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RESEARCH ARTICLE

ETHNOBOTANICAL KNOWLEDGE OF IRULA TRIBAL COMMUNITY OF WALAYAR VALLEY, SOUTHERN WESTERN GHATS, INDIA

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ABSTRACT

The medicinal plants have played important role in treating and preventing a variety of diseases throughout the world. India is one of the most medico-culturally diverse countries in the world where the medicinal plant sector is part of a time honoured tradition that is respected even today. Irula tribal community of Walayar valley, the Western Ghats, Tamil Nadu is still using mainly for their health care. However, no data were published in this line. Therefore, the present study was carried out to know the medicinal plants and the ailments for which they were being prescribed among the Irula tribal communities in Walayar valley. The ethnobotanical information was collected through interviews among local traditional healers in the study area. A total number of 146 species of plants distributed in 122 genera belonging to 58 families were identified as commonly used ethnomedicinal plants in the study. Interestingly, 26 new claims were also made in the present study. Fabaceae family was the dominant one contributed 15 species for medicinal uses. Among the life-forms, herbs were used largely (40.41% of species) for medicinal uses than the other life-forms. Decoction was the most common method of medicine preparation (63%) among Irulas of Walayar valley. A high number of 134 species were used for medicine preparation by multiple modes. Therefore, it is suggested to take-up pharmacological and phytochemical studies to evaluate the species to confirm the traditional knowledge of Irulas on medicinal plants.

INTRODUCTION

The relationship between plants and human cultures is not limited to the use of plants for food, clothing and shelter but also includes their use for religious ceremonies, ornamentation and health care (Schultes, 1992). Man depends on plants in order to meet his requirements for survival since time immemorial (Phillips and Meilleur, 1998). Globally, about 85% of the traditional medicines used for primary health care are derived from plants (Farnsworth, 1988). Humans have developed knowledge of using available plants to treat a number of ailments through different medical systems such as Siddha, Ayurveda and Unani. The tribal and rural people of various parts of India are highly depending on medicinal plant therapy for meeting their health care needs (Shanmugam *et al.*, 2012; Venkatachalapathi *et al.*, 2015). India, as a megabiodiversity nation endowed huge number of over 18763 species of angiosperms of which nearly 8000 are prescribed by the local healers and tribals for various ailments (Jain, 1991). However, documentation of medicinal flora is not yet completed. In addition to large number of local healers, 427 tribal communities available in India (Kala, 2005) are considered to be one of the most reliable sources of information on medicinal plants.

These different ethnic groups settled throughout the nation have their own way of life style even in using the plant resources. The Irula tribal community settled in Walayar valley of southern Western Ghats, Coimbatore district, Tamil Nadu, India are small in population (ca.350) using local plants only for their health care. Their traditional knowledge on medicinal plants is not at all brought out so far. Therefore, the present study was aimed to document the plant species being used by them through frequent interrogation with them.

MATERIALS AND METHODS

Study area

The study area, Walayar valley spreads over an area of ca.256 Km² lying between 10°50'18" and 10°50'21"N and 76°51'20" and 76°51'22"E (Fig. 1). Temperature in the year is ranging between 28 (January) and 38°C (April). The mean annual rainfall for the past 15 years is 1614mm. The soil is sandy loam with the acidic pH of 6.5. Moist evergreen forest is the predominant vegetation type in this area. The Irula tribals altogether with the population of ca.350 have been sheltering in 5 hamlets situated inside the forest. Apart from minor forest produce collection, they have engaged as agricultural labours and casual labours in forest department activities.

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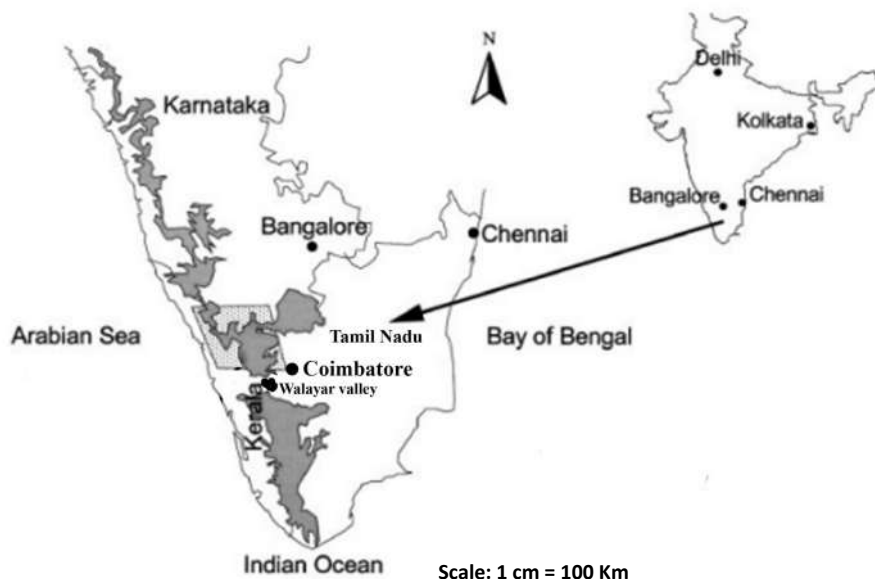


Fig. 1. Location of study area, the Walayar valley

DEPARTMENT OF BOTANY
Kongunadu Arts and Science College, Coimbatore - 641 029.
FIELD DATA SHEET
Field No. 3

1. Voucher No.	:	63
2. Date	:	19/09/2014
3. Altitude	:	400 m above msl
4. Latitude	:	12° 15' N
5. Study area	:	Walayar Valley
6. Type of Forest	:	Shrub - scrubland
7. Locality	:	Walayar Valley
8. District	:	Coimbatore
9. State	:	Tamil Nadu
10. Soil	:	Sandy loam
11. Species	:	<i>Cucurbita pepo</i>
12. Family	:	Hydrocotylaceae
13. Habit	:	Herb
14. Vernacular name	:	M-lapapari
15. Language	:	Tamil/Telugu
16. Phenophase	:	Flowering
17. Taxonomic description	:	Small herb, leaves lanceolate, Petiole yellow, 1.5cm above base 3 cm, stem 6, axis 3 angled, fruit bicarinate
18. Uses	:	Herb. Proven and joint pain.
19. Collector	:	Dr. S. Paulings
20. Tribal/local healers	:	Telugu.

Fig. 2. Field data sheet for collection of ethnobotanical information from Irula tribals of Walayar valley

For primary health care, the healers in all hamlets have been generally prescribing the specific plants.

Data collection

The field survey was conducted in all the five Irula tribal habitations of Walayar valley for 10 months from March, 2014 to December, 2015. For the interview, 20 herbalist healers were approached with questionnaire items which include healer’s age, their experience as healers and medicinal plants used for various ailments.

The vernacular names in Tamil for the medicinal plants used by the healers and households were recorded. For documenting the ethnobotanical information, field data sheet has been prepared and used (Fig. 2). All the plants collected were deposited as herbarium in the Botany Department of Kongunadu Arts and Science College, Coimbatore. For all the specimens, the voucher numbers were given and they were botanically identified with the help of ‘The Flora of the Presidency of Madras’ (Gamble, 1935) and ‘Flora of Tamil Nadu Carnatic’ (Matthew, 1991).

Table 1. Irulas ailments grouped by illness category (Cook, 1995)

