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Traditional knowledge of Kani tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India

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Abstract

An ethnobotanical survey was carried out among the ethnic groups (Kani/Kanikaran) in Southern Western Ghats of India. Traditional uses of 54 plant species belonging to 26 families are described under this study. In this communication, the information got from the tribals were compared with the already existing literature on ethnobotany of India. The documented ethnomedicinal plants were mostly used to cure skin diseases, poison bites, wounds and rheumatism. The medicinal plants used by kanis are arranged alphabetically followed by family name, local name, major chemical constituents, parts used, mode of preparation and medicinal uses.

Keywords: Kani tribals; Ethnomedicine; Tirunelveli hills; Western Ghats and traditional knowledge

1. Introduction

India is having a rich vegetation with a wide variety of plants, because of the extreme variations in geographical and climatic conditions prevailing in the country. Plants have been used since ancient times for the treatment of various ailments. The traditional systems of medicine together with folklore systems continue to serve a large portion of the population, particularly in rural areas, in spite of the advent of the modern medicines. Out of about 15,000 species of higher plants in India, medicinal uses have been attributed to 1500 species (Handa, 1998). In India, Southern Western Ghats has rich vegetation compared to other areas of Western Ghats. It is situated in the Southern end of the Western Ghats and lies between the longitudes 77°5′–77°40′E and latitudes 8°5′–8°50′N. Nearly 1800 species of plants are listed to be present in the Tirunelveli hills (Manickam et al., 2003).

Ethnobotany tries to study the relationship between humans and nature. Ethnic people are highly knowledgeable about the plants and their medicinal values. This knowledge is passed through oral communication from generation to generation. Over the last century, ethnobotany has evolved into a specific discipline that looks at the people–plant relationship in a multidisciplinary manner, such as ecology, economic botany, pharmacology, public health and other disciplines as needed (Balick, 1996). Tribal population provides considerable information about the use of many plants or plant parts as medicine. Today according to the World Health Organization (WHO) as many as 80% of the world's people depend on traditional medicine for their primary healthcare needs (Azaizeh et al., 2003). There are considerable economic benefits in the development of indigenous medicines and in the use of medicinal plants for the treatment of various diseases. In a report recently published by the World Bank, Lambert et al. (1997) pointed out that preserving and enhancing the plant knowledge and use was equivalent to 'rescuing a global heritage'.

Traditional medical practices are an important part of the primary healthcare system in the developing world (Sheldon et al., 1997). Herbal medicines are comparatively safer than synthetic drugs. Plant-based traditional knowledge has become a recognized tool in search for new sources of

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drugs and neutraceuticals (Sharma and Mujundar, 2003). The ethnobotanical survey can bring out many different clues for the development of drugs to treat human diseases. Herbal medicines are assumed to be of great importance in the primary healthcare of individuals and communities in many developing countries (Ghosh, 2003). Considering the current rate of deforestation with the concurrent loss of biodiversity, there is a need for accurate documentation of the knowledge and experience of the traditional herbalists (Grierson and Afolayan, 1999). In this paper, we report on the information gathered from traditional healers among Kani tribals on the plants used for treatment of various diseases in Tirunelveli hills of Tamil Nadu, India.

2. Study area

Tamil Nadu is situated in Southern end of India, east of Kerala and south of Andhra Pradesh and Karnataka states. Several folds of Southern Western Ghats separate the states of Tamil Nadu and Kerala. The area of investigation (Fig. 1) is located in the Kalakkad Mundanthurai Tiger Reserve Forest (KMTR) of Tirunelveli hills; it is a representative area of the Southern Dry Mixed Deciduous forests in Tamil Nadu. KMTR is India's 17th Tiger Reserve under Project Tiger and the sanctuary is developed as a National Tiger Reserve from the year 1988 with a total area of 817 km^2 in the south most Western Ghat ranges. Geographically, it is a part of South Western tip of the Western Ghats, a region that is known for its species richness, diversity and high degree of endemism.

