



Local Perceptions of Medicinal Plants in Attappady Forests of Palakkad district, Kerala, India

*Aravindhan, V. & Ashwini, R.

Department of Botany, Kongunadu Arts and Science College (Autonomous),
Coimbatore - 641 029, Tamil Nadu, India

Received: 03.06.2024

Revised and Accepted:
02.10.2024

Key Words: *Irulas*,
Attappady Hills,
Ethnomedicine, Traditional
knowledge, Medicinal plants

Abstract

Documentation of the medicinal knowledge provides us with the links to the cultural interactions of human societies living in the forests. World Health Organization reports that 80 % of medicines are derived from the medicinal plants, particularly among the rural areas. Thus, studies that aim to investigate strategies and methodologies for reinforcing traditional knowledge are fundamental to emphasize the importance of plant resources for medicine development. There is still insufficient information about the factors contributing to the link between medicinal plant knowledge use and associated drivers. This study aimed to assess the factors influencing local communities preferences and perceptions of medicinal plant knowledge practice among Irula, Muduga and Kurumba ethnic groups. The study used ethnobotanical data from 27 knowledgeable elders/participants from Irulas, ethnic group, collected through semi-structured interviews and also examined the impact of socio-demographic variables on perceived use of medicinal plant knowledge among informants. A total of 66 plant species belonging to 58 genera distributed in 40 families have been documented with their ethnomedicinal uses. Herbs were the primary source of medicine followed by shrubs, climbers and trees. The data proved that herbs are used as major sources of medicine among the tribal people in the study area. The information provided in the paper is limited and there is a scope to initiate further ethnobotanical study among the communities to gather information as far as possible. The medicated claims incorporated in the study need to be evaluated through phytochemical and pharmacochemical investigations to discover their potentiality as drugs.

1. Introduction

Relationship between human food and medicines are integral part of human life (Nolan & Turner, 2011; Mandal *et al.*, 2012). There are societies that use plants to cure diseases and traditional medicine still taking a very important position in the life of many people around the world (Matu and Van Staden, 2003; Ahmad *et al.*, 2015). Over 25,000 plants are used in traditional medicine for the discovery of new drugs in pharmacology around the world (Huang, 2011). From the 20th century the plants has been revalued

by ethnobotanists and the field of ethnobotany has changed with the compilation of raw data (Guarrera, 2003).

The most important ethnobotanical studies involve the dynamics between human populations, plant foods and medicines that have historic significance in maintaining human nutrition and health. The populations are known to develop social networks to aid in the procurement of plant materials needed to retain traditional medicine (De Vos, 2010). The

*Corresponding author
E-mail: varavindhan_bo@kongunaducollege.ac.in



population has always had resort, for centuries, to medicinal plants as a solution and the only way to solve many of their health-related problems. In fact, nowadays, many people still use herbal medicine, and popular herbal therapeutic knowledge is being passed down from generation to generation, even though this tradition is disappearing (Schultes, 1994; Pieroni and Price, 2006).

People who lack this tradition continue to turn to herbalists to buy plants or consult traditional healers for any type of health-related problems. The ethnobotanists consider traditional plants and medicines in their efforts to interpret health belief systems (Quave & Pieroni, 2007). Ethno-ecological studies also highlight the forces that continuously shape how information is transferred from one generation to the next (Nolan, 1998). The ethnobotanical knowledge is passed on verbally among generations and most of this knowledge has not been formally documented (Nadembega *et al.*, 2011). The documentation of knowledge is an essential step in ethnobiology, since it provides data for further studies and evaluates indigenous pharmacopoeias (Berlin, 1992; Leonti *et al.*, 2001).

Ethno-botanical studies have become increasingly valuable in the development of health care and conservation programs in different parts of the world. The green pharmaceuticals are receiving extraordinary importance and popularity. Sustainable use of wild populations of medicinal plants requires robust assessment of the distribution and abundance of target species. While it is increasingly recognized that sustainable harvest of

wild populations "is one of the most misunderstood and misused concepts in today's conservation arena" (Struhsaker, 1998), and that sustainable use has no direct connection with the more encompassing concept of 'ecological sustainability' (Hall & Bawa, 1993).