S. No.	Ailment categories	Biomedical terms	Tamil terms
1.	Circulatory system/ cardiovascular diseases (CSCD)	Blood purification Blood secretion Anemia Increase WBC Memory power Heart problem	Rattha sutthigarippu Rattha surapu Rattha cokai Vellaianu urpathi Gnabaga sakthi Idhaya noi
2.	Cooling agent (CA)	Body coolant	Udal kulircchi
3.	Dental care (DC)	Toothache	Pal vali
4.	Dermatological infections/diseases (DID)	Cuts Wound healing Skin diseases Anti-inflammatory Antioxidant Eczema Pimples Scabies Ringworm infection Itching	Vettukkayam Kaayam Thol noi Alargi etirppu Puthunachi Thol alargi Mugapparu Sori/sirangu Padarthamarai Arippu/poocchikadi
5.	Ear, nose, throat problems (ENT)	Eye pain Ear pain Mouth ulcer	Kan vali Kathu vali Vaai pun
6.	Endocrinal disorders (ED)	Diabetes Kidney stone Urinary problem	Sarkkarai/ neerilivu noi Siruneeraga kal Siruneeraga noi
7.	Fever (Fvr)	Fever	Kaichal
8.	Gastro-intestinal ailments (GIA)	Ulcer Stomachache Carminative Gastric complaints Digestion/indigestion Inducing appetite Dysentery Diarrhea	Vayitru pun Vayitru vali Iraippai kutal vali Vayvu kolaru Geeranam/ageeranam Paciyai thunduthal Seedhabaethi Vayitru pokku
9.	General health (GH)	Piles Tonic Increase weight Bathing Cracked feet	Mula noi Sathu marunthu Udal edai kutta Kulika Patha vedipu
10.	Genito-urinary ailments (GUA)	Delivery pain Menstrual problem Abortion Male fertility Venereal diseases Sterility in women	Pirasava vali Matavitay thontharavugal Karu kalaipu Anmai sakthi perukkuthal Paalvinai noi Pengal malatuthanmai
11.	Hair care (HC)	Dandruff Hair tonic	Podugu Mudi valara
12.	Liver problem (LP)	Jaundice	Manajal kaamalai
13.	Poisonous bite (PB)	Snake bite Dog bite Poisonous bite Scorpion bite	Pambukkadi Naikkadi Vishakkadi Thaelkkadi
14.	Respiratory system diseases (RSD)	Asthma Wheezing Chest pain Cold Cough	Moochu thinaral Moochu kulai noi Nenju vali Jalathosam Irumal
15.	Skeleto-muscular system disorders (SMSD)	Rheumatism Body pain Arthritis Joint pain Tumor Bone fracture Swelling/Inflammation Headache/One side headache Paralysis	Moottu vadham Udal vali Kilvatam Moottu vali Putru noi Elumpu murivu Veekam Thalai vali Pakavatam
16.	*Insecticidal (IC)	Nervous problem Mosquito repellent	Narambu pathipu Kosuvathi

*Not indicated by Cook; however as Irulas are using certain plants to avoid mosquito biting very commonly, it is included in the present study.

Table 2. List of medicinal plants used by the Irula tribal community in Walayar valley of Coimbatore district, Southern Western Ghats, India

S. No.	Botanical name and family	Local name	Use value	Parts used	Ailment category: number of use reports (ailments treated)	Preparation	Application
1	Trees <i>Acacia catechu</i> Willd. (Mimosaceae)	Karungali	0.60	Stem	GIA-1 (ulcer) RSD-1 (chest pain) SMSD-1 (swelling)	Decoction Decoction Decoction	Oral Oral Oral
2	* <i>A. leucophloea</i> (Roxb.) Willd. (Mimosaceae)	Vellvale maram	1.40	Bark	DID-4 (wound healing) GIA -3 (stomach problem)	Raw Decoction	Topical Oral
3	<i>A. nilotica</i> (L.) Willd. (Mimosaceae)	Karuvale maram	0.20	Stem and bark	DC-1 (toothache)	Past	Toothpaste
4	<i>Aegle marmelos</i> (L.) Corr. (Rutaceae)	Vilvam	0.60	Leaf and fruit	ED-1 (diabetes) Fvr-1 (fever) DID-1 (antiinflammatory)	Raw Decoction Decoction	Oral Oral
5	<i>Ailanthus excelsa</i> Roxb. (Simaroubaceae)	Perumaram	0.20	Leaf	GUA-1 (menstrual problem)	Decoction	Oral
6	<i>Alangium salvifolium</i> (L.f.) Wangerin. (Alangiaceae)	Alangi	0.80	Leaf and stem	GIA-2 (stomach ache) RSD-2 (chest pain)	Raw Decoction	Oral Oral
7	* <i>Albizia amara</i> ROXB. (Fabaceae)	Arappu	1.20	Leaf	HC-6 (dandruff)	Raw	Oral
8	<i>A. lebbeck</i> (L.) Benth. (Fabaceae)	Vagai	0.20	Leaf	DID-1 (eczema)	Raw	Oral
9	* <i>Alstonia venenata</i> R. Br. (Apocynaceae)	Sinnappalai	0.20	Latex	DID-1 (wound)	Raw	Oral
10	* <i>Artocarpus heterophyllus</i> Lam. (Rutaceae)	Pala	0.60	Leaf and fruit	SMSD-1 (arthritis) DID-2 (antioxidant and skin diseases)	Decoction Raw	Oral Ora
11	<i>Azadirachta indica</i> A. Juss. (Meliaceae)	Vembu	0.60	Whole plant	PB-1 (snake bite) CSCD-1 (blood purification) SMSD-1 (rheumatism)	Raw Decoction Decoction	Oral Oral Oral
12	<i>Canarium strictum</i> Roxb. (Burseraceae)	Sambirani chedi	0.20	Leaf and Bark	IC-1 (mosquito repellent)	Powder	Topical
13	<i>Canthium diococum</i> (Gaertn.) Merr. (Rubiaceae)	Payira maram	0.40	Leaf	PB-1 (dog bite) GIA-1 (stomach ache)	Decoction Decoction	Oral Oral
14	* <i>Carissa spinarum</i> Linn. (Apocynaceae)	Chrukila	0.40	Fruit and latex	ENT-1 (mouth ulcer) DID-1 (antioxidant)	Decoction Raw	Oral Oral
15	<i>Cassia fistula</i> Linn. (Caesalpiniaceae)	Kakke maram	1.00	Stem and flower	Fvr-2 (fever) GIA-2 (stomach pain) DID-1 (antiinflammatory)	Decoction Decoction Decoction	Oral Oral Oral
16	<i>Cinnamomum camphora</i> (L.) Nees & Eberm. (Lauraceae)	Pachkarpooram	0.20	Stem	ENT-1 (ear ache)	Decoction	Oral
17	* <i>Commiphora caudata</i> Wight & Arn. (Burseraceae)	Kiluvai	0.80	Leaf	Fvr-4 (fever)	Decoction	Oral
18	* <i>Dalbergia sissoo</i> Roxb. ex DC. (Fabaceae)	Ette	0.20	Stem	DID-1 (skin diseases)	Past	Topical
19	<i>Dodonaea angustifolia</i> (L.f.) Benth. (Sapindaceae)	Baraley	0.40	Leaf and bark	SMSD-2 (Bone fracture and head ache)	Past	Topical
20	<i>Erythrina variegata</i> (L.) Merr. (Fabaceae)	Mullumurungai	0.40	Leaf	RSD-2 (cold and cough)	Decoction	Oral
21	<i>Ficus racemosa</i> Roxb. (Fabaceae)	Athi	0.60	leaf, bark and fruit	CSCD-1 (blood secretion) GUA-1 (leucorrhoea) SMSD-1 (arthritis)	Raw Decoction Decoction	Oral Oral Oral
22	* <i>Limonia acidissima</i> L. (Rutaceae)	Vilampalam	0.60	Fruit	GUA-1 (leucorrhoea) DID-1 (antioxidant) SMSD-1 (arthritis)	Raw Decoction Decoction	Oral Oral Oral
23	<i>Mangifera indica</i> L. (Anacardiaceae)	Mavin mara	0.80	Leaf, bark and fruit	DID-2 (Wound healing and antioxidant) GIA-1 (menstrual problem) SMSD-1 (swelling)	Raw Decoction Decoction	Oral Oral Oral
24	* <i>Melia azedarach</i> L. (Maliaceae)	Malaivembu	0.60	Bark	GIA-3 (stomach ache)	Decoction	Oral
25	* <i>M. dubia</i> L. (Maliaceae)	Malaivembu	0.60	Leaf and Bark	IC-1 (mosquito repellent) ED-1 (diabetes) GIA-1 (stomach ache)	Powder Decoction Decoction	Topical Oral Oral
26	* <i>Mesua ferrea</i> L. (Calophyllaceae)	Churuli	0.20	Flower	GIA-1 (stomach ache)	Decoction	Oral
27	<i>Moringa oleifera</i> L. (Moringaceae)	Murungai	0.40	Leaf, flower and fruit	GUA-2 (male fertility)	Decoction	Oral
28	<i>Phyllanthus emblica</i> L. (Euphorbiaceae)	Nelli	0.60	Fruit	CSCD-1 (blood purification) DID-1 (antioxidant) HC-1 (hair tonic)	Raw Decoction Decoction	Oral Oral Oral
29	<i>Pongamia pinnata</i> L. (Fabaceae)	Pungam	0.40	Seed	SMSD-2 (rheumatism)	Decoction	Oral
30	<i>Sapindus emarginatus</i> Vahl. (Sapindaceae)	Pucha	0.60	Stem and fruit	SMSD-1 (head ache) GH-2 (piles and bathing)	Decoction Decoction	Oral Oral

Countinue.....

