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Traditional uses of medicinal plants among the tribal people in Theni District (Western Ghats), Southern India

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ABSTRACT

Objective: To identify the knowledgeable *Paliyar* and *Muthuvar* traditional healers in Theni District of Tamil Nadu, Southern India and to explore their indigenous ethnomedicinal knowledge. **Methods:** With the help of standardized questionnaires, 12 informants were interviewed on the medicinal use of the local flora in various tribal villages of Theni District, Tamil Nadu during August 2008 to July 2009. **Results:** A total of 86 plant species belonging to 75 genera and 45 families were reported with ethnomedicinal uses. In terms of the number of medicinal plant species, Acanthaceae (6 genera and 7 species, 8% of total collected plants) and Cucurbitaceae (5 species) are dominant families. Among the different plant parts used for the preparation of medicine, the leaves were most frequently used for the treatment of diseases. **Conclusions:** The use of plants among the Paliyars and *Muthuvar*s reflects their interest in ethnomedicine and further investigation on these species may lead to the discovery of novel bioactive molecules.

1. Introduction

Between 60%-70% of populations in developing countries living in agricultural and forest areas collect various plant parts and foods from the forest species such as roots, leaves, fruits, and nuts which forms an integral part of their daily diets[1]. Medicinal plants have a long-standing history in many indigenous communities, and continue to provide useful tools for treating various diseases[2]. The practices of traditional medicine are based on hundreds of years of belief and observations, which predate the development and spread of modern medicine[3]. In developing countries, there is an increasing attempt to incorporate traditional medicines, especially herbal preparations in the local health care systems and a modernized people are increasingly turning to herbal medicine[4,5].

In India, medicinal plants are widely used by all sections of the population with an estimated 7500 species of plants used by several ethnic communities and it is known that India has the second largest tribal population in the world after Africa[6,7]. With enormously diversified ethnic groups and rich biological resources, India represents one of the great emporia of ethnobotanical wealth. Even today, tribal communities in India still collect and preserve locally available wild and cultivated plant species and practice herbal medicine to treat a variety of diseases and disorders[8].

Nearly hundred papers have been published and several unpublished reports are also available with ethnomedicinal claims among different tribal communities of Tamil Nadu. A perusal of the literature reveals that a few ethnomedicinal studies among *Paliyar* tribals have been reported from the various districts of Tamil Nadu, *viz.*, Madurai District[9], Tirunelveli District[10,11], Virudhunagar District[12-16] and Dindigul District[17] although Theni District has not yet been explored well in ethnobotanical point of view, except a recent study by Ignacimuthu *et al*[18]. There is no report available in the literature about the *Mudhuvar* tribals of Tamil Nadu. Therefore, this study was undertaken to ascertain the detailed information on plants used by *Paliyar* and *Muthuvar* tribals and their usage based on ethnobotanical knowledge.

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2. Materials and methods

2.1. Study area

Theni District lies at the foot of Western Ghats and is situated between 90 ° 53′ and 10 °22′ north latitude and 77 °17′ and 77 °67′ east longitude (Figure 1). The general geographical information of the district is diversified by several ranges and hills. The vegetation is classified as southern tropical forests in the plains and foot hills, dry deciduous forests, moist deciduous forests and evergreen forests in the high altitudes. In the present study, ethnobotanical surveys were carried out in the following *Paliyar* and *Muthuvar* villages of Theni District: Kurangani (*Muthuvars*), Arasaradi/ Notchioodai, Attupparai/ kathrikaparai, Karattupatti, Manjalaru, Munthal, Thazhaiuthu and Velapparkovil (Paliyars).