Knowledge about the curative power of plants should not only be considered as a tradition handed down from parents to children, but as a science that has been studied, perfected and applied by different cultures throughout the ages. Through a process of dialogue with scientific knowledge, such studies can guarantee the transmission of information to a community and stimulate a persistent concern about the effects of natural resources on health. It is noteworthy that the use of medicinal plants is not restricted to rural areas, arising valuation of this transmitted knowledge to an urban environment. While there is cultural richness present in the subject, few studies seek to understand the relevance of the subject in an urban environment and only a few ethnobotanical studies for urban backyards are available. In this context, the present study aimed to investigate the ethnobotanical knowledge on medicinal plants of tribal's from Attappady, a rural locality in Palakkad district of Kerala.

2. Materials and Methods

2.1 Study area

Attappady is a tribal pocket in Palakkad district, which lies in the northern eastern part of the state and at a highest ranging from 450-2500 meters along mean sea level. Extensive survey was planned in the tribal pockets of Attappady. Though tribe's



folk constitute 1:1 percent of the population of the Kerala state, 27% of the population in Attappady is tribesfolk comprising Irular, Mudugar, Kurumbar, and Dhodugar. The Attappady valley is an undulating base in at an elevation ranging from 1200 to 3600 feet above sea level to the north mannarghat, west of the Earned taluk of Malappuram district. This mountain valley is located between 10°55'10" and 11°14'19" North latitude and between 76°27'11" and 76°48'8" East longitude stretching from Mukkali to Anakkatty and Thazemully to Muthikulam covering an area of 745 sq.km.

The indigenous people of attappady belong to three major tribal groups such as Irula, Muduga and Kurumba. Irulas is a Dravidian tribe spread over the three states of Tamil Nadu, Kamataka, and Kerala. They are also known as Ellurva, Iruliya, Kasovaurali, Radu, Pujari and Velliga. Their dialect is Irula. They communicate with others in Tamil, Telugu and Malayalam. Irulas are persevering and clever agriculturists and a few are shifting cultivators. They practiced shifting cultivation on the forested uplands (Kottikadu, literally meaning land to be cut and cleared), dry land farming with ploughing (Erkadu, meaning ploughed land), and wet land, mainly paddy cultivation. There were no separate plots for agriculture. They cultivated and made use of whatever parts of the forest they chose to cultivate.

2.2 Data Collection

During the period of study (2021 - 2022), frequent field surveys were conducted throughout the hills at different seasons so as to get more information on the utility of the plant

species from the tribes. The information was gathered through questionnaires, personal interviews and discussions among them. The interview was conducted with the people who are having the sound knowledge on medicinal plants found in their area and used by their families and neighbours in their local language (Tamil). The questionnaire contains the details of the plants, parts used, medicinal uses and mode of preparation of remedies. The ethnobotanical data were collected according to the methodology suggested (Jain, 1989 ; Jain and Goel, 1995).

In the study, 27 knowledgeable elders (17 men and 10 women between the ages of 35 to 70) chosen with the assistance of local administrators and community leaders served as key informants. Each informant was visited three times in order to verify the reliability of the data obtained. If what was said during the first visit concerning the use of particular medicinal plants by any informant did not agree with what was told during the further visits, the information was considered unreliable and had to be discarded. The medicinal plants were also collected during the field survey, identified and photographed. The collected plant materials was assigned field book numbers and the field characters such as habit, habitat, colour and odour of flowers, period of flowering and fruiting, occurrence and other relevant ecological features were also observed.

All the collected plant species were dried and the herbarium specimens were prepared as per standard methods suggested by Jain and Rao, (1976). The taxonomic



identification of the plant specimens were done with the help of local and regional floras such as *Flora of Presidency of Madras* (1915 - 1936), *Flora of Tamilnadu Carnatic* (1983), *Flora of Tamil Nadu* (1983 ; 1987). The voucher specimens were deposited in the Herbarium of Department of Botany, Kongunadu Arts and Science College, Coimbatore, Tamil Nadu for future reference. Based on the information obtained from the traditional healers in the study area, all the ailments were grouped into many categories.

3. Results and Discussion

The present study is an attempt to document the ethnobotanical knowledge of Attappady Forests of Palakkad district, Kerala, India. A total of 66 plant species belonging to 58 genera distributed in 40 families have been documented with their ethnomedicinal uses (Table 1). Out of the total plant species, the dicotyledonous plant species are represented by 58 species, 54 genera and 36 families, whereas, the monocotyledons are represented by 8 species, 4 genera and 4 families (Fig. 1). The dominant genera in terms of number of species in the study were analyzed and found that the genus *Cassia* is the dominant one with 3 species followed by *Achyranthes*, *Ficus*, *Ipomea*, *Phyllanthus* and *Piper* with 2 species each. The highest number of species belongs to Fabaceae with 6 species followed by Malvaceae, Asteraceae and Amaranthaceae with 4 species each, Acanthaceae and Liliaceae with 3- species each (Fig. 2). The high proposal of medicinal species Fabaceae and Asteraceae families has already reported (Chellaiah *et al.*, 2006; Ayyanar & Ignacimuthu, 2011; Morvin *et al.*, 2014).