31	<i>Syzygium aromaticum</i> (L.) Merrill & Perry. (Myrtaceae)	Kiraampu	0.60	Fruit	DC-3 (toothache)	Past	Toothpaste
32	<i>S. cuminii</i> L. (Myrtaceae)	Naval	1.40	Leaf, bark, fruit and seed	ED-4 (diabetes) DID-2 (antioxidant) GIA-1 (dysentery)	Raw Raw	Oral Oral
33	<i>Tamarindus indica</i> L. (Fabaceae)	Puli	0.40	Seed	PB-1 (scorpion bite) DID-1 (antioxidant)	Decoction Decoction	Oral Oral
34	<i>Terminalia arjuna</i> (Roxb.) W. & A. (Combritaceae)	Marutu	0.20	Bark	RSD-1 (chest pain)	Raw	Oral
35	<i>T. bellerica</i> Roxb. (Combritaceae)	Thanikai	0.20	Bark	RSD-1 (chest pain)	Decoction	Oral
36	<i>T. chebula</i> Retz. (Combritaceae)	Kadukkai	0.20	Fruit	GIA-1 (stomach pain)	Decoction	Oral
37	<i>Wrightia tinctoria</i> R. Br. (Apocynaceae)	Palai	0.20	Leaf	DC-1 (toothache)	Past	Toothpaste
38	<i>Ziziphus mauritiana</i> L. (Ramnaceae)	Elanthai	0.60	Leaf	DID-3 (wound)	Past	Topical
39	<i>Z. enophylla</i> L. (Ramnaceae)	Malai elanthai	0.60	Leaf	DID-3 (wound)	Past	Topical
40	Shrubs		0.60	Latex	GIA-1 (ulcer)	Decoction	Oral
	<i>Argemone mexicana</i> L. (Papaveraceae)	Kutiyotti			DID-2 (pimples and wound healing)	Raw	Oral
41	<i>Atalantia monophylla</i> L. (Rutaceae)	Kattuelumichai	1.00	Fruit	SMSD-4 (body pain) DID-1 (antioxidant)	Decoction	Oral
						Raw	Oral
42	<i>Begonia malabarica</i> L. (Begoniaceae)	Rattha choori	0.80	Whole plant	SMSD-4 (arthritis and joint pain)	Raw and Decoction	Oral
43	<i>Calotropis procera</i> (Aiton) W.T.Aiton. (Asclepiadaceae)	Vella Erukku	0.20	Latex	DID-1 (wound)	Raw	Oral
44	<i>Cassia auriculata</i> L. (Fabaceae)	Aavaarampoo	1.20	Flower	ED-6 (diabetes)	Raw and Decoction	Oral
45	<i>Citrus limon</i> (L.) Burm. f. (Rutaceae)	Elumichi	0.20	Fruit	GIA-1 (dysentery)	Raw and Decoction	Oral
46	<i>Clerodendrum inerme</i> (L.) Gaertn. (Lamiaceae)	Sangam	0.20	Leaf	DID-1 (skin diseases)	Decoction	Oral
47	<i>Helicteres isora</i> L. (Sterculiaceae)	Valampuri edampuri	0.20	Fruit	ENT-1 (ear ache)	Decoction	Oral
48	<i>Jatropha gossypifolia</i> L. (Euphorbiaceae)	Adalai	0.60	Latex	ENT-3 (mouth ulcer)	Decoction	Oral
49	<i>Justicia adhatoda</i> L. (Acanthaceae)	Adatodai	1.20	Leaf	Fvr-6 (fever)	Decoction	Oral
50	<i>J. gendarussa</i> L. (Acanthaceae)	Vadaikkutti	0.20	Leaf	SMSD-1 (body pain)	Decoction	Oral
51	* <i>Lantana camara</i> L. (Verbenaceae)	Unnichi	0.40	Leaf	DID-2 (wound healing and antiinflammatory)	Past / Decoction	Topical /Oral
52	<i>L. wightii</i> L. (Verbenaceae)	Unnichi	0.60	Leaf	DID-3 (wound healing)	Past	Topical
53	<i>Manihot esculenta</i> L. (Euphorbiaceae)	Maravalli	0.20	Rhizome	DID-1 (wound healing)	Past	Topical
54	* <i>Pavetta indica</i> L. (Rubiaceae)	Vellaippavattai	0.80	Leaf	PB-4 (snake bite)	Decoction	Oral
55	<i>Rauvolfia serpentina</i> (L.) Benth. (Apocynaceae)	Amalpori	0.80	Leaf	PB-4 (snake bite)	Decoction	Oral
56	<i>R. tritaphylla</i> L. (Apocynaceae)	Pampukaalaach hedhi	0.60	Leaf	PB-3 (snake bite)	Decoction	Oral
57	* <i>Solanum surattense</i> L. (Solanaceae)	Kandankathiri	1.20	Whole plant	RSD-6 (cold and wheezing)	Decoction	Oral
58	<i>Vitex negundo</i> L. (Verbenaceae)	Notchi	1.40	Leaf	SMSD-7 (headache and body pain)	Decoction	Oral
59	Herbs		0.80	Whole plant	GH-4 (piles)	Decoction	Oral
	<i>Abutilon indicum</i> L. (Malvaceae)	Thuththi					
60	<i>Acalypha indica</i> L. (Euphorbiaceae)	Kuppaimeni	0.20	Leaf	LP-1 (jaundice)	Decoction	Oral

Continue.....

61	<i>Achyranthes aspera</i> L. (Amaranthaceae)	Nayuruvi	0.40	Whole plant	PB-2 (dog bite and poisonous bite)	Decoction	Oral
62	<i>Aloe vera</i> L. (Liliaceae)	Sotru katrallai	0.80	Whole plant	GUA-4 (menstrual problem)	Raw and Decoction	Oral
63	<i>Amorphophallus paeniifolius</i> (Dennst.) Nicolson. (Araceae)	Kattukarunai	1.00	Rhizome	GH-2 (tonic) GIA-1 (carminative) GUA-1 (menstrual problem) DID- 1 (antiinflammatory)	Raw Decoction Decoction	Oral Oral Oral
64	<i>Acalypha fruticosa</i> L. (Euphorbiaceae)	Punairananki	0.20	Leaf	DID-1 (skin disease)	Decoction Past	Oral Topical
65	<i>Acorus calamus</i> L. (Acoraceae)	Vasambu	1.80	Rhizome	RSD-5 (cough)	Decoction	Oral
66	* <i>Aerva lanata</i> L. (Amaranthaceae)	Poolai poo	1.20	Leaf	ED-6 (kidney stone)	Raw	Oral
67	<i>Alpinia galanga</i> L. (Zingiberaceae)	Perratthei	0.40	Rhizome	SMSD-1 (rheumatism) GIA-1 (ulcer)	Decoction Decoction	Oral Oral
68	<i>Andrographis paniculata</i> L. (Acanthaceae)	Neelavembu	0.80	Whole plant	PB-4 (snake bite)	Decoction	Oral
69	* <i>Anisomeles malabarica</i> (L.) R.BR. (Lamiaceae)	Peymiratti	0.20	Leaf	DID-1 (eczema)	Past	Topical
70	<i>Asystasia gangetica</i> L. (Acanthaceae)	Mitikirai	0.40	Leaf	SMSD-1 (rheumatism) ED-1 (diabetic)	Decoction Raw	Oral Oral
71	<i>Centella asiatica</i> L. (Apiaceae)	Vallarai	0.60	Whole plant	CSCD-1 (memory power) GIA-2 (gas trouble and stomach ache)	Raw Raw	Oral Oral
72	<i>Chromolaena odorata</i> L. (Astraceae)	Kamyunist Alai	0.20	Leaf	DID-1 (wound healing)	Decoction Past	Oral Topical
73	<i>Cleome aspera</i> L. (Cleomaceae)	Karumpoandu	0.20	Leaf	DID-1 (eczema)	Past	Topical
74	<i>C. monophylla</i> L. (Cleomaceae)	Ellukku sakkalathi	0.40	Leaf	Fvr-1 (fever) SMSD-1 (inflammation)	Decoction Decoction	Oral Oral
75	* <i>C. viscosa</i> L. (Cleomaceae)	Naikadugu	0.80	Leaf	ENT-4 (ear ache)	Decoction	Oral
76	<i>Coleus aromaticus</i> Benth. (Lamiaceae)	Karpooravalli	0.40	Leaf	RSD-2 (cough and cold)	Raw and Decoction	Oral
77	<i>Commelina benghalensis</i> L. (Comllinaceae)	Kancatam	0.20	Whole plant	DID-1 (wound healing)	Past	Topical
78	<i>Curcuma aromatica</i> Salisb. (Zingiberaceae)	Manjal	1.00	Rhizome	SMSD-1 (tumour) DID-4 (wound healing and antiinflammatory)	Raw Decoction	Oral Oral
79	* <i>Curculio orchids</i> Gaertn. (Hypoxidaceae)	Nilapanai	1.20	Rhizome	CSCD-4(heart problem) SMSD-1 (joint pain)	Decoction Decoction	Oral Oral
80	<i>Cyanotis axillaris</i> L. (Commelinaceae)	Vallukkai	0.40	Leaf	SMSD-1 (swelling) DID-1 (itching)	Raw Decoction	Oral Oral
81	<i>Cymbopogon citratus</i> STAPF. (Poaceae)	Elumichai pul	0.20	Root	GIA-1 (diarrhoea)	Decoction	Oral
82	<i>Cynodon dactylon</i> L. (Cyperaceae)	Arugam pull	0.40	Whole plant	GIA-2 (indigestion and stomach ache)	Raw and Decoction	Oral
83	<i>Cyperus rotundus</i> L. (Cyperaceae)	Korai kilangu	0.20	Rhizome	DID-1 (wound)	Past	Oral
84	<i>Desmodium gangeticum</i> (L.) DC. (Fabaceae)	Orilai	0.40	Stem and root	Fvr-1 (fever) SMSD-1 (head ache)	Decoction Decoction	Oral Oral
85	<i>Eclipta prostrata</i> L. (Asteraceae)	Karisalankanni	1.00	Leaf	HC-5 (hair tonic)	Decoction	Oral
86	* <i>Eleusine coracana</i> (L.) Gaertn. (Poaceae)	Kaelvaragu	0.20	Seed	Fvr-1 (fever)	Decoction	Oral
87	<i>Enicostemma axillare</i> L. (Gentianaceae)	Vellarugu	0.20	Leaf	PB-1 (snake bite)	Decoction	Oral
88	<i>E. littorale</i> Blume. (Gentianaceae)	Vellarugu	1.20	Leaf	PB-6 (snake bite)	Decoction	Oral
89	<i>Evolvulus alsinoides</i> L. (Convolvulaceae)	Vishnukiranthi	0.20	Whole plant	Fvr-1 (fever)	Decoction	Oral
90	<i>Hemidesmus indicus</i> L. (Asclipadaceae)	Nannari	0.80	Root	Fvr-1 (fever) GIA-3 (stomach problem)	Decoction Decoction	Oral Oral

