stomach for 2 days.
74	<i>Justicia betonica</i> L.	Upputhondi	Acanthaceae	Shrub	Leaves	Muscle swelling: Infuse the leaves in rice starch and consume, and apply steam on the affected area.
75	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Potichike	Crassulaceae	Herb	Leaves	Kidney Stone: Grind three leaves with red rock sugar and raw milk, and consume on an empty stomach for 3 to 4 days.
76	<i>Lawsonia inermis</i> L.	Therana gida	Lythraceae	Shrub	Leaves	Menopausal bleeding: Mix 10g of leaf powder and 1 teaspoon of cumin seeds with

						50ml of water, take it twice a day for 5 days. Jaundice: Ground leaves are consumed with raw milk on an empty stomach for 3 consecutive days in the morning.
77	<i>Leucas cephalotes</i> (Roth) Spreng.	Bili thumbe	Lamiaceae	Herb	Leaves	Phlegm formation: Grind a fistful of leaves into a ball and leave it overnight. In the morning, mix around 5g of the paste with half a cup of raw milk and consume on an empty stomach. Repeat as necessary.
78	<i>Ludwigia octovalvis</i> (Jacq.) Raven	Karichendu	Onagraceae	Herb	Root	Fever: This root is infused in water along with leaves of <i>Nyctanthes arbor-tristis</i> and consumed.
79	<i>Ludwigia palustris</i> (L.) Elliott	Ulk madh	Onagraceae	Herb	Leaves	Sprain: These leaves along with leaves of <i>Sida acuta</i> and <i>Achyranthes aspera</i> is boiled in Coconut oil and applied on the affected area.
80	<i>Maesa indica</i> (Roxb.) A. DC.	Vaayuvudanga	Primulaceae	Shrub	Leaves	Vayu Dosha: Leaves are ground and consumed.
81	<i>Mimosa pudica</i> L.	Nachike gida	Fabaceae	Herb	Whole Plant	Piles: Boil 2kg of the plant in 10lts of water till it reduces to 1ltr. Grind the residual leaves and make 28 balls. Consume one ball daily along with one lid of liquid extract in the morning on an empty stomach for 28 days. Maintain a specific diet during this period. Cut Wounds: Leaves are ground along with turmeric and applied on the wound until it heals.
82	<i>Mucuna pruriens</i> (L.) DC.	Balli Angare	Fabaceae	Climber	Leaves	Cough: One fist of leaves is fried in mud pan, mixed with honey and consumed.
83	<i>Musa paradisiaca</i> L.	Boodha bale mara	Musaceae	Herb	Stem	Gallbladder stone: The sap is extracted and consumed with tender coconut water until the symptom reduces.
84	<i>Myristica fragrans</i> Houtt.	Jaai Kaai	Myristicaceae	Tree	Seeds	Insomnia: Seeds are powdered and consumed along with milk for 28 days at night.
85	<i>Nicandra physalodes</i> (L.) Gaertner	Kaad gida	Solanaceae	Herb	Seeds	Insomnia: Dried seeds are tied on top of the head.
86	<i>Nothapodytes nimmoniana</i> (J.Grah.) D.J. Mabberley	Peenari	Stemonuraceae	Shrub	Leaves	Chronic Weakness and fever: Leaves are infused in boiling rice starch and consumed.
87	<i>Nyctanthes arbor-tristis</i> L.	Krishna Parijatha	Oleaceae	Tree	Leaves, Flower	Fever: The leaves are boiled with water and pepper longum until the water is reduced to half the initial quantity, and then consumed. Anaemia: Flowers are eaten regularly.
88	<i>Ochlandra travancorica</i> (Bedd.) Gamble	Vaate	Poaceae	Shurb	Stem	Cut Wounds: Stem is scraped and the powder is mixed with lime and tied onto the wound.
89	<i>Osbeckia muralis</i> Naud.	Nelavarke	Melastomataceae	Herb	Leaves	Fever: Leaves are used to treat fever.
90	<i>Oxalis corniculata</i> L.	Huli soppu/ Puli thoppu	Oxalidaceae	Herb	Leaves	Cataract: The leaves are ground with butter and the resulting extract is strained through a thin cloth and applied directly into the eyes. Dysentery: Leaves are ground with cumin and consumed.
91	<i>Persicaria chinensis</i> (L.) Nakai9+9	Akki pann	Polygonaceae	Shrub	Whole plant	Lactagogue: Whole plant is infused in boiling water, add rice extract and consume it for 2-3 days along with rice, as well drink.
92	<i>Phlebodium aureum</i> (L.) J. Sm.	Itthi	Polypodiaceae	Fern	Sap/ Root	Cancer: The sap or root of this fern grown on <i>Ficus racemosa</i> tree, along with the bark of <i>Ficus religiosa</i> and <i>Ficus benghalensis</i> is used to treat cancer.
93	<i>Pholidota pallida</i> Lindl.	Rathan joth	Orchidaceae	Epiphytic Herb	Bulb	Fertility: Bulb is eaten with sugar.
94	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Kiru nellige, nela nelli	Phyllanthaceae	Herb	Leaves	Jaundice: Grind 8-10 tender leaves with <i>Centella asiatica</i> , <i>Azadirachta indica</i> , <i>Leucas aspera</i> leaves, and 1/4 liter of raw milk. Consume orally on an empty stomach for 3 days. Follow a specific diet during treatment.
95	<i>Phyllanthus emblica</i> L.	Nellige mara	Phyllanthaceae	Tree	Bark	Bloody diarrhoea: Soak bark shreds in water, mix extract with buttermilk, take one cup of the mixture thrice a day.
96	<i>Physalis minima</i> L.	Mutte pann/ Gummate pann	Solanaceae	Herb	Leaves	Contact dermatitis: Apply a mixture of these leaves and <i>Solanum nigrum</i> L. leaves on the affected area and head three times a day for up to seven days.
97	<i>Piper longum</i> L.	Hippali	Piperaceae	Vine	Fruit	Cold: The fruit is dried and powdered and eaten with ginger.
98	<i>Plumbago zeylanica</i> L.	Chithramoola	Plumbaginaceae	Shrub	Leaves	Eczema: The leaves are boiled along with oil and applied on the affected area for 5 days.

