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# An ethnobotanical study of indigenous knowledge on medicinal plants used by the village peoples of Thoppampatti, Dindigul district, Tamilnadu, India



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## ABSTRACT

**Ethnopharmacological relevance:** This study provides significant ethnopharmacological information, both qualitative and quantitative on medicinal plants in the Thoppampatti village, Dindigul district, Tamilnadu, India. There is urgency in recording such data to conserve the traditional medicinal plants. This is the first ethnobotanical study which records the traditional important medicinal plants of Thoppampatti village. To collect, analyze and evaluate the ethnopharmacologic knowledge in Thoppampatti village in order to protect it. This study reports the results of an ethnopharmacological survey on the uses of medicinal plants by inhabitants of the Thoppampatti.

**Materials and methods:** The field study was carried out in a period of about one year (April 2012–May 2013) in Thoppampatti village. The information was obtained through open and semi-structured interviews with 48 (27 males, 21 females) knowledgeable local people and traditional healers (THs). The collected data were analyzed qualitatively and quantitatively. In addition, use value (UV), relative importance (RI) and Jaccard index (JI) was determined.

**Results:** A total of 139 species of plants, mostly trees and herbs, belonging to 54 families were identified in this study. This is used to treat 142 diseases and ailments. These ailments were categorized into 18 major categories. Leaves were the most frequently used parts, while decoction and juice are the most common method of preparation to treat various diseases. Based on IUCN Red data the identified medicinal plants include 11 least concerned species, 3 vulnerable species and one endangered species. The most important species according to their use value were *Cynodon dactylon* (0.79), *Azadirachta indica* (0.73), *Ocimum tenuiflorum* (0.71), *Moringa oleifera* (0.68), *Coriandrum sativum* (0.62), *Abelmoschus esculentus* (0.61), *Acalypha indica* (0.59) and *Hibiscus rosa-sinensis* (0.59).

**Conclusion:** As a result of the present study, medicinal plants play an important role in the health care of Thoppampatti village inhabitants; they rely on medicinal plants to treat various ailments. In addition, the medicinal plants with high RI values might give some useful leads for further pharmacological investigations. Deforestation and overexploitation of a particular plant species leads to extinction so sustainable utilization of medicinal plants is recommended in the study area.

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## 1. Introduction

Ethnobotanical studies are very important to reveal the past and present culture about plants in the world. India is one of the treasure houses of medicinal plants in the world. The survey of medicinal plants in a particular area is important to conserve the traditionally important plants of that particular landscape (Sivasankari et al., 2013). The Indian subcontinent is praised with most varied and diverse soils and climate conditions suitable for

the growth of various plant species. India is very rich in medicinal plant information and known for its rich biodiversity of medicinal plants, hence called botanical garden of the world (Perumal Samy and Ignacimuthu, 1998).

India has a rich and varied heritage of biodiversity encompassing a wide spectrum of habitat from tropical rain forest to alpine vegetation and from semi-arid vegetation coastal wetlands. India figured with two hotspots the Western Ghats and the Eastern Himalayas; in addition, India has 26 recognized endemic centers that are home to nearly one third of all flowering plants identified and described to date in India. Of them 1.7 million of the worlds described biota, India contributes 3% of the global flora. Among the flowering plants, India accounts for 7% of 250,000 flowering plants so far described in the world (Ramesh, 2003). The World Health

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Organization estimates that about 80% of the population of most developing countries relies on herbal medicines for their primary health care needs (de Silva, 1997; Mukherjee and Wahil, 2006).

A vast knowledge on medicinal plants exists as or amongst the primitive societies of the country, where a large number of potent medicinal plants are found growing wild. A great amount of ethnobotanical research work has been undertaken in various forests of tribal/rural populations scattered throughout the country (Maheshwari, 2000). Indigenous knowledge of using medicinal plants for healing human ailments is, however, in danger of gradually becoming extinct, because this knowledge is passed on orally from generation to generation without the aid of a writing system and because many traditional healers do not keep written records (Kaido et al., 1997).

In view of the tremendously growing world population, increasing anthropogenic activities, rapidly eroding natural ecosystem is the main threat for medicinal plant. The natural habitat for a great number of herbs and trees are dwindling. Many of them are in an edge of extinction. According to the Red list of threatened species 44 plant species are critically endangered, 113 endangered and 87 vulnerable in India alone (IUCN, 2001). Unsustainable harvesting practices by herb gatherers, often for commercial purpose, have resulted in the depletion of many medicinal species in the forests. Low prices also discourage cultivation as with less effort (Bodeker and Burford, 2008). Conservation of natural resources in order to maintain the structure and functions of the ecosystem and ensure tangible benefits in term of fuel, fodder and other resource base needs is also a matter of much concern to the whole world today (Elizabeth and Dowdeswell, 1995).

The plains of Dindigul districts are blessed with rich diversity of medicinal plants because it is located in the foothills of Sirumalai hills. This makes it an ideal ground for the luxurious growth of plants with therapeutic value. But since the region being uncontrollably invaded by urban development and human settlements, life of such valuable medicinal wealth is at stake. The requirements of medicinal plants and their derivatives have been increased day by day. There is an urgent need to conserve the endemic diversity in the medicinal plants before it is wiped out from nature. Therefore, collection and cultivation of such species is important to conserve it. However, traditional knowledge of medicinal plants used by village people of Thoppampatti has not received enough attention yet; it deserves the modern research and development, only a few dedicated ethnopharmacological studies have been conducted in neighboring areas of Thoppampatti so far.

The main objective of this study is to documenting the floristic wealth of wild medicinal plants in Thoppampatti, record their local names (in Tamil) and conserve the traditional knowledge of village peoples on usage of indigenous medicinal plants to treat various health problems, analyze the data with different qualitative and quantitative tools to calculating the use value (UV), relative importance (RI) in order to identify the most important plant species used and encourage the conservation and sustainable utilization of medicinal plants in the study area.

## 2. Materials and methods

### 2.1. Description of the study area

Thoppampatti, a village in Dindigul district of Tamilnadu state, India which is located 63 km towards west from district capital Dindigul, 473 km from state capital Chennai. The entire area of Thoppampatti village lies between 10°27'0"N and 10°44'30"N latitude and 77°22'0"E and 77°43'0"E longitude with an area of nearly 590 sq. km and is surrounded by Palani towards South, Dharapuram towards North, Madathukulam towards west,

Oddanchatram towards East. (Fig. 1). The altitude of the study area is about 325 m above mean sea level with a mean annual rainfall of 836 mm, concentrated in the rainy season from October to December. In the hottest month, March the mean temperature is 32 °C and in the coldest month, October, the mean temperature is 19.7 °C, average humidity is 52%. Semi and tropical monsoon type of climate is prevailing in the village. Soils of the village are mainly yellowish brown to reddish brown. The general texture class of the soil is loamy sand to loamy clay and is relatively acidic in nature. Thoppampatti is a part of the biodiversity rich Western Ghats which is ecologically very sensitive and economically important for agricultural production and food supply. Medicinal plants in this village play a vital role in meeting the health requirements of the people, they are used in the local and siddha health care systems. According to the 2011 census of India, total population of Thoppampatti village is 3156 includes 1616 males and 1540 females. All residents have facilities to access sanitary toilet and safe drinking water, and 89.12% have electricity. The villagers are mostly farmers; the main crops cultivated in Thoppampatti are rice, ragi, sorghum, tomatoes, sugarcane and other vegetables. However, wild plant resources are of great importance for local people who still rely on forest for food, herbs and firewood etc. Generally, villagers are more willing to collect vegetables from the wild rather than cultivate them. Many plants are used as wild vegetables. The villagers derive their main monetary income through the sales of vegetables and non-timber forest products such as mushrooms, medicinal plants, wild edible vegetables and fruits etc. No previous floristic studies have been conducted and reported in Thoppampatti village.

### 2.2. Interviews and ethnobotanical data collection

For the study and documentation of medicinal plants, intensive exploration trips were conducted about twelve months from April 2012 to May 2013 for the through collection of ephemerals in Thoppampatti village Dindigul district. With the help of an interpreter, all interviews and discussions were conducted in Tamil (தமிழ்), the local language. Ethnobotanical information was collected using questionnaire by semi-structured interviews with knowledgeable village peoples, prior to the interviews the Informed Consent was obtained. A total of 48 informants (27 males and 21 females) includes various strata of participants (local users, knowledgeable persons and traditional vaidyas/healers; the age of the selected informants ranged between 40 and 89 years) were identified/selected from the community for thorough investigation. Among them 27% were above 70 years old, whereas 58% were between the ages of 50 and 70, and 14% were younger than 50. Women comprised 43% of the interviewees, and were important as they are more interested in local medicinal plants. Ethnobotanical properties of plants were recorded through informal meetings, interviews, open and group discussions and overt observation, with selected strata of informants. Field surveys were conducted according to life forms, flowering periods and seasons of utilization of plant products by village peoples. During the interviews, the vernacular names questions were asked about each medicinal plant prescribed, such as plant part used (i.e., leaves, root, stem, etc.), mode of preparation (i.e., decoction, infusion, powder, etc.), and route of administration (i.e., oral, external, etc.). Each time a plant was mentioned as used was considered a single 'use record' (Amiguet et al., 2005). For example, if plant A was used to treat fever, a single use record would be noted; however, if plant A was used to treat fever and diarrhea, two use records would be noted. Mentions were then classified by use categories following Cook (1995).

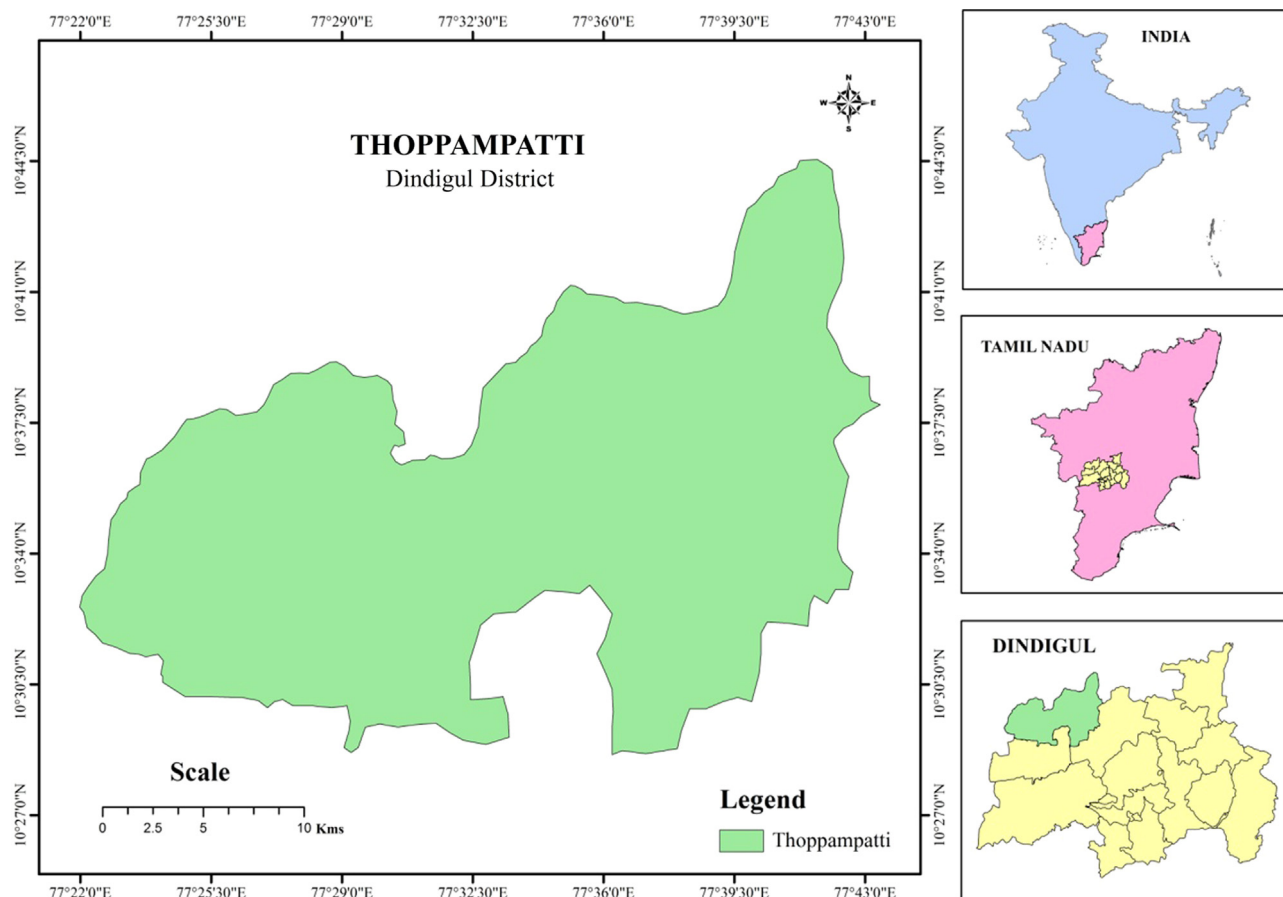


Fig. 1. Geographical position of the study area.