Continue.....

91	<i>*Hybanthus enneaspermus</i> L. (Violaceae)	Orithalthamarai	1.00	Whole plant	GUA-5 (male fertility)	Raw and Decoction	Oral
92	<i>Hygrophylla auriculata</i> Schum. (Acanthaceae)	Voyal chullai	0.20	Leaf	GUA-1 (menstrual problem)	Decoction	Oral
93	<i>Hyptis suaveolens</i> (L.) Poit. (Lamiaceae)	Karunchsatachi	0.20	Leaf	DID-1 (eczema)	Past	Topical
94	<i>Leonotis nepetaefolia</i> (L.) W.T. Ait. (Fabaceae)	Theanthumpai	0.20	Leaf	DID-1 (eczema)	Past	Topical
95	<i>Mimosa pudica</i> L. (Fabaceae)	Thootal sinigi	1.20	Whole plant	CA-4 (body coolant) RSD-2 (asthma)	Decoction	Oral
96	<i>Notonia grandiflora</i> DC. (Astraceae)	Muyalkathu	0.20	Leaf	ENT-1 (ear ache)	Decoction	Oral
97	<i>Ocimum sanctum</i> L. (Lamiaceae)	Nallathulasi	1.20	Leaf	RSD-6 (cold and cough)	Decoction	Oral
98	<i>O. tenuiflorum</i> L. (Lamiaceae)	Karut tulasi	0.40	Leaf	RSD-2 (cold and cough)	Decoction	Oral
99	<i>Oxalis corniculata</i> L. (Oxalidaceae)	Paliakirai	0.40	Whole plant	Fvr-1 (fever) ED-1 (kidney stone)	Decoction Raw	Oral Oral
100	<i>Phyllanthus amarus</i> Schum. & Thonn. (Euphorbiaceae)	Kizhaanelli	1.20	Whole plant	LP-6 (jaundice)	Decoction	Oral
101	<i>P. maderaspatensis</i> L. (Euphorbiaceae)	Civappu kilanelli	0.60	Fruit	GIA-3 (indigestion)	Raw and Decoction	Oral
102	<i>P. reticulatus</i> Poir. (Euphorbiaceae)	Karunelli	0.40	Leaf	GH-1 (piles) DID-1 (antioxidant)	Decoction Raw	Oral Oral
103	<i>*Physalis minima</i> L. (Solanaceae)	Kupanti	0.40	Leaf	GIA-1 (gas trouble)	Decoction	Oral
104	<i>Plectranthus amboinicus</i> (Lour.) Spreng. (Lamiaceae)	Karpooravalli	1.20	Leaf	RSD-6 (cold and cough)	Decoction	Oral
105	<i>Plumbago zeylanica</i> L. (Plumbaginaceae)	Chittiramoolam	1.20	Flower	GUA-5 (sterility in women)	Decoction	Oral
106	<i>Polygala arvensis</i> Willd. (Polygalaceae)	Vecinankai	0.20	Root	SMSD-1 (inflammation)	Decoction	Oral
107	<i>Pseudarthria viscida</i> (L.) Wight & Arn. (Fabaceae)	Moovilai	0.60	Stem and root	CSCD-1 (heart problem) Fvr-1 (fever)	Decoction Decoction	Oral Oral
108	<i>Sansevieria roxburghiana</i> Schult. (Agavaceae)	Sanam	0.80	Leaf	GIA-1 (dysentery) ENT-4 (ear ache)	Decoction Decoction	Oral Oral
109	<i>Sesamum indicum</i> L. (Pedaliaceae)	Ellu	0.80	Seed	CA-4 (body coolant)	Decoction	Oral
110	<i>*Sida rhombifolia</i> L. (Malvaceae)	Kurunthotti	0.40	Leaf and root	SMSD-1 (tumour) GIA-1 (gas trouble)	Raw Decoction	Oral Oral
111	<i>Spermacoce latifolia</i> Aubl. (Rubiaceae)	-	0.20	Leaf	DID-1 (wound healing)	Past	Topical
112	<i>Tephrosia purpurea</i> (Linn.) Pers. (Fabaceae)	Kozhunji	0.20	Root	GIA-1 (stomach problem)	Decoction	Oral
113	<i>*Tragia involucrata</i> L. (Euphorbiaceae)	Kanchori	0.20	Fruit	SMSD-1 (one side headache)	Raw and Decoction	Oral
114	<i>Tridax procumbens</i> L. (Astraceae)	Vettukkaya puntu	0.80	Leaf	DID-4 (wound healing)	Past	Topical
115	<i>Vernonia cinerea</i> (L.) Less. (Asteraceae)	Mukuttipoondu	0.20	Leaf	SMSD-1 (paralysis)	Decoction	Oral
116	<i>Vigna radiata</i> (L.) R. Wilczek. (Fabaceae)	Pasipayaru	0.20	Seed and latex	DID-1 (skin disease)	Past	Topical
117	<i>Withania somnifera</i> L. (Solanaceae)	Amukkaramkizangu	0.60	Rhizome	SMSD-3 (nervous disorders)	Decoction	Oral
118	Climbers <i>Abrus precatorius</i> L. (Fabaceae)	Kundu mani	1.20	Seed, latex and root	ENT-4 (eye pain) GUA-2 (delivery pain)	Decoction Decoction	Oral Oral
119	<i>Acacia sinuata</i> (Lour.) Merr. (Fabaceae)	Seeyakkai	0.40	Fruit	DC-1 (toothache) HC-1 (dandruff)	Powder Powder	Oral Oral
120	<i>Ampelocissus tomentosa</i> (Roth) Planch. (Vitaceae)	Kattukodi mundiri	0.80	Fruit	DID-4 (antioxidant and skin diseases)	Raw	Oral
121	<i>Asparagus racemosus</i> Willd. (Asparagaceae)	Thanneervittan	1.20	Rhizome	ED-6 (urinary problem)	Decoction	Oral
122	<i>Antigonon leptopus</i> Hook. & Arn. (Polygonaceae)	Kodi roja	0.20	Root	DID-1 (anti-inflammatory)	Decoction	Oral
123	<i>Aristolochia bracteolata</i> L. (Aristolochiaceae)	Aaduthinnapalai	0.80	Leaf	DID-3 (eczema, scabies and ringworm infection) PB-1 (snake bite)	Decoction Decoction	Oral Oral

Continue.....