						Piles: Leaves are used in the treatment. Jaundice: Root is chewed along with banana until symptoms reduces.
99	<i>Plumeria rubra L.</i>	Kanagale	Apocynaceae	Tree	Bark / Sap	Psoriasis: The sap is rubbed on the palm and the paste obtained is applied on the affected area. OR The bark is infused in boiling coconut oil and applied.
100	<i>Polygonum plebeium R.Br.</i>	Seeranige soppu	Polygonaceae	Herb	Whole Plant	Leukorrhea: Entire plant along with roots is ground and mixed with egg yolk and consumed 2-3 times.
101	<i>Pongamia pinnata (L.) Pierre</i>	Pungi mara, Honge mara	Fabaceae	Tree	Bark	Anti-Rabies: Bark is soaked in the water and the extract is fed along with raw milk in empty stomach, early morning, once.
102	<i>Portulaca oleracea L.</i>	Dhonithoppu	Portulacaceae	Herb	Leaves	Immunity Increases: Leaves are ground along with cumin seeds, filtered and taken orally with water.
103	<i>Pterocarpus marsupium Roxb.</i>	Honne mara, Benge mara	Fabaceae	Tree	Bark	Chest pain: The sap collected from the trunk is consumed for immediate relief.
104	<i>Pterocarpus santalinus L.f.</i>	Raktha chandana	Fabaceae	Tree	Root	Muscle Swelling: Root is ground with lemon juice and applied on the affected area. Acne scar: Root is ground with Aloe vera gel and applied regularly.
105	<i>Rauvolfia serpentina (L.) Benth. ex Kurz</i>	Sarpagandha	Apocynaceae	Herb	Sap	Herpes: Sap is applied on the affected area.
106	<i>Rauvolfia tetraphylla L.</i>	Sarpagandha	Apocynaceae	Shrub	Leaves	Blood Pressure: One teaspoon of the powdered leaves is taken with water.
107	<i>Remusatia vivipara (Roxb.) Schott</i>	Mara kembu	Araceae	Epiphytic herb	Tuber	Carbuncles: Tuber is ground along with 7 grains of rice and applied on the affected area.
108	<i>Rhaphidophora pertusa (Roxb.) Schott</i>	Odibaale kande	Araceae	Climbing shrub	Stem	Fever: A mixture of the stem, <i>Caesalpinia bonduc</i> seeds, jaggery, and pepper is consumed twice a day until symptoms reduce.
109	<i>Rosa leschenaultiana (Thory) Wight & Arn.</i>	Kaad gulabi	Rosaceae	Shrub	Leaves	Psoriasis: Leaves are ground along with turmeric and applied on the affected area.
110	<i>Rotala rotundifolia (Buch.-Ham. ex Roxb.) Koehne</i>	Neer Bhrami	Lythraceae	Herb	Whole plant	Menorrhagia/PCOD: The entire plant is ground with <i>Phyllanthus amarus</i> and <i>Andrographis paniculata</i> leaves and consumed once every 4 days for 2-3 months on an empty stomach in the morning.
111	<i>Rubia cordifolia L.</i>	Araballi	Rubiaceae	Climber	Leaves, Root, Sap	Fever: Root is ground into a paste and consumed along with lemon juice for 3 days in empty stomach. Cataract: Three leaves of this is ground with one fist of <i>Capsicum annuum L.</i> leaves, filtered and 1 drop is poured into the eye and rapidly blinked. Repeat after 2 days and when required. Eye irritation: Sap is mixed with honey and gently applied into the eyes. Abortion: Root is ground and consumed with water. Snake bite: Root is ground with lemon juice and applied on the bitten area.
112	<i>Rubus fockei K.N. Gandhi</i>	Vaale pann	Rosaceae	Shrub	Root	Fever and cold: Root infusion is consumed for two days.
113	<i>Ruta graveolens L.</i>	Naagadhali	Rutaceae	Herb	Root	Scorpion bites/Snake bite: A paste made from the root, garlic, lemon and <i>Solanum anguivi</i> root is applied to the wound.
114	<i>Sansevieria trifasciata Prain</i>	Vengali	Asparagaceae	Herb	Leaves	Fits/ Dizziness: These leaves along with <i>Ocimum sanctum</i> and tender <i>Calotropis procera</i> leaves is ground and applied on the head for relief.
115	<i>Saraca indica L.</i>	Seethala Ashoka	Fabaceae	Tree	Leaves/ Root	Infertility: These along with leaves or root of <i>Withania somnifera</i> is dried and powdered together and consumed for three months.
116	<i>Sauropus androgynus (L.) Merr.</i>	Shakthi thoppu	Phyllanthaceae	Shrub	Leaves	Anaemia: Around 20 leaves are eaten every day until recovery.
117	<i>Scleropyrum pentandrum (Dennst.) D.J. Mabb.</i>	Baakotte	Santalaceae	Tree	Bark	Rabies in dog: East facing bark is made into paste and cooked with rice and fed to the dog for two times.
118	<i>Scoparia dulcis L.</i>	Kallurki, Kaad sambaara	Plantaginaceae	Herb	Leaves	Kidney Stone: Few leaves are ground and made into powder along with <i>Kalanchoe pinnata</i> leaves and consumed with raw milk for 3 days in empty stomach, early morning. Specific diet has to be maintained.