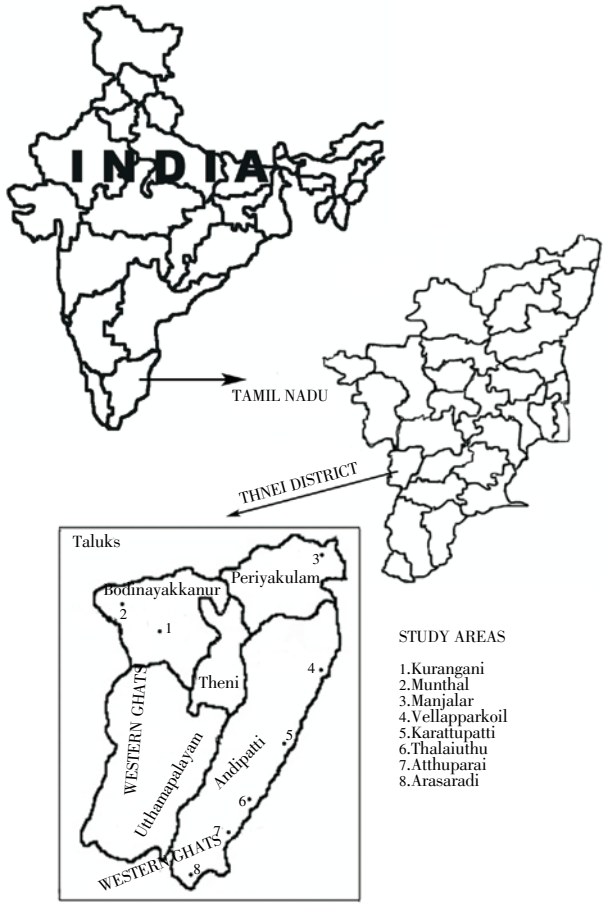

Figure 1. Location map of Theni district in Tamil Nadu, India.

2.2. Studied tribal communities

There are two types of tribal communities inhabiting the villages of Theni District *viz.*, Paliyars and Mudhuvars. The *Paliyar* tribals inhabit a narrow strip of Western Ghats in the hilly regions of Madurai, Dindigul, Theni, Tirunelveli and Virudhunagar Districts of Tamil Nadu and Idukki District of Kerala[9]. The *Muthuvar* tribals are usually not willing to disclose their knowledge about the uses of the plants. The knowledge about medicinal plants is rather specialized and is limited to a few members in the community who are recognized as 'Vaidhyar' (also known as medicine men, informants and traditional healers).

2.3. Data collection

The fieldwork in the villages of Theni District took place between August 2008 and July 2009. The tribal settlements were located through field surveys in this region. Eight tribal hamlets (seven *Paliyar* inhabiting villages and one *Muthuwar* inhabiting village) were identified in Theni District for the present study. Traditional healers with the knowledge of medicinal plants were selected for the collection of ethnomedicinal information. Twelve informants (10 males and 2 females) between the ages of 34 to 65 were consulted to gather information in the study area.

Ethnobotanical data were collected according to the methodology suggested by Jain[19]. The information was collected through questionnaires and discussions among the informants in their local language (Tamil). The questionnaire allowed responses on the plant prescribed, part of the plant used, medicinal uses for each part, mode of preparation (*i.e.*, decoction, paste, powder and juice), form of usage (either fresh or dried) and additional plants used as ingredients. The collected and preserved plants were identified using The Flora of Presidency of Madras[20] and The Flora of Tamil Nadu Carnatic[21]. Voucher specimens were deposited in the herbarium of Pachaiyappa's College (PCH), Chennai, India.

3. Results

The present study focused mainly on the plant species used by the *Paliyar* and *Muthuvar* tribals for primary healthcare needs as reported by the informants/traditional healers. The reported plants were arranged according to their scientific name, voucher specimen number, family, vernacular names (as recorded during the field work), parts used, therapeutic uses and method of usage of herbal preparations.

3.1. Enumeration of ethnomedicinal plants

Abutilon indicum (*A. indicum*)(L.) Sweet, PCH-677, Malvaceae, Thutthi. Decoction of dried leaves are mixed with jaggery (an undefined sugar made from palm sap) and taken orally to treat piles, body heat and skin diseases

Achyranthes aspera Blume., PCH-638, Amaranthaceae, Nayuruvi. Fresh roots are used as toothbrush. Seeds are used as nutritive food.

