

Ethno-Medicinal Plants Used for the Treatment of Leprosy in Tribal Peoples of Kanyakumari District

G. Johnsy and V. Kaviyaranan

Center for Advanced Studies in Botany, University of Madras,
Maraimalai Campus, Chennai - 600 0025, Tamilnadu, India

Abstract: Ethanobotanical survey was conducted to document plant remedies used for the treatment of leprosy in Western Ghats of Kanyakumari district, Tamilnadu, India. Data were collected by oral interviews of herbal medical practitioners of tribal's. The data obtained were further analyzed tabulated to give the botanical names, common names, local names, families and the parts of the plants used. The results showed that, fifty one different plant species were cited by the tribal peoples and the medical practitioners of this area used for the treatment of leprosy. The medicinal plants are arranged alphabetically followed by botanical name, family, local name, habit, parts used, occurrence and uses. In this documentation, for a variety of medicinal uses, kanni tribes is found dependent maximum on herbs followed by Trees, shrubs and climbers. All the tribal peoples interviewed in this study had no formal education. The inherited the knowledge of their practices from their fore parents relatives and friends. Traditional medicines also have the potential to form the basis of pharmaceutical drugs for the treatment of leprosy.

Key words: Kanyakumari • Ethno-Medicinal Plants • Tribal • Leprosy

INTRODUCTION

India is a great topographic and climatic diversity and has a very rich flora and fauna. The uses of plants as medicines have been practiced from an ancient time [1]. Rig Veda is one of the important earliest available documents which emphasizes about herbal medicinal knowledge. Herbal medicine is the study and use of medicinal properties of plants. Therefore medicinal plants contribute precious resources for mankind. WHO has estimated that 80% of the people in the world rely on traditional medicine for primary health-care needs. India has about 45,000 plant species and several thousands have been claimed to possess medicinal properties [2-4]. This past and current dependence on plant as a source for medicines gives impetus to the ethno-pharmacological studies for studying their efficacy, safety and drug-discovery potentials [5].

Leprosy also known as Hansen's disease is a chronic infectious disease that primarily affects the skin, the peripheral nerves, the upper-respiratory track and eyes. The causative agent of the disease is the acid-fast

bacterium, *Mycobacterium leprae*, Sasaki *et al.* [6]. The fact that leprosy has been deemed an incurable disease-causing severe deformities and disabilities has resulted in severe stigmatization. The leprosy bacilli are transmitted either by inhalation or by direct contact in to an open wound from an infected individual [7, 8]. The traditional practitioners who are also experts in the use of medicinal plants from the primary healthcare provides to both rural and urban populations. The present study was conducted in the Western-Ghats of Kanyakumari district, Tamilnadu, India because in this region has present numerous medicinally important plants.

MATERIALS AND METHODS

Study Area: Kanyakumari Forest Division constitutes the southern tip of Western Ghats. The total area under Reserved Forest area is 1,684 square kilometers with a total area of 1,67,214 hectares, where forests occupy an area of 50,486 hectares, which is 30. 2 percent of the total geographical area of the district. The forest consists of soaring lofty trees, deep valleys, rippling waterfalls, rich

flora and fauna and ideal picnic spots. Topographically, this district may be broadly classified into three regions, viz. Coastal, middle and mountainous regions. The climatic condition is favorable for agriculture. The rainfall of this region is varies from 103-310 cm. The edapho-climatic conditions of this area support high plant diversity and regarded as a treasure house of traditional medicinal wisdom. The Western Ghats is one of the biodiversity Hot Spots in the world.

Survey: In order to assess the consumption of indigenous medicinal plants, survey was carried out during the year, 2009-2012 in the forest areas of Kanyakumari district. To get maximum information the survey was widened diagonally during the rainy season. The information on medicinal uses of the indigenous plants has been described after gathering it from local people, experienced aged rural folk, traditional medicine practitioners, local herbal drug sellers and comparing it with the available literature. A total of 79 inhabitants were interviewed by random selection. In addition, direct plant observation and identification was done with the help of local healers. A structured questionnaire was used to collect data on local plant names, uses, parts used and modes of preparation and administration. Samples of recorded herbs, twigs of shrubs and trees were identified in the field with the help of local guides and literatures.