119	<i>Senna hirsuta</i> (L.) H.S.Irwin & Barneby	Komba thathe	Fabaceae	Herb	Leaves	Wasp/ Honeybee sting: These leaves are ground along with salt and turmeric tuber and applied on affected area.
120	<i>Sida acuta</i> Burm. f.	Bala (Bheemanakaddi)	Malvaceae	Herb	Leaves	Bone fracture: Leaves are ground with rice starch and tied tightly onto the affected area.
121	<i>Sida cordifolia</i> L.	Kurundhoti (Bala)	Malvaceae	Shrub	Leaves, Root	Sprains: These leaves along with <i>Drymaria cordata</i> leaves is boiled together in coconut oil and applied on the affected area until it heals. Burnt wounds: Root is mashed and boiled in oil along with <i>Mimosa pudica</i> leaves, <i>Ocimum sanctum</i> leaves, <i>Achyranthes aspera</i> L. leaves and powder of the tender peels of <i>Bambusa vulgaris</i> and applied on the affected area.
122	<i>Sida rhombifolia</i> L.	Kurundhoti	Malvaceae	Subshrub	Leaves	Carbuncles: Leaves are ground with rice starch and tied onto the affected area.
123	<i>Smilax zeylanica</i> L.	Mundrk balli	Smilacaceae	Climbing Shrub	Whole plant	Antiseptic: Whole plant is burnt and the ash is applied onto the wound.
124	<i>Smithia sensitiva</i> Aiton	Muttidare muni	Fabaceae	Herb	Whole plant	Stomach ailments: Leaves are used in the treatment.
125	<i>Solanum indicum</i> L.	Bettu sunde kaai, Cheriyakachute	Solanaceae	Shrub	Fruit	Body ache: Fruits along with garlic, cumin seeds, fenugreek and birds eye chilli is ground and boiled with water and consumed orally 2-3 times. Stomach ache: Two to three fruits are chewed and eaten directly.
126	<i>Solanum nigrum</i> L.	Kaake thoppu	Solanaceae	Herb	Leaves	Edema: Leaves are made into a paste and taken with water, 3 times a day for 2 days and applied on the face to reduce swelling.
127	<i>Sphaeranthus indicus</i> L.	Mooduganttina gida	Asteraceae	Herb	Leaves, Flowers	Body Strength: Tender Leaves and flowers of the plant along with salt, pepper is infused in boiling water and few drops of lemon juice is added and consumed orally.
128	<i>Spilanthes paniculata</i> Wall. ex DC.	Poomoggu	Asteraceae	Herb	Flowers	Increase appetite: 2-3 flowers are consumed directly.
129	<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Naai thulsi	Verbenaceae	Subshrub	Leaves	Insect stings: Leaves are ground with turmeric and applied.
130	<i>Strobilanthes alternata</i> (Burm.f.) Moylan ex J.R.I.Wood	Muriballi	Acanthaceae	Herb	Whole plant	Wound healing: Whole plant is ground and the juice obtained is applied immediately on the wound.
131	<i>Syzygium cumini</i> (L.) Skeels	Nerale mara	Myrtaceae	Tree	Fruit/Seed	Diabetes: Fruits or seeds are ground and consumed with milk or water.
132	<i>Tabernaemontana heyneana</i> Wall.	Kokke pale mara	Apocynaceae	Tree	Bark, Fruit, Latex	Snake bite: Bark is ground with lemon juice and applied on the bitten area as well orally consumed and applied on top of the head 3 to 4 times. Shouldn't drink, eat or sleep the entire day. Herpes/Dermatitis/ Psoriasis: Bark is crushed mixed with lemon juice and applied on the affected area until it heals. Thorn expellant: Affected area is opened with a needle and latex is applied into it. Whooping cough: The fruit is tied on to the neck.
133	<i>Talinum fruticosum</i> (L.) Juss.	Nela basale	Talinaceae	Herb	Leaves	Nose bleeding: Leaves are infused in water and consumed.
134	<i>Tectona grandis</i> L.f.	Thega mara	Lamiaceae	Tree	Leaves	Burnt Wounds: Shreds of leaves are boiled in coconut oil and the extract is applied once in a day on the burnt area for continuously 3 days. After a gap of two days repeat the same thing.
135	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Thandi mara	Combretaceae	Tree	Bark, Seeds	Leukoderma: Bark paste is applied on the affected area. Asthma: Seeds are dried, powdered and one spoon of it is eaten along with honey at night. Inflammation in muscles: Seed paste is applied on the affected area.
136	<i>Terminalia chebula</i> Retz.	Alalekaai	Combretaceae	Tree	Fruit	Typhoid: Fruits are dried and powdered. Mixed with water and taken orally, two times a day until symptom reduces.
137	<i>Thottea siliquosa</i> (Lam.) Ding Hou	Chakrani ber	Aristolochiaceae	Shrub	Root	Vomiting and diarrhoea: Root is ground into a paste with lemon juice and two spoons are taken 3 times a day. (The upper part of the root is used to treat vomiting and the lower part for diarrhoea)
138	<i>Tinospora cordifolia</i> (Willd.) Miers	Amruthaballi	Menispermaceae	Climber	Leaves	Eczema: Leaves are ground along with turmeric, <i>Lawsonia inermis</i> L. leaves and