Herbs were the primary source of medicine (42%) followed by shrubs (24%), climbers (20%) and Trees (14%) (Fig. 3). The data proved that herbs are used as major sources of medicine among the tribal people in the study area. These herbs were used singly as only one plant or in combination with more than one plants to treat the diseases and time to be taken for the treatment disease either short period of time or long period of time depending on severances of disease and condition of the patient. The frequent use of herbs among the indigenous communities is a result of wealth of herbaceous plants in their environs (Uniyal *et al.*, 2006; Gidayet *et al.*, 2010) and Agasthiyar hills harbours more number of herbs as compared to trees, shrubs and climbers (Prakash *et al.*, 2008).

Among the different plant parts used, the leaves (48%) were most frequently used for the preparation of medicine solely or mixed with other plant parts. It was followed by roots and seeds (13%), fruit (7%), flower and latex (5%), whole plant, bark and stem (3%) (Fig. 4). All over the world tribal communities, utilized for the preparation of herbal medicine using leaves (Ezekiel *et al.*, 2012). The preparation and utilization of plant parts were grouped into five categories. Of these, most commonly used method of preparation was Juice (56%) followed by paste (22%), powder (11%) and raw parts (4%). The paste was prepared by grinding the fresh or dried plant parts with oil or water. The powder was prepared by the grinding of shade dried plant parts. The decoction was obtained by boiling the plant parts in water until the volume of the water reduced to



minimum or required amount. According to the informants, preparation of paste for the treatment of ailments is a common method of the

tribal communities in global level (Rajkumar & Shivanna, 2009).