Method of Medicinal Plant Collection: The medicinal plants are usually collected during the seasons when they are available in plenty. For instance they collect tubers during the Tamil month of 'Karthigai' (between mid-November and mid-December). Nut and seed collection is done during the hot season when they attain fruit before the South West monsoon, between mid - February to April. Small herbal plants and creepers are collected just after the rains, when the plants are robust and healthy.

A special mortar and a pestle made of stone or wood or dried parts of animal bones are used for preparing the medicine. The dosage and duration of treatment of these drugs vary from one to another. They strictly follow the collection time of plant material, plant part, storage technique and method of preparation.

In addition, direct plant observation and identification was done with the help of local healers known as 'Maruthuvar'. A structured feedback form was used to draw information from the resource persons using standard methods. Information on medicinal plants, local name, plant parts used and mode of administration for

curing diseases has been recorded. Plants collected during the surveys were identified with the help of published regional flora [9-11].

RESULTS

Based on the present study, it has been found that the kanni tribal community of kothaiyar hill is rich in ethno-biological knowledge and this knowledge is being transmitted from one generation to another in the verbal form. Traditional medicines are the primary health care resources for the tribes to protect their health. Present data are the general results of the ethano-botanical survey conducted during the period of January 2010 to December 2013. In the present investigation fifty one medicinal plants are used for the treatment of leprosy (Table 1). Among all the species *andrographis paniculata*, *Centella asiatica*, *Clitoria ternatea*, *Melia azadarach*, *Murraya koenigii* and *Piper betle* are commonly used by the local people for the treatment of leprosy.

These medicinal plant species were distributed across thirty eight families and forty seven genera. In terms of number of medicinal plant species, Amaranthaceae, Caesalpiniaceae and Fabaceae were the most dominant families of medicinal plant followed by Mimosaceae, Meliaceae, Asclepiadaceae, Verbenaceae, Cucurbitaceae, Oleaceae and Solanaceae. Herbs form an important source of medicine consisting of about 35. 29. 4% followed by trees 33. 33%, Shrubs 17. 65 and climber 13. 73%, respectively.

Different parts of medicinal plants were used as medicine by the local traditional health healers. In this study, various parts of plants were utilized in preparation of herbal remedies used for the treatment of leprosy. However, in majority of the plant species (31.15%) the medicine was obtained from the root and Leaves (24.59%) followed by whole plant (13. 11%), seed (8.2%), bark (6.56%) respectively (Fig. 1).

Most often the whole plant or plant part (Leaf, stem, root, seed, bark, flower) was crushed thoroughly to extract juice and the juice administered orally after straining through a piece of cloth. A decoction was sometimes prepared, which typically involved boiling the plant or plant part (Leaf, bark) in four volume of water till the volume has been reduced by half. One other occasion, a plant or plant part was dried and made into pills and administered orally for leprosy. Oils are extracted from the seed and that oils are applied for the infected parts of leprosy.