124	<i>A. indica</i> L. (Aristolochiaceae)		Aaduthinnapai	0.80	Leaf	DID-3 (eczema, scabies and ringworm infection) PB-1 (snake bite)	Decoction	Oral
125	<i>Basella rubra</i> L. (Basellaceae)		Kodippasali	0.40	Leaf	CSCD-2 (anemia and increase WBC)	Decoction	Oral
126	<i>Cardiospermum canasense</i> Wall. (Sapindaceae)	Wall.	Mudakathan	1.40	Leaf	SMSD-6 (joint pain) GIA-1 (stomach ache)	Raw and Decoction Raw	Oral Oral
127	* <i>C. halicacabum</i> Wall. (Sapindaceae)		Mudakathan	1.00	Leaf	SMSD-4 (joint pain) GIA-1 (stomach ache)	Decoction Raw	Oral Oral
128	<i>Cissus quadrangularis</i> L. (Vitaceae)		Pirandai	1.00	Stem	GIA-5 (indigestion and inducing appetite)	Decoction Raw	Oral Oral
129	<i>Coccinia grandis</i> L. (Cucurbitaceae)		Kovai	0.20	Leaf	LP-1 (jaundice)	Decoction	Oral
130	<i>Cucurbita moschata</i> Duch. ex Lam. (Cucurbitaceae)	Lam.	Poosani	0.20	Fruit	GH-1 (increase weight)	Raw and Decoction	Oral
131	<i>Cuscuta chinensis</i> L. (Convolvulaceae)		Manjapulluruvi	0.20	Stem	SMSD-1 (bone fracture)	Past	Oral
132	* <i>Cyclea peltata</i> L. (Menispermaceae)		Padaikilangu	0.40	Whole plant	GIA-1 (stomach ache) GH-1 (tonic)	Decoction	Oral
133	<i>Dioscorea oppositifolia</i> L. (Dioscoreaceae)		Kavvala kodi	1.60	Rhizome	GIA-4 (piles) DID-4 (wound)	Decoction Decoction	Oral Oral
134	<i>D. pentaphylla</i> L. (Dioscoreaceae)		Kaattuvalli	0.20	Rhizome	GIA-1 (stomach ache)	Decoction	Oral
135	<i>Gloriosa superba</i> L. (Liliaceae)		Kanuvalikodi	0.20	Root	GUA-1 (abortion)	Decoction	Oral
136	<i>Gymnema sylvestre</i> R. Br. (Asclipadaceae)		Chirukurunjan	1.00	Leaf	ED-5 (diabetes)	Decoction	Oral
137	<i>Ipomea staphylina</i> Roemer & Schultes. (Convolvulaceae)		Onan kodi	0.20	Latex	GH-1 (cracked feet)	Raw	Oral
138	* <i>Mukia maderaspatana</i> (Linn.) M. Roemer. (Cucurbitaceae)		Mosumosukkai	1.40	Leaf	GH-7 (piles)	Decoction	Oral
139	<i>Pergularia daemia</i> Forsk. (Asclepiadaceae)		Vaeliparuththi	0.40	Leaf and fruit	RSD-1 (asthma) GIA-1 (gas trouble)	Decoction Decoction	Oral Oral
140	<i>Piper betle</i> L. (Piperaceae)		Vettilai	1.20	Leaf	GIA-4 (indigestion) DID-2 (skin disease)	Decoction	Oral
141	<i>P. nigrum</i> L. (Piperaceae)		Kurumilagu	0.40	Seed	RSD-2 (cold and cough)	Past Decoction	Topical Oral
142	<i>Sarcostemma acidum</i> Roxb. (Asclepiadaceae)		Somamum	0.40	Latex	RSD-1 (cough) DID-1 (antiinflammatory)	Decoction Decoction	Oral Oral
143	* <i>Solena amplexicaulis</i> L. (Curcubitaceae)		Pulivanchi	1.40	Rhizome	DID-7 (skin diseases and antiinflammatory)	Decoction	Oral
144	<i>Tylophora indica</i> R. Br. (Asclipedaceae)		Mekachettu	0.20	Leaf	RSD-1 (asthma)	Decoction	Oral
145	Epiphytes			0.20	Bark	GUA-1 (menstrual problem)	Decoction	Oral
146	<i>Loranthus flacata</i> Linn. f. (Loranthaceae)		Pulluruvi					
	<i>Viscum album</i> Mistletoe. (Loranthaceae)		Pulluruvi	0.80	Fruit	CSCD-3 (heart problem) SMSD-1 (tumour)	Decoction Decoction	Oral Oral

*Species of new claim.

Table 3. Ingredients added for the preparation of herbal medicines by the Irula healers

S. No.	Botanical name	Other plants added	Other ingredients added
1	Trees <i>Acacia catechu</i>	<i>Alpinia galanga</i> , <i>Cleome monophylla</i> and <i>Cyanotis axillaris</i> (chest pain)	Milk
2	<i>A. leucophloea</i>	<i>Alangium salviifolium</i> , <i>Cyclea peltata</i> , <i>Dioscorea pentaphylla</i> and <i>Tephrosia purpurea</i> (wound healing and stomach ache)	Coconut oil and honey
3	<i>A. nilotica</i>	<i>Curcuma aromatica</i> (toothache)	Coconut oil
4	<i>Aegle marmelos</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (diabetes)	Coconut oil and honey
5	<i>Ailanthus excelsa</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (menstrual problem)	Coconut oil
6	<i>Alangium salviifolium</i>	<i>Acacia catechu</i> , <i>Terminalia arjuna</i> , <i>T. bellerica</i> and <i>Curculio orchids</i> (chest pain)	Milk and honey
7	<i>Albizia lebbek</i>	<i>Anisomeles malabarica</i> , <i>Cleome aspera</i> and <i>Curcuma aromatica</i> (eczema)	Coconut oil
8	<i>Alstonia venenata</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
9	<i>Artocarpus heterophyllus</i>	<i>Ficus racemosa</i> , <i>Begonia malabarica</i> , <i>Pedaliium murex</i> and <i>Cardiospermum halicacabum</i> (arthritis and skin diseases)	Coconut oil
10	<i>Azadirachta indica</i>	<i>Ficus racemosa</i> , <i>Alpinia galanga</i> , <i>Phyllanthus emblica</i> and <i>Asystasia gangetica</i> (blood purification)	Milk and honey
11	<i>Canarium strictum</i>	<i>Allium sativum</i> and <i>Curcuma aromatica</i> (mosquito repellent)	-
12	<i>Canthium diococcum</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (dog bite and stomach ache)	Salt
13	<i>Cassia fistula</i>	<i>Justicia adhatoda</i> , <i>Oxalis corniculata</i> and <i>Hemidesmus indicus</i> (fever)	Milk
14	<i>Cinnamomum camphora</i>	<i>Helicteres isora</i> , <i>Cleome viscosa</i> and <i>Costus speciosus</i> (ear ache)	Coconut oil
15	<i>Commiphora caudata</i>	<i>Ocimum sanctum</i> , <i>Cleome monophylla</i> and <i>Piper nigrum</i> (fever)	Milk/honey
16	<i>Dalbergia sissoo</i> Roxb.	<i>Curcuma aromatica</i> (skin diseases)	Coconut oil
17	<i>Dodonaea angustifolia</i>	<i>Cardiospermum halicacabum</i> , <i>C. canasense</i> , <i>Curculio orchids</i> and <i>Cissus quadrangularis</i> (joint pain)	Egg white yoke and coconut oil
18	<i>Erythrina variegata</i>	<i>Ocimum tenuiflorum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (cough and cold)	Honey
19	<i>Ficus racemosa</i>	<i>Hemidesmus indicus</i> , <i>Pavetta indica</i> , <i>Vetiveria zizanioides</i> , <i>Curcuma aromatica</i> and <i>Ailanthus excelsa</i> (leucorrhoea)	Milk and honey
20	<i>Limonia acidissima</i>	<i>Hemidesmus indicus</i> , <i>Pavetta indica</i> , <i>Vetiveria zizanioides</i> , <i>Curcuma aromatica</i> , <i>Cardiospermum canasense</i> and <i>Ailanthus excelsa</i> (leucorrhoea and arthritis)	Milk and honey
21	<i>Mangifera indica</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
22	<i>Melia azedarach</i>	<i>Hemidesmus indicus</i> , <i>Terminalia arjuna</i> , <i>T. bellerica</i> , <i>Centella asiatica</i> and <i>Cynodon dactylon</i> (stomach ache)	Milk
23	<i>M. dubia</i>	<i>Allium sativum</i> , <i>Canarium strictum</i> and <i>Curcuma aromatica</i> (mosquito repellent)	-
24	<i>Mesua ferrea</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (dog bite and stomach ache)	Sugar
25	<i>Phyllanthus emblica</i>	-	Sugar, milk and honey
26	<i>Pongamia pinnata</i>	<i>Cardiospermum halicacabum</i> and <i>Cardiospermum canasense</i> (rheumatism)	Neem oil
27	<i>Syzygium cuminii</i>	-	Milk and honey
28	<i>Tamarindus indica</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (scorpion bite)	Coconut oil
29	<i>Terminalia arjuna</i>	<i>Alpinia galanga</i> , <i>Curculio orchids</i> , <i>Cleome monophylla</i> , <i>Terminalia bellerica</i> and <i>Cyanotis axillaris</i> (chest pain)	Coconut oil, sugar and honey
30	<i>T. bellerica</i>	<i>Alpinia galanga</i> , <i>Curculio orchids</i> , <i>Cleome monophylla</i> , <i>Terminalia bellerica</i> and <i>Cyanotis axillaris</i> (chest pain)	Coconut oil, sugar and honey
31	<i>T. chebula</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (dog bite and stomach ache)	Salt
32	<i>Wrightia tinctoria</i>	<i>Curcuma aromatica</i> (toothache)	-
33	<i>Ziziphus mauritiana</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
34	<i>Z. enophylla</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
35	Shrubs <i>Argemone mexicana</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (ulcer and pimples)	Milk and coconut oil