						sesame oil and applied on the affected area until it heals.
139	<i>Toddalia asiatica</i> (L.) Lam.	Kaad Chorange	Rutaceae	Shrub	Whole Plant	Lactagogue/ Libido: Whole plant is ground along with raw milk and consumed in empty stomach, early in the morning.
140	<i>Tradescantia zebrina</i> (Schinz) D. R. Hunt	Muriballi	Commelinaceae	Herb	Whole plant	Wound healing: Whole plant is ground and the juice obtained is applied immediately on the wound.
141	<i>Tylophora indica</i> (Burm. f.) Merrill	Aadu muttada balli	Asclepiadaceae	Climber	Leaves	Asthma: A leaf is dried on a pan, mix it with one spoon of honey and taken orally for 5 days.
142	<i>Urena lobata</i> L. ssp. <i>sinuata</i> (L.) Borssum.	Kaad gida	Malvaceae	Herb	Leaves	Sprain: Leaves are crushed with hands, mixed with castor oil, applied on the affected area and rub it.
143	<i>Vitex negundo</i> L.	Lokke thoppu	Lamiaceae	Tree	Leaves	Mosquito repellent: Leaves are dried for two days and burnt when required.
144	<i>Wattakaka volubilis</i> (L. fil.) Stapf.	Paimott Balli	Apocynaceae	Liana	Leaves	Paronychia: Leaves are ground along with lemon juice and tied onto the affected finger.
145	<i>Ziziphus rugosa</i> Lam.	Kotte pann mara	Rhamnaceae	Shrub	Bark	Mouth Ulcer: Bark is ground with butter and applied on the affected area until it heals.