Table 1: Enumeration of Ethno-medicinal plants

S.no	Botanical Name	Family	Local Name	Habit	Parts used	Occurrence	Use
1	<i>Achyranthes aspera</i> L.	Amaranthaceae	Nayuruvi, shiru-kadaladi	Herb	Roots, Leaves	Common in waste lands	Dried powder of leaves and roots are used in infected area.
2	<i>Alternanthera sessilis</i> (Linn.) R. Br. ex. DC	Amaranthaceae	Ponnan kanni keerai	Herb	Whole plant	Rare cultivated near the huts.	Decoction of whole plants is used for leprosy.
3	<i>Albizia lebecke</i> , (L.) Benth.	Mimosaceae	Vakai	Tree	seed	Cultivated in plains. Wild in forests	Oil is taken from the seed is used as leprosy.
4	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Mullu keerai	Herb	Roots, Leaves	Cultivated in small scale	Paste of root and leaves are used in infected part of the skin.
5	<i>Anacardium occidentale</i> , L.	Anacardiaceae	Kollavu	Tree	Gum	Cultivation around the lands.	The gum from the bark is useful to leprosy.
6	<i>Andrographis paniculata</i> , (Burm. f) Wallich ex. Nees.	Acanthaceae	Nilavembu,	Herb	Whole plant	Common in all places.	Decoction of the whole plant is given for leprosy
7	<i>Argemone Mexicana</i> , Linn	Papaveraceae	Ponnumathai	Herb	Root	Found in waste lands	Decoction of the root is given for leprosy.
8	<i>Aristolochia indica</i> , Linn.	Aristolochiaceae	Garuda kodi, kiratan, ishvaramuri	Shrub	Root	Common in hedges	Roots powered and mixed with honey and given orally to cure leprosy.
9	<i>Azadirachta indica</i> A. Juss	Meliaceae	Neem, veppu, vembu	Tree	Stem, leaves, seeds, root	Common in all places.	Dried plant parts are mixed to make powder and applied it daily.
10	<i>Bambusa arundinacea</i> , (Retz.) Willd.	Bambusaceae	Mulmunkil	Tree	Root	Common along the valleys.	Decoction of the roots is useful for leprosy.
11	<i>Calophyllum inophyllum</i> , Linn.	Clusiaceae	Punnai, Punnagam	Tree	Seed	Inside the forests.	The oil from seed is useful in intramuscular pain in leprosy.
12	<i>Calotropis gigantea</i> , (L.) R. Br	Asclepiadaceae	Erukku	Shrub	Leaves	Common in dry places and road sides.	Tincture of leaves is given for leprosy. Decoction of the root bark is given against leprosy.
13	<i>Cassia fistula</i> , Linn.	Caesalpiniaceae	Kattu konnai, Kani konna.	Tree	leaves	Wild in forests.	Leaf juice is useful in leprosy.
14	<i>Cassia occidentalis</i> , Linn.	Caesalpiniaceae	Peythavari	Herb	Seeds	Common in waste lands.	Decoction of the seeds is given for leprosy.
15	<i>Cassia tora</i> L.	Caesalpiniaceae	Tagrai	Shrub	Leaf, seed	Common in plains and waste lands.	Leaf juice and seed powder apply for cure of leprosy.
16	<i>Centella asiatica</i> , (L.) Urban.	Apiaceae	Vallarai	Herb	Leaves	Common in wet places.	Crushed leaves applied orally for leprosy.
17	<i>Cissus quadrangularis</i> L.	Vitaceae	Pirandai, Perandai	Climber	Stem	Hotter parts of forest	Paste of stem is used in the infected parts.
18	<i>Clerodendrum viscosum</i> , Vent., Hard.	Verbenaceae	Perukilai	Large Shrub	Leaves	Found in waste lands.	Decoction of the leaves is useful in leprosy.
19	<i>Clitoria ternatea</i> , Linn.	Fabaceae	Kakkalam, Shankupushpam,	Herb	Root	Along the foot path of forest area.	Decoction of the root is useful in leprosy.
20	<i>Coccinia grandis</i> ,(L.)J. Voigt.	Cucurbitaceae	Kovai	Herb	Fruits	Common in plains.	Fruit juices are useful in leprosy
21	<i>Commelina benghalensis</i> L.	Commelinaceae	Aduthinthalai, kanavazhar	Herb	Latex, leaves roots	Common in wet places.	Leaf paste, Latex and the powder of root are used for the treatment of leprosy.
22	<i>Curcuma longa</i> L.	Zingiberaceae	Manjal	Herb	Tuber	Cultivated as intercrop.	Tuber paste is used for the treatment of leprosy.
23	<i>Cyclea peltata</i> (Lam.) Hook. f. & Thoms	Menispermaceae	Pada Thazhi	Climber	Tuber	Common in wet places.	Tubers of padathazhi along with tubers of <i>Curcuma zeodaria</i> , ground into paste and given for leprosy
24	<i>Cymbopogon citratus</i> , Stapf.	Poaceae	Chukku Nari Pullu,	Herb	Whole plant	Common in rocky places.	Decoction of the plant is useful in leprosy.
25	<i>Dalbergia sissoo</i> , Roxb.	Fabaceae	Etti	Tree	Root, wood	Rare in forests.	Decoction of root and heartwood are useful in leprosy.
26	<i>Eclipta alba</i> Hassk	Asteraceae	Karisalankanni	Herb	Whole plant	Common in moist places.	Powder of plant parts are used for the treatment of leprosy.
27	<i>Erythrina variegata</i> , Linn,	Fabaceae	Mullumrukku	Tree	Bark	Found in hill slopes	Decoction of bark is used for leprosy.
28	<i>Evolvulus alsinoides</i> (L.)L.	Convolvulaceae	Vishnukranthi	Herb	Whole plant	Common in wet areas	Decoction of whole plant is used for the treatment of leprosy.
29	<i>Ficus benghalensis</i> , Linn.	Moraceae	Alamaram	Tree	Leaves	Wild in plain as well as in hills.	Decoction of leaves good for leprosy.
30	<i>Hemidesmus indicus</i> , (Linn) R. Br	Asclepiadaceae	Narunatti	Climber	Root	Common in all places	Decoction of the root is used for leprosy.
31	<i>Jasminum angustifolium</i> , Vahl.	Oleaceae	Kattumullai	Climber	Roots	Cultivation near the huts.	Paste of roots is useful for external application of leprosy.
32	<i>Jasminum grandiflorum</i> (Linn.)	Oleaceae	Picchi	Climber	Root	Cultivated near the huts.	Decoctions of roots are useful for leprosy.
33	<i>Lawsonia inermis</i> , Linn	Lythraceae	maruthani	Small tree	Root	Common in all places	Infusions of roots are useful in tree.
34	<i>Marsilea quadrifolia</i> , Linn.	Marsileaceae	Nirarai	Herb	Whole plant	Sides of the reservoirs.	Decoction of the whole plant is useful in leprosy.
35	<i>Melia azedarach</i> , Linn.	Meliaceae	Malaivempu malaiveppam	Tree	Roots	Rare in forest areas.	Infusions of roots are useful in leprosy.