### 2.3. Collection of plants

All plant specimens were collected in both flowering and fruiting condition. In case if there is no flowering and fruiting conditions, the plant twig with few leaves were collected for proper identification with the help of local vaidyas and knowledgeable persons so as to ascertain the correct identification of plants and also to obtain information on their habitat. Samples of medicinal plants were collected for scientific identification and herbarium preparation following standard procedures (Jain and Rao, 1977). Specimen number, local name, location and identification points were remarked on each herbarium sheet and field note book. Digital photos of medicinal plants were attentively taken. Data on each plant were recorded by using the data capture form.

### 2.4. Taxonomic identification

The plants were identified by the professional experts and scientific names of plant species were recorded from reputed flora and books (Hooker, 1973; Kritikar and Basu, 1975; Jain and De Filippis, 1991). Some of the medicinal plants were identified in the field and the remaining ones were identified through a literature review. After identifying the medicinal plants, the herbarium specimens were taken to the Department of Biology, Gandhigram Rural Institute-Deemed University (GRI-DU), Gandhigram, Tamilnadu, South India for comparison and verification of each plant's scientific name. (The herbarium specimens will be donated to the GRI-DU after the completion of this research.)

### 2.5. Conservation status of the plants

In this study, collected plant species were compared with IUCN Red List in order to identify their status. Conservation status of the listed medicinal plants at local level was measured following the IUCN Red List Categories and Criteria, version 2013.1 (IUCN, 2013).

### 2.6. Data analysis

The majority of the data collected in this study were descriptive in nature. Interview data were coded and sorted into themes. Inconsistencies and unique statements were noted and given particular attention. Recurrent themes were uncovered in this report by a process of systematic content analysis. In its broadest sense, different researchers have emphasized various aspects of content analysis, from its capacity to generate quantitative descriptions by analyzing word counts (Silverman, 1993). Ethnobotanical data were analyzed and summarized by using Microsoft excel.

#### 2.6.1. Use value (UV)

The use value (Trotter and Logan, 1986), a quantitative method that demonstrates the relative importance of species known locally was also calculated using the following formula:

$$UV = (\sum U/n)$$

Where UV is the use value of species, 'U' is the total number of use reports per species and 'n' represents the total number of informants interviewed for a given plant. Values will be high (near 1) if there are many use reports for a plant, implying that the plant is



important, and near 0 if there are few reports related to its use. The use value does not distinguish whether a plant is used for single or multiple purposes.

### 2.6.2. Relative importance (RI)

Relative importance value (RI) was calculated according to Bennett and Prance (2000).  $RI = PP + AC$ , where PP is obtained by dividing the number of pharmacological properties (reported specific ailments) attributed to a species divided by the maximum number of properties attributed to the most resourceful species (species with the highest number of properties). AC is the number of ailment categories treated by a given species divided by the maximum number of ailment categories treated by the most resourceful species. Highest possible value of RI is 2.0, which indicates the highest diversity of medicinal uses of a plant.

### 2.6.3. Jaccard index (JI)

We also calculated Jaccard index (JI) for comparison with previously published data collected from neighboring regions was performed by analyzing the percentages of quoted species and their medicinal uses. JI is calculated using the following formulae:

$$JI = \frac{c \times 100}{a + b - c}$$

where  $a$  is the number of species of the area A,  $b$  is the number of species of the area B, and  $c$  is the number of species common to both A and B (Gonzalez-Tejero et al., 2008).

## 3. Results and discussion

### 3.1. Documentation of indigenous knowledge on ethnomedicine

The experiences of the local people were recorded during the interviews. The results of the field survey are presented in Table 1 and arranged in alphabetical order of their family names. For each species, the botanical and family name, vernacular name (Tamil) and English name, life form, part(s) used, preparation/administration, Traditional medicinal uses, important chemical compounds and user values are presented. During the study, 198 specimens were collected in the research area. According to the results of identification of the specimens, 139 medicinal plant species belonging to 54 families were found in the research area. Among them 114 species are wild and 25 species are cultivated plants. The most common medicinal plant families are Fabaceae (17.82%), Cucurbitaceae (7.19%), Apocynaceae (6.47%), Lamiaceae (5.03%), Malvaceae (4.31%), Amaranthaceae (4.31%), Moraceae (4.31%), Rubiaceae (2.87%) and Rutaceae (2.87%). The most frequently used medicinal plants were *Andrographis paniculata*, *Cynodon dactylon*, *Moringa oleifera*, *Ocimum tenuiflorum*, and *Azadirachta indica*.

### 3.2. Collection sites

Medicinal plants are collected in the wild by individuals or their family members. Three percent of medicinal plants used were cultivated for medicinal purposes, and 17.98% were cultivated as vegetables, with 79.02% found growing wild in fields, backyards, or forests. Most plants could be easily found near homes, reflecting that the current study area is rich in natural resources allowing for the collection, rather than cultivation of medicinal plants. One must consider that the medicinal properties of plants, as well as the secondary metabolites produced under stress and competition, are not always expressed in fast growing monocultures. Rather, higher levels of active compounds may be present in wild populations where plants grow more slowly (Uniyal et al., 2006). Cultivation of medicinal plants can not only conserve the plant resources but also

makes them convenient to be collected. In addition, generally, plants cultivated in home gardens are more frequently used by indigenes (Zheng and Xing, 2009). Therefore, it is necessary to conduct further investigation into the components of medicinal plants and to conduct chemical analysis.

### 3.3. Life forms and relative abundance of the plants

In the current survey, 30.20% of the reported species are herb. Other highly reported species are tree (28.05%), shrub (20.14%), climber (10.07%), creeper (5.75%) and succulent (1.43%). The frequent use of herbs among the indigenous communities is a result of wealth of herbaceous plants in their environs (Tabuti et al., 2003). Among the plants documented, 39.75% and 18.43% of the species grow in homestead and hill forest respectively. But most of the portions (41.82%) grew in both homestead and hill forest. According to the present study, the plants are wild (79.02%) or cultivated (17.98%). Some of them are both cultivated and wild (3.00%). The documented species are categorized into three classes namely common, less common and rare. In most of the cases we found the reported plants in common (65.81%) category. Only some of the species fall in rare category (3.59%) and these are *Asparagus racemosus*, *Enicostemma axillare*, *Gloriosa superba*, *Phylla nodiflora* and *Saraca asoca*.

### 3.4. Plant parts used

Analysis of the growth forms of the medicinal plants used in the study area revealed that local people were recorded to use the flowers, fruits, latex, leaves, rhizomes, roots, seeds, spike, bark, bulb, corms, wood, gum, pods, grains, stem, tuber and whole plant. All parts of various plant species are used against a variety of diseases. The most frequently used part is the leaves (23%), followed by roots (16%), whole plant (15%), seed (12%), fruits (10%), barks (10%), flowers (6%), gum (2%), wood, latex, stem (1% each) and others (3% includes Spike, Corms, Pods, Grains and Rhizome) (Fig. 2). In some cases, more than one organ of the same species, especially a combination of leaves and stems, are used in the preparation of different medicines. This finding in our study is in line with many ethnobotanical surveys showing that leaves were most frequently used in areas such as China, India, Thailand, Bangladesh, Peruvian Amazon and Colombia (Singh and Singh, 2009; Kadir et al., 2013; Vásquez et al., 2013; Island et al., 2013). Many indigenous communities elsewhere also utilized mostly leaves for the preparation of herbal medicines (Ayyanar and Ignacimuthu, 2011). The leaves were predominantly used part compared with others, this is because they were collected very easily than underground parts, flowers and fruits etc. (Giday et al., 2009) and in scientific point of view leaves are active in photosynthesis and production of metabolites (Ghorbani, 2005). Beside this another important reason of using leaves could be concerning conservation of the plants as digging out roots might be the cause of death of the plant and putting the species in a vulnerable condition (Kadir et al., 2012).

### 3.5. Utilization method of medicinal plants

Traditionally used plants are prepared and administrated in different ways. Of those reported in the study, 88.49% of plants were reported to be consumed only internally by informants, 11.51% were reported to be use externally, whereas some of the plants were used both internally and externally. As far as internal consumption is concerned different preparation methods are used which include decoction, infusion, juice, powder, paste, cooked, pickle and chewing. The major mode of preparation is decoction (34.37%) followed by juice (21.35%), powder (21.35%), paste (9.37%),