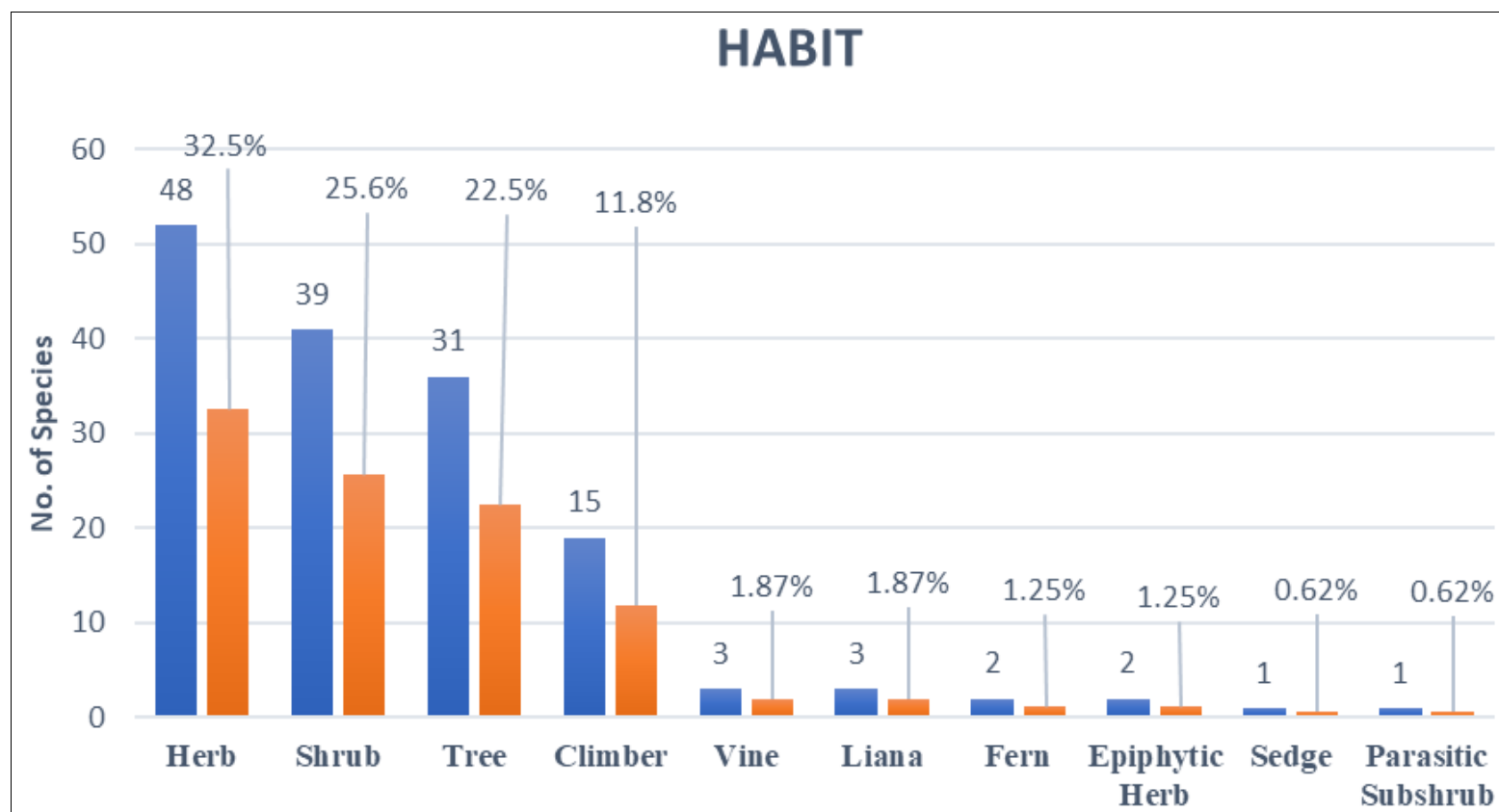


Fig 2: Medicinal plant habit with percentage.

ts used and the mode of usage

The traditional healers in the study area typically use fresh parts of medicinal plants for preparing ethnomedicines, with leaves (45%) being the most used part followed by roots and barks (13% each) (Figure 3). Ethnomedicines are usually taken orally, followed by dermal application. The respondents reported using six different preparation methods for remedies, with paste (34%) being the most commonly used followed by infusion (19%) and juice (17%) (Figure 4). There is no standardized dose for most of the ethnomedicines in the study area, and the dose varies depending on the traditional healer who prepares the herbs or the severity of the disease. Single-plant preparation is the most common method, while some remedies are prepared by combining parts of more than one plant.