Fig. 1: Analysis of dominant groups in the study area

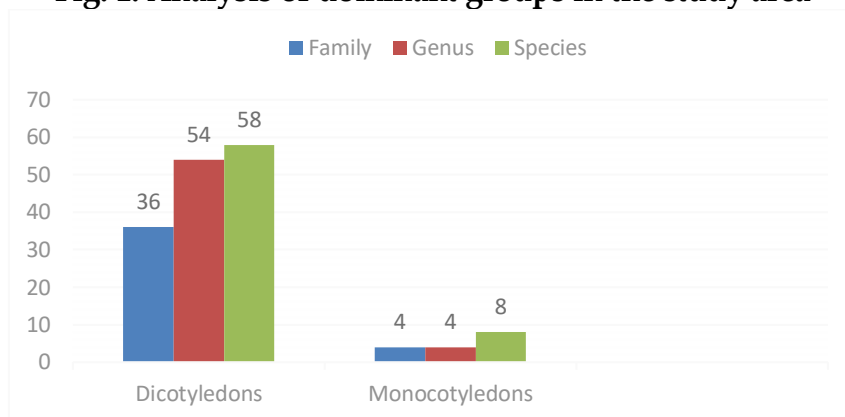


Fig. 2: Dominant families in the study area

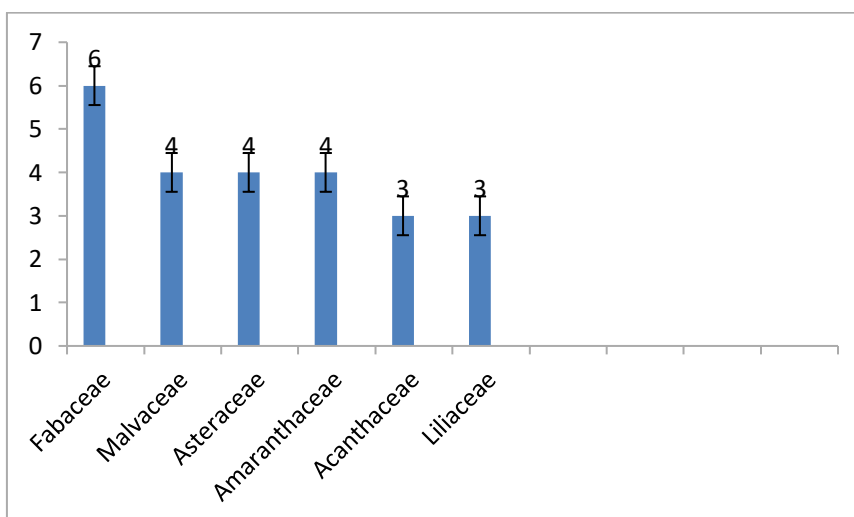


Fig. 3: Habit-wise analysis of ethnomedicinal data

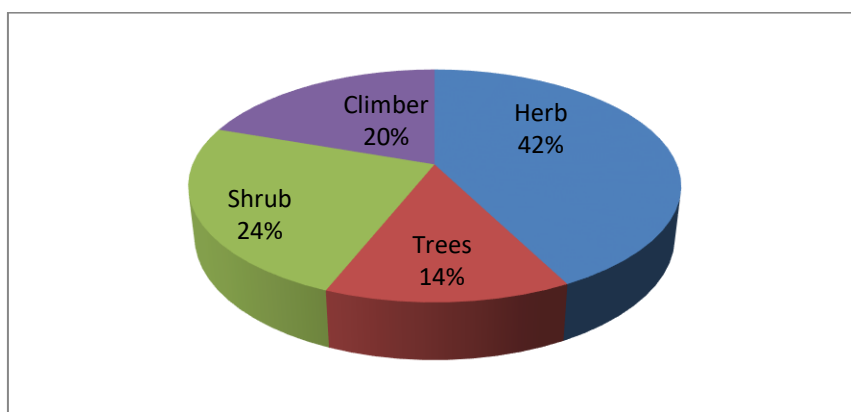
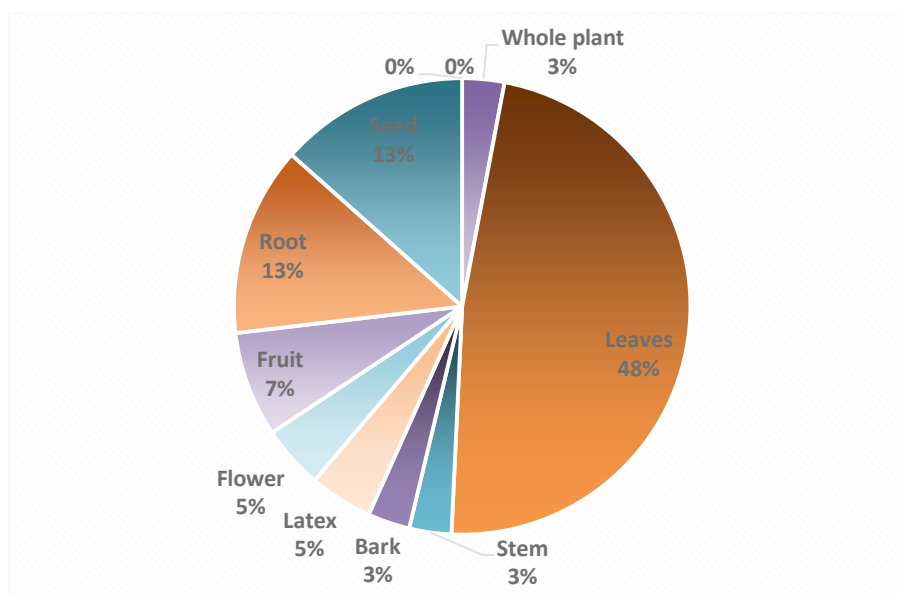


Fig. 4 : Plant parts used for treating the various ailments



The present study also identified certain invasive/alien plants viz., *Acacia nilotica*, *Argemone mexicana*, *Catharanthus roseus*, *Datura innoxia*, *Lantana camara* and *Prosopis juliflora* which are introduced and have either naturalized or are in the way to naturalized in various parts of our country. Most of the invasive species are under the consideration of medicinal purposes. Several of these are used for adulteration: for example, mustard oil is adulterated with extract from seeds of *Argemone mexicana*. But some of the species like *Lantana camara* and *Prosopis juliflora* are having high allelopathic potential and harmful to natural plant population. Discovering uses of alien species by tribes can indicate better properties in the alien species or depletion of indigenous species for a specific uses. The medicinal preparations were made out of a single plant part or in combination of several plant parts. The present study revealed that both single mode and multiple modes of preparations

were involved in the medicinal preparations.