**Table 1**  
List of traditional medicinal plants investigated in this study with their related information.

Voucher no.	Botanical name	Family	Vernacular name <sup>a</sup>	English name	Life form	Plant part(s) used <sup>b</sup>	Admin/ prep. <sup>c</sup>	Ailments treated/therapeutic effect	Major chemical compounds	UV <sup>d</sup>
PG117	<i>Andrographis paniculata</i> (Burm. f.) wall. ex Nees	Acanthaceae	நிலவேம்பு (Nilavembu)	Chiretta	Herb	WP	Or, Ju, De	Antipyretic, anthelmintic, Chronic fever & bronchitis	Andrographolide, bicyclic diterpenoid lactone, kalmeghin	0.49
PG219	<i>Justicia beddomei</i> (Clarke) Bennet	Acanthaceae	ஆடாதொடா (Aaduthota)	Adulsa	Shrub	WP	Or, De	Irritable, cough, hemoptysis, analgesic & asthma.	Tannins, morphine	0.43
PG107	<i>Achyranthes aspera</i> L.	Amaranthaceae	நாயுருவி (Nayuruvi)	Prickly chaff flower	Herb	WP, Sp	Ex, Pt, Pd	Carminative, asthma, dyspepsia & Flatulence	Achyranthine, saponins, ecdysterone.	0.36
PG109	<i>Aerva lanata</i> (L.) juss. Ex schult.	Amaranthaceae	சிறுபூளை (Siru pulai)	Mountain Knot grass	Succulent	WP, Rt	Or, De	Astringent, suppurative, lithontriptic & cough	Methylervine, kaempferol, quercetin.	0.01
PG113	<i>Alternanthera sessilis</i> (L.) R. Br. ex Dc	Amaranthaceae	பொன்னாங்கண்ணி கீரை (Ponnankani keerai)	Sessile joyweed	Herb	WP	Or, De	Depurative, digestive problems & night blindness	$\alpha$ -Spinasterol, $\beta$ -spinasterol, stigmasterol.	0.51
PG114	<i>Amaranthus spinosus</i> L.	Amaranthaceae	முள்ளுக்கீரை (Mullukeerai)	Spiny amaranth	Herb	WP	Ex, In	Stomachic & eczema	Betacyanin, amaranthine, stigmasterol	0.13
PG154	<i>Chenopodium album</i> L.	Amaranthaceae	பருப்புக்கீரை (Paruppukeerai)	Wild spinach	Herb	WP	Or, Ju, Pd	Laxative, anthelmintic against round and hookworms, blood purifier, antiscorbutic & intestinal ulcers	Ascaridole, cryptomeridiol	0.28
PG115	<i>Anacardium occidentale</i> L.	Anacardiaceae	முந்திரி (Mundhiri)	Cashew nut	Tree	Rt, Br, Le, Fr	Or, Ju, De	Purgative, snake bite, leprosy & anorexia	Anacardic acid, $\beta$ -copaene, $\beta$ -caryophyllene.	0.31
PG221	<i>Lannea coromandelica</i> (Houtt.) Merrill.	Anacardiaceae	ஓதியன் (Odiyan)	Wodier	Tree	Br, Le, Gu	Or, De, Ex	Stimulant, astringent, gout, sprains, bruises, local swellings, elephantiasis & asthma	Cluytly ferulate, lanosterol, <i>dlepi</i> - catechin, <i>iso</i> -quercetin, morin	0.17
PG119	<i>Annona squamosa</i> L.	Annonaceae	சீதாபழம் (Sitappalam)	Custard apple	Tree	Rt, Le, Fr, Sd	Or, Pd, Ju	Spinal disorders, invigorating, mental depression & sedative	Heterophylline, isoatisine quinoline, Squamone, bullatacinone.	0.17
PG259	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Annonaceae	நெட்டிலிங்கம் (Nettilingam)	Mast tree	Tree	Br	Or, De	Fever, skin diseases & anthelmintic	Azafluorene, clerodane Diterpenes, polyalthialdoic acid	0.17
PG166	<i>Coriandrum sativum</i> L.	Apiaceae	கொத்துமல்லி (Kothumalli)	Coriander	Herb	Le, Fr	Or, Ju	Stimulant, stomachic, carminative, antispasmodic, diuretic & anthelmintic	Delta-linalool, coumarins, Phthalides, phenolic acids	0.62
PG180	<i>Daucus carota</i> L.	Apiaceae	மஞ்சள் கிழங்கு (Manjal kilangu)	Wild carrot	Herb	Rt, Sd	Or, Co, Ju	Palpitation, burning maturation, kidney stones, cough & bronchitis	Apigenin, chypsin, luteolin, furanocoumarins,	0.26
PG141	<i>Calotropis gigantea</i> (L.) R. Br. ex. Schult.	Apocynaceae	எருக்கு (Erukku)	Rubber bush	Shrub	WP	Or, Pd, Ju	Stomachic, purgative, bronchitis & asthma	Akudarin, $\beta$ -amyrin, stigmasterol	0.29
PG151	<i>Catharanthus roseus</i> (L.) G. Don.	Apocynaceae	நித்தியகல்யாணி (Nithiyakalyani)	Madagascar periwinkle	Subshrub	WP	Ex, Pt	Sedative, wasp stings, cytostatic & anti-neoplastic	Rosinidin, vinblastine, vincristine	0.02
PG199	<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Schult.	Apocynaceae	சிறுகுறிஞ்சான் (Shirukurinja)	Australian cow plant	Herb	WP	Or, Pd, De	Diabetes, stimulates the heart, circulatory system, activates the uterus, & furunculosis	Gymnemagenin, gymnemic acid, oleanane	0.21
PG204	<i>Hemidesmus indicus</i> (L.) R. Br.	Apocynaceae	நன்னாரி (Nannari)	Indian sarsaparilla	Semi erect shrub	Rt, Le, St	Or, De	Blood purifier, syphilis, leucorrhea, galactagogue, diarrhea, febrifuge, alterative & abscess	Coumarino-lignoids, hemidesmine, emidine, indicine	0.31
PG206	<i>Holarrhena pubescens</i> Wall. ex G. Don.	Apocynaceae	குடசப்பாலை (Kudasappaalai)	Indrajao	Shrub	Br, Le, Sd	Or, De, Pd	Asthma, amebiasis, rheumatism, malaria, colic, dyspepsia, piles, diseases of the skin and spleen & toning up vaginal tissues after delivery	Regholarrhenine-A, pubescine, norholadiene, pubescimine, kurchinin, holarifine	0.12
PG207	<i>Holostemma adakodien</i> Schult. H. rheedii Wall.	Apocynaceae	பலைகீரை (Palaykeerai)	Holostemma	Climber	Rt	Or, Pd, De	Spermatorrhoea, laxative, stomachic, fever & ophthalmic.	$\alpha$ -Amyrin, lupeol, $\beta$ -sitosterol	0.06

PG209	<i>Ichnocarpus frutescens</i> (L.) R. Br.	Apocynaceae	உடற்கொடி (Udarkodi)	Black creeper	Climber	Rt, Sd	Or, De	Hyperdipsia, seminal weakness, gout, rheumatism, bronchitis & asthma	Mustard oil, glucoiberin, cucurbitacin E,	0.09
PG258	<i>Plumeria rubra</i> L.	Apocynaceae	களளிமந்தாரை (Kallimantarai)	Red jasmine	Tree	Rt, Le	Or, De	Ulcers, rheumatism, venereal diseases & leprosy	Rubrinol, cardiac glycosides	0.11
PG268	<i>Sarcostemma acidum</i> (Roxb.) Voigt.	Apocynaceae	சோமம் (Somam)	Moon plant	Shrub	WP	Or, Rw	Viral infection, hydrophobia, emetic, insecticidal & psychopathy	Malic acid, succinic acid, lupeol	0.01
PG165	<i>Colocasia esculenta</i> (L.) Schott	Araceae	சேம்பு (Chaembu)	Edibleyam	Herb	Le, Cs	Or, Co	Internal hemorrhages, demulcent, anodyne, alopecia & rubefacient	Calcium oxalate, apigenin, luteolin	0.57
PG120	<i>Areca catechu</i> L.	Arecaceae	கொட்டைப்பாக்கு (Kottai pakku)	Betel Nut	Tree	Rt, Le, Fr	Or, Ch	Astringent, anthelmintic, leucorrhea & vaginal laxity	Arecaidine, arecoline	0.38
PG138	<i>Borassus flabellifer</i> L.	Arecaceae	பனைமரம் (Panaimaram)	Palmyra palm	Tree	Rt, Le, Fr	Or, Fr, Ju	Diuretic, cooling, laxative, anti inflammatory, antibilious, gastritis & hiccups	Vitamins A and C, borassosides, dioscin, spirostane	0.57
PG123	<i>Aristolochia bracteolata</i> Lam.	Aristolochiaceae	ஆடுதீண்டாபானை (Aadutheendaappaalai)	Bracteated birthwort	Herb	Rt, Le, Sd	Or, Ju	Intestinal worms, abortifacient & emmenagogue	Ceryl alcohol, aristolochic acid, $\beta$ -sitosterol.	0.16
PG124	<i>Aristolochia indica</i> L.	Aristolochiaceae	ஆடகம் (AaAdagam)	Indian birthwort	Creepers	Rt, Le, fr	Ex	Anodyne, diuretic, cardiotonic, abortifacient & emmenagogue	Aristolochic acid, aristolactams.	0.08
PG126	<i>Asparagus racemosus</i> Willd.	Asparagaceae	தண்ணீர்விட்டான் கிழங்கு (Thanneervittan kizhangu)	Indian asparagus	Herb	Tu Rt	Or	Galactagogue, hematuria, dysentery & throat infections	Asparagamine A, shatavaroside A, sarsasapogenin	0.18
PG203	<i>Helianthus annuus</i> L.	Asteraceae	தூரியகாந்தி (Suriyakanthi)	Sunflower	Herb	Rt, Le, Fl, Sd	Or, De	Coughs and colds, bronchial, Laryngeal, pulmonary affections & whooping cough	Fatty oil, tocopherols, phytosterol	0.28
PG131	<i>Basella alba</i> L. var. <i>rubra</i> Stewart.	Basellaceae	கொடிப்பசளி (Kodippasali)	Indian spinach	Creepers	St, Le	Or, Ju	Demulcent, diuretic & laxative	arginine, leucine, isoleucine, lysine, threonine, tryptophan, soluble oxalates	0.38
PG143	<i>Carica papaya</i> L.	Caricaceae	பப்பாளி (Pappali)	Papaya	Tree	Fr, Lx	Or, In	Stomachic, digestive, carminative, diuretic, galactagogue, abortifacient, vermifuge & piles	Papin, carpasemine carpaine, sarsasapogenin	0.48
PG153	<i>Celastrus paniculatus</i> Willd.	Celastraceae	வாலுஞ்சை (Valuluvai)	Staff tree	Climber	Br, Le, Sd	Or, De, Pt	Nervine, brain tonic, diaphoretic, febrifugal, emetic & paralysis	Celastrine, paniculatin	0.11
PG160	<i>Cleome viscosa</i> L.	Cleomaceae	நாயக்கடுகு (Nayikkadugu)	Wild mustard	Shrub	WP	Or, Pd	carminative, antiseptic, anthelmintic, rubefacient & vesicant	Macrocyclic, diterpene, cleomaldeic acid, cleomeolide, Colchicine, gloriosine,	0.07
PG194	<i>Gloriosa superba</i> L.	Colchicaceae	கலப்பைக்கிழங்கு (Kalappankizhangu)	Glory Lily	Herb	Rz	Or, Co	Uterine stimulant, gout, anti inflammatory, alterative & anthelmintic	Colchicine, gloriosine,	0.07
PG189	<i>Evolvulus alsinoides</i> (L.)	Convolvulaceae	விஷ்ணுக்ராந்தி (Vishnukranti)	Dwarf morning glory	Herb	WP	Or, De	Conception, epilepsy, insanity, spermatorrhoea, uterine bleeding & internal hemorrhages	Evolvine, $\beta$ -sitosterol, stearic, oleic, linoleic acids, pentatriacontane, triacontane	0.03
PG211	<i>Ipomoea batatas</i> (L.) Lam.	Convolvulaceae	சர்க்கரைவள்ளி கிழங்கு (Sakkaravalli kilangu)	Sweet potato	Herb	Tu, Rt,	Or, Co	Renal, calculi, diabetes & general weakness	Starch, dextrose, carotene	0.31
PG235	<i>Merremia tridentata</i> (L.) Hallier. f.	Convolvulaceae	முடியாச்சுந்தல் (Mudiyar kunthal)	Arrow-leaf morning glory	Creepers	WP	Or, De	Hemiplegia, uropathy, Laxative, inflammations & general debility	Flavonoids, diometin, luteolin, 7-O- $\beta$ -D-glucosides	0.19
PG158	<i>Citrullus colocynthis</i> (L.) Schrad.	Cucurbitaceae	குமட்டி (Kumatti)	Colocynth bitter apple	Herb	Rt, Fr	Ex, Pt	Migraine, jaundice, neuralgia, varicose veins & piles	Cucurbitacin, quercetin,	0.17
PG164	<i>Coccinia grandis</i> (Lin.) Voigt	Cucurbitaceae	கோவை (Kovai)	Ivy gourd	Climber	Rt, Le, Fr	Or, Ju, Co	Carminative, antipyretic, jaundice, galactagogue, antispasmodic & expectorant	Lupeol, cucurbitacin B	0.36
PG169	<i>Cucumis melo</i> L.	Cucurbitaceae	சுக்கங்காய் (Sukkangai)	Snake cucumber	Creepers	Fr, Sd	Or, Ju	Appetizer, galactagogue, cooling, diuretic, used in painful maturation & suppression of urine	Cucurbitacin B, C, D and Q	0.25
PG170	<i>Cucumis sativus</i> L.	Cucurbitaceae	வெள்ளிக்காய் (Vellari)	Cucumber	Creepers	Fr, Sd	Or, Pi	Hyperdipsia, Insomnia & constipation	Avenasterol, spinasterol, karounidiol, isokarounidiol	0.31
PG172	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae	பரங்கிக்காய் (Parangikayi)	Red pumpkin	Creepers	Fr, Sd	Or, Co, Ju	Refrigerant, diuretic, neuralgia & migraine	Vitamin B, Calcium, cucurbitacins, linonelic acid	0.56
PG220	<i>Lagenaria siceraria</i> (Mol.) Standl.	Cucurbitaceae	சுரைக்காய் (Suraikai)	Bitter bottle gourd	Climber	Le, Fr	Or, Co	Bronchitis, asthma, inflammations, jaundice & purgative.	Cucurbitacin, $\beta$ -glycosidase,	0.46