Table 1: Continued

36	<i>Momordica charantia</i> L.	Cucurbitaceae	Siru pavakaai	Climber	Fruit	Cultivated and wild	Fruit juice was used for the treatment of leprosy.
37	<i>Michelia champaca</i> , Linn.	Magnoliaceae	Sampuga, sempakam	Small Tree	Flowers and Fruits	Rare	Pounded flowers, flower buds and fruits are useful in leprosy.
38	<i>Mussaenda frondosa</i> , L.	Rubiaceae	Vellimadanthai		Root	Found in wet places	Root paste is used in the treatment of white leprosy.
39	<i>Murraya koenigii</i> , (L.) Spreng	Rutaceae	Karriveppu, kariveppilai	Small tree	Leaves, petioles	Common, cultivated.	Decoction of leaves and petioles is given against leprosy.
40	<i>Nerium oleander</i> L.	Apocyanaceae	Arali	Shrubs	Root	Wild as well as cultivated	Roots are used for the preparation of oil for leprosy.
41	<i>Ocimum americanum</i> L.	Lamiaceae	Naithulasi	herb	Leaves	Common in waste places	Decoctions of leaves are useful in leprosy.
42	<i>Pandanus fascicularis</i> Lam. f	Pandanaceae	Thalai	Shrub	Root	Along water courses.	Infusions of roots are used in leprosy.
43	<i>Piper betle</i> , Linn.	Piperaceae	Ilaikkodi, vettilai	Climber	Whole plant	Cultivated in hotter parts.	The decoction of whole plant is useful in leprosy.
44	<i>Ricinus communis</i> , Linn.	Euphorbiaceae	Amanakku, Amankkenchedi,	Shrub	Roots	Common in hedges.	Infusion of roots is useful in leprosy.
45	<i>Santalum album</i> , Linn	Santalaceae	Chanthanam	Tree	Wood	Rare cultivated	Wood paste is applied externally for the treatment of leprosy.
46	<i>Solanum nigrum</i> , Linn	Solanaceae	Manatthakkali	Herb	Leaves	Found in wet places.	Leaf juices are used for the treatment of leprosy.
47	<i>Solanum viarum</i> Dunal.	Solanaceae	Karimulli	Shrub	Root	Weed in cultivated lands.	Root paste is used for the treatment of leprosy.
48	<i>Terminalia bellirica</i> , Roxb.	Combretaceae	Thani	Tree	Bark	Common in hill slopes.	Infusion of bark is used as the treatment of leprosy.
49	<i>Tectona grandis</i> , Linn.	Verbenaceae	Thekku	Tree	Bark, leaves	Found in forest areas.	Decoction of bark and Juice of leaves is useful in leprosy.
50	<i>Thespesia populnea</i> , (Linn.) Sulland ex. Correa. Serr.	Malvaceae	Puvarasu, cheelanthi	Tree	Bark and leaves	Wild in forests and plains.	Decoction of the bark and leaves are useful for leprosy.
51	<i>Trichodesma indicum</i> , (L) R. Br.	Boraginaceae	Kalludaithumbai	Herb	Whole plant	Found along the roadsides.	Decoction of whole plant is useful for leprosy.