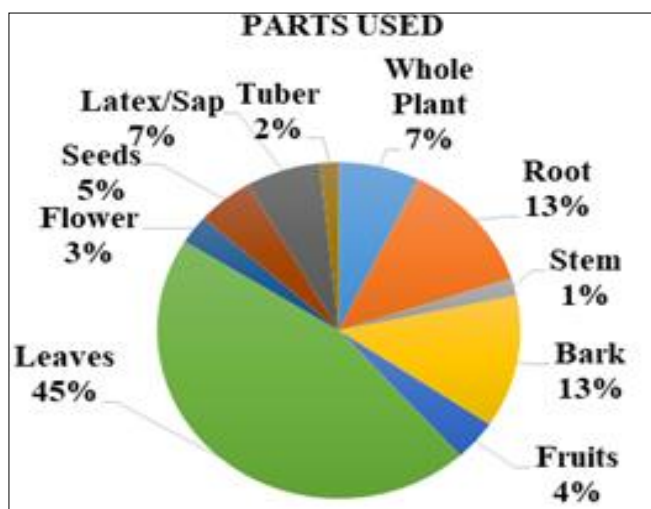


Fig 3: Percentage of parts used in medicinal plants

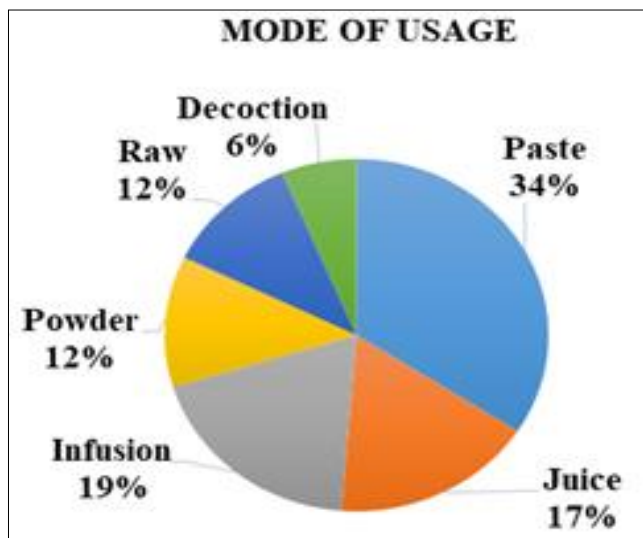


Fig 4: Percentage of usage mode in medicinal plants.

Demographic profile of the respondents

Out of 51 people who were interviewed, 33 (64.7%) were male and 18 (35.29%) were female. The highest number of respondents was above 40 years old (as shown in Table 2). More than half of the respondents (52.94%) were unable to read and write, while a majority of those who had received some education had only completed primary schooling (19.6%). This suggests that there is a lack of exposure to modern education. Most of the females (50%) and males (51.5%) were engaged in manual labour, with 36.3% of men being farmers (as shown in Table 2). These preliminary findings indicate that traditional knowledge is well-established, but it appears to be diminishing among younger generations.

Table 2: Demographic profile of the respondents.

		Total	Percentage (%)	
Gender	Male	33	64.7	
	Female	18	35.29	
Age groups	21-29	2	3.92	
	30-39	8	15.68	
	40-49	13	25.49	
	50-59	11	21.56	
	60-69	9	17.64	
	70-79	5	9.80	
	80-89	3	5.88	
Education	Illiterate	27	52.94	
	Primary	10	19.60	
	Middle	5	9.80	
	Secondary	6	11.76	
	University	3	5.88	
Occupation	Female	Housewives	5	27.77
		Labourers	9	50
		Others	4	22.22
	Male	Farmers	12	36.36
		Labourers	17	51.51
		Shop keepers	2	6.06
		Primary teachers	2	6.06

Informant consensus factor

The level of agreement among respondents in the study area regarding the use of a particular plant species to treat specific ailments was determined by calculating the Informant Consensus Factor (F_{ic}) value. The study identified

16 categories of diseases in the region, and the range of F_{ic} values varied between 0.75 to 0.4. The ailments with the highest F_{ic} values were kidney problems (0.75), gastrointestinal disorders (0.74), liver disorders (0.69), and wound healing (0.66), as shown in Table 3.

