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Nilgiris: A Medicinal Reservoir

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Abstract

Nilgiris is not only known for its biodiversity, but it is also known for its diversity in ethnic groups like Kurumbas, Todas, Irulas, Kattunayakas, Paniyas and Kotas. All these communities have their own way of utilizing the plant wealth for medicinal purposes for the wellness of their own community. A field trip was carried out to some of the Kurumba settlements and documented traditional knowledge (TK) of the group. The medical practice was documented in the order of botanical name, common name, part used, family, medicinal uses and mode of administration. Later the medical practice of Kurumba tribes was analyzed with the TK of other tribal communities in order to understand the medicinal usage pattern among different aboriginal groups settled in the region. From this study, we came to know that Kurumba tribes generally using 51 medicinal plants for treating various diseases and earlier literature revealed that more than 188 plants species were used by different other tribal communities such Todas, Irulas, Kattunayakas, Paniyas and Kotas respectively for various ailments.

Keywords: Ethnomedicine, Kurumba, Niligiri.

1. Introduction

The history of the use of plants and animals as a source of medicine dates back, perhaps to the origin of the human race. Use of plants to treat various diseases in India dates back to the Rigveda (3500 to 1800 B.C.E), which explains curative properties of some drugs. But ethnobotany as a science was first officially recognized by Harshberger^[1] to point out the plants that are used by the aboriginals. Later, various ethnobotanists recognized this science as a multidisciplinary science comprising many interesting and useful aspects of plant science, history, anthropology, culture and literature. Also, this deals with the relationship between plants and human beings, especially the economic uses of plants by primitive tribes far away from civilization and culture. These definitions and concepts that have evolved gave a very broad dimension to the field of Ethnobotany.

During the past three to four decades the importance of traditional interrelationships between indigenous people and forests has been better understood thoroughly. Since the tribal's mostly inhabit forest and hilly terrain, they depend on the forests and wild plants not only for their food but also for curing various types of diseases and disorders. These methods are well developed and have proven successful for generations. The transfer of the traditional knowledge through generations is not by any written form, but by various occasional applications of these resources among different ethnic groups in specific. Several workers have carried out research works on the documentation of the traditional knowledge in isolation but no work has been carried out towards the consolidation and analysis of all these traditional medicinal practices followed in the present study region. Hence with this objective the present investigation is an attempt to understand the medicinal repository and usage pattern by various traditional healers belonging to different ethnic communities residing in the region.

The Nilgiri district is located in the North Western corner of Tamil Nadu state in South India and the district has a geographical area of 2,543 sq. kms., constituting about 1.95 per cent of the area of Tamil Nadu state. It is located between 11° 10" and 11° 45" N latitude and 76° 14" and 77° 2" E longitude. It is bounded on the north by Karnataka State, North West by Kerala State, on the South East by Coimbatore District and in the North East by Erode District of Tamilnadu. The Nilgiris is situated at the junction of the Eastern and Western Ghats. It has an average elevation of 2000 mts. above the Mean Sea Level; the highest peak is Doddabetta at 2640 mts. It is bound by the Bhavani River on the southern side and in the north by Moyar River. Etymologically, the word 'Nilgiris' means Blue Mountains. The name 'Neelagiri' was first coined by the people living in the plains below the plateau because of the blue haze that covers the entire range, which is common with most distant hills of considerable evergreen vegetation.