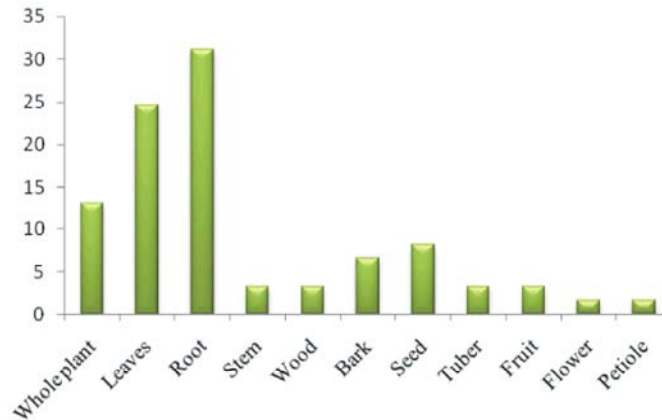


Fig. 1: Parts of medicinal plants used for the treatment of Leprosy

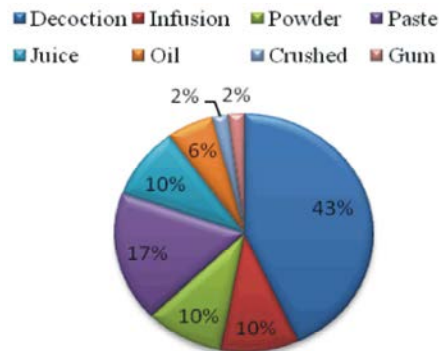


Fig. 2: Mode of preparation of medicine

Table 2: Habitual diversity among the enumerated plants

Plat form	No. of Species	% of species
Herb	18	35. 29
Shrub	9	17. 65
Tree	17	33. 33
Climber	7	13. 73

DISCUSSION

The present study was conducted to investigate the use of traditional medicinal plants in treatment by the peoples of Pechiparai, Perunchanni, Kothaiyar hills of Kanyakumari district. This study has documented 51 medicinal plants used locally in the treatment of leprosy. There are various problems associated with information collection about medicinal plants from traditional sources. The problem encountered in knows the information from traditional sources was communication of tribal language. The interviewer and the herbalist may be communicating in the trial language, but the understanding might be different when the same words are being used. This is particularly important when using medical terminologies of the herbal plants. This problem was recognized during this study and efforts were made to minimize its impact on the outcome of the study.

The medicinal use of plants leaves and roots in the management and treatment of diseases has been an age long practice [12]. Plant derived medicines are widely used because they are relatively safer than the synthetic alternatives, they are easily available and cheaper [13]. The collected information is arranged in the alphabetic order of the plant botanical name, family with the local name and mode of used (Table 1). The use of herbal medicine is wide spread in this region with higher percentage of the tribals as well as nontribal population relaying on it.

Medicinal plants and their uses in the indigenous medicine are well known to many Indian communities. The recent trend has been to blend the traditional knowledge with modern heath care practices to provide effective health care services to a wider population [14]. Plant remedies were prepared mostly as infusions or decoctions (Fig. 2). Infusions were prepared on delicate parts of the plants, that is, leaves, flowers and stem buds. The advantage with this method is that many active principles are extracted with almost no alteration of their chemical structure thus preserving almost all their properties [15]. Decoctions on the other hand were used to prepare herbal teas from the hard parts of the plants

(root, rhizome, seeds and stem barks). It was observed that some plants were prepared using more than one method and in some cases more than one plant part was used.

During the last two decades scientists all over the world are playing more attention to the study of ethno-medicine to the tribal people all over the world are playing more attention to the study of ethno medicinal plants to the tribal peoples. Among the tribal communities only the older people could provide the full information regarding the medicinal properties, mode of preparation and the parts used for the plants. In fact the present study in the tribal settlement area of Kanyakumari district forest areas indicates the most of the younger peoples are now depending on modern medicines because their faster curing capacity. So the traditional knowledge of the tribal people is eroding fast to generation after generation. So the documentation of medicinal plants and the usage will help for the future generation.