This sanctuary is very popular with botanists and ornithologists as it has a great variety of fauna and flora. Among the animals found in this place are tiger, panther, jackal, chameleon, hog, mongoose, elephant, porcupine, yak, bonnet macaque, langurs, slender loris, sloth bear, sambar deer and wild dogs, while the reptile population includes the king-cobra, cobra, python and several other poisonous and non-poisonous snakes. KMTR was declared a forest preserve for the rare lion-tailed macacque, which can easily be spotted here. Tamiraparani, the perennial river of Tamil Nadu originates from Agasthiamalai (Pothigaimalai) and flows through this sanctuary.

The exact study area is Kouthalai, which is situated on the bank of river Tamiraparani and surrounded by Kannikatty, Mayilaru, Inchikuzhi and Karayar. The elevation ranges from 300 to 900 m and the annual rainfall is 1500 mm. Ignacimuthu et al. (1998) made a medico-ethnobotanical survey among the tribals in some areas of Mundanthurai Sanctuary. The KMTR area has been recognized as one of the 'hot spots' (areas of high species richness or of high endemism, which are of high priority for protection) for Biodiversity conservation by the IUCN. Some of the 'red-listed species' (red list is a compilation of endangered wildlife species by IUCN—the IUCN red list is the world's most comprehensive inventory of the global conservation status of plants and animals) documented in the KMTR are *Adenia hondala*, *Cycas circinalis*, *Drocera indica*, *Kingiodendron pinnatum*, *Gloriosa superba*, *Pseudarthria viscida* and *Santalum album*. Some of the 'rare plant species' (species facing a difficulty in maintaining the viable population) found in the KMTR are *Begonia malabarica*, *Aristolochia tagala*, *Smilax zeylanica*, *Garcinia gummigatta*, *Trichopus zeylanicus*, *Hopea parviflora*, *Calophyllum inophyllum* and *Alstonia scholaris*.

3. Kani tribals

The tribe found in the study area is known as Kanikaran or Kani. They are traditionally a nomadic community. Kanikaran tribes speak Tamil and Malayalam as their language. They are short in nature; usually dark skinned and carry a self-sustaining existence based on farming. Earlier they lived under rock shades and caves, which provided shelter to these people. Their habits and manners have undergone changes due to outside contacts. Every tribal group has a tribal chief. They are today living in several tribal hamlets, each consisting of 5–20 families disbursed in and around the forest areas of Tirunelveli hills in Tirunelveli district. As per the 1981 census of Tirunelveli district, the Kanikaran population is 0.35% of the total population (district population—3,65,932) of the district. The Kanikarans of Mundanthurai Sanctuary seem to be the migrants from Thiruvanathapuram of Kerala state and they may have entered into Tamil Nadu through the Courtallam pass (Ignacimuthu et al., 1998).

Healers commonly begin their training as children or teenagers working as assistants to their mothers, fathers and to other relatives who are recognized healers. After having trained for a number of years, the apprentice will be ceremonially granted the authority to use a given treatment. This individual will be recognized by others in their culture as having mystical power to heal, as well as having the proper training to use medicinal plants. Most of the Kani tribals have a general knowledge of medicinal plants that are used for first aid remedies, to treat cough, cold, fever, headache, poisonous bites and some other simple ailments. Many plant remedies are known by some local people, especially by the elder who is not necessarily a traditional healer. The healers are more frequently men than women.

The tribals residing in the deep forest areas are still dependent on medicinal plants for their primary healthcare and treatment of various diseases. Kanis still supplement their food by gathering roots and tubers from the nearby forest areas. They eat tubers like *Manihot esculenta* and *Dioscorea oppositifolia*, etc. They are extremely hard working and can survive without the help of modern facilities. They are socio-economically backward and most of them are very poor. They are also engaged in seasonal collection of honey, bee wax and some minor forest produce. They cultivate edible plants, like tapioca, banana, millets, and cash crops, such as pepper, coconut, areca nut and cashew nut.