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36	<i>Atalantia monophylla</i>	<i>Adhatoda vasica</i> , <i>Eucalyptus globules</i> and <i>Ocimum basilicum</i> (body pain)	Honey
37	<i>Begonia malabarica</i>	<i>Cardiospermum halicacabum</i> , <i>C. canasense</i> and <i>Cissus quadrangularis</i> (arthritis and joint pain)	Egg white yoke
38	<i>Cassia auriculata</i>	-	Milk
39	<i>Citrus limon</i>	-	Salt and sugar
40	<i>Clerodendrum inerme</i>	<i>Curcuma aromatica</i> (skin diseases)	Coconut oil
41	<i>Helicteres isora</i>	<i>Cleome viscosa</i> and <i>Costus speciosus</i> (ear ache)	Coconut oil
42	<i>Jatropha gossypifolia</i>	-	Coconut oil
43	<i>Justicia adhatoda</i>	<i>Syzygium cuminii</i> , <i>Ocimum sanctum</i> , <i>Begonia malabarica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (fever)	-
44	<i>J. gendarussa</i>	-	Coconut oil
45	<i>Lantana camara</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
46	<i>L. wightii</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
47	<i>Manihot esculenta</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
48	<i>Pavetta indica</i>	<i>Achyranthes aspera</i> , <i>Enicostemma littorale</i> , <i>Rauvolfia serpentina</i> , <i>R. trtraphylla</i> , <i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite)	-
49	<i>Rauvolfia serpentina</i>	<i>Achyranthes aspera</i> , <i>Enicostemma littorale</i> , <i>Ocimum sanctum</i> , <i>Rauvolfia trtraphylla</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite)	-
50	<i>R. trtraphylla</i>	<i>Achyranthes aspera</i> , <i>Enicostemma littorale</i> , <i>Rauvolfia serpentina</i> , <i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite)	-
51	<i>Solanum surattense</i>	<i>Piper nigrum</i> , <i>Zingiber officinale</i> and <i>Asystasia gangetica</i> (weezing)	Food
52	<i>Vitex negundo</i>	<i>Cleome viscosa</i> , <i>Cynodon dactylon</i> , <i>Euphorbia hirta</i> , <i>Ocimum sanctum</i> and <i>Piper nigrum</i> (headache and body pain)	Coconut oil
53	Herbs	<i>Cassia auriculata</i> and <i>Cynodon dactylon</i> (piles)	Castor oil
	<i>Abutilon indicum</i>		
54	<i>Acalypha indica</i>	<i>Piper nigrum</i> and <i>P. betle</i> (jaundice)	Milk
55	<i>Achyranthes aspera</i>	<i>Citrus limon</i> , <i>Vitex negundo</i> , <i>Piper nigrum</i> and <i>P. betle</i> (dog bite and poisonous bite)	-
56	<i>Acorus calamus</i>	<i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (cough)	Honey
57	<i>Curculio orchids</i>	<i>Citrus limon</i> , <i>Pseudarthria viscid</i> , <i>Terminalia arjuna</i> and <i>T. bellerica</i> (heart problem)	-
		<i>Cardiospermum halicacabum</i> and <i>C. canasense</i> (joint pain)	Egg white yoke
58	<i>Cleome monophylla</i>	<i>Commiphora caudate</i> , <i>Ocimum sanctum</i> and <i>Piper nigrum</i> (fever)	Milk/honey
59	<i>C. viscosa</i>	<i>Cinnamomum camphora</i> , <i>Helicteres isora</i> and <i>Costus speciosus</i> (ear ache)	Coconut oil
60	<i>Coleus aromaticus</i>	<i>Piper nigrum</i> and <i>P. betle</i> (cough and cold)	-
61	<i>Cymbopogon citratus</i>	<i>Allium sativum</i> and <i>Piper nigrum</i> (diarrhoea)	Sugar/salt
62	<i>Cynodon dactylon</i>	-	Sugar
63	<i>Desmodium gangeticum</i>	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> , <i>Hemidesmus indicus</i> and <i>Ocimum sanctum</i> (fever) <i>Cleome viscosa</i> and <i>Cynodon dactylon</i> (headache)	Gingelly oil and Neem oil
64	<i>Eclipta prostrata</i>	<i>Phyllanthus emblica</i> , <i>Hibiscus rosa-siensis</i> , <i>Cleome viscosa</i> and <i>Cynodon dactylon</i> (hair tonic)	Coconut oil
65	<i>Eleusine coracana</i>	-	Salt
66	<i>Enicostemma axillare</i>	<i>Achyranthes aspera</i> , <i>Enicostemma littorale</i> , <i>Rauvolfia trtraphylla</i> , <i>Hibiscus rosa-siensis</i> , <i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite)	Salt
67	<i>E. littorale</i>	<i>Achyranthes aspera</i> , <i>Enicostemma axillare</i> , <i>Rauvolfia trtraphylla</i> , <i>Hibiscus rosa-siensis</i> , <i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite)	Salt
68	<i>Evolvulus alsinoides</i>	-	Sugar
69	<i>Hemidesmus indicus</i>	<i>Ocimum sanctum</i> and <i>Piper nigrum</i> (fever)	
70	<i>Hybanthus enneaspermus</i>	-	Milk and honey
71	<i>Hygrophylla auriculata</i>	-	Honey
72	<i>Mimosa pudica</i>	<i>Alpinia galanga</i> , <i>Piper nigrum</i> and <i>Zingiber officinale</i> (asthma)	Honey
73	<i>Notonia grandiflora</i>	<i>Helicteres isora</i> , <i>Cleome viscosa</i> and <i>Costus speciosus</i> (ear ache)	Coconut oil
74	<i>Ocimum sanctum</i>	<i>Piper nigrum</i> and <i>P. betle</i> (cough and cold)	Honey
75	<i>O. tenuiflorum</i>	<i>Piper nigrum</i> and <i>P. betle</i> (cough and cold)	Honey

Continue.....