CONCLUSION

Traditional medicines also have the potential to form the basis of pharmaceutical drugs for the treatment of leprosy. The herbal medicines play an important role in the treatment of leprosy. The indigenous rural tribal peoples of Kanyakumari district depends on traditional health care system. Most of the present treatments are time consuming, expensive and with adverse side effects. Considering these facts herbal remedy can be exciting aspects in the treatment of leprosy with lesser side effect. More information may be collected from the peoples residing in the remote village of this district. Thus the loss of these potentially valuable genetic resources ultimately affects the whole society. The conservation efforts are needed by re plantation of these medicinal plants with the help of the local tribal peoples of this district. Undoubtedly, this will help in preserve the endangered plant species of the region. This kind of studies together more information on the medicinal plant biodiversity and the tribal peoples of Kanyakumari district.

ACKNOWLEDGEMENT

The authors thank the Director, CAS in Botany, University of Madras, India, for providing lab facility and the University Grant Commission, Government of India, for providing a research grant.

REFERENCES

1. Fang, X., L. Shao, H. Zhang and S. Wang, 2005. CHMIS-C: a comprehensive herbal medicine information system for 278 cancer. *Journal of Medical Chemistry*, 48(5): 1481-1488.
2. Grover, J.K., S. Yadav and V. Vats, 2002. Medicinal plants of India with anti-diabetic potential, *Journal of Ethno-Pharmacology*, 81(1): 81-100.
3. Kettner, C., H. Kosch, M. Lang, J. Lachner, D. Obomy and E. Teppan, 2005. A medicinal plant Database, workshop on Database Issue. *Biological Databases (DBiBD)*. Edinburgh, Creating.
4. Azazieh, H., B. Saad, E. Cooper and O. Said, 2008. Traditional Arabic and Islamic medicine, a Re-emerging health aid, Evid based complement, *Alternatenate med*, Epub Ahead of Print.
5. Simplice Damintoti Karou, Wendyam M.C. Nadembega, Denise P. Ilboudo, Djeneba Ouermi, Messanvi Gbeassor, Comlane Desouza and Jacques Simpre, 2007. *Sida acuta* Burn. F.: a medicinal plant with numerous potencies, *African Journal of Biotechnology*, 6(25): 2953-2959.
6. Sasaki, S., F. Takeshita, K. Okuda and N. Ishii, 2001. *Mycobacterium leprae* and leprosy: a compendium. *Microbial Immanuel.*, 45: 729-736.
7. Ishii, N., M. Onoda, Y. Sugita, M. Tomoda and M. Ozaki, 2000. Survey of newly diagnosed leprosy patients in native and foreign residents of Japan. *Int. J. Leprosy*, 68: 172-176.
8. WHO., 2006. Leprosy situation in the WHO Region of the Americas www.who.int/lep/situation/americas/en/print.html. Accessed in January 28th.
9. Gamble, T.S., 1918. *Flora of Presidency of Madras London*, Part I, II, III.
10. Mathew, K.M., 1918. *The flora of the Tamil Nadu. Carnatic vol. I, II, III. Proc.*
11. Gamble, T.S., 2008. (Rep. Ed). *Flora of the presidency of Madras 3 vols.*
12. Sofowara, E.A., 1982. *Medicinal Plants and Traditional Medicines in Africa. Nigeria: John Wiley and Sons Ltd*, pp: 64-79.
13. Iwu, M.M., A.R. Duncan and C.O. Okunji, 1999. New antimicrobials of plant origin, In: Janick J, editor. *Prospective on new crops and new uses. Alexandria, V. A. ASHS Press*, pp: 457-462.
14. Chetna Bisht, 2009. Anoop Badoni. *Distribution and Indigenous Uses of Some Medicinal Plants in District Uttarkashi, Uttarakhand, India. Distribution and Indigenous Uses.*, 1(6): 38-40.
15. George, D. and R. Pamplona, 2000. *Encyclopaedia of medicinal plants (1) MARPA artes Graficas, Spain.*