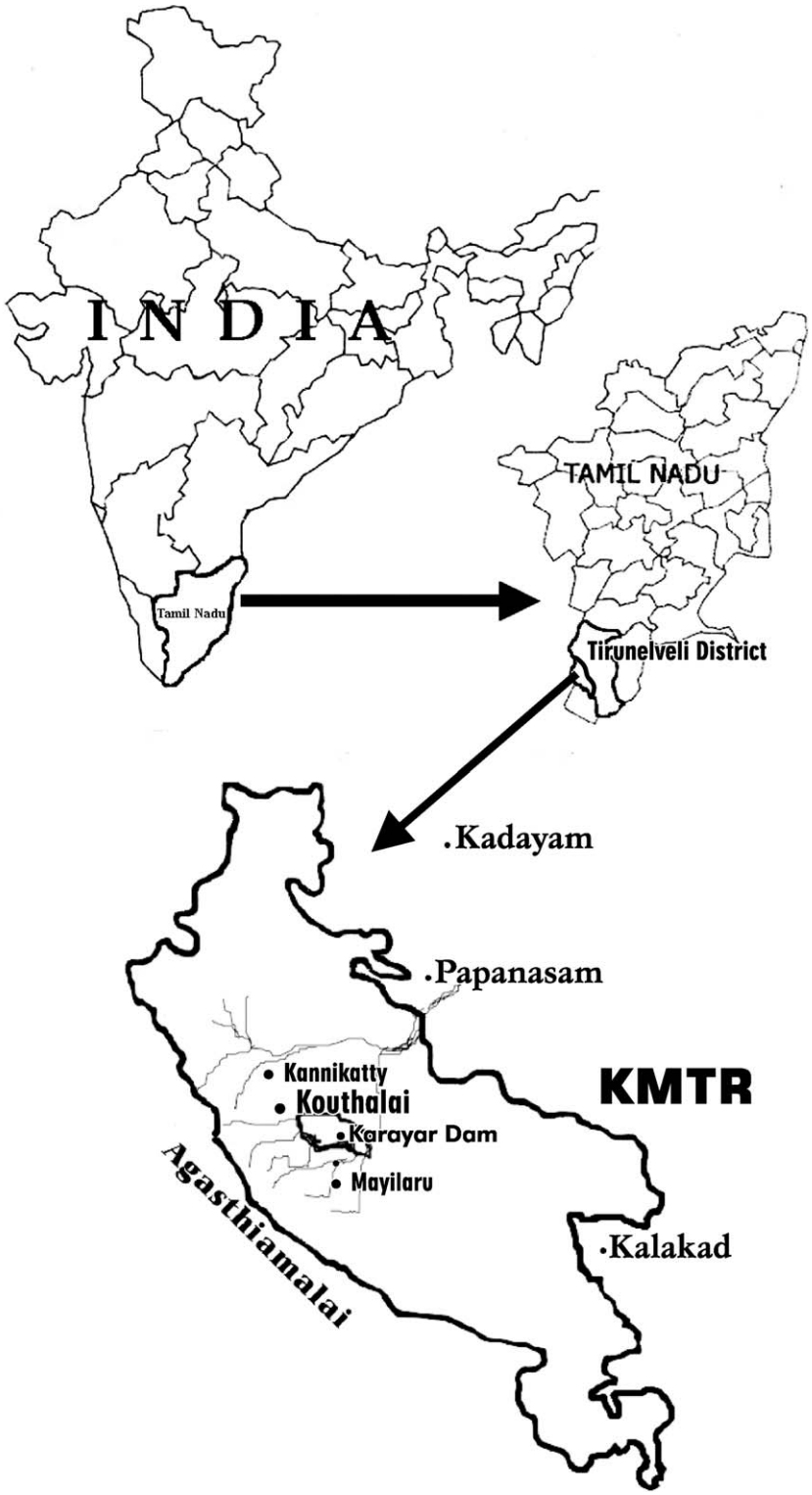

Fig. 1. Location map of study area (Kouthalai) in Tirunelveli hills, Tamil Nadu, India.