The Irular traditional healers in the study area used more than one plant parts for the preparation of medicine in the treatment of single or multiple ailments. The tribal people too frequently use some adjuvants such as honey, milk, hot water and jaggery to improve the acceptability and medicinal property of certain remedies. The present study observed that, the plant species viz., *Leucas aspera*, *Acalypha indica*, *Solanum surattense*, *Phyllanthus amarus*, *Cassia auriculata* and *Vernonia cinerea* has been scientifically proved to cure various ailments. It is observed from the study that, the tribal people in the study region cultivate some of the common medicinal plants in their home gardens for medicinal uses. Some of them are: *Ocimum tenuiflorum*, *Piper nigrum*, *Aloe vera*, *Plectranthus amboinicus* and *Carica papaya*. Among them most commonly used medicinal plants such as *Achyranthes aspera*, *Aloe vera*, *Allium cepa*, *Allium sativum*, *Azadirachta indica*,



Cynodon dactylon and *Tridax procumbens* which plays an important role in the primary healthcare system of tribal and indicated that, the study area has a wide spectrum of medicinal plants to treat various human ailments.

The recording of information from traditional healers will go a long way in finding out locally available solution for health care. It is especially relevant in view of the high cost of synthetic medicines, which are beyond the reach of the poor people, these indigenous healthcare recipes with scientific refinement can be made accessible even to the deprived

persons. The information provided in the paper is limited and there is a scope to initiate further ethnobotanical study among the communities to gather information as far as possible. The medicated claims incorporated in the study need to be evaluated through phytochemical and pharmacochemical investigations to discover their potentiality as drugs. There is an urgent need to explore and document the ethnomedicinal plants used by the tribal communities of Attappady forests and adjacent areas before such valuable knowledge vanishes.



Table 1: Ethnomedicinal plants used in the Attappady Forests of Palakkad district, Kerala

Botanical name	Family name	Part(s) used	Medicinal uses
<i>Abutilon indicum</i>	Malvaceae	Leaves	Leaf and garlic was chewed in mouth and and blow air to cure ear problems
<i>Acacia pennata</i>	Mimosaceae	Root, Bark	Leaf juice mixed with milk is used for treatment of indigestion for infants
<i>Achyranthus aspera</i>	Amaranthaceae	Root	Root paste is used for insect bite and skin rashes
<i>Achyranthus bidentata</i>	Amaranthaceae	Root	Root juice is used for toothache
<i>Adhatoda vasica</i>	Acanthaceae	Leaves	Leaves, dry ginger and crushed pepper is boiled and the decoction is taken to sore throat.
<i>Aegle marmelos</i>	Rutaceae	Fruit	Fruit pulp is mixed with honey to cure mouth and stomach ulcer
<i>Aerva lantana</i>	Amaranthaceae	Flower	Dried flower decoction is taken to cure burning sensation in urine
<i>Alysicarpus procumbens</i>	Fabaceae	Whole plant	Whole plant crushed and smeared over wounds
<i>Andrographis paniculata</i>	Acantheceae	Leaves	Leaf juice is smeared over wounds
<i>Amaranthus spinosus</i>	Amaranthaceae	Leaves and Stem	Cooked stem and leaves Addition in regular diet helps in curing irregular mensuration
<i>Andrographis paniculata</i>	Acantheceae	Leaves	Leaf juice is smear over wounds
<i>Aillium sativum</i>	Liliaceae	Bulb	Bulb is crushed and heated in coconut oil used for the treatment of earache
<i>Aristolochia indica</i>	Aristolochiaceae	Leaves	Leaves powder mixed with black pepper given orally as antidote for snake bite
<i>Asperagus racemosa</i>	Asparagaceae	Root	Root paste is applied to cure till cure wounds.
<i>Azadirhita indica</i>	Melicaeae	Bark	Bark is soaked in water overnight and drink to cure stomach ulcer.
<i>Bauhinia tomentosa</i>	Faceaceae	Leaves, Flower	Leaves juice used to cure lung infection and raw flower used to cure dysentery and diarrhoea
<i>Biophytum sensitivum</i>	Oxalidaceae	Leaves	The leaf sap is used for wound healing and burns
<i>Boerhaia diffusa</i>	Nyctaginaceae	Root	Root paste is applied for burns
<i>Bombusa bambos</i>	Poaceae	Young leaves	Young leaves sap is used to cure diarrhoea, indigestion and ulcer
<i>Bryophyllum pinnatum</i>	Crassulaceae	Leaves	The juice of lea used for wound, boils and insect bite
<i>Calotropis procera</i>	Asclepidaceae	Milky latex	Throat produced wound is healed by applying milky latex externally
<i>Carica papaya</i>	Caricaceae	Raw fruit	Raw fruit is taken to to cure mensural imbalance
<i>Cardiospermum</i>	Sapindaceae	Leaves	Crushed leaf sap is used as drops to cure