Adhatoda zeylanica (*A. zeylanica*)Medicus, PCH-604, Acanthaceae, Adhatodai. Decoction of fresh leaves is taken orally to get relief from cold, cough, breathing problems and throat pain.

Aegle marmelos (*A. marmelos*) (L.) Corr. Serr., PCH-685,

Rutaceae, Vilvam. Decoction of fresh leaves is taken orally twice a day for a week to treat cough, breast inflammation, eye problems and to keep the body in cool.

Aerva lanata (L.) A. L. Juss., PCH-668, Amaranthaceae, Siru-peelai. Decoction of fresh leaves is taken orally 3 times a day to treat kidney stone inflammation until cure.

Albizia amara (Roxb.) Boivin, PCH-608, Mimosaceae, Arappumaram. Fresh leaves are ground and mixed with rice-flour and applied on hair before bath for a week to get rid of dandruff.

Amaranthus spinosus L., PCH-635, Amaranthaceae, Mulluthandu. Decoction of fresh leaves and stem are taken orally twice a day for three days to cure indigestion.

Andrographis paniculata (Burm. f.) Wallich ex Nees, PCH-666, Acanthaceae, Siriyanangai. Leaves are mixed with the root of *Aristolochia indica* and ground into a paste. The paste thus obtained is applied over the body to treat fever. Decoction of fresh leaves is taken orally thrice a day for two days to treat poisonous bites.

Anogeissus latifolia (DC.) Wallich ex Beddome, PCH-680, Combretaceae, Vekkali. Root of young plant is pound and tied on cut wounds to heal soon.

Aponogeton natans (L.) Engl. & K. Krause, PCH-629, Aponogetonaceae, Kottikilangu. Three grams of fresh tuber are ground into a paste and boiled with 200 mL of coconut oil and applied on hair before bath for three days to get rid of dandruff.

Argemone mexicana L., PCH-610, Papaveraceae, Brammathandu. Latex from the plant is poured directly in the affected places for two weeks to cure fungal infection on head (poochi/ puzhu vettu).

Aristolochia bracteolata Lam., PCH-605, Aristolochiaceae, Aduthinnapaalai. A pinch of leaves are ground into a paste and taken orally along with honey to treat stomach problems (tape warms).

Aristolochia indica L., PCH-669, Aristolochiaceae, Sivan mooligai. Two grams of root bark is ground with water and the paste thus obtained is taken orally in empty stomach twice a day for a week to treat skin diseases and poisonous bites.

Asparagus racemosus Willd., PCH-673, Liliaceae, Thanner-vittan kilangu. Fresh tuber is ground with water and taken orally with milk twice a day for a week to cure urinary problems.

Azadirachta indica A. Juss., PCH-682, Meliaceae, Vembu. Tender leaves are taken orally for excretion of intestinal warms from stomach.

Barleria cristata L., PCH-611, Acanthaceae, December poo chedi. Root is ground into a paste and taken orally; half a dose may be given to children to treat diarrhoea.

Barleria prionitis L., PCH-622, Acanthaceae, Kattu kanakamparam. Decoction of leaves is inhaled thrice a day to get relief from headache.

Begonia malabarica Lam., PCH-655, Begoniaceae, Pillaivalathi kilangu. Root is made into a paste and applied over the body to get healthy body.

Blepharis maderaspatensis (L.) Roth., PCH-661, Acanthaceae, Sathai otti poondu. Leaves are made into a paste and applied over the affected places to heal wounds.

Bombox ceiba L., PCH-615, Bombacaceae, Ilavamaram. The broad and thick prickles of the plant are rubbed on stone and the paste thus obtained is applied on pimples to disappear.

Caralluma attenuata Wight., PCH-625, Asclepiadaceae, Kolisirumum. Fresh tender stem is taken orally thrice a day for two days to get relief from cold.

Cardiospermum halicacabum (*C. halicacabum*)L., PCH-679, Sapindaceae, Vadhamudakki. Leaves are ground with hot water and taken orally twice a day for two days to treat joint pain and body pain.