76	<i>Oxalis corniculata</i>	<i>Hemidesmus indicus</i> , <i>Piper nigrum</i> and <i>P. betle</i> (fever)	Honey
77	<i>Phyllanthus amarus</i>	<i>Andrographis paniculata</i> , <i>Piper nigrum</i> and <i>Piper betle</i> (jaundice)	Milk
78	<i>P. reticulatus</i>	<i>Abutilon indicum</i> , <i>Cassia auriculata</i> and <i>Cynodon dactylon</i> (piles)	-
79	<i>Physalis minima</i>	<i>Piper nigrum</i> and <i>P. betle</i> (gas trouble)	Milk
80	<i>Plectranthus amboinicus</i>	<i>Piper nigrum</i> and <i>P. betle</i> (cough and cold)	Honey
81	<i>Plumbago zeylanica</i>	<i>Hemidesmus indicus</i> , <i>Pavetta indica</i> , <i>Vetiveria zizanioides</i> , <i>Hybanthus enneaspermus</i> , <i>Begonia malabarica</i> and <i>Piper nigrum</i> (sterility in women)	Milk/honey
82	<i>Pseudarthria viscida</i>	<i>Terminalia arjuna</i> , <i>T. bellerica</i> , <i>T. chebula</i> , <i>Curculio orchids</i> , <i>Phyllanthus emblica</i> and <i>Desmodium gangeticum</i> (heart problem and fever)	Coconut oil, Milk/honey
83	<i>Sansevieria roxburghiana</i>	<i>Helicteres isora</i> , <i>Cleome viscosa</i> and <i>Costus speciosus</i> (ear ache)	Coconut oil
84	<i>Sida rhombifolia</i>	<i>Curcuma aromatica</i> , <i>C. neilgherrensis</i> , <i>Piper nigrum</i> , <i>Zingiber officinale</i> , <i>Wrightia tinctoria</i> and <i>Asparagus racemosus</i> (tumor)	Coconut oil, salt, milk/honey
85	<i>Spermacoce latifolia</i>	<i>Commelina benghalensis</i> and <i>Curcuma aromatica</i> (wound healing)	Coconut oil
86	<i>Tephrosia purpurea</i>	<i>Hemidesmus indicus</i> , <i>Cymbopogon citratus</i> and <i>Zingiber officinale</i> (stomach problem)	Milk/honey
87	<i>Tridax procumbens</i>	<i>Curcuma aromatica</i> (wound healing)	Coconut oil
88	<i>Vernonia cinerea</i>	<i>Curcuma aromatica</i> , <i>Cardiospermum halicacabum</i> and <i>C. canasense</i> (paralysis)	Egg white yoke
89	<i>Vigna radiata</i>	<i>Curcuma aromatica</i> (skin disease)	Coconut oil
90	<i>Withania somnifera</i>	<i>Syzygium cumini</i> , <i>Begonia malabarica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (fever)	Milk/honey
91	Climbers	<i>Asparagus racemosus</i> , <i>Acalypha indica</i> , <i>Citrus limon</i> , <i>Curcuma aromatica</i> , <i>Piper nigrum</i> , <i>Allium sativum</i> , <i>Cleome viscosa</i> and <i>Costus speciosus</i> (delivery pain and eye pain)	Milk/honey
92	<i>Abrus precatorius</i>	<i>Curcuma aromatica</i> and <i>Citrus limon</i> (antioxidant and skin diseases)	Honey and coconut oil
93	<i>Ampelocissus tomentosa</i>	<i>Curcuma aromatica</i> , <i>Solena amplexicaulis</i> and <i>Citrus limon</i> (anti-inflammatory)	Coconut oil
94	<i>Antigonon leptopus</i>	<i>Allium sativum</i> , <i>Citrus limon</i> , <i>Cyperus rotundus</i> and <i>Phyllanthus amarus</i> (urinary problem)	Butter milk/cow milk
95	<i>Asparagus racemosus</i>	<i>Achyranthes aspera</i> , <i>Aristolochia indica</i> , <i>Curcuma aromatica</i> , <i>Zingiber officinale</i> , <i>Wrightia tinctoria</i> , <i>Citrus limon</i> , <i>Vitex negundo</i> , <i>Piper nigrum</i> and <i>P. betle</i> (snake bite, eczema, scabies and ringworm infection)	Coconut oil
96	<i>Aristolochia bracteolata</i>		
96	<i>Basella rubra</i>	<i>Basella alba</i> , <i>Phyllanthus emblica</i> , <i>Centella asiatica</i> and <i>Ficus racemosa</i> (anemia and increase WBC)	Honey
97	<i>Cardiospermum canasense</i>	<i>Cardiospermum halicacabum</i> , <i>C. canasense</i> , <i>Curculio orchids</i> , <i>Cissus quadrangularis</i> and <i>Dodonaea angustifolia</i> (joint pain)	Pungam oil, egg white yoke and coconut oil
98	<i>Cissus quadrangularis</i>	<i>Allium cepa</i> , <i>A. sativum</i> and <i>Murraya koenigii</i> (indigestion and inducing appetite)	Asafoetida
99	<i>Coccinia grandis</i>	<i>Azadirachta indica</i> , <i>Phyllanthus amarus</i> , <i>Ocimum sanctum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (jaundice)	Milk and honey
100	<i>Cucurbita moschata</i>	<i>Allium cepa</i> , <i>A. sativum</i> and <i>Murraya koenigii</i> (increase weight)	Gingelly oil
101	<i>Cuscuta chinensis</i>	<i>Cardiospermum halicacabum</i> , <i>Cissus quadrangularis</i> and <i>Curculio orchids</i> (joint pain)	Egg white yoke and coconut oil
102	<i>Cyclea peltata</i>	<i>Hemidesmus indicus</i> , <i>Pavetta indica</i> and <i>Vetiveria zizanioides</i> (stomach ache and tonic)	Milk
103	<i>Dioscorea oppositifolia</i>	<i>Abutilon indicum</i> , <i>Cassia auriculata</i> and <i>Cynodon dactylon</i> (piles)	Castor oil
104	<i>D. pentaphylla</i>	<i>Hemidesmus indicus</i> , <i>Allium cepa</i> and <i>A. sativum</i> (stomach ache)	Milk and honey
105	<i>Gloriosa superba</i>	<i>Cynodon dactylon</i> , <i>Justicia adhatoda</i> , <i>Piper nigrum</i> and <i>P. betle</i> (abortion)	Coconut oil and honey
106	<i>Gymnema sylvestre</i>	-	Milk and honey
107	<i>Ipomea staphylina</i>	<i>Curcuma aromatica</i> , <i>Cocculus hirsutus</i> , <i>Cuminum cyminum</i> and <i>Madhuca longifolia</i> (cracked feet)	Coconut oil
108	<i>Mukia maderaspatana</i>	<i>Curcuma aromatica</i> (piles)	Coconut oil
109	<i>Pergularia daemia</i>	<i>Piper nigrum</i> and <i>Tephrosia purpurea</i> (asthma and gas trouble)	Milk
110	<i>Piper betle</i>	<i>Coccinia grandis</i> , <i>Cissus quadrangularis</i> , <i>Curcuma aromatica</i> and <i>Piper nigrum</i> (indigestion and skin diseases)	Milk and honey
111	<i>P. nigrum</i>	<i>Allium cepa</i> , <i>A. sativum</i> , <i>Piper nigrum</i> and <i>P. betle</i> (cold and cough)	Milk and honey
112	<i>Sarcostemma acidum</i>	<i>Cocculus hirsutus</i> , <i>Cuminum cyminum</i> and <i>Madhuca longifolia</i> (cough and antiinflammatory)	Coconut oil
113	<i>Solena amplexicaulis</i>	<i>Cuminum cyminum</i> and <i>Madhuca longifolia</i> (antiinflammatory)	Coconut oil
114	<i>Tylophora indica</i>	<i>Piper nigrum</i> , <i>Withania somnifera</i> , <i>Allium sativum</i> and <i>Tephrosia purpurea</i> (asthma and gas trouble)	Milk
115	Epiphytes	<i>Curcuma aromatica</i> , <i>Piper nigrum</i> and <i>P. betle</i> (menstrual problem)	Coconut oil
116	<i>Loranthus flacata</i>		
116	<i>Viscum album</i>	<i>Acacia catechu</i> , <i>Terminalia arjuna</i> , <i>T. bellerica</i> and <i>Curculio orchids</i> (chest pain)	Milk and honey

Ailment categories

Sixteen ailment categories were grouped (Cook, 1995) on basis of the information provided by the Irula healers of Walayar valley (Table 1). They are gastro-intestinal ailments (GIA), dermatological infections/diseases (DID), respiratory system diseases (RSD), genitourinary ailments (GUA), fever (Fvr), skeletomuscular system disorders (SMSD), poisonous bites (PB), circulatory system/cardiovascular diseases (CSCD), endocrinal disorders (ED), liver problems (LP), dental care (DC), hair care (HC), ear, nose, throat problems (ENT), cooling agents (CA), general health (GH) and insecticidal property (IC).

Characteristics of healers and households

According to the interrogation it was known that the age of the herbalist healers was varied largely. Mostly within the age of 75 years (100%), the males became herbal healers and there were no female herbal healers among the tribal villages studied. It was also revealed that only one-third of the healers have education at school level. Most of the interviewed persons who have tremendous knowledge on the use of plants as medicine were come under the age category of above 50 years.