*Corresponding author
 E-mail: varavindhan_bo@kongunaducollege.ac.in



<i>halicacabum</i>			earache
<i>Cassia auriculata</i>	Fabeaceae	Flower	Dried flower and turmeric is grinded fine powder is used to treating pimples
<i>Cassia occidentalis</i>	Fabeaceae	Root	Root paste is applied to cure ring worm
<i>Cassia tora</i>	Fabeaceae	Leaves	Leaf decoction is used to cure urinary infection
<i>Catharanthus roseus</i>	Asclepiadaceae	Leaves	Leaf is crushed and the juice used for the treatment of cuts and wounds
<i>Centella asiatica</i>	Apiaceae	Leaves, Stem	Leaf and stem juice is used for arthritis
<i>Cissampelos pareira</i>	Menispermaceae	Leaves	Leaves juice is used to cure fever
<i>Cleome viscosa</i>	Cleomaceae	Leaves	Leaf sap is smeared over till cure wounds
<i>Crotalaria pellida</i>	Fabeaceae	Root	Root paste is tied with sesame oil for oil dressing for swelling joints
<i>Crotalaria umbellata</i>	Fabeaceae	Root	Root paste is used for antiseptic for wounds
<i>Cyperus rotundus</i>	Cyperaceae	Rhizome	Rhizome powder is applied in area to remove unwanted hair on regular basis
<i>Datura metel</i>	Solanaceae	Leaves	Sun light infused Dried leaf in coconut oil is used in curing dandruff
<i>Ecliptaprostrata</i>	Asteraceae	Leaves	Leaf paste used for hair dyeing and oil prepared out from it is used as hair stimulant
<i>Elettaria cardamomum</i>	Zingiberaceae	Seeds	Seed infusion made by using water helps in preventing nausea
<i>Emilia sanchifolia</i>	Asteraceae	Leaves	The juice of leaves is used to cure eye inflammation and also used to treat cut wounds
<i>Ficus religiosa</i>	Moreaceae	Fruit	Taking raw fruit helps in stimulating appetite
<i>Ficus racemosa</i>	Moreaceae	Latex	Leaf latex is cure boils
<i>Glycomis pentaphylla</i>	Rutaceae	Leaves	Leaf juice and lime stone is added well and taken to heal till cure the wounds
<i>Grewia aspera</i>	Tiliaceae	Leaves	Leaf paste is for external application of wounds
<i>Hibiscus vitifolia</i>	Malvaceae	Root	Root extract is used to treat jaundice
<i>Ipomea hederifolia</i>	Convolvulaceae	Root	Aqueous extract of root is used to cure general stomach complaints
<i>Ipomea obscura</i>	Convolvulaceae	Leaves	Leaf and sesame oil is boiled and is used to cure body pain arthritis
<i>Ixora coccinea</i>	Rubiaceae	Leaves	Leaf sap is dropped in nasal to treat nasal infection
<i>Lantana camera</i>	Verbenaceae	Flower	Warm coconut oil and flower is used to prepare oil used in treating skin itches and antiseptic
<i>Lawsonia inermis</i>	Lythraceae	Leaves	Leaf paste is used to cured boils
<i>Laportea crenulata</i>	Urticaceae	Root	Juice of root dropped to treat bleeding nose
<i>Lecus aspera</i>	Lamiaceae	Leaves	Leaf juice is mixed with warm milk and crushed garlic used to cure ulcer
<i>Mimosa pudica</i>	Mimosaceae	Root	Root is grinded applied external for infants for treating general stomach pain
<i>Moringa oleifera</i>	Morigaceae	Leaves	Daily consuming soup of leaf will increase the amount of mother's breast milk
<i>Oxalis corniculata</i>	Oxaliaceae	Whole plant	The plant extract is used for treating burning pain during urination
<i>Passiflora foetida</i>	Passifloraceae	Leaves	Dried leaf power is mixed with honey and is