Table 3: Informant consensus factor (F_{ic}) for different ailment categories.

Sl. No.	Use categories	Number of taxa (N_t)	Number of use reports (N_{ur})	Informant Consensus factor (F_{ic})
1.	Gastrointestinal disorders	11	40	0.74
2.	Respiratory disorders	17	35	0.52
3.	Antipyretic	13	31	0.6
4.	Dermatologic disorders	21	42	0.51
5.	Anti-poison	17	28	0.40
6.	Wound Healing	12	34	0.66
7.	Liver disorder	5	14	0.69
8.	Kidney problem	5	17	0.75
9.	Reproductive system disorder	14	29	0.53
10.	Ear, Nose & Tongue	3	5	0.5
11.	Diabetes	6	14	0.61
12.	Genito-urinary disorder	5	10	0.55
13.	Skeleton Muscular system disorder	16	27	0.42
14.	Immunity booster	6	11	0.5
15.	Eye disorders	4	7	0.5
16.	Antiepileptic	3	6	0.6

Discussion

This research presents data on 145 medicinal plants that are utilized by traditional healers in the study area. The findings indicate that the local population has a long history of utilizing plant resources to treat various health conditions. The people in the region possess knowledge about the medicinal properties of different plants and have learned to prepare remedies through personal experience and inherited wisdom passed down from their ancestors.

The dominance of plant families like Fabaceae, Apocynaceae, and Malvaceae in traditional medicine practices could be attributed to their wider distribution and abundance in the flora of the region [Amjad *et al.* 2017] ^[2]. According to the research, while leaves and fruits are frequently used in conventional treatments, using them for medical purposes may not have a substantial adverse effect on the medicinal plant species in the area. However, conservationists have noted that plant species valued for their root parts or heavily harvested for their bark are at a higher risk of overexploitation [Murad *et al.* 2011] ^[15]. In addition, the leaves of plants are commonly used in herbal medicines because they are the primary site of photosynthesis and contain numerous metabolites. Leaves are also easy to collect and are produced in large quantities, making them a practical choice for medicine preparation [Jan *et al.* 2022] ^[14]. The study also revealed that the local population often prefers freshly harvested plant parts in traditional remedies as they believe they contain more active ingredients and are more effective. This recurrent use of freshly harvested medicinal plant materials could potentially put pressure on certain plant species in the region [Flatie *et al.* 2009, Tickin 2004] ^[10, 20].

According to the present study, herbs are the primary type of plant used in the region for treating human ailments, followed by shrubs and trees. This high usage of herbs may be due to their abundance, widespread availability, and traditional knowledge of the healers passed down for many generations. Additionally, using more herbaceous plants may be advantageous, as they are easier to cultivate when in short supply [Jan *et al.* 2022] ^[14].

The traditional healers in the region primarily use medicinal plant paste to treat various ailments and similar results have been documented in other study areas [Srithi *et al.* 2009, Ayyanar *et al.* 2011] ^[4, 18]. This practice may be due to the effectiveness of these decoctions, which has been observed

through many years of trial and error, as well as the accumulation of indigenous knowledge on the efficacy of these remedies. The results support previous research showing that the oral route is the most preferred method of administration [Bekalo *et al.* 2009] ^[5].

According to the study, the highest F_{ic} values were recorded for medicinal plants used to treat kidney problems, gastrointestinal disorders, liver disorders, and wound healing, which could be because these ailments are more prevalent in the study areas. The lowest F_{ic} value was recorded for anti-poison plants, which are used to treat rare ailments. However, all other diseases had F_{ic} values above 0.5, suggesting that the survey focused on medicinal plants commonly used to treat common human ailments in the study areas. Research shows that high F_{ic} value medicinal plants contain various bioactive compounds, many of which have been scientifically proven through various studies [Cheikhoussef *et al.* 2011] ^[8].

Conclusion

The study has revealed that the Western Ghats region of Kodagu has an array of medicinal plants commonly used to promote human health. The ethnomedicinal knowledge of the area is at stake due to a lack of interest and the dissemination of knowledge among the people. The promotion of awareness programs and conservation measures among the local community is the need of the hour. This offers scope for future bioprospection and scientific validation of indigenous knowledge.

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References

1. Amjad MS, Arshad M, Qureshi R, Khan MAU. Ethnobotanical inventory and folk uses of indigenous plants from Pir Nasoor National Park, Azad Jammu and Kashmir. Asian Pacific Journal of Tropical Biomedicine, 2013;3(7):530-539.