RESULTS AND DISCUSSION

The present study revealed that 146 plant species of 122 genera belonging to 58 families were used by the Irula tribal community of Walayar valley. One of the interesting observation made in the study is that among the 146 ethnomedicinal plants, 26 claims from the species viz., *Acacia leucophloea*, *Aerva lanata*, *Alstonia venenata*, *Anisomeles malabarica*, *Artocarpus heterophyllus*, *Cardiospermum halicacabum*, *Carissa spinarum*, *Cleome viscosa*, *Commiphora caudata*, *Curculigo orchioides*, *Cyclea peltata*, *Dalbergia sissoo*, *Eleusine coracana*, *Hybanthus enneaspermus*, *Lantana camara*, *Limonia acidissima*, *Melia azedarach*, *M. dubia*, *Mesua ferrea*, *Mukia maderaspatana*, *Pavetta indica*, *Physalis minima*, *Sida rhombifolia*, *Solanum surattense*, *Solena amplexicaulis* and *Tragia involucrata* were new and reported for the first time (Table 2). Fabaceae was the dominant family in terms of species richness, consisted 15 species followed by Euphorbiaceae with 9 species, Lamiaceae with 7 species, Asclepiadaceae with 6 species, Acanthaceae, Apocynaceae, Asteraceae and Rutaceae with 5 species each, Cucurbitaceae and Sapindaceae with 4 species each, Cleomaceae, Combretaceae, Convolvulaceae, Meliaceae, Mimosaceae, Rubiaceae, Solanaceae and Verbenaceae with 3 species each. The remaining 40 families were represented by less than 2 medicinal plants only. Herbs were the primary sources of medicine consisting of 59 species (40.41%) followed by trees with 39 species (26.71%), climbers with 27 species (18.49%), shrubs with 19 species (13.01%) and epiphytes with 2 species (1.36%) (Fig. 3). Further, among the various plant parts, leaves were highly used for medicinal purposes, collected from 55 species (38%) followed by multiple parts from 18 species (12%), whole plant of 16 species (11%), fruits from 13 species (9%), rhizomes from 12 species (8%), latex from 7 species (5%), bark and root from 6 species each (4% each), stem from 5 species (4%), flower from 3 species (2%) and seed from 5 species (3%) (Fig. 4).

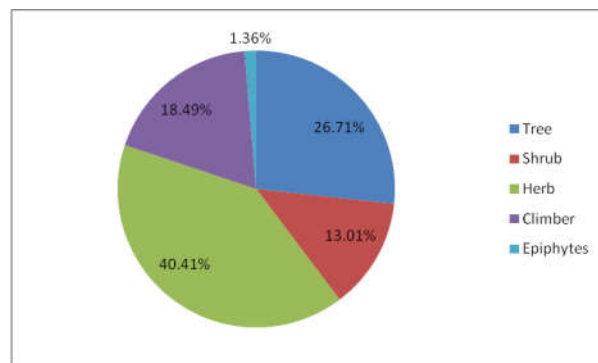


Fig. 3. Per cent life-forms of medicinal plants used by Irulas in Walayar valley

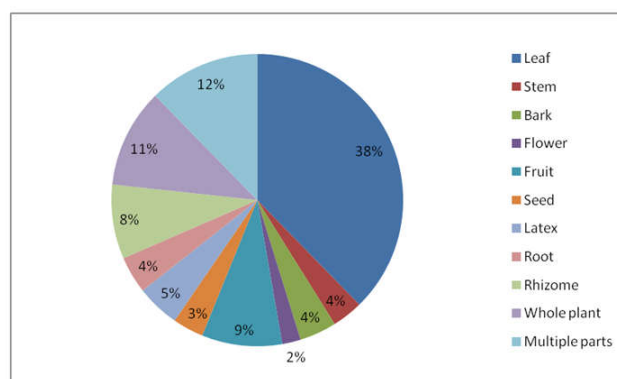


Fig. 4. Per cent plant parts used for medicine preparation

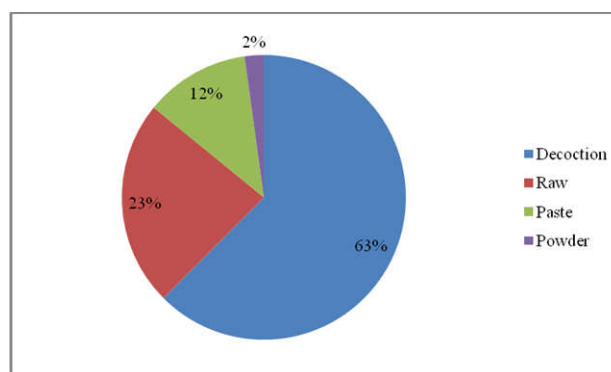


Fig. 5. Per cent form of medicine preparation by Irula tribe

The preparation and utilization of plant parts were grouped into five categories (Fig. 5). Of these, most commonly used method of preparation was decoction (63%) followed by raw form (23%), paste (12%) and powder (2%). The decoction was obtained by boiling the plant parts in water until the volume of the water reduced to minimum or required amount. Venkatachalapathi *et al.* (2015) already found that decoction is the commonly prepared form of medicines to treat many diseases by the local healers of Nilgiris, the adjoining part of the study area, Walayar valley. However, paste for the treatment of ailments is a common medicine preparation among the tribal communities at global level (Giday *et al.*, 2007; 2009; 2010; Roosita *et al.*, 2008). The paste was prepared by grinding the fresh or dried plant parts with oil or water. The powder was prepared by grinding of shade dried plant parts.

Internal uses (88%) predominated over external or topical uses (10%) and toothpaste application (2%) in the present study. For topical use, the most important methods used were direct application of paste or with oil and mostly dealt with the cases like skin diseases, cuts and wounds, poison bites, rheumatism, body pain, swellings and headache. Most of the medicines were given orally which were also suggested by some other workers elsewhere (Lee *et al.*, 2008; Andrade-Cetto, 2009). The medicine preparations were made out of a single plant part or in combination with several plant parts. The present study revealed that both multiple mode (134 plants) and single mode (12 plants) of preparations were involved in the medicine preparations by the Irula tribal community in Walayar valley. The frequent use of multiple plant remedies among the traditional healers could be attributed to the belief of synergic reactions where one plant could have a potentiating effect than other (Giday *et al.*, 2010).

It is believed that the multiple prescriptions contain a range of pharmacologically active compounds and polyherbal treatment has more healing power than single medicinal plant, since each medicinal plant used in the mixture is a remedy (Teklehaymanot *et al.*, 2007). The Irula traditional healers too frequently were using some adjuvants such as honey, cow milk, butter milk, hot water, salt, pepper powder and ginger to improve the acceptability and medicinal property of certain remedies. The oils of castor, coconut, gingelly, mustard, neem and sesamum were commonly used for the preparation of paste or medicated oil (Table 3). Further, the local healers were using specific plant parts and specific dosages for the treatment of diseases. The doses administered to the patients depended on age, physical status and health conditions. Plants which are used in repetitive manner in any ailment could be more likely to have biologically active components or pharmacologically active (Trotter and Logan, 1986).

Most of the plants reported in this study as good evidence of effectiveness and were scientifically validated as significant pharmacological agents. For example, *Gymnema sylvestre* is used in the treatment of diabetes for a long time in Indian traditional medical practice and elsewhere in the world and it claimed to have blood glucose lowering activity both *in vitro* and *in vivo* by a number of reports (Heinrich, 2000; Mukherjee *et al.*, 2006; Uniyal *et al.*, 2006). The informants in the present also using this plant for the treatment of diabetes. In support of the traditional knowledge on medicinal uses of certain species *viz.*, *Andrographis paniculata*, *Lantana camara*, *Gloriosa superba*, *Cassia fistula*, *Terminalia chebula*, *Cissus quadrangularis*, *Tridax procumbens* and *Vernonia cinerea* reported in the present study, the scientific works made also confirmed their healing properties (Thurston, 1975; Ramachandran and Manian, 1991; Singh, 2004). The ethnomedicinal studies evidently pointed out that instead of trying to identify the active compounds and pharmacological actions of plants through massive collection from natural sources, it is better to start investigating the efficacy of the plant, based on their use in folkloric practice, since most of the commercially proven drugs used in modern medicine were initially tried in crude form in traditional of folk healing practices (Fabricant and Fransworth, 2001).

Conclusion

The present study revealed that the usage of traditional medicinal plants for the treatment of various ailments among

the Irula tribes is still an integral part of their life and culture. They have a strong belief in the efficacy and success of traditional medicine. Results of the present study provide evidence that the medicinal plants continued to play an important role in the healthcare system of this community. This treasure of information is gradually vanishing in the near future due to lack of interest among the younger generations of tribal people as well as their tendency to migrate to cities for luxuriant jobs. Thus, the present study would be useful in documenting the knowledge on medicinal plants of Irula tribal community. The new claims which were recorded from the study showed that still much can be learned from investigating herbals available abundantly in the forests. These plants may indicate the possible occurrence of valuable phytochemical compounds and it requires a search for potential new drugs to treat various ailments.

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