Cassia auriculata L., PCH-603, Caesalpiniaceae, Aavarampoo. Fresh flower petals are made into a paste and taken orally with honey once a day before going to bed for a month to treat kidney problems.

Cassia obtusa (Roxb.) Wight & Arn., PCH-644, Caesalpiniaceae, Nilavagai. Leaves are ground into powder and taken orally with hot water thrice a day for two days to treat indigestion and constipation.

Cissus quadrangularis L., PCH-651, Vitaceae, Pirandai. Paste made from the tender stem is applied over the painful places to get relief from joint pain.

Citrullus lanatus (Thunb.) Matsum & Nakai, PCH-652, Cucurbitaceae, Perun-kumattikai. Fresh fruits are made into a paste and heated with neem oil and the paste thus obtained is tied over the painful places with cloth to treat rheumatism.

Cleome gynandra L., PCH-671, Cleomaceae, Thaivelai. Fresh leaves are made into a paste and applied over the painful places to treat wounds and swellings.

Clerodendrum phlomidis L.f., PCH-672, Verbenaceae, Thaluthalai. Leaves are ground into a paste and taken orally along with honey twice a day for three days to get relief from body tiredness and to cure skin diseases.

Coccinia grandis (L.) J. Voigt, PCH-630, Cucurbitaceae, Kovaithalai. Juice extracted from the leaves is taken orally once a day for a month to treat piles. Fresh leaves are ground into a paste and applied over the body to keep the body in cool.

Corallocarpus epigaeus (Rotter) C.B. Clarke, PCH-626, Cucurbitaceae, Kollan-kovai. Juice extracted from the tuber is mixed with urine (for male - female urine and for female - male urine) and applied over the poisonous bites.

Curculigo orchioides Gaert., PCH-643, Hypoxidaceae, Nilappanai. Fresh tubers are boiled with water and the paste thus obtained is taken orally to get relief from body tiredness and to treat rheumatism.

Cynodon dactylon (L.) Pers., PCH-609, Poaceae, Arukampullu. Fresh plant parts are ground with hot water and made into a paste and taken orally in empty stomach to ensure the normal blood circulation.

Cyprus rotundus L., PCH-627, Cyperaceae, Koraipullu. Fresh tubers are made into a paste and taken orally along with honey to treat fever and swellings.

Desmodium gangeticum L., PCH-637, Fabaceae, Muvilai

kurunthu. Decoction of shade-dried root is taken orally to treat asthma.

Dioscorea bulbifera L., PCH-617, Dioscoreaceae, Kai valli kilangu. Fresh tubers are edible.

Dioscorea oppositifolia L., PCH-621, Dioscoreaceae, Kattu valli kilangu. Fresh tubers are edible.

Dioscorea pentaphylla L., PCH-645, Dioscoreaceae, Norankilangu. Fresh tubers are boiled with water and salt and taken orally to treat piles.

Eclipta alba (*E. alba*) (L.) Hassk., PCH-619, Asteraceae, Karisalai. Three grams of fresh leaves are ground with 2 or 3 black peppers and mixed with hot water. The decoction thus obtained is taken orally once a day for a week to treat anemia, hair falling and swellings.

Euphorbia hirta L., PCH-649, Euphorbiaceae, Palpottuthalai. Four grams of fresh leaves are ground with cow's milk and taken orally once a day early in the morning to treat lactation in women.

Euphorbia tirucalli L., PCH-674, Euphorbiaceae, Thirukalli. Milky latex is dipped in cotton. After drying of the cotton, burn it and the obtained ash is mixed with coconut oil and applied over head to get rid of dandruff.

Evolvulus alsinoides L., PCH-686, Convolvulaceae, Vishnukranthai. Decoction of fresh leaves is taken orally twice a day to treat fever until cure.

Flacourtia indica (Burm.f.) Merr., PCH-657, Flacourtiaceae, Pulamullu. Juice extracted from the leaves is taken orally thrice a day for two weeks to treat jaundice.

Gmelina asiatica Roxb., PCH-642, Verbenaceae, Nelakumil. Fresh fruits are boiled with coconut oil and made into a paste and applied over the head to get rid of dandruff.