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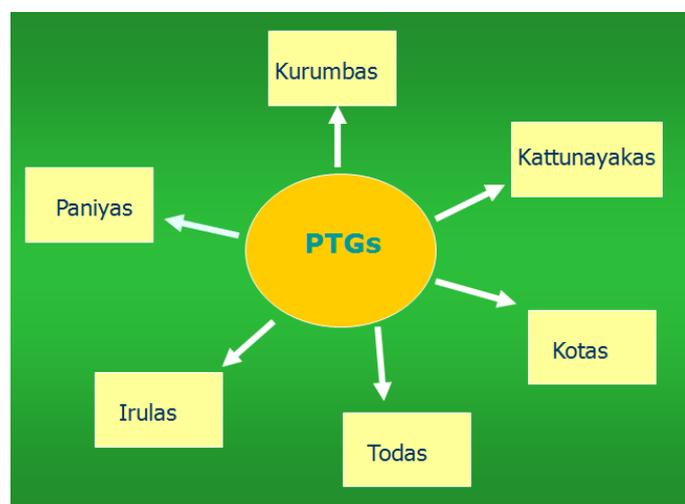
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The Nilgiri district is also forms the part of ‘Nilgiri Biosphere Reserve’ (NBR) which is the first biosphere reserve set up in India under the Indian National Man and Biosphere Programme [2].

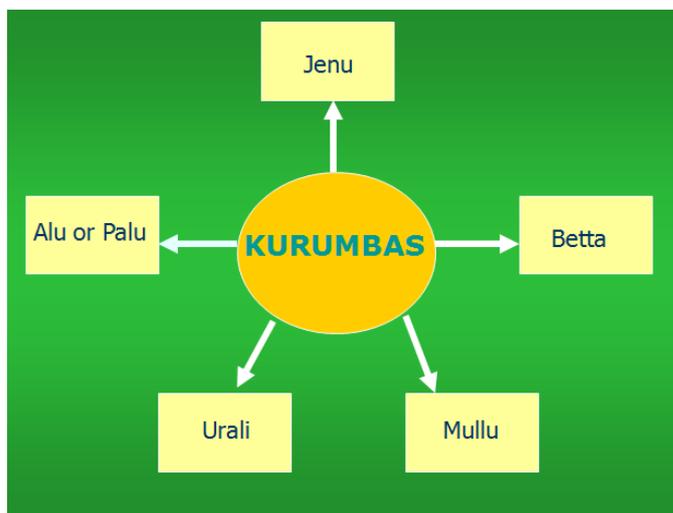
For the administrative purpose, the Nilgiri District is divided into six taluks. They are Udhagamandalam, Kotagiri, Coonoor, Kundah, Gudalur and Pandalur. The Udhagamandalam town is also called as Ooty or Udhagai which is headquarters for the district administration. Totally six scheduled tribes, identified as Primitive Tribal Groups (PTGs) by the government of India which inhabit in the Nilgiri district. They are Kurumbas, Todas, Irulas, Kattunayakas, Paniyas and Kotas (Fig: 2a). Among the six tribes, the Kurumbas are supposed to be the expert healers using herbal medicines. On the basis of hill residence, clan organization, dialects and belief system, the Kurumbas of Nilgiri District are divided in to five ethnic groups. They are Alu or Palu Kurumbas, Betta Kurumbas, Jenu or Teen Kurumbas, Mullu Kurumbas and Urali Kurumbas (Fig: 2b). Among these five divisions of Kurumbas, Alu Kurumbas are supposed to be the experts in traditional medicinal practices [3]. The three taluks, Kotagiri, Coonoor and Kundah where Alu Kurumbas live has been selected as the ‘study area’ for the present study (Fig: 1).



Fig 1: Map depicting the study area



2a



2b

Fig 2a and 2b: Schematic representation of various aboriginal groups and Kurumba clan organization

2. Material and Methods

At the beginning of the ethnobotanical survey visit was made to Tribal Research Centre which in Muthorai Palada, Ooty was consulted for describing about the land, Kurumba settlements and conservation status of the research site. Then extensive ethnobotanical explorations were undertaken during 2009, in the Kurumba settlements of Kundah taluk. The tribal healers were identified from the settlements and the permission was obtained from the headsmen of each settlement for carrying out the study. In the present study, totally 6 tribal healers were interviewed and their help was taken in identifying the plants, herbs and tribal medicine.