Table 1 (continued)

Voucher no.	Botanical name	Family	Vernacular name <sup>a</sup>	English name	Life form	Plant part(s) used <sup>b</sup>	Admin/ prep. <sup>c</sup>	Ailments treated/therapeutic effect	Major chemical compounds	UV <sup>d</sup>
PG230	<i>Luffa cylindrica</i> (L.) M. Roem.	Cucurbitaceae	பீர்க்கங்காய் (Pirkankay)	Sponge gourd	Climber	Fr, Sd	Or, Ju, De	Pharyngitis, rhinitis, mastitis, swellings, amenorrhea, burns & migraine.	Bryonolic acid, lucyosides, oleanane	0.08
PG237	<i>Momordica charantia</i> L.	Cucurbitaceae	பாகற்க்காய் (Paharkai)	Bitter gourd	Climber	WP		Anthelmintic, intermittent, fever, ulcers & jaundice.	Charantin, P-insulin, Galactouronic acid	0.49
PG242	<i>Mukia maderaspatana</i> (L.) M. Roem.	Cucurbitaceae	முசுமுசுக்கை (Musumusukkai)	Rough bryony	Climber	WP	Or, De	Burning sensation, aperients & neuralgia	Columbin, linoleic, oleic and palmitic acids	0.16
PG229	<i>Luffa acutangula</i> var. <i>amara</i> (Roxb.) C.B. Clarke	Cucurbitaceae	பெருபீர்க்கம் (Perupeerkam)	Ridged gourd	Climber	Fr, Le, Sd	Or, Ju, Co	Purgative, diuretic, splenic enlargement, cough, asthma, emetic & expectorant	Oleanane	0.18
PG177	<i>Cyperus rotundus</i> L.	Cyperaceae	கோரைக்கிழங்கு (Koraikkizhangu)	Nut grass	Grass	Rz	Or, De, Pd	Carminative, febrifuge, hepatoprotective, diuretic, antipyretic, analgesic, emmenagogue & leprosy	$\alpha$ -Cyperone, $\beta$ -selinene, cyperene, patchoulene, kobusone, isokobusone	0.06
PG106	<i>Acalypha indica</i> L.	Euphorbiaceae	குப்பைமேனி (Kuppaimeni)	Indian acalypha	Herb	WP	Ex, Pt	Diuretic, skin diseases, constipation & bronchitis	Kaempferol, acalphyne, quinine, tannin	0.59
PG218	<i>Jatropha curcas</i> L.	Euphorbiaceae	காட்டாமணக்கு (Kattamannaku)	Physic nut	Shrub	Le, Oi	Ex, Pt	Scabies, ringworm, eczema, whitlow, warts, syphilis & animal bites	Curcin, curcosones, lathyrane diterpenes	0.21
PG264	<i>Ricinus communis</i> L.	Euphorbiaceae	ஆமணக்கு (Aamanaku)	Castor oil plant	Shrub	Rt, Le, Fl, Sd, Oi	Ex, Pt, Oil	Constipation, fever, purgative, bronchitis & dermatitis	Albumin, ricin, ricinine, ricinoleic acid	0.09
PG103	<i>Abrus precatorius</i> L.	Fabaceae	குண்டுமணி (Gundumani)	Indian Wild liquorice	Climber	Rt, Le, Sd	Ex, De	Diuretic & aphrodisiac	Abrine, Precatorine, abrusgenic acid	0.05
PG104	<i>Acacia arabica</i> (Lam.) Willd.	Fabaceae	கருவேலம் (Karvelam)	Babul	Tree	Br, Fl	Ex, Pt	Skin disease, bleeding piles & dental problems	Tannins, gallic acid	0.29
PG105	<i>Acacia catechu</i> (L.f.) Willd.	Fabaceae	கருங்காலி (Karungali)	Cutch tree	Tree	Br, Wd	Pt, De	Stomachic, antiseptic & conjunctivitis	Catechin, catechutannic acid, epicatechin, taxifol.	0.13
PG110	<i>Albizia lebbek</i> (L.) Benth.	Fabaceae	வேங்கை (Vagai)	Siris tree	Tree	Br, Fl, Sd	Or, De	Scrofula, skin eruptions & leprosy	Oleanolic acid, proceric acid, $\beta$ -sitosterol,	0.09
PG133	<i>Bauhinia variegata</i> L.	Fabaceae	மந்தாரை (Mantharai)	Mountain ebony	Tree	Rt, Le	Or, De, Pd	Styptic, dyspepsia, flatulence, hematuria, menorrhagia, anthelmintic & piles	Kaempferol-3-galactoside, kaempferol-3-rhamnoglucoside, octacosanol, stigmasterol,	0.08
PG139	<i>Butea monosperma</i> (Lam.) Taub.	Fabaceae	புரசு (Purasu)	Flame of the forest	Tree	Br, Le, Fl, Sd, Gu	Or, De, Pd	Styptic, anthelmintic, leucorrhoea, emmenagogue & hepatoprotective	Coreopsin, monospermoside, butin, butrin, isobutrin, palastrin	0.16
PG140	<i>Cajanus cajan</i> (L.) Millsp.	Fabaceae	துவரை (Thuvarai)	Pigeon pea	Herb	Le, Sd	Or, Pt, Ju	Hypocholesterolemic, jaundice, oral problems & eruptions	Phenylalanine, cajanol, riboflavin, Pyridoxine	0.42
PG145	<i>Cassia fistula</i> L.	Fabaceae	சரக்கொன்றை (Sarakkonrai)	Indian laburnum	Tree	Fr, Sd	Or, Pd	Purgative, febrifugal, astringent, antibilious & amebiasis	Sennosides A, rhein, tannin, kaempferol, fistul.	0.16
PG147	<i>Cassia occidentalis</i> L.	Fabaceae	பேயாவாரை (Paeyaavara)	Coffee Senna	Herb	WP	Or, Ju, Pd, De	Febrifugal, expectorant, stomachic, whooping cough & convulsions	Chrysarobin, N-methylmorpholine, sennosides, anthraquinones	0.08
PG149	<i>Cassia senna</i> L.	Fabaceae	நிலாவாரை (Nilaavaarai)	Indian senna	Tree	Le, Dr, Fr	Or, Pd	Antibilious, distention of stomach, vomiting, hiccups	Rhein, aloë-emodin, kaempferol, isomammnetin.	0.24
PG150	<i>Cassia tora</i> L.	Fabaceae	தகரை (Thagarai)	Sickle senna	Legume	Le, Sd	Or, Pd	Jaundice, dysentery, eczema & ringworm	Chrysophanol, aloë-emodin, Thrachrysone, rhein, emodin	0.13
PG163	<i>Clitoria ternatea</i> L.	Fabaceae	கன்னிக்கொடி (Kannikkodi)	Butterfly pea	Herb	Rt, Le, Sd	Or, Pd, Ju	Cathartic, purgative, aphrodisiac, elephantiasis & eruptions	Tannins, resins, starch, taraxerol, taraxerone	0.09
PG168	<i>Crotalaria juncea</i> L.	Fabaceae	சனல் (Sanal)	Sun Hemp	Shrub	Le, Sd	Or, Pd	Demulcent, purgative, emetic, emmenagogue, abortifacient, psoriasis & impetigo	Junceine, tricosedmine, riddelline, seneciphylline, senecionine	0.18