Grewia hirsuta M.Vahl., PCH-628, Tiliaceae, Kottampalam. Root is boiled, pounded and tied on the affected places to treat swellings.

Gymnema sylvestre (Retz.) R.Br. ex Roemer & Schultes, PCH-659, Asclepiadaceae, Sakkaraikolli. Fresh leaves are ground with hot water and taken orally twice a day for two months to treat diabetes.

Holarrhena antidysenterica Wallich ex A.DC., PCH-613, Apocynaceae, Erukakalaipalai. Decoction made from the root bark is taken orally twice a day for two days to get relief from stomachache.

Hygrophila auriculata (Schum.) Heine, PCH-639, Acanthaceae, Neermulli. Paste of leaves are taken orally early in the morning for a week to treat inflammation and urinary problems.

Ionidium suffruticosum (L.) Ging. Ex DC., PCH-647, Violaceae, Orithalthamarai. Fresh flowers and fruits are ground into a paste. The paste thus obtained is taken orally along with cow's milk in the empty stomach to cure infertility in men.

Justicia tranquebariensis L.f., PCH-658, Acanthaceae, Punnakkupundu. Paste made from the leaves is applied over the biting places and tied with cloth to treat rabies (dog bite).

Leea indica (Burn.f.) Merr., PCH-641, Leeaceae, Nekku. Root bark is made into a paste and applied over the wounds to heal soon.

Leucus aspera (Willd.) Link, PCH-676, Lamiaceae, Thumbai. Juice extracted from the leaves is mixed with honey and taken orally to treat skin allergy.

Leucus martinicensis (Jacq.) R.Br., PCH-653, Lamiaceae, Perunthumbai. Root bark is made in to a paste and mixed with caster oil and applied around chest to get relief from chest pain.

Ludvigia octavalvis (Jacq.) Raven, PCH-662, Onagraceae, Savangathalai. Decoction of fresh leaves is taken orally for two days to get relief from headache.

Mukia maderaspatana (L.) M. Roemer, PCH-636, Cucurbitaceae, Musumusukkai. Fresh leaves are made into a paste and taken orally to cure throat infection.

Murraya koenigii (L.) Spreng, PCH-620, Rutaceae, Karuveppilai. Decoction of shade dried leaves are mixed with rice flour and taken orally to cure eye problems and indigestion.

Ocimum tenuiflorum (*O. tenuiflorum*) L., PCH-675, Lamiaceae, Thulasi. 10 to 15 fresh leaves are taken orally twice a day to get relief from cold, cough and fever.

Olax scandens Roxb., PCH-606, Olacaceae, Alingi. Boiled leaves are tied in the forehead for two times to get relief from headache.

Pergularia daemia (Forsk.) Choiv., PCH-681, Asclepiadaceae, Velipparuthi. Milky latex obtained from the plant is heated on fire and the smoke is inhaled thrice a day to cure cold in children.

Plumbago zeylanica L., PCH-624, Plumbaginaceae, Kodiveli. Paste made from the root is taken orally in empty stomach by the pregnant women leads to abortion.

Portulaca tuberosa L., PCH-654, Portulacaceae, Pillai kilangu. Fresh tubers are taken orally once a day for two weeks to treat infertility in men.

Rivea hypocrateriformis (Desr.) Choisy, PCH-656, Convolvulaceae, Pothikeerai. Fresh tender leaves are eaten as vegetable to strengthen the body.

Sapindus emarginatus Vahl., PCH-670, Sapindaceae, Soppukkottai. Seeds are mixed with water and crushed. The paste thus obtained is applied over the head to get rid of dandruff.

Scoparia dulcis L., PCH-660, Scrophulariaceae, Sarakothani. Decoction made from the root is taken orally twice a day for two days to treat stomachache.

Smilax zeylanica L., PCH-650, Liliaceae, Parangipattai. Shade dried stem bark is made into powder and taken orally along with hot water once a day to cure skin diseases and arthritis.