Participatory rural appraisal (PRA) method was used for obtaining the data. As this approach is very cost effective and could be completed in few days including the entire writing up of results as well as the recommendations [4]. During the survey, it was easier to approach the healers individually in private, as they were more comfortable to reveal their traditional plant lore than when they are in large groups. Some of the informants also accompanied us to the field for collecting the medicinal plants. For the better understanding of the local medicinal practices by the group semi structured questionnaire were used⁵. Prior Informant Consent (PIC) was obtained from the informants in view of reproducing the medicinal information and also for capturing photographs.

During the course of the study, each informant was visited at least three times in order to verify the reliability of the data obtained. If what was said during the visit related to the usage of a particular medicinal plant by an informant did not agree with what was told during the earlier visits, then the information is considered as unreliable and discarded and also if the identity of a particular medicinal plant varies during the visits then the data is discarded. During the process of documentation consistent field walks were also carried out to the specific habitat for identification and collection of the particular therapeutic plant cited by the healer. The information gathered was confirmed by different tribal groups dwelling in different places of the study area [6]. During the field visits each collection of individual plant species was labeled with field numbers and then medicinal plants were locally identified, photographed and collected for preparing herbarium.

The original information given by the informants was recorded in the field notebook. For preservation of specimens in the field, wet method ^[7] using 70% methyl alcohol and 4% formaldehyde was employed. The herbarium was prepared by following the procedure described in Methods and Approaches in Ethnobotany ^[8] were generally followed. Plants were characterized based on the identification keys given in standard identification manuals The Flora of Presidency of Madras ^[9], The Flora of Tamil Nadu Carnatic ^[10] and The Flora of South Indian Hill Station ^[11]. After identification, the identified specimens were kept in species and genera folders. The families are arranged according to Bentham and Hooker's system of classification. The genera within the family and the species within the genus were kept in alphabetical order. Nomenclature of each species was checked according to

International Code of Botanical Nomenclature ^[12]. For the meaningful analysis and the interpretation the entire raw data were presented in the tabular form in the following sequence botanical identity, family, local name, uses and preparations.

3. Collection of Literature

The published literature on the ethnobotanical studies carried out by various workers was retrieved using Pubmed and Google query using keywords Ethnobotanical studies of Kotas, Todas, Kattunayakas, Irulas and Paniyas of Nilgiri district. These published research articles were then analysed manually to ascertain the traditional knowledge of these communities related to the study area and the usage pattern of the medicinal plant species. The graphical representations were used for summarizing and interpreting the current research results.