4. Methodology

Frequent field surveys were made in Kouthalai hills during different seasons in 2002 and 2003. The ethnobotanical data (local name, mode of preparation, medicinal uses) were collected through interviews and discussions among the tribal practitioners in and around the study area. Data were also collected through questionnaires in their local languages (Tamil and Malayalam). Information were collected through interview with five persons aged between 40 and 78, who had

the traditional knowledge of plants. In addition to the vernacular names questions were also asked about each plant prescribed, such as part of the plant used, medicinal uses, detailed information about mode of preparation (i.e., decoction, paste, powder and juice); form of usage either fresh or dried, and mixtures of other plants used as ingredients were also collected. The medicinal plants were identified (local name), photographed and sample specimens were collected for the preparation of herbarium.

The collected plant species were identified taxonomically using *The Flora of Presidency of Madras* (Gamble, 1935) and *The Flora of Tamil Nadu Carnatic* (Matthew, 1983). The identified plant specimens were then confirmed with the herbaria of Botanical Survey of India (BSI), Southern Circle, Coimbatore, India. The specimens were deposited in the herbarium of Entomology Research Institute, Loyola College, Chennai (India). The tribal information is also kept in the same institute. Voucher specimen numbers along with other details are given in Table 1.

5. Results and discussion

The present investigation revealed that the Kani tribes of Kouthalai region were using 54 species of plants belonging to 26 families (Table 1) for medicinal use. Among them 19 were herbs, 12 were shrubs, 7 were small trees, 6 were big trees and 10 were climbers. The most commonly represented families were Asteraceae (7) and Fabaceae (5). They were using these plants to cure diseases like skin disorders, cold, fever, cough, headache, rabies, diarrhoea, fertility problems, tooth diseases, stomach ache, wounds, rheumatism, hair falling and poison (snake, scorpion and insect) bites. This is consistent with the general observations made earlier in relation to ethnobotanical studies on some of the other tribal communities of Tamil Nadu (Karthikeyani, 2003, Irular tribe; Rajan et al., 2002, Kattunayaka tribe; Rajendran et al., 2002, Valaya tribe; Viswanathan, 1997, Malayali tribe; Alagesaboopathi et al., 1999, Paliyar tribe; Masilamani, 1997, Gounda tribe).

Medicines were prepared in the form of powder, decoction, paste and juice. It was also observed that some plants were used in more than one form of preparation. Several plants were used in the form of powder: examples are leaves of *Carmona retusa*, *Cissus trilobata*, *Crotalaria pallida*, *Elephantopus scaber*, *Mussaenda hirsutissima*, roots of *Hemidesmus indicus*, leaf and root bark of *Kleinia grandiflora*, leaf and stem bark of *Tabernaemontana heyneana*, whole plant of *Diospyros ebenum*, *Evolvulus alsinoides* and *Themeda triandra.* Some plants were used in the form of decoction: examples are leaves and seeds of *Aglaia roxburghiana*, leaf, stem and unripe fruits of *Ceropegia candelabrum*, leaves of *Cipadessa baccifera*, *Ocimim canum*, leaves and unripe fruits of *Helicteres isora*, leaf and stem bark of *Mallotus philippinensis*, and whole plant of *Ocimum basilicum*.

Some plants were used in the form of paste: examples are leaves of *Biophytum candolleanum*, *Bridelia retusa*, *Cayratia pedata*, *Oxalis corniculata*, *Pothos scandens*, *Tridax procumbens*, *Hemionitis arifolia*, *Urena lobata*, leaf and stem bark of *Alstonia scholaris*, *Scleropyrum pentandrum*, young stem of *Caryota urens*, and the whole plant of *Eupatorium odoratum* and *Osbeckia zeylanica*. Some plants were used in the form of juice: examples are leaves of *Bidens pilosa*, *Ecbolium viride*, *Maesa indica*, *Mollugo pentaphylla* and *Ruellia prostrata*. In some cases, fruits (*Carmona retusa*, *Ficus retusa*, *Mallotus philippinensis* and *Memecylon gracile*) are used as medicine both in fresh and dried form.