			used in treating gastric ulcer problem
<i>Phyllanthus embilica</i>	Phyllanthaceae	Fruit	Juice and honey used in treatment of sore throat
<i>Phyllanthus niruri</i>	Phyllanthaceae	Leaves	Paste folded in betel leaf is taken by chewing to cure body pain and jaundice
<i>Piper betel</i>	Piperaceae	Leaves	Decoction of piper betel leaf, pepper, and dried ginger is used to cure phlegm
<i>Piper longum</i>	Piperaceae	Fruit	Decoction of dried fruit is used for the treatment of fever, cold and cough
<i>Polygala arvensis</i>	Polygalaceae	Leaves	Leaf juice is employed in curing cuts and wounds
<i>Rauwolfia serpentina</i>	Apocynaceae	Root	Aqueous extract of root used for treating insomnia
<i>Santalum album</i>	Santalaceae	Heart wood	Heart wood is rubbed and applied skin boils
<i>Solanum virginianum</i>	Solanaceae	Fruit	Dried fruit powder is mixed with honey to reduce fever
<i>Solanum xanthocarpum</i>	Solanaceae	Seed	Dried seed smoke is passed through mouth to cure plaque and dental issues
<i>Tridax procumbens</i>	Asteraceae	Leaves	Leaf is crushed juice is used for antiseptic for wounds
<i>Vernonia cinera</i>	Asteraceae	Seed	Seed paste is applied for treating skin infection
<i>Vitex negundo</i>	Verbenaceae	Leaves	Leaf and small portion of Amla leaf boiled water is used for bathing to cure body pain

4. Conclusion

The study revealed that the information obtained from traditional healers in the study area were grouped into many ailment categories in which gynecological disorders and dermatological ailments had gained a high percent of citations when compared with the existing literature. It is an urgent need of the hour to preserve the dwindling rich natural heritage because the informants themselves informed that many medicinal plants have been disappearing from the forest for the past few decades. The respondents explained with the proof that they have to walk or trek long distance to collect medicinal plants that had earlier been easily available in close proximity to their settlements. Similarly, the elder informants felt that their mode of treatment of diseases is slowly vanishing due to modernization and the younger generation is not showing any interest in learning these practices. Further, education and health-care facilities have not shown improvement. Therefore, it is necessary to

open schools exclusively to tribal children in each of the settlements to impart quality education to enable them compete with others. Thus, the necessity is to provide adequate infrastructure facilities for good connectivity with non-tribal areas. The Government of India Scheme "Education for All" need to be implemented in a priority basis in tribal settlements.

5. References

- Ahmad, L., Semotiuk, A., Zafar, M., Ahmad, M., Sultana, S. and Liu, Q.R. (2015). Ethnopharmacological documentation of medicinal plants used for hypertension among the local communities of DIR Lower, Pak. *J. Ethnopharmacol.*, 175: 138 – 146.
- Ayyanar, M. and Ignacimuthu, S. (2011). Ethnobotanical survey of medicinal plants commonly used by Kani tribals in Tirunelveli hills of Western Ghats, India. *J. Ethnopharmacol.*, 134: 851 – 864.