Table 1: Ethno medicinal plants used by Kurumba tribes

Sl. No	Botanical Name, Local name, Part Used	Family	Medicinal Uses	Mode of administration
1	<i>Achyranthes aspera</i> L., Nayuruvi, Leaves	Amaranthaceae	Diverticulosis and Diverticulitis	Leaves are cooked under low fire and are consumed, Leaves are also grinded and the juice is diluted in water and consumed
2	<i>Achyranthes bidentata</i> Blume, Kithoop, Leaves	Amaranthaceae	Rapid healing of wounds	Leaves paste is applied to wounds for quick healing
3	<i>Aloe vera</i> (L.) Burm.f. Sotru Kattrazhai, Leaves	Liliaceae	Hair and skin diseases	Leaves paste is applied on the hair and also on the affected region on the skin
4	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC., Nilakirai, Leaves	Amaranthaceae	Diarrhoea	Leaves are cooked and consumed during the course of disease
5	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC., Nilakeera, Leaves	Amaranthaceae	Used as food and acts as a roughage	Used as regular food
6	<i>Amaranthus gangeticus</i> L. Mulai keerai, Entire plant	Amaranthaceae	Good digestion, Constipation,	The leaves along with the stem is cooked over low flame for 15 minutes and consumed along with the food
7	<i>Artemisia nilagarica</i> (C. B. Clarke) Pamp. Manikoland, Leaves and stem	Asteraceae	Removing worms from wounds both in humans and animals	Leaves and stem is grinded to paste and applied to wounds
8	<i>Berberis Tinctoria</i> Lesch. Jakkala, Leaves and stem	Berberidaceae	Dysentery, Bloating of stomach	Juice of the bark or dried bark is powdered and drank along with water
9	<i>Bidens pilosa</i> L., Katu kunni, Leaves	Compositae	White patches on the legs	Leaves paste is used as an external ointment
10	<i>Breynia rhamnoides</i> Muell. Poolan, Root and Leaves	Euphorbiaceae	White patches on the skin all over the body	Root and Leaves paste is used
11	<i>Carica papaya</i> L. Poppilli mara, Fruit	Caricaceae	Indigestion and Constipation	Used for good digestion along with regular food and for diarrhoea
12	<i>Chenopodium ambrosioides</i> L. Jaregida, Entire plant	Amaranthaceae	Intestinal cramps	Juice is consumed by diluting the same in warm water.
13	<i>Clematis gauriana</i> Roxb. Meenae, Leaves and stem	Ranunculaceae	Wounds and skin diseases	The paste is applied on the wound and sundried, then the patient is required to take bath
14	<i>Coleus malabaricus</i> Benth., Periya tulasi, Leaves	Labiatae	Asthma	Leaf paste is applied on chest or vapour of the leaves boiled in water is inhaled
15	<i>Coleus parviflorus</i> Benth., Nila, Tuber	Lamiaceae	Itching, boils on the skin	Paste of the tuber along with neem leaves is applied to skin to reduce itching and boils
16	<i>Cissampelos pureira</i> , L., Koodibatale, Leaves	Menispermaceae	Headache, fever, burning sensation in chest	Luke warm paste is applied on forehead
17	<i>Citrus aurantium</i> L., Eravae kai, Fruit	Rutaceae	Good for digestion, Hemorrhoids	Juice of the fruit is consumed along with salt with one glass of water for good digestion
18	<i>Cymbopogon citratus</i> (DC.) Stapf., Karppura pul, Leaves	Poaceae	Used in case of acute diarrhoea due to indigestion, stomach pain	Leaves juice is used along with various dishes to improve the digestion and also consumed directly along with water during diarrhoea