Among different plant parts used by kanis in Tirunelveli hills, the leaves are most frequently used for the treatment of diseases. External applications and internal consumption are involved in the treatment of wounds, rheumatism, poisonous bites, headache, skin diseases and hair falling. For diseases like cold, fever, cough, diarrhoea, fertility problems, tooth diseases and stomachache only internal consumption is adopted. In the present study, some of the medicinal plants are endemic to Western Ghats. For example *Trichopus zeylanicus* is abundantly found in this area and very rarely found in other places of Western Ghats. It is also an endangered plant. Young stem of *Caryota urens* (raw) and unripe fruits (boiled) of *Solanum vagum* are used as food by kanis. Leaves of *Alysicarpus vaginalis*, *Biophytum candolleanum* and whole plant parts of *Evolvulus alsinoides* are used for the treatment of venereal diseases.

Herbal medicines prescribed by tribal healers are either preparation based on single plant part or a combination of several plant parts. The Kani tribals usually prepare medicines in a combination of several plant parts. They believe that combination of several plant parts cures diseases rapidly. Oils from *Cocos nucifera*, *Sesamum indicum*, *Azadirachta indica*, *Ricinus communis* and *Calophyllum inophyllum* are mixed with other plant medicines to treat some ailments. In the present study, leaves of *Urena lobata*, *Maesa indica*, stem bark of *Scleropyrum pentandrum*, whole plant of *Osbeckia zeylanica* and leaves of *Memecylon gracile* are used in single form. Leaves of *Pothos scandens*, roots of *Hemidesmus indicus*, leaves of *Elephantopus scaber*, leaves and fruits of *Diospyros ebenum*, leaves and stem bark of *Tabernaemontana heyneana* and whole plant of *Ocimum basilicum* are used in combination with several (more than three) plant parts for curing diseases. Unripe fruits and leaves of *Carmona retusa*, stem bark, fruits and flowers of *Mallotus philippinensis* are used as medicine both in combined and single form.

Generally, fresh part of the plant is used for the preparation of medicine. When fresh plant parts are unavailable, dried parts are also used. Leaf paste of *Hemionitis arifolia* (fern) is used to cure rabies; powdered leaves of *Mussaenda hirsutissima* is used for the treatment of heel cracks; paste of stem bark and leaves of *Scleropyrum pentandrum* are used to cure skin disorders. The roots of *Hemidesmus indicus* and whole plant parts of *Trichopus zeylanicus* and *Elephantopus scaber* are exploited commercially as excellent source

Table 1
Ethnomedicinal plants, local name, mode of preparation and uses in Kouthalai of Tirunelveli hills, India

Botanical name (voucher specimen number)	Family	Local name	Parts used, mode of preparation, ethnomedicinal uses and some other plants used as ingredients	Major chemical constituents*
Ageratum conyzoides L. (T11)	Asteraceae	Mookuthi poo	Juice of leaf along with the leaves of *Cocculus hirsutus* is taken to cure diarrhoea	Coumarin, friedelin, β-sitosterol, stigmasterol, tertiary quarternary alkaloids, conyzorigun and etc.
Aglaia roxburghiana Hiern. var. *courtallensis*, Gamb. (T181)	Meliaceae	Chokkalai	Decoction of leaves and seeds is mixed with the decoction of root of *Aristolochia tagala*, *Strychnos nuxvomica*, *Coscinium fenestratum*. The decoction is taken orally to cure snake and scorpion bites	Triterpenes—roxburghiadiol A and B
Alstonia scholaris R. Br. (T223)	Apocynaceae	Elilaip-palai	Paste of leaf and stem bark is mixed with the leaves of *Vitex negundo* and *Dodonaea angustifolia*. The paste is applied to the swellings. Latex is used for abortion	β-sitosterol, alkaloids-scholaricine, picrinine, alstonamine and scholarine
Alysicarpus vaginalis DC. (T157)	Fabaceae	Siru kodiveli	Decoction of leaves along with *Crataeva adansonii* leaves is used to cure venereal diseases	Proteins, pentosans and some chemicals such as copper and manganese
Anotis monosperma B. &Hk. f. (T73)	Rubiaceae	Kodi urinchi	Powder of leaf, root and stem along with the leaves and flowers of *Cassia senna* is heated with water and applied to cure scorpion and insect bites	Not available
Bidens pilosa L