Solanum nigrum L., PCH-633, Solanaceae, Milakuthakkali. Decoction of fresh leaves are taken orally early in the morning for two months to treat mouth ulcer. Also the decoction is used as mouth wash.

Solanum surattense Burm.f., PCH-618, Solanaceae, Kandankatthari. Fresh leaves are heated in fire and the smoke is inhaled through nose or mouth to treat cough and asthma.

Solanum trilobatum L., PCH-678, Solanaceae, Thudhuvalai. Fresh leaves are boiled with black pepper and

tender coconut and the paste thus obtained is taken orally thrice a day for two days to get relief from cold and cough.

Solena amplexicaulis (Lam.) Gandhi, PCH-616, Cucurbitaceae, Ivirali kovai. Unripe fruits are eaten raw to strengthen the body.

Sterculia urens Roxb., PCH-665, Sterculiaceae, Senthanakku. Shade dried root is mixed with the root of *Madhuca longifolia* and *Ricinus communis* and the paste thus obtained is taken orally once a day for three days by pregnant women for abortion.

Terminalia arjuna (DC.) Wight & Arn., PCH-632, Combretaceae, Maruthamaram. Shade dried stem bark is mixed with water and jaggery (an undefined sugar made from palm sap) and taken orally once a day for a month to treat breast pain and heart weakness.

Terminalia catappa L., PCH-601, Combretaceae, Thandri. Fruit pulps are taken orally early in the morning for a week to get relief from stomachache.

Thespesia lampas (Cav.) Wight & Arn., PCH-623, Malvaceae, Kattuparuthi. Seeds are crushed and made into a paste and taken orally along with jaggery thrice a day for two days to get relief from whooping cough.

Tinospora cardifolia (Willd.) Hook.f. & Thomson, PCH-663, Menispermaceae, Seenthilkodi. A few pieces of shade dried stem are boiled with 5 peppers and the paste thus obtained is taken orally for two days to treat fever.

Tribulus terrestris L., PCH-667, Zygophyllaceae, Siruneringil. Shade dried plant parts are made into powder and mixed with water and taken orally once a day for two weeks to treat kidney problems.

Tridax procumbens L., PCH-684, Asteraceae, Vettukayapundu. Paste made from the fresh leaves is applied over the wounds to heal soon.

Trigonella foenum-graecum L., PCH-683, Fabaceae, Venthayam. Powder made from seeds is mixed with water and taken orally in empty stomach for a week to keep body in cool and to treat dysentery.

Triumfetta rhomboidea Jacq., PCH-612, Tiliaceae, Elumpottiveru. Paste made from the fresh roots is applied externally and tied with cloth for a week to get relief from bone fracture.

Urena lobata L., PCH-648, Malvaceae, Ottu thuththi. Paste made from the root is taken orally thrice a day for two days to get relief from stomach pain.

Vigna vexillata (L.) A.Rich., PCH-634, Fabaceae, Minni. Juice extracted from the leaves is applied on the affected places to cure skin diseases.

Vitex negundo L., PCH-646, Verbenaceae, Notchi. Fresh leaves are boiled with water and the vapour thus obtained is inhaled thrice a day to get relief from fever and cold.

Vitex peduncularis Wall. ex Schauer, PCH-640, Verbenaceae, Neer notchi. Paste made from the fresh stem bark is applied over the places of sprains.

Wedelia chinensis (Osbeck) Merr., PCH-631, Asteraceae, Manjalkarisalai. Shade dried plant powder is mixed with powdered pepper and water and the paste thus obtained is applied externally on the affected places to heal mouth wounds.

Withania somnifera (L.) Dunal, PCH-607, Solanaceae, Amkura. Shade dried root is made into powder and taken orally along with milk once a day for a week to strengthen the body.

Woodfordia fruticosa Kurz., PCH-602, Lythraceae, Kattaddi. Juice extracted from the leaves is applied over the affected places to get relief from rheumatic pain.

Xanthium indicum (L.) Koen., PCH-664, Asteraceae, Seeppukai. Paste made from the leaves is mixed with water and used for mouth wash to treat toothache.