19	<i>Colocasia esculenta</i> L. Schott., Chembu, Leaves and Rhizome	Araceae	Small red colour boils appearing on the skin	Juice of the leaves and rhizome paste is mixed with gingelly oil to prepare a gel like formulation and this is applied externally for 21 days to cure skin disease
20	<i>Curcuma longa</i> L., Manjal, Rhizome	Zingiberaceae	Itching and also for skin glowing skin	Paste is applied on the skin
21	<i>Cymbopogon citratus</i> L. Karppura pul, Roots	Poaceae	For pimples	Garlic and grass root paste is applied on the body and then hot water bath is given
22	<i>Datura stramonium</i> L., Yemmuth, Leaves and fruits	Solanaceae	Used to cure piles	The tender Leaves paste with fruits intact is prepared and applied to the anal region as a cure for piles
23	<i>Dodonea viscosa</i> Linn., Manantha, Leaves	Sapindaceae	Fracture for both animals and humans	Leaves are heated lightly and are tied around the fracture.
24	<i>Euphorbia hirta</i> L., Amanpacharasi, Leaves	Euphorbiaceae	Blood in stool	Leaves are crushed and the juice is mixed with water and taken internally at regular intervals of time after the food
25	<i>Euphorbia rothiana</i> Spreng., Kopot, Latex	Euphorbiaceae	Used for healing sores, also helps to grow hairs and used as insect repellent	The latex is applied externally for healing sores. It is also believed to promote hair growth. The whole plant is good insect repellent.
26	<i>Eucalyptus polybractea</i> R. T. Baker, Karpura mara, Leaves and bark	Myrtaceae	Used for round patches appearing in between the fingers	Leaves paste is used along with <i>Curcuma longa</i> L. to cure the skin disease
27	<i>Ficus infectoria</i> Roxb., Selakai, Fruits	Moraceae	Used as food	The fruit is eaten raw along with chilli and salt
28	<i>Ficus racemosa</i> L., Athikai, Fruits	Moraceae	For good healthy eye sight	The fruit contains tiny insect which is good for eyesight
29	<i>Grewia aspera</i> Roxb. Dadchi maram, Bark	Tiliaceae	Diarrhoea	Bark is dried, powdered and then boiled with water and consumed at regular intervals for 3 days
30	<i>Gymnema hirsutum</i> W&A., Sakarasedi, Leaves	Asclepiadaceae	Diabetes	Powder of the dried Leaves is directly consumed along with water
31	<i>Hibiscus rosa sinensis</i> L., Chembarathi, Flowers	Malvaceae	Good for hair	Flowers are boiled along with oil and applied regularly on the head for cooling effect and for good hair growth
32	<i>Ipomoea alba</i> L., Velutha, Leaves	Convolvulaceae	For skin diseases	Leaves paste is used directly as an external ointment
33	<i>Lantana camara</i> L., Parlegida, Flowers	Verbenaceae	Skin inflammations	Flower is squeezed and the juice extracted is applied on the affected area of the skin
34	<i>Leucas biflora</i> (Vahl.) R.Br. Kaduthumbae, Entire plant	Lamiaceae	Skin irritations	Paste of the whole plant is mixed with the coconut oil and applied extensively on the affected areas
35	<i>Malaxis densiflora</i> (A. Rich.) Kuntze, Nelnethch, Leaves	Orchidaceae	Used for wounds for quick healing	The leaf paste is spread on the wound for quick healing
36	<i>Melothria maderaspatana</i> Cogn. Solapushni kai, Stem	Cucurbitaceae	Prolonged cough	The stem is crushed and the juice is taken in for 3 days, for effective results
37	<i>Murraya koenigii</i> L. Kariveppila, Leaves	Rutaceae	Skin inflammations	Leaves are boiled along with coconut oil and applied on the affected part in warm condition
38	<i>Nasturtium indicum</i> (L.) DC., Kadge, Entire plant except the root portion	Brassicaceae	For ear diseases	The plant is first slightly baked on charcoal and then the juice is extracted by crushing and the juice is used drop wise inside the ear
39	<i>Ocimum basilicum</i> , Var. <i>purpurascens</i> , Katu thulasi, Entire plant	Lamiaceae	Skin inflammations after the insect bites	Leaves paste is externally applied
40	<i>Passiflora calcarata</i> Mast. Potul, Leaves	Passifloraceae	Skin diseases	Leaves juice is applied externally
41	<i>Physalis peruviana</i> L., Urechithuvar, Leaves	Solanaceae	Used for quick wound healing	Leaves paste is smeared on wounds for quick healing
42	<i>Piper brachystachyum</i> Wall., Kadu kurumulaku, Fruit	Piperaceae	Cough and also used in various other medicinal preparation	Paste or juice of the fresh fruit is used as powder or the dried fruit is also used as a decoction
43	<i>Psidium guajava</i> L., Koyyapazham, Fruit and leaves	Myrtaceae	Used as anti-dysenteric and Antidiarrhoeal. The fruits are edible.	Leaf decoction is taken orally as anti-dysenteric and antidiarrhoeal. The young leaves are grinded with buffalo milk and then taken internally for