PG174	<i>Cyamopsis tetragonoloba</i> (L.) Taub.	Fabaceae	கொத்தவரை (Kothavarai)	Cluster bean	Herb (legume)	Pd	Or, Co	Digestive, appetizer, laxative, antibilious, galactagogue & nyctalopia	Galactomannan, 3-epikatonc acid	0.43
PG182	<i>Desmodium gangeticum</i> (L.) DC.	Fabaceae	சிறுபுல்லாடி (Sirupulladi)	Tick tree	Shrub	Rt	Or, De	antipyretic, diuretic, astringent, aphrodisiac, expectorant & debility	Dimethyltryptamine, hypaphorine, hordenine, candicine, N-methyltyramine, β-phenylethylamine	0.16
PG183	<i>Dichrostachys cinerea</i> (L.) Wight and Arn.	Fabaceae	விடத்தலை (Vidathalai)	Sicklebush	Tree	Rt, Br, Tr, Sh	Or, De	Constipation, lithontriptic, elephantiasis & vaginopathy	Tannin, n-octacosanol, beta-amyrin, cyanidin, quercetin.	0.08
PG186	<i>Erythrina variegata</i> L.	Fabaceae	கல்யாணமுருங்கை (Kalyana Murukkan)	Indian coral tree	Tree	Br, Le	Or, Pd, De	Antibilious, anthelmintic, febrifuge, astringent, expectorant & rheumatism	Erythraline, erythramine, erythrinine, octacosyl ferulate	0.26
PG210	<i>Indigofera tinctoria</i> L.	Fabaceae	சிவனார்வேம்பு (Sivanarvembu)	Indigo	Shrub	WP	Or, De	Hepatoprotective, hypoglycemic, nervine, leucorrhea, burns, ulcers, piles, epilepsy, asthma, lumbago & gout	Indicine, apigenin, kaempferol, luteolin, quercetin	0.16
PG241	<i>Mucuna pruriens</i> (L.) D.C.	Fabaceae	பூனைக்காலி (Poonaiikkaali)	Velvet bean	Climbing shrub	Rt, Le, Sd,	Or, De, Pd	Impotence, spermatorrhoea, urinary problems, leucorrhea, neurosis, mild vesicant	Mucunine, prurieninine, glutathione, lecithin, vernolic, gallic acids	0.13
PG260	<i>Pongamia pinnata</i> L.	Fabaceae	புங்கமரம் (Pungmaram)	Indian beech	Tree	Rt, Le, Fl, Br, Sd	Or, Ju, Ex, Oil	Hemorrhages, beriberi, dermatopathy, otalgia, anorexia & anemia	Salicin, populin, erisin, tannin	0.18
PG263	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	வேங்கை (Vengai)	Indian kino tree	Tree	Wd, Le, Fl, Gu	Or, De	Elephantiasis, fracture, anemia, Hemorrhages, sores, fevers, anorexia & wounds	Tannins, pterostilbene, liquiritigenin, Kino tannic, marsupin, propterol	0.13
PG267	<i>Saraca asoca</i> (Roxb.) De Wilde.	Fabaceae	அசோகம் (Asogam)	Ashoka tree	Tree	Br, Le, Fl, Sd	Or, De	Fever, pimples, syphilis, uterine tonic, menorrhagia, hemorrhagic & bone fracture	Gallic acid, quercetin, tannin, leucocyanidin	0.03
PG271	<i>Tephrosia purpurea</i> (L.) Pers	Fabaceae	கொழிஞ்சி (Kolingi)	Wild indigo		Br, St	Or, Pd	Urinary disorder, stop vomit, laxative, bronchitis & rheumatism	Tephrosin rutin, rotenoids, lupeol, kanjone, lanceolarin	0.03
PG184	<i>Enicostemma axillare</i> (Lam.) Raynal	Gentianaceae	வெள்ளருகு (Vellargu)	Indian gentian	Herb	WP	Or, Pd, De	Bitter tonic, carminative, blood purifier, anti inflammatory, antipsychotic, anthelmintic, snake bite & dropsy	Ophelic acid, gentianine, erythrocentaurin, swertiamarin and gentiocrucine	0.13
PG118	<i>Anisomeles malabarica</i> (L.) R. Br. ex Sims	Lamiaceae	பேய்மிரட்டி (Peyimaruttii)	Malabar catmint	Herb	WP	Or, Pd, De.	Anthelmintic, febrifuge, epilepsy, anorexia	β-Sitosterol, letulinic acid, ovatodiolide, anisomelic acid.	0.09
PG162	<i>Clerodendrum viscosum</i> Vent.	Lamiaceae	பெருகிளை (Perukilai)	Glory tree	Shrub	Le, Rt	Or, Ex, Ju, Pt	Antiprotozoal, rheumatism, colic pain, skin diseases & alopecia	Clerodolone, clerodone, clerodol, scutellarin, Poriferasterol.	0.03
PG195	<i>Gmelina arborea</i> Roxb.	Lamiaceae	குமிழம் (Kumizham)	White teak	Tree	Rt, Br	Or, De	Stomachic, laxative, antibilious, demulcent, galactagogue, & febrifuge	Lignans, arborone, paulownin acetate, epieudesmin	0.14
PG225	<i>Leucas aspera</i> (willd.) Link	Lamiaceae	தும்பை (Thumbai)	White dead nettle	Herb	Le, Fl	Or, De, Ju	Carminative, antihistaminic, antipyretic, febrifuge, antiseptic, jaundice, anorexia, dyspepsia, anthelmintic, respiratory & skin diseases	Triterpenoid, leucolactone, sitosterol, stigmasterol, campesterol.	0.29
PG233	<i>Mentha arvensis</i> var. piperascens Malinv. ex Holmes	Lamiaceae	புதினா (Putina)	Japanese mint	Herb	Le	Or, Ju, Co	Arthralgia, halitosis, colic, dental caries, asthma & fever	Menthol, α- and β-pinene, α-thujene, l-limonene, β-phellandrene, furfural	0.18
PG246	<i>Ocimum basilicum</i> L.	Lamiaceae	திருநீற்றுபச்சிலை (Thiruneettrupachilai)	Sweet basil	Shrub	Le, Sd	Or, Ju, De	Cold, malaria, carminative, antispasmodic, diuretic, demulcent & antibacterial	Linalool, ocimene, citronellol, myrcene, eugenol	0.08
PG247	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	துளசி (Tulasi)	Holy basil	Shrub	WP	Or, De, Pd	Cardiopathy, luecoderma, Asthma, genitourinary diseases & ophthalmia.	Eugenol, carvacrol, nerol,	0.71
PG181	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Loranthaceae	புல்லுருவி (Pulluruvi)	Mistletoe	Herb	WP	Or, Ju	Astringent, narcotic, swellings, strangury, renal, calculi & diuretic	Quercitrin, gallic, ellagic and chebulinic acids	0.09
PG223	<i>Lawsonia inermis</i> L.	Lythraceae	மருதாணி (Maruthani)	Henna	Tall shrub	Rt, Le, Sd	Or, De, Ex, Pa	Astringent, hemorrhagic, antispasmodic, antifungal, antibacterial & hair Conditioner	naphthoquinones, lawsone, coumarins, tannins	0.31
PG101	<i>Abelmoschus moschatus</i> (L.) Medik.	Malvaceae	வெற்றிலை கஸ்தூரி (Vetrilai kasthuri)	Musk seed	Herbs	Br, Sd	Or, De	Ophthalmia, cough, asthma & nausea	β-Sitosterol, myricetin, plasmalogen	0.12

Table 1 (continued)

Voucher no.	Botanical name	Family	Vernacular name <sup>a</sup>	English name	Life form	Plant part(s) used <sup>b</sup>	Admin/ prep. <sup>c</sup>	Ailments treated/therapeutic effect	Major chemical compounds	UV <sup>d</sup>
PG102	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	வெண்டை (Vendai)	Lady finger	Subshrub	Fr	Or, Co	Gonorrhea, anemia & urethrorrhea	Oxalic acid	0.61
PG137	<i>Bombax ceiba</i> L.	Malvaceae	முள்ளிலவு (Mullilavu)	Cotton tree	Tree	Rt, Gu, Le, Fl, Fr, Sd	Or	Demulcent, emollient, skin troubles, splenomegaly & inflammations	Lycopsamine, supindine viridiflorate	0.31
PG196	<i>Gossypium herbaceum</i> L.	Malvaceae	பருத்தி (Paruthi)	Asiatic cotton	Shrub	Le, Sd	Or, Pd, De	Diuretic, demulcent, laxative, expectorant, abortifacient, galactagogue & nerve	Gossypol, myristic, myristoleic acids	0.11
PG205	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	செம்பருத்தி (Semparuthi)	Rose of China	Shrub	Rt, Le, Fl	Or, De, Pt	Fatigue, expulsion of the placenta, laxative, anodyne & skin diseases	Cyclopropanoids, methyl sterulate, 2-hydroxysterulate, malvalate, $\beta$ -sitosterol	0.59
PG270	<i>Sida rhombifolia</i> L.	Malvaceae	கரிசலாங்கண்ணி (Karisalanganni)	Common bala	Herb	WP	Or, Pd	Aphrodisiac, pulmonary tuberculosis, nervous diseases & rheumatism	Vasicinol, vasicinone, ephedrine, si-ephedrine, cryptolepine	0.08
PG231	<i>Marsilea quadrifolia</i> L.	Marsileaceae	ஆரைக்கீரை (Aarai keera)	Water shamrock	Aquatic fern	WP	Or, Ju	Anti inflammatory, diuretic, depurative, febrifuge & refrigerant	Tubulin, tanic acid	0.14
PG127	<i>Azadirachta indica</i> A. Juss.	Meliaceae	வேம்பு (Vembu)	Neem	Tree	Br, Le, Fl, Sd, Oi	Or, De, Ju	Hyperdipsia, eczema, leucoderma, intermittent, spermicidal & fever	Nimbin, nimbinin, nimbidin.	0.73
PG232	<i>Melia azedarach</i> L.	Meliaceae	மலைவேம்பு (Malaivembu)	Pride of India		Rt, Le, Sd, Fl, Br, Gu	Or, Ju, De, Pd	Anthelmintic, febrifuge, sedative, emmenagogue, deobstruent & resolvent	Bakayanin, lactone, bakalactone, quercitrin, rutin, tetranortriterpenoids, Salanin, vilasinin	0.37
PG175	<i>Cyclea peltata</i> Hook. f and Thoms.	Menispermaceae	பாடா (Paada)	Buckler leaved moon-seed jackfruit	Climber	Rt, Le	Or, De	Smallpox, bone fractures, malarial fever, jaundice, stomachache & Splenomegaly	Tetrandrine	0.12
PG125	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	சீமைப்பலா (Seemai pala)		Tree	Rt, Le, Sd, Wd, Lx	Or, De, Rv	Skin diseases, laxative, aphrodisiac, sedative & ophthalmia	Cycloartenone, artocarpesin, norartocarpetin	0.57
PG190	<i>Ficus benghalensis</i> L.	Moraceae	ஆலமரம் (Aalamaram)	Banyan tree	Tree	WP	Or, De, In, Pd	Seminal weakness, leucorrhea, menorrhagia, nervous disorders, erysipelas & burning sensation	Phytosterolin, leucocyanidin, leucopelargonidin	0.16
PG191	<i>Ficus microcarpa</i> (L.) f.	Moraceae	கல் இச்சி (Kal Ichi)	Chinese banyan	Tree	Al, Rt, Br, Le	Or, Pd	Ulcers, antibilious, skin diseases, eczema & inflammations.	$\beta$ -Amyrone, lupeol, maslinic acid, epifriedelinol, stearic acid, $\beta$ -sitosterol, daucosterol	0.09
PG192	<i>Ficus racemosa</i> L.	Moraceae	அத்தி (Atthi)	Cluster Fig	Tree	Rt, Br, Le, Fr, Lx	Or, De	Astringent, antiseptic, abortifacient, menorrhagia, leucorrhea, urinary disorders, skin diseases, swellings, boils & hemorrhages	Glucol, beta-sitosterol, lupeol acetate, friedelin and lignin	0.09
PG193	<i>Ficus religiosa</i> L.	Moraceae	அரசு (Arasu)	Peepal	Tree	Br, Le, Tr, Sh, Fr, Sd, Lx.	Or, De	Laxative, hemostatic, vaginal disinfectant, & neuralgia	$\beta$ -Sitosteryl-Dglucoside, vitamin K, <i>n</i> -octacosanol, methyl oleanolate, lanosterol, stigmasterol	0.06
PG240	<i>Moringa oleifera</i> Lam.	Moringaceae	முருங்கை (Murungai)	Drumstick	Tree	Rt, Br, Le, Pd, Sd	Or, De, Ju, Co	Cardiac, circulatory stimulant, antipyretic, anthelmintic, antiparalytic	Spirochin, pterygospermin, niazirin, benzylisothiocyanate	0.68
PG262	<i>Psidium guajava</i> L.	Myrtaceae	கொய்யா (Koyya)	Guava	Tree	Rt, Le, Fl, Fr	Or, Ju, De	Hemorrhages, dysentery, cholera, nephritis & colic	Linoleic acid, quercetin	0.32
PG187	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	கற்பூரமரம் (Karpooramaram)	Blue gum tree	Tree	Oi	Ex, In	Antispasmodic, decongestant, asthma, expectorant, rheumatism, diaphoretic, migraine & congestive headache	Acyl-phloroglucinolmonoterpene, methylcellagic acid	0.13
PG245	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	தாமரை (Thamarai)	Sacred lotus	Herb	WP	Or, Pd, De, Co	Menorrhagia, cholera, ring worm, cooling, piles & hepatoprotactive	Quercetin, luteolin, kaempferol, nuciferin, nelumbin, roemerin	0.17
PG136	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	முக்கூரட்டை (Mookkirattai)	Horse purslane	Herb	WP	Or, De, Pd, Ju	Arthritis, antispasmodic, antibacterial, anticonvulsant, analgesic, expectorant, CNS depressant, laxative, diuretic & abortifacient	Boeravinones G and H	0.06