2. Amjad MS, Qaem MF, Ahmad I, Khan SU, Chaudhari SK, Zahid Malik N, *et al.* Descriptive study of plant resources in the context of the ethnomedicinal relevance of indigenous flora: A case study from Toli Peer National Park, Azad Jammu and Kashmir, Pakistan. *PloS one*,2017:12(2):e0171896.
3. Ashitha Ganesh B, Devi Prasad AG. Diversity of ethnomedicinal plants and their therapeutic uses in Western Ghats region of Kodagu district, Karnataka, India. *Environmental Sciences*,2021:9(2):209-224.
4. Ayyanar M, Ignacimuthu S. Ethnobotanical survey of medicinal plants commonly used by Kani tribals in Tirunelveli hills of Western Ghats, India. *Journal of ethnopharmacology*,2011:134(3):851-864.
5. Bekalo TH, Woodmatas SD, Woldemariam ZA. An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, southern nations, nationalities and peoples regional state, Ethiopia. *Journal of Ethnobiology and Ethnomedicine*,2009:5:1-15.
6. Bhat JA, Kumar M, Bussmann RW. Ecological status and traditional knowledge of medicinal plants in Kedarnath Wildlife Sanctuary of Garhwal Himalaya, India. *Journal of Ethnobiology and Ethnomedicine*,2011:7(1):32.
7. Calixto JB. Efficacy, safety, quality control, marketing and regulatory guidelines for herbal medicines (phytotherapeutic agents). *Brazilian Journal of Medical and Biological Research*,2000:33(2):179-189.
8. Cheikhoussef A, Shapi M, Matengu K and Mu Ashekele H. Ethnobotanical study of indigenous knowledge on medicinal plant use by traditional healers in Oshikoto region, Namibia. *Journal of ethnobiology and ethnomedicine*,2011:7:1-11.
9. Cunningham AB. *Applied ethnobotany: people, wild plant use and conservation.* Routledge, 2014.
10. Flatie T, Gedif T, Asres K, Gebre-Mariam T. Ethnomedical survey of Berta ethnic group Assosa Zone, Benishangul-Gumuz regional state, mid-west Ethiopia. *Journal of Ethnobiology and Ethnomedicine*,2009:5(1):1-11.
11. Giday M, Asfaw Z, Woldu Z, Teklehaymanot T. Medicinal plant knowledge of the Bench ethnic group of Ethiopia: an ethnobotanical investigation. *Journal of Ethnobiology and Ethnomedicine*,2010:6(1):34.
12. Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. Medicinal plants in Mexico: Healers' consensus and cultural importance. *Social Science and Medicine*,1998:47(11):1859-1871.
13. Heinrich M. Ethnopharmacy and natural product research--multidisciplinary opportunities for research in the metabolomics age. *Phytochemistry Reviews*,2016:15(2):187-198.
14. Jan HA, Abidin SZU, Bhatti MZ, Ahmad L, Alghamdi AK, Alkreathy HM. Medicinal Plants and Related Ethnomedicinal Knowledge in the Communities of Khadukhel Tehsil, Buner District, Pakistan. *Sustainability*,2022:14(20):13077.
15. Murad W, Ahmad A, Gilani SA, Khan MA. Indigenous knowledge and folk use of medicinal plants by the tribal communities of Hazar Nao Forest, Malakand District, North Pakistan. *Journal of Medicinal Plants Research*,2011:5(7):1072-1086.
16. Mussarat S, Abd El-Salam NM, Tariq A, Wazir SM, Ullah R, Adnan M. Use of ethnomedicinal plants by the people living around Indus River. *Evidence-Based Complementary and Alternative Medicine*, 2014.
17. Pieroni A. Local plant resources in the ethnobotany of Theth, a village in the Northern Albanian Alps. *Genetic Resources and Crop Evolution*,2008:55(8):1197-1214.
18. Srithi K, Balslev H, Wangpakapattanawong P, Srisanga P, Trisonthi C. Medicinal plant knowledge and its erosion among the Mien (Yao) in northern Thailand. *Journal of ethnopharmacology*,2009:123(2):335-342.
19. Tariq A, Mussarat S, Adnan M, Abd_Allah EF, Hashem A, Alqarawi AA, *et al.* Ethnomedicinal evaluation of medicinal plants used against gastrointestinal complaints. *BioMed research international*, 2015.
20. Ticktin T. The ecological implications of harvesting non-timber forest products. *Journal of Applied Ecology*,2004:41(1):11-21.