				burning sensation of the stomach.
44	<i>Plectranthus nilghericus</i> Benth., Sone gida, Entire plant	Labiatae	Minor wounds	Leaf paste is applied on the wound directly for fastening the healing process
45	<i>Rubia cordifolia</i> Linn., Maral, Leaves	Rubiaceae	Injuries caused by fire	Paste of the fresh plant is directly applied on the wound or the powder of the dried plant material is also used as an external application
46	<i>Santalum album</i> L., Sanddanamara, Seed	Santalaceae	Used for skin troubles. It is also used as refrigerant.	Seed oil is used for skin troubles. The wood powder is used as a refrigerant
47	<i>Shuteria vestita</i> , W&A, Kadu belaga, Leaves	Fabaceae	Boils appearing on the skin	Leaves paste is used directly as an external ointment
48	<i>Sida rhombifolia</i> L., Kal gadale, Leaves	Malvaceae	Wounds	The paste is used along with paste of <i>Centella asiatica</i> externally as an ointment
49	<i>Solanum denticulatum</i> Blume., Periya midinje, Entire plant	Solanaceae	Migraine	The entire plant part paste is applied in cloth and tied on the head
50	<i>Solanum indicum</i> Linn., Sunda maram, Roots and leaves	Solanaceae	Toothache and snakebite	Juice is taken in case of toothache is there and the paste is also used as a first aid for snake bite
51	<i>Syzygium cumini</i> (L.) Skeels Naval Pazham, Stem Bark, Fruit and Seeds	Myrtaceae	Used for sore throat, dysentery and ulcers. It is also used for purifying blood. It Antidiarrhoeal and anti diabetic activity	The stem bark paste is taken orally for sore throat, dysentery and ulcer. The fruit is given for purifying blood. The fresh juice of bark with goat milk is used as antidiarrhoeal. The seed powder mixed with <i>Salvia officinalis</i> leaves is given as anti-diabetic

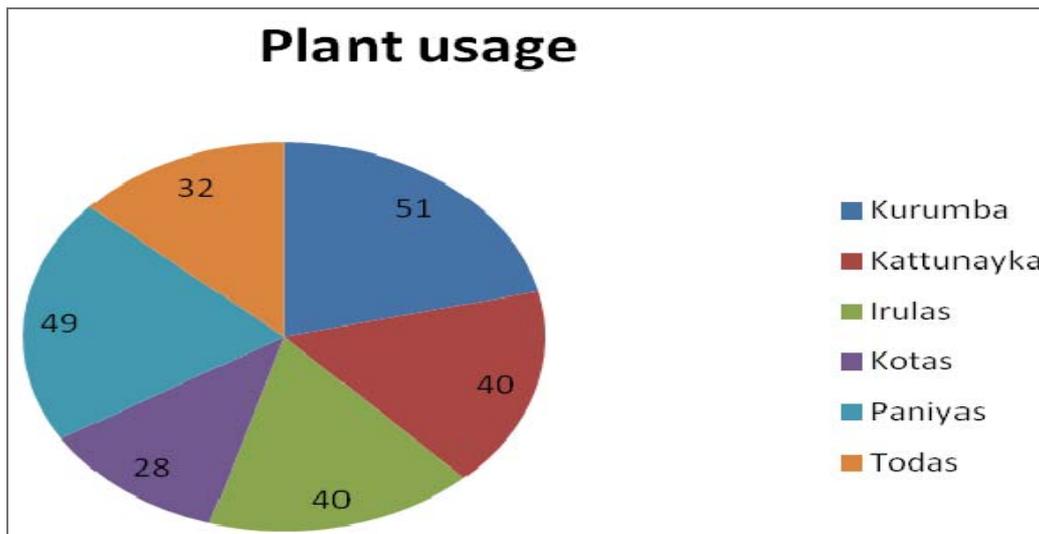


Fig 3: Plant usage pattern by different PTGs (Primitive Tribal Groups)

Table 2: Plant part usage pattern across various aboriginal groups.