PG214	<i>Jasminum grandiflorum</i> L.	Oleaceae	காட்டுமல்லி (Kattu malli)	Spanish jasmine	Shrub	WP	Or, De, Sy, Ju	Calming, sedative, CNS depressant, astringent, mild anesthetic, anthelmintic, emmenagogue & chronic ulcers	Ascorbic acid, anthranilic acid, glucoside, indole oxygenase, alkaloid jasminine	0.26
PG215	<i>Jasminum multiflorum</i> (Burm. f.) Andrews	Oleaceae	மகரந்தம் (Magarantham)	Downy jasmine	Shrub	Le, Fl, Br	Or, De	Inflammation, Diuretic, emetic, rheumatism & cephalalgia	Secoiridoid lactones, jasmolactone	0.11
PG217	<i>Jasminum sambac</i> (L.) Aiton	Oleaceae	குண்டுமல்லி (Kunndu malligai)	Arabian jasmine	Shrub	Rt, Le, Fl	Or, De, Sy	Emmenagogue, blood purifier, indolent & breast tumors	Secoiridoid glycosides, jasminin, quercitrin, isoquercitrin, rutin	0.28
PG135	<i>Biophytum sensitivum</i> (Lin). DC.	Oxalidaceae	திண்டனலி (Theenda nali)	Sikerpud	Herb	WP	Or, De, Pt	Insomnia, convulsions, cramps, strangury & asthma	Amentoflavone, cupressuflavone, isoorientin	0.11
PG122	<i>Argemone mexicana</i> L.	Papaveraceae	குடிவோட்டி (Kuddivotti)	Mexican poppy	Herb	WP	Ex, In	Aphrodisiac, emetic, jaundice & flatulence	Dehydrocorydalmine, jatrorrhizine, columbamine, sanguinarine and dihydrosanguinarine.	0.08
PG269	<i>Sesamum indicum</i> L.	Pedaliaceae	எள்ளு (Ellu)	Sesame	Shrub	Rt, Le, Oi	Or, Pd, Oil	Cholera, amenorrhea, uropathy, hair restorer & alopecia	Protein, thiamine, niacin	0.13
PG251	<i>Phyllanthus amarus</i> Schum. and Thonn.	Phyllanthaceae	கீழாநெல்லி (Keelanelli)	Indian water lily	Herb	WP	Or, Ju	Deobstruent, jaundice, dyspepsia, indigestion & skin eruptions	Lignans, lanthin, niranthin, phyltetralin	0.56
PG252	<i>Phyllanthus emblica</i> L.	Phyllanthaceae	நெல்லி (Nelli)	Indian gooseberry	Tree	Rt, Br, Le, Fr	Or, Ju, Pd, Pi	Diabetes, anemic, bronchitis, antioxidant, jaundice, dyspepsia & leprosy	Vitamin C, zeatin, riboside, phyllembin	0.42
PG254	<i>Piper betle</i> L.	Piperaceae	வெற்றிலை (Vettilai)	Betel pepper	Creepers	WP	Or, Ju, Ch	Bronchitis, stimulant, carminative, astringent & antiseptic	Hentriacontane, <i>n</i> -triacontanol, stearic acid, chavicol	0.39
PG255	<i>Piper longum</i> L.	Piperaceae	திப்பிலி (Tippili)	Indian long pepper	Climber	Root, Dr, Sp	Or, Pd, Co	Cough, bronchitis, asthma, appetizer & carminative	Longamide, sesamin, Piperine, asarinine	0.17
PG256	<i>Piper nigrum</i> L.	Piperaceae	மிளகு (Milagu)	Black pepper	Climber	Fr	Or, Pd	Viral hepatitis, flatulence, indigestion & dermatopathy	Piperine, piperlyne, piperoleins,	0.38
PG129	<i>Bacopa monnieri</i> (L.) Penn.	Plantaginaceae	நீர்ப்பிரமி (Neerbirami)	Thyme-leaved Gratiola	Creepers	WP	Or, Pd	Anodyne, carminative, antispasmodic, bronchodilator & erysipelas	Brahmine, herpestine, betulinic acid, stigmaterol, luteolin	0.15
PG257	<i>Plumbago indica</i> L.	Plumbaginaceae	சித்திரமூலம் (Chittramoolam)	Indian leadwort	Shrub/ Small Tree	Rt, Lx	Or, Ju	Anthelmintic, Scabies & odontalgia	Plumbagin	0.06
PG130	<i>Bambusa arundinacea</i> Wight. ex Steud.	Poaceae	மூங்கில் (Moongil)	Thorny bamboo		Rt, Le, Gr, Bamboo	Or, manna.	Strangury, dysmenorrhea, febrifuge, ophthalmia & antinflammatory	Taxiphyllin, silicious crystalline	0.26
PG176	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	அருகம்புல் (Arugampullu)	Bermuda grass	Grass	WP	Or, Ju, Pd	Epitasis, hematuria, inflamed tumors, cuts, wounds, bleeding piles, cystitis, nephritis, scabies & diarrhea	Ferulic, syringic, <i>p</i> -coumaric, vanillic, <i>p</i> -hydroxybenzoic, O-hydroxyphenyl acetic Acids	0.79
PG249	<i>Panicum sumatrense</i> Roth	Poaceae	சாமை (Samai)	Little millet	Herb	Gr	Or, Co, Pd	Diarrhea, dysentery, dyspepsia & ulcers	Protein, Fat, Fiber	0.07
PG200	<i>Hedyotis corymbosa</i> (L.) Lam.	Rubiaceae	பர்படாகம் (Parpatagam)	Diamond flower	Herb	WP	Or, Pd, De	Purifies blood, improves Digestion & stimulates action of liver	Caffeine, fumaric acid, asperulosidic	0.06
PG201	<i>Hedyotis herbacea</i> L.	Rubiaceae	நொன்னம்புல்லு (Nonannanampullu)		Herb	WP	Or, Pt	Elephantiasis, & ulcers	Anthraquinone, Caffeine, fumaric acid	0.13
PG212	<i>Ixora coccinea</i> L.	Rubiaceae	வெட்சி (Vetchi)	Jungle flame Ixora	Shrub	Rt, Le, Fl	Or, De	Astringent, antiseptic, blood purifier, sedative, leucorrhea, diarrhea, catarrhal & hemoptysis	Lupeol, leucocyanidin glycoside,	0.12
PG239	<i>Morinda pubescens</i> J. E. Smith	Rubiaceae	மஞ்சணாறி (Manjanaari)	Indian mulberry	Shrub	Rt, Fr, Le	Or, De, Pd	Emmenagogue, leucorrhea, dysentery, catarrhal, febrifuge & regulate menstruation	Alizarin, <i>nor</i> -damnacanthol, ursolic acid, $\beta$ -sitosterol, asperuloside, caproic acid	0.09
PG108	<i>Aegle marmelos</i> (L.) Corr. Serr.	Rutaceae	வில்வம் (Vilvam)	Bael tree	Tree	Rt, Le, Fr	Or, Pd, De	Stomachalgia, laxative & expectorant	Aeglemarmelosine, $\beta$ -sitosterol, aegel.	0.27

Table 1 (continued)

Voucher no.	Botanical name	Family	Vernacular name <sup>a</sup>	English name	Life form	Plant part(s) used <sup>b</sup>	Admin/ prep. <sup>c</sup>	Ailments treated/therapeutic effect	Major chemical compounds	UV <sup>d</sup>
PG159	<i>Citrus limon</i> (L.) Burm. f.	Rutaceae	பெரிய எலுமிச்சை (Periya elumuchhai)	Lemon	Tree	Fr	Or, Ju	Antiscorbutic, carminative, stomachic, antihistaminic, antibacterial, leprosy & white spots	Coumarins, 3-hydroxyflavylum	0.53
PG227	<i>Limonia acidissima</i> L.	Rutaceae	வில்வமரம் (Vilamaram)	Wood apple	Tree	Br, Le, Fr, Gu	Or, De, Rw	Anorexia, vomiting, cough & dysentery,	Geraniol, $\alpha$ and $\beta$ -pinene, linool, eudesmol, <i>p</i> -cymene, camphane, azulene	0.16
PG244	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	கறிவேப்பிலை (Karuveppilai)	Curry-leaf	Tree	Rt, Br, Le	Or, Ju, Co	Antiprotzoal, antimicrobial, antispasmodic, appetizer & dysentery	Carbazole, girinimbine beta-carotene	0.53
PG265	<i>Santalum album</i> L.	Santalaceae	சந்தனம் (Sandanam)	Sandalwood	Tree	Wd	Ex, Pd, Oil	Cooling, diaphoretic, diuretic, expectorant, antiseptic & chronic cystitis	$\beta$ -Santalol, Dihydroagarofuran	0.15
PG142	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	முடக்கத்தான் (Mudukottan)	Ballon vine	Climber	Rt, Le, Sd	Or, De	Rheumatism, lumbago, fractures, nervous diseases, hemorrhoids & erysipelas	Pentadecanoic acid, apigenin, protocatechuic acid, calycosin, rutin	0.17
PG236	<i>Mimusops elengi</i> L.	Sapotaceae	மகிழம் (Magizham)	Bullet wood	Tree	Br, Fr	Or, Pt, De	Dysentery, fertility in women & astringent	Tannins, mimusopsic acids, spinasterol, taraxerol	0.08
PG178	<i>Datura metel</i> L.	Solanaceae	ஊமத்தை (Oomatthai)	Thornapple	Herb	WP	Ex, Pt	Headache, epilepsy, convulsions, cramps, rigid thigh muscles, febrifuge, diarrhea, rheumatism & narcotic	Scopolamine, atropine, daturin	0.18
PG253	<i>Physalis minima</i> L.	Solanaceae	சொடுக்குத்தாளி (Sodakku Thakkali)	Sun berry	Herb	WP	Or, Ju	Burning sensation, gout, colic & urinary diseases	Quercetin, withasteroids, Physalindicanols, withaminimin	0.12
PG197	<i>Grewia tiliaefolia</i> Vahl.	Tiliaceae	சடச்சி (Sadachi)	Dhaman	Tree	Br, Fr	Or, De, Ex, Pt	Dysentery, semen coagulant and used in fractures	Quercetin, kaempferol, pelargonidin, naringenin	0.09
PG222	<i>Lantana camara</i> var. <i>aculeata</i> (L.) Moldenke	Verbenaceae	உண்ணிசெடி (Unnichedi)	Lantana	Shrub	WP	Ex, Pt, Lo	Rheumatic, malaria, tetanus & ataxy of abdominal viscera.	Lantadenes, lancamarone, anthocyanin	0.09
PG250	<i>Phyla nodiflora</i> (L.) Greene	Verbenaceae	பொடுதலை (Poduthalai)	Jalapippali	Creeping	WP	Or, Ju	Flatulence, asthma, febrifuge, antispasmodic & erysipelas	Nodiflorins, lipiflorins, nepetin, nodifloretin	0.06
PG155	<i>Cissus quadrangula</i> L.	Vitaceae	பிரண்டை (Pirantai)	Square stalked vine	Herb	WP	Or, Ju	Scurvy, Ophthalmic & hemoptysis	Ketosteroids, sitosterol, alphaamyrin, $\alpha$ -ampyrone, tetracyclic triterpenoids.	0.37
PG112	<i>Aloe barbadensis</i> mill	Xanthorrhoeaceae	கற்றாழை (Kathalai)	Indian aloe	Succulent	Le	Or, Ju	Amenorrhea, dyspepsia, tumor & dropsy	Antraquinone C-glycosides, anthrones, anthraquinones.	0.43
PG272	<i>Tribulus terrestris</i> L.	Zygophyllaceae	நெருஞ்சி (Nerungi)	Land caltrop	Herb	Le, Fl	Or, Pd	Crystalluria, antispasmodic, muscle relaxant, & cough	Saponins, giotogenin, chlorogenin, rutin, quercetin	0.01

<sup>a</sup> Vernacular name: Plant name in Tamil, within bracket pronunciation of plant name in Tamil.

<sup>b</sup> Plant part (s) used: Fr, Fruit; Le, Leaf; Br, Bark; Rt, Root; Sd, Seed; Fl, Flowers; Sp, Spike; WP, Whole Plant; Wd, Wood; Gu, Gum; Lx, Latex; Cs, Corms; Pd, Pods; Rz, Rhizome; Gr, Grains; St, Stem; Tu Rt, Tuberous root; Tr Sh, Tender shoot; Al Rt, Aerial root; Dr Sp, Dried Spike; and Oi, Oil.