- Berlin, B. (1992).** *On the making of a comparative ethnobiology.* In: B Berlin, (Ed.), *Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies.* Princeton University Press, Princeton, pp. 3 - 51.
- Chellaiah, M., Muniappan, A., Nagappan, R. and Savarimuthu, I. (2006).** Medicinal plants used by traditional healers in Kancheepuram district of Tamil Nadu, India. *J. Ethnobiol. Ethnomed.*, 2: 43-48.
- De Vos, P. (2010).** European Materia Medica in Historical Texts: Longevity of a tradition and implications for future use. *J. Ethnopharmacol.*, 132: 28 - 47.
- Ezekiel, A., Daniel, P. and Kisangau, M. (2012).** Ethnomedicinal study of plants used in villages around Kimboza forest reserve in Morogoro, Tanzania. *J. Ethnobiol. Ethnomed.*, 8: 1 - 7
- Gamble, J.S. and Fisher, C.E.C. (1915-1936).** *Flora of Presidency of Madras.* Vols. 1-3. Adlard & Sons Ltd, London (Reprint ed. 1957).
- Giday, M., Asfaw, Z. and Woldu, Z. (2009).** Medicinal plants of the Meinit ethnic group of Ethiopia: an ethnobotanical study. *J. Ethnopharmacol.*, 124: 513 - 521.
- Guarrera, P.M. (2003).** Food medicine and minor nourishment in the folk traditions of Central Italy (Marche, Abruzzo and Latium). *Fitoterap.*, 74: 515 - 544.
- Hall, P. and Bawa K. (1993).** Methods to assess the impact of extraction of non-timber tropical forest products on plant populations. *Econ. Bot.*, 47: 234 - 247.
- Henry, A.N., Kumari, G.R. and Chitra, V. (1987).** *Flora of Tamil Nadu, India.* Series I (Analysis): Vols. II-III.
- Botanical survey of India, Coimbatore, India.
- Huang, H. (2011).** Plant diversity and conservation in China: planning a strategic bioresource for a sustainable future. *Bot. J. Linnean Soc.*, 166: 282 - 300.
- Jain, S.K, and Rao R.R. (1976).** *A handbook of field and herbarium methods.* Today & Tomorrow Publishers, New Delhi, India.
- Jain, S.K. (1989).** *Methods and Approaches in Ethnobotany.* Society of Ethnobotany, Lucknow, India.
- Jain, S.K. and Goel, A.K. (1995).** *A manual of Ethnobotany.* Scientific Publishers, Jodhpur, India. pp. 142-153.
- Leonti, M. (2011).** The future is written: impact of scripts on the cognition, selection, knowledge and transmission of medicinal plant use and its implications for ethnobotany. *J. Ethnopharmacol.*, 134: 542 - 555.
- Mandal, V., Gopal, V. and Mandal, S.C. (2012).** An inside to the better understanding of the ethnobotanical route to drug discovery - the need of the hour. *Nat. Prod. Commun.*, 7: 1551 - 1554.
- Matthew, K.M. (1983).** *The flora of Tamilnadu Carnatic.* The Rapinat Herbarium, Tiruchirapalli, India.
- Matu, E.N., and Van Staden, J. (2003).** Antibacterial and anti-inflammatory activities of some plants used for medicinal purposes in Kenya. *J. Ethnopharmacol.*, 87: 35 - 41.
- Morvin Yabesh, J.E., Prabhu, S. and Vijayakumar, S. (2014).** An ethnobotanical study of medicinal plants used by traditional healers in Silent valley of Kerala, India. *J. Ethnopharmacol.*, 54: 774 - 789.
- Nadembega, P., Boussim, J.I., Nikiema, J.B., Poli, F. and**



- Antognoni, F. (2011).** Medicinal plants in Baskoure, Kourittenga Province, Burkina Faso: an ethnobotanical study. *J. Ethnopharmacol.*, 133: 378 - 395.
- Nair, M.P. and Henry, A.N. (1983).** *Flora of Tamil Nadu, India. Series I (Analysis): Vol. I. Botanical survey of India, Coimbatore, India.*
- Nolan, J.M. (1998).** The roots of tradition: social ecology, cultural geography, and medicinal plant knowledge in the Ozark - Ouachita Highlands. *J. Ethnobiol.*, 18: 249 - 269.
- Nolan, J.M. and Turner, N.J. (2011).** Ethnobotany: The study of people-plant relationships. *Ethnobiology. J. Ethnobiol.*, 133 -147.
- Pieroni, A. and Price, L.L. (2006).** *Eating and healing traditional food as medicine.* Haworth Press, Binghamton, pp. 432-439.
- Prakash, J.W., Anpin Raja, R.D., Asbin Anderson, N., Christudhas, N., Regini, G.S., Bensar, K., Rajeev, R., Kiruba, S., Jeeva, S. and Das, S.S. (2008).** Ethnomedicinal plants used by Kani tribes of Agasthiyarmalai biosphere reserve, Southern Western Ghats. *Ind. J. Trad. Knowl.*, (3): 410 - 413.
- Quave, C. and Pieroni, A. (2007).** *Traditional health care and food and medicinal plant use among historic Albanian migrants and Italians in Lucania, Southern Italy.* In: A, Pieroni, I, Vandebroek, Eds. *Traveling cultures and plants: the ethnobiology and ethnopharmacy of human migrations.* Berghahn Books, New York. pp. 204 - 226.
- Rajkumar, N. and Shivanna, M.B. (2009).** Ethnomedicinal application of plants in the eastern region of Shimoga District, Karnataka, India. *J. Ethnopharmacol.* 126: 64 - 73.
- Schultes, R.E. (1994).** The importance of ethnobotany in environmental conservation. *Amer. J. Econ. & Sociol.*, 53: 202 - 206.
- Struhsaker, T.T. (1998).** A biologist's perspective on the role of sustainable harvest in conservation. *Conserv. Biol.*, 12: 930 - 932.
- Uniyal, S.K., Singh, K.N., Jamwal, P. and Brij, L. (2006).** Traditional use of medicinal plants among the Tribal communities of Chhota Bhangal, Western Himalaya. *J. Ethnobiol. Ethnomed.*, 2:14-20.