Sl. No	Name of the group	Leaves	Stem	Bark	Flowers	Fruit	Rhizome	Seeds	Entire Plant	Root	Tuber	Rhizome	Heart wood	Latex
1	Kurumbas	20	1	1	1	5	1	1	7	1	1	1	0	1
2	Kattunayakas	10	4	1	0	3	0	1	5	11	1	1	0	0
3	Irulas	12	3	13	0	1	0	0	1	3	1	1	1	0
4	Kotas	10	0	0	0	7	0	4	1	2	1	0	0	0
5	Paniyas	16	3	2	0	3	2	5	4	3	0	1	0	1
6	Todas	14	2	0	1	1	0	1	5	3	0	1	0	0

Table 3: Plant usage pattern of various parts of the same plant among the PTG's.

	Name of the group	Leaves & Stem	Root & Leaves	Leaves & Rhizome	Leaves & Latex	Leaves & Bark	Leaves & Tuber	Leaves & Fruit	Leaves & Seed	Fruit & Root	Flower & Root, Bark	Latex & Fruit	Fruit & Leaves	Leaves, Flower & Fruit	Stem bark, Root & Fruit	Stem Bark & Seeds	Leaves & Flower
1	Kurumbas	4	2	1	0	1	0	1	0	0	0	0	1	0	0	1	1
2	Kattunayakas ^[16]	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
3	Irulas ^[13, 17]	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
4	Kotas ^[14]	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
5	Paniyas ^[13]	0	0	0	0	0	0	0	0	2	1	1	2	1	1	1	0
6	Todas ^[15]	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1

4. Results and Discussion

A total of 49 medicinal plants used by the Kurumba healers from the Kundah taluk were documented, belonging to 33 families. These medicinal plants were used for curing different ailments ranging from common skin infection to gastro intestinal diseases (Table 1). The analysis of the data revealed that Kurumbas use the plant species mainly belonging to the family Amaranthaceae (6 species), Solanaceae (4 species) and Euphorbiaceae (3 species). The primary plant parts used for the herbal remedies by the Kurumbas are 20 plant species leaves and 7 plant species are used in form of entire plant. As per the data gathered during field study and from the literature survey the number of medicinal plant species used by the six ethnic groups dwelling in the Niligiri district are as follows Kurumbas – 49 , Kattunayakas – 40 , Irulas – 40, Kotas – 28, Paniyas – 49 and Todas – 32 respectively (Figure 3). The number of plant species usage patterns among other tribal groups is also primarily focusing on leaves like Kattunayakas – 10, Irulas – 12, Kotas – 10, Paniyas – 16 and Todas – 14. At the same time, Kattunayakas use roots of 11 plant species as medicinal ingredient which highest usage of root as ingredient among all the other tribal groups. Similarly usage of bark is more in Irulas (13 plant species), 7 fruit bearing plant species are used for medicinal purpose in Kotas and seeds of 5 plant species are used by Paniyas. Some of the plants species like *Alternanthera sessilis* and *Cymbopogon citratus* are used for multiple ailments.

A combination of different parts of the same plant is also followed in the medicinal preparation, for a single ailment by all the ethnic groups. For example, leaf-stem combinations are used by Kurumbas: 4, Kattunayakas: 1 and Irulas: 2 plant species respectively. In case of Paniya healers mainly prefer to use fruit and root as well as fruit - leaf combination in the medicinal preparation. Similarly Toda healers prefer to use leaf -bark, leaf - latex and leaf – flower combination in their medicinal preparation. Interestingly, it was

observed that leaf-rhizome combination was only practiced in Kurumba community. At same time Paniyas follow a variety of unique combinations in terms of usage of multiple parts of a single plant like leaf-flower-fruit, stem bark-root-fruit, flower-root-bark and fruit-root as ingredients in the medicinal preparations. Todas also use unique combination of leaf – latex in their preparations. (Table 3).