<sup>c</sup> Administration/Preparation: Or, Oral; Ex, External; De, Decoction; Pt, Paste; Pd, Powder; Ju, Juice; Co, Cooked; In, Infusion; Pi, Pickle; Rw, Raw; Sy, Sirup; Fr Ju, Fermented Juice; and Ch, Chewing.

<sup>d</sup> UV is the sum of the number of use reports cited by each informant for a given species divided by the total number of informants.



cooked (8.33) and infusion (3.12%). The data regarding mode of preparation of medicinal plants to treat diseases is illustrated in Fig. 3. Infusion is done by suspending plant material in either cold or pre-warmed water and decoction is done by boiling or heating of plant material in water (Packer et al., 2012). Powder is obtained by finely grinding the plant parts to be used, after drying them. Juices are usually extracted from succulent plants. Most preparations are made with water as solvent. Beside this the village people use banana pulp, orange peel, lemon, black peeper, sugar, salt, camphor, tobacco leaf etc. as adjuvant with different solvents. For the preparation of paste or ointment they often use castor oil, coconut oil, ginger, mustard oil and neem (*Azadirachta indica* A. Juss.). The advantage of external application is safety because external application results in indirect yet immediate local effects on the area and allows for easier regulation of dosages depending on the concentrations of beneficial or toxic

compounds (Abe and Ohtani, 2013). Oral administration is mostly suggested by the healers due to the ease of administration without using complex accessories and this result agrees with some other studies conducted elsewhere (Perumal Samy et al., 2008; Kadir et al., 2012; Poonam and Singh, 2009; Nadembega et al., 2011; Ayyanar and Ignacimuthu, 2011).

### 3.6. Technical skill

Thoppampatti people were semi-skilled in identification, collection, processing and use of medicinal plants. They prepared drugs with the help of traditionally designed simple techniques which include the flat stone and pestle. Leaf juice was extracted by twisting it in clean cloth. In all preparations, standardized

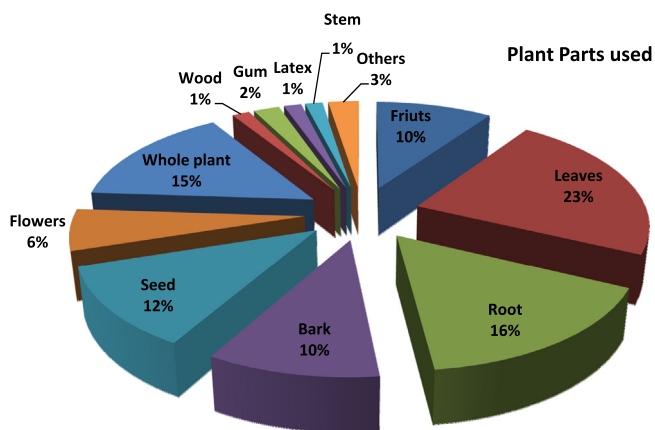


Fig. 2. Frequency of plant parts employed in ethnomedicinal uses by the village peoples of Thoppampatti. (Other parts include Spike, Corms, Pods, Grains and Rhizome).

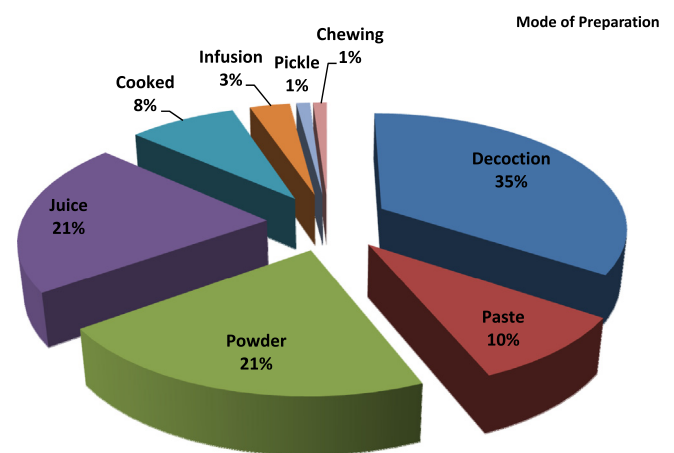


Fig. 3. Mode of preparation of medicinal plants by village peoples to treat various ailments.

Table 2  
Major categories of ailments

Ailment categories	Biomedical terms	No. of species used	Percentage (%)
Gastro-intestinal problems	Stomachic, anthelmintic, diarrhea, dysentery, cholera, carminative, indigestion, dyspepsia, vermifuge, hiccup, flatulence, laxative, purgative, antispasmodic, appetizer, deobstruent, cathartic, colic pain, anorexia, nausea, antibilious	88	63.30
Respiratory problems	Cough, bronchitis, asthma, hemoptysis, expectorant, tuberculosis, scrofula	41	29.49
Urinary and rectal problems	Hematuria, piles, dysuria, kidney, urinary, urethrorhea, nephritis, crystalluria, lithontriptic, strangury, calculi, constipation	25	17.98
Circulatory diseases	Hypertension, anemia, styptic, astringent, blood purifier, hemorrhage, dropsy, depurative	31	22.30
Infections and parasitic diseases	Elephantiasis, antiseptic, ascariasis, chicken pox, head lice, ringworm, scabies, amebiasis, antiprotozoal	18	12.94
Inflammations and pains	Abdominal pain, rheumatism, narcotic, anodyne, abdominal pain, sedative, pectoral pain, cephalalgia, fever, analgesic, antipyretic, abdominal pain, febrifuge	43	30.93
Venereal and genital Diseases	Syphilis, gonorrhea	5	3.59
Dermatological problems	Leprosy, rubefacient, antiscorbutic, demulcent, cooling, eczema, leukodermatic, emollient, diaphoretic, eruptions, psoriasis, erysipelas, dermatitis, boils, skin diseases, suppurative	39	28.05
Female problems	Emmenagogue, galactagogue, menorrhagia, leucorrhea, dysmenorrhea, hemorrhage, vaginal laxity, vaginal disinfectant, abortifacient	35	25.17
Male fertility problems	Seminal weakness, sperm coagulant, spermatorrhoea, Aphrodisiac	13	9.35
Eye, ear, nose and throat problems	Gout, otalgia, ophthalmia, pharyngitis, rhinitis, cold, nyctalopia	18	12.94
Endocrine, nutritional and metabolic disorders	Stimulant, alterative, beriberi, diabetes, scurvy, splenomegaly, diuretic	27	19.42
Injury and poisons of external causes	Snake bite, allergy, burns, cuts, wounds, fracture	11	7.91
Neurological disorders	Epilepsy, antiparalytic, mental depression, CNS stimulant, nervine, neuralgia, insomnia, tetanus, epilepsy	22	15.82
Antidote	Emetic	6	4.31
Hair growth promoter	Alopecia	3	2.15
Liver problems	Hepatoprotective, jaundice	16	11.51
Anticancer/tumor	Anti-neoplastic, cytostatic, tumor	5	3.59

**Table 3**  
IUCN Red listed medicinal plants recorded in study area.

Botanical name	Family	IUCN status
<i>Alternanthera sessilis</i> (L.) R. Br. ex DC	Amaranthaceae	LC
<i>Bacopa monnieri</i> (L.) Penn.	Scrophulariaceae	LC
<i>Bauhinia variegata</i> L.	Caesalpiniaceae	LC
<i>Borassus flabellifer</i> L.	Arecaceae	EN
<i>Colocasia esculenta</i> (L.) Schott.	Araceae	LC
<i>Cyperus rotundus</i> L.	Cyperaceae	LC
<i>Daucus carota</i> L.	Apiaceae	DD
<i>Dichrostachys cinerea</i> (L.) Wight and Arn.	Mimosaceae	LC
<i>Holarrhena pubescens</i> Wall. ex G. Don.	Apocynaceae	LC
<i>Marsilea quadrifolia</i> L.	Marsileaceae	LC
<i>Panicum sumatrense</i> Roth.	Poaceae	LC
<i>Phylla nodiflora</i> (L.) Greene.	Verbenaceae	LC
<i>Pongamia pinnata</i> L.	Fabaceae	LC
<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	VU
<i>Santalum album</i> L.	Santalaceae	VU
<i>Saraca asoca</i> (Roxb.) De Wilde.	Caesalpiniaceae	VU

LC: Least concerned, EN: endangered, VU: vulnerable, and DD: data deficient

decoction in water was prepared. Drying of fresh plant in direct sun is avoided to maintain plant constituents. The traditional healers of the village usually collect the important medicinal plants from the field, dry and crush them, before storing the plant material in bottles.

### 3.7. Medicinal plants and the common diseases

Village pupil strongly relies on the medicinal plants to treat wide variety of diseases and ailments. Altogether, 139 plant species were used to treat 142 different human health problems in the study area (Table 1). Many of the plants are used to treat more than one ailment. With 4 species (2.87%) used in the treatment of two ailments, 16 species (11.51%) treating three ailments, 28 species (20.14%) treating four ailments, 46 species (33.09%) treating five ailments, 21 species (15.10%) treating six ailments, 14 species (9.98%) treating seven ailments, 8 species (5.75%) treating eight ailments, *Datura metel*, *Eucalyptus globules* and *Holarrhena pubescens* were used to treat nine different ailments, *Cynodon dactylon* and *Ficus racemosa* were used in ten different ailments. Similarly *Boerhavia diffusa*, *Indigofera tinctoria* and *Leucas aspera* used in eleven ailments. High versatility of medicinal plants could indicate higher diversity of active compounds contained by the species.

The medicinal uses are grouped in 18 broad categories and number of plant species used for treatment is presented in Table 2. Local people are choosing to use herbal remedies mainly for the treatment of gastro-intestinal problems (Stomachic, anthelmintic, diarrhea etc.) (63.30%) 88 plant species are used for treating the gastrointestinal diseases followed by respiratory tract diseases (cold, cough, bronchitis and asthma) (29.49%), Inflammations and pain (30.93%), 28.05% of the plants are used for various dermatological problems and 25.17% of plants were used to treat several female problems which includes menorrhagia, leucorrhea and abortifacient. Among the traditional medicinal plants *Artocarpus heterophyllus*, *Desmodium gangeticum*, *Clitoria ternatea*, *Argemone mexicana*, *Sida rhombifolia*, *Abrus precatorius* and *Moringa oleifera* are extensively used for the increasing of fertility of man (i.e. aphrodisiac). Elephantiasis is a most prevalent disease in Dindigul district therefore the village peoples use *Lannea coromandelica*, *Hedyotis herbaceae*, *Pterocarpus marsupium*, *Clitoria ternatea* and *Dichrostachys cinerea* for the treatment and they also burned the *Eucalyptus globules* leaves with some other medicinal plants to produce the smoke at the evening time which repel the mosquito.

**Table 4**  
Relative Importance (RI) values of medicinal plants used against eight specific use categories and eleven ailments categories treated.