Ziziphus mauritiana Lam., PCH-614, Rhamnaceae, Ilanthai. Paste made from the leaves is mixed with coconut oil and applied over the forehead to get relief from headache.

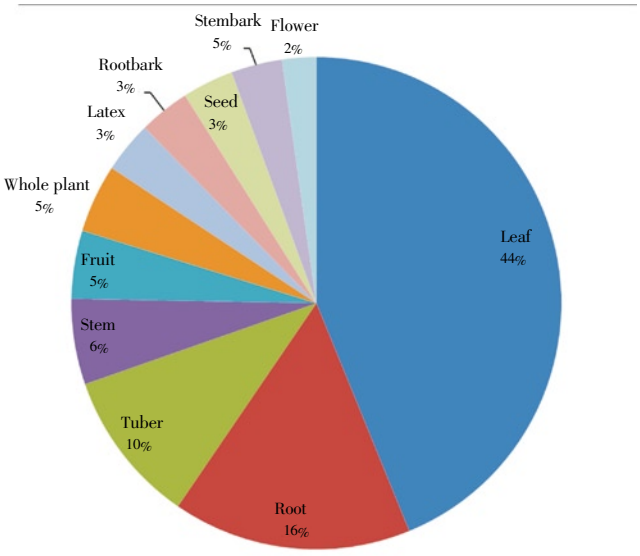

Figure 2. Percentage of plant parts used for the preparation of medicine by *Paliyar* and *Muthuvar* tribal people in Theni district, Tamil Nadu, India.

Eighty six species of medicinal plants used to treat 50 types of diseases by the *Paliyar* and *Muthuvar* traditional healers have been documented in this study. These plants are distributed in 75 genera and 45 families. Among these 66 plants were reported by *Paliyar* tribals, 20 plants were reported by *Muthuvar* tribals and 6 plants were reported by *Paliyar* as well as *Muthuvar* tribals. Most of the plants reported in this study were collected from natural vegetation (85%) and few of them from home gardens (15%). Acanthaceae is represented by the highest number of species (seven species) followed by Cucurbitaceae (five species), Asteraceae, Solanaceae and Verbenaceae each comprising four species. Seven families (Amaranthaceae, Asclepiadaceae, Combretaceae, Dioscoreaceae, Fabaceae, Lamiaceae and Malvaceae) contained three species each. The rest are represented with eight families of two species each and 25 families of one species each.

Among the different plant parts used for the preparation of medicine (Figure 2), leaves (44%) were found to be the most frequently used plant parts in the preparation of medicine followed by roots (16%), tubers (10%), stems (5%), fruits (5%),

whole plant parts (5%), latex, seeds, root bark/stem bark (3%) and flowers (2%). Most of the ethnobotanical studies confirmed that leaves are the major portion of the plant used in the treatment of diseases[7-10,15-18]. The methods of preparation fall into four categories, *viz.*: plant parts applied as a paste, juice extracted from the fresh parts of the plant, and plant plants used to prepare decoction in combination with water and powder made from fresh or dried material.

4. Discussion

The herbal preparations made from the traditional medicinal plants were mostly used for the treatment of stomachache, fever and cold (six species each), skin diseases and wounds (five species each), body cooling, body strength and headache (four species each). The study showed that a good number of the collected plants were used for the treatment of multiple diseases. *A. zeylanica* (cold, cough, breathing problems and throat pain) and *A. marmelos* (cough, breast inflammation, body cooling and eye problems) are used for the treatment of four diseases; *A. indicum*, *C. halicacabum*, *E. alba* and *O. tenuiflorum* are used for the treatment of three diseases; 16 plants used for two diseases and the rest of the plants are used to treat only one disease.

In conclussion, the use of herbal remedies is important among the *Paliyar* and *Muthuwar* tribals in Theni District and accurate knowledge of the plants and their medicinal properties are held by only a few individuals in this community. Further research on the medicinal plants mentioned in this study might provide some potential leads to fulfill the needs of search for bioactive compounds and the discovery of new drugs to fight diseases.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgements

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