5. Conclusion

On comparison of the Kurumba medicinal practices data documented from a single taluk with respect to the data pertaining to entire Nilgiri district for other tribal communities (Kattunayakas, Irulas, Kotas, Paniyas and Todas), clearly demonstrates that the medicinal plants information possessed by the Kurumbas has not been better documented in other regions of Nilgiri district. The only available ethnomedical documentations among Kurumba tribes have been reported earlier by two workers ^[3, 18]. The complete study of the Kurumba medicinal practice will definitely shed light on the possible origin of the traditional knowledge among the healers of different communities residing in the region. Again if we look at the usage pattern of these medicinal plants parts among the ethnic groups is primarily the leaves, entire plant and roots, which can pose a extinction threat to the plant wealth. Hence it's very important to ensure that these medicinal plants are conserved else it may vanish in the due course of time because of the over exploitation these resources for medicinal purposes and also most of the forest lands are being cleared for plantation purpose and to promote tourism. All these activities have adversely impacted on the medicinal biodiversity of the region. This provides an insight to the understanding many high value medicinal plant species, parts used, the mode of administration, indicating the high potential for economic development through the sustainable collection of these medicinal flora.

6. References

1. Harshberger JW. The purpose of ethnobotany. *Botanical Gazette* 1896; 21:146-154.
2. Daniels RJR. The Nilgiri Biosphere Reserve and its role in conserving India's biodiversity. *Current Science* 1992; 64:706-708.
3. Parthasarathy J. Tribes and Inter Ethnic Relationship in the Nilgiri District, Tamil Nadu, TRC/HADP publication, Udhamandalam, 2007.
4. Martin GJ. *Ethnobotany: A conservation manual*. Chapman & Hall, London, 1995.
5. Dilip KEK, Janardhana GR. Ethnobotanical polypharmacy of Traditional healers in Wayanad (Kerala) to treat type 2 diabetes. *Indian J Tradit Knowl* 2012; 11:667-673.
6. Jain SK, Goel AK. *A Manual of Ethnobotany*, Edn 1, Jodhpur: Scientific Publishers, 1995.
7. Fosberg FR, and Sachet M. Manual for tropical herbaria, *Regum Vegetible* 1965; 9:132-135
8. Jain SK. *Ethnobotany: An interdisciplinary science for holistic approach to man plant relationships, Methods and Approaches in Ethnobotany*, Edn 2, Jodhpur: Scientific Publishers, 1989.
9. Gamble JS. *The Flora of Presidency of Madras*, Allard & Sons, Ltd London, 1975.
10. Mathew KM. *The Flora of the Tamil Nadu Carnatic, The Rapinet herbarium, St. Joseph's college, Tiruchirapalli, India*, 1983.
11. Fyson PF. *The Flora of the South Indian Hill Station*, In: Superintendent Government Press, Madras, 1932.
12. Greuter W. *International code of Botanical Nomenclature*, Edn 1, Konigstein, Germany, 1988.
13. Rajan S, Baburaj DS, Sethuraman M, Parimala M. Stem and stem bark used medicinally by the tribals Irulas and Paniyas of Nilgiri district, Tamil Nadu. *J Nat Remedies* 2001; 1(1):49-54.
14. Rajan S, Sethuraman M. Plants used in the folk medicine by the Kotas of Nilgiri district, Tamil Nadu, *Ancient Sci Life* 1991; (4):233-230.
15. Rajan S, Jayendran M, Sethuraman M. Folk herbal practices among Toda tribe of the Nilgiri Hill in Tamil Nadu, India, *J Nat Remedies* 2005; 5(1):52-58.
16. Rajan S, Sethuraman M, Pulok KM. Ethnobiology of Nilgiri Hills, India, *Phytother Res* 2002; 16(2):98-116.
17. Murugesan M, Balasubramanian, Arthi H. Ethno medical knowledge of plants used by Irula tribes, Chengal combai, the Nilgiris, Tamil Nadu, *Ancient Sci Life* 2005; xxiv(4):179-182.
18. Angannan CK. *The Ethnobotany of the Tribe, Kurumbas in the Nilgiris, South India*, Doctoral thesis, Bharthiar University, Tamil Nadu, 1999.