Plant species	PP <sup>a</sup>	AC <sup>b</sup>	RI <sup>c</sup>
<i>Boerhavia diffusa</i> L.	0.90	1.00	1.90
<i>Indigofera tinctoria</i> L.	1.00	0.87	1.87
<i>Ficus racemosa</i> L.	0.90	0.87	1.77
<i>Leucas aspera</i> (wild.) L.	1.00	0.75	1.75
<i>Holarrhena pubescens</i> Wall. ex G. Don.	0.90	0.75	1.65
<i>Cynodon dactylon</i> pers.	1.00	0.62	1.62
<i>Enicostemma axillare</i> (Lam.)	0.81	0.75	1.56
<i>Cyperus rotundus</i> L.	0.72	0.75	1.47
<i>Hemidesmus indicus</i> (L.) R. Br.	0.72	0.75	1.47
<i>Lannea coromandelica</i> (Houtt.) Merrill.	0.72	0.75	1.47
<i>Luffa acutangula</i> (Roxb.) C.B. Clarke	0.72	0.62	1.34
<i>Datura metel</i> L.	0.81	0.50	1.31
<i>Eucalyptus globulus</i> Labill.	0.81	0.50	1.31
<i>Azadirachta indica</i> A. Juss.	0.54	0.75	1.29
<i>Carica papaya</i> L.	0.72	0.50	1.22
<i>Coccinia grandis</i> (L.) Voigt.	0.54	0.62	1.16
<i>Cyclea peltata</i> Hook. F and Thoms.	0.54	0.62	1.16
<i>Borassus flabellifer</i> L.	0.63	0.50	1.13

<sup>a</sup> PP: pharmacological properties.

<sup>b</sup> AC: ailment categories.

<sup>c</sup> RI: relative importance (PP + AC).

### 3.8. Conservation status of the plants

According to IUCN Red List Categories and Criteria (version 3.1), four types of species are found, vulnerable (VU) (2.15%), endangered (EN) (0.71%), least concerned (LC) (7.91%) and data deficient (DD) (0.71%). We infer three species as vulnerable at local level: *Pterocarpus marsupium* Roxb., *Santalum album* L., *Saraca asoca* (Roxb.) De Wilde. On the other hand, *Borassus flabellifer* L. is reported as the only endangered species (Table 3). In Thoppampatti various factors that were considered as main threats for medicinal plants were recorded by interviewing the informants. The major factors claimed were deforestation (85%), agricultural expansion (72%), overgrazing (48%), fire (14%) and drought (13%). The effort to conserve medicinal plants in the village was observed to be very poor. Some traditional practitioners have started to conserve medicinal plants by cultivating at home gardens, though the effort was minimal. About 17.98% of the medicinal plants collected were reported as found cultivated at home gardens. Also the continued environmental degradation of medicinal plant habitats has brought the depletion of medicinal plants and the associated knowledge. Knowledge of medicinal plants is disappearing because most of the people with medicinal plant knowledge are passed away without properly passing their knowledge to the next generations (Singh and Singh, 2009).

### 3.9. Use value (UV)

Use value representing the relative importance of plants, were high for *Cynodon dactylon* (0.79), *Azadirachta indica* (0.73), *Ocimum tenuiflorum* (0.71), *Moringa oleifera* (0.68), *Coriandrum sativum* (0.62), *Abelmoschus esculentus* (0.61), *Acalypha indica* (0.59) and *Hibiscus rosa-sinensis* (0.59). The lowest use value was calculated at 0.01, with only two people reporting utility (Table 1). High use-value plants were the most frequently used plant species used for each ailment category: *Cynodon dactylon* for diseases of the skin and genitourinary diseases, *Azadirachta indica* for diseases of the skin and female problems, *Ocimum tenuiflorum* for genitourinary and respiratory diseases, *Moringa oleifera* for endocrine illnesses and male vitality, *Coriandrum sativum* for diseases of gastro intestinal system and *Hibiscus rosa-sinensis* for skin diseases and various inflammations. All plants showed a high UV when

**Table 5**

Comparison between the medicinal plant uses in Thoppampatti and those recorded in previously conducted ethnobotanical field studies in neighboring regions.

Study area	Year(s) when the field studies were conducted area	Latitude and longitude	Number of recorded plant species	Number of recorded plant family	Similarity percentage (%)	Jaccard Index (JI)	Reference
Pudukkottai	2009 to 2010	78°25' to 79°15'N and 9°50' to 10°40'E	200	61	42.44	21.07	Nandagopalan et al. (2011)
Tirunelveli	2006 to 2010	8°25' to 8°53'N and 77°10' to 77°35'E	90	52	25.90	18.65	Ayyanar and Ignacimuthu (2011)
Kancheepuram	October 2003 to April 2004	11° 00' to 12° 00'N and 77° 28' to 78° 50'	85	41	23.74	17.28	Muthu et al. (2006)
Coimbatore	April 2003 to November 2006	11° 00' to 12° 00' N and 77° 28' to 78° 50' E	75	40	20.86	15.67	Venkataswamy et al. (2010)
Uthapuram	April 2012 to May 2013	9°51' to 9°52'N and 77°42' to 77°43'E	52	36	18.70	15.75	Sivasankari et al. (2013)
Sivagangai	June 2009 to May 2010	93°0' to 10° 30' N and 77° 00' to 78°30' E	71	36	17.27	12.90	Shanmugam et al. (2012)
Theni	August 2008 to July 2009	90°53' to 10° 22'N and 77° 17' to 77° 67'E	86	45	15.82	10.83	Jeyaprakash et al. (2011)

used for exogenous diseases, such as infectious and parasitic diseases (e.g., scabies, ascariasis), injury, poisoning and certain other consequences of external causes (e.g., cuts and wounds) or diseases of the skin and subcutaneous tissue (e.g., skin eruptions). *Moringa oleifera* and *Ocimum tenuiflorum* were also used for endogenous diseases and lifestyle-related diseases, problems of the circulatory system (e.g., high blood pressure, anemia), diseases of the digestive system (e.g., constipation), and for genitourinary systems. Our study shows that plants with higher UVs have become more widely used for a variety of diseases in modern times. The plants with low UV was reported as *Aerva lanata*, *Sarcostemma acidum*, and *Tribulus terrestris* which have UV value 0.01 each. This reflects the scarce availability of the plants in the study area leads them to low UV (Rokaya et al., 2010). This is an interesting result and shows the importance of medicinal plants in the village. This results reflects the results obtained by several researchers (Ayyanar and Ignacimuthu, 2011; Kadir et al., 2012)

### 3.10. Relative importance

The plant with more number of pharmacological properties (PP) were *Cynodon dactylon*, *Indigofera tinctoria*, *Leucas aspera* (11 PP); so, they have a normalized PP value of 1.00 (11/11). *Boerhavia diffusa* was employed to treat eight ailments categories and had a normalized AC value of 1.00 (8/8). *Boerhavia diffusa* had the highest RI of 1.90 and it was followed by *Indigofera tinctoria* (1.87), *Ficus racemosa* (1.77), *Leucas aspera* (1.75), *Holarrhena pubescens* (1.65), *Cynodon dactylon* (1.62) and *Enicostemma axillare* (1.56) (Table 4). Many of the most versatile species reported in this study were similar for some neighboring indigenous communities in India (Ignacimuthu and Ayyanar, 2006; Muthu et al., 2006; Ignacimuthu et al., 2008). The high RI values of *Boerhavia diffusa* and *Indigofera tinctoria* might be an indication of its abundance in the area. High versatility of medicinal plants could indicate higher diversity of active compounds contained by the species. The data indicated that some plants have more diversified medicinal uses or applications than others (Hassan-abdallah et al., 2013).

### 3.11. Harmful effects of medicinal plants

According to the people using *Abrus precatorius*, *Argemone mexicana*, *Aristolochia indica*, *Datura metel* and *Ricinus communis* these plants should be used carefully since over dosage could be dangerous. *Abrus precatorius* is toxic due to the presence of abrine, which works by penetrating the cells of the body and inhibiting cell protein synthesis. Estimated 0.1–1 µg/kg is fatal to human

(Dickers et al., 2003). *Argemone mexicana* mustard can be adulterated by argemone seeds rendering it poisonous (Singh et al., 2010). *Aristolochia indica* has been shown to be both a potent carcinogen and kidney toxin (Cosyns, 2003). All parts of *Datura metel* contain dangerous levels of tropane alkaloids and may be fatal if ingested by humans or other animals (Preissel and Hans, 2002). The toxicity of *Ricinus communis* is due to the presence of ricin, although the lethal dose in adults is considered to be four to eight seeds. According to the 2007 edition of Guinness world Records, this plant is the most poisonous in the world. It is anticipated that pods and beans of pyrrolizidine alkaloid of *Cassia occidentalis* is responsible for its hepatotoxic activity (Vanderperren et al., 2005; Vashishtha et al., 2007; Kadir et al., 2012). During interviews, very few informants recognized these species as dangerous to human health. Those that did gave generic information on the effects of using these plants on humans and animals, though they were not aware of the type of toxic element present in the plants, or of speed of action or of the specific effects these elements have on man.

### 3.12. Comparison with other studies in neighboring regions

Comparison of our study with other comprehensive ethnobotanical studies on traditional medicinal plants that have been already done in the neighboring areas (Muthu et al., 2006; Venkataswamy et al., 2010; Ayyanar and Ignacimuthu, 2011; Jeyaprakash et al., 2011; Nandagopalan et al., 2011; Shanmugam et al., 2012; Sivasankari et al., 2013) is presented in Table 5. The research areas do not have the same dimensions and the research methods are differ. This comparison showed that there exists considerable similarity with respect to plant use and modes of application. Table 4 illustrates the similarity between medicinal plants in the current study and those recorded in previously conducted studies in neighboring regions. The percentage of similarity ranged from 15.82% to 42.44%. The highest degree of similarity was observed in Pudukkottai (42.44%) and Tirunelveli (25.90%). The Jaccard index (JI) also calculated for comparing the study area with neighboring study area, the JI ranged from 21.07 to 10.83. According to this study, *Abrus precatorius*, *Acalypha indica*, *Andrographis paniculata*, *Azadirachta indica*, *Cissus quadrangularis*, *Coccinia grandis*, *Cynodon dactylon*, *Datura metel*, *Desmodium gangeticum*, *Hibiscus rosa-sinensis*, *Moringa oleifera*, *Murraya koenigii*, *Phyllanthus amarus*, *Pongamia pinnata*, *Ricinus communis*, and *Tribulus terrestris* are the most common herbal medicinal plants in Thoppampatti and its surrounding regions.



## 4. Conclusion

For the first time, information about traditional uses of the medicinal plants in the Thoppampatti village, Dindigul district, Tamilnadu, South India has been obtained through this study. Our study reveals that medicinal plants are major source of medicine for the local people living in Thoppampatti village. Results obtained in this study represents a useful and long lasting information about the medicinal plants, which can contribute to preserve the indigenous knowledge on the use of medicinal plants in this region and also attract the future generations towards the traditional healing practices. Through this study we found that a great variety of medicinal plants were used by village peoples for the treatment of numerous diseases and ailments but several peoples only have the appropriate knowledge on the plants and their medicinal properties. In the present study, a total of 139 species belonging to 54 families of medicinal plants traditionally used by local people were carefully documented. The village peoples treat 142 different ailments using these medicinal plants. Among them 79.02% species are wild and 17.98% species are cultivated plants. Most used plants are *Andrographis paniculata*, *Cynodon dactylon*, *Moringa oleifera*, *Ocimum tenuiflorum*, and *Azadirachta indica*. From the report of our study, *Borassus flabellifer* is listed as endangered species. Besides, *Pterocarpus marsupium*, *Santalum album* and *Saraca asoca* were inferred as vulnerable species in study area. We should carry out the necessary step to prevent these plants from the locally endangered. We recommended the plants having highest UV and RI such as *Cynodon dactylon*, *Azadirachta indica*, *Ocimum tenuiflorum*, *Moringa oleifera*, *Indigofera tinctoria*, *Leucas aspera* and *Boerhavia diffusa* for further investigations. However this study provides baseline information for scientific studies leading to isolation of bioactive compounds that can serve as starting materials in the discovery of new plant based drugs or standardized extracts as improved traditional medicine and also create awareness among the village peoples about the importance of medicinal plants and their conservation.

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## Appendix A. Supplementary materials

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jep.2014.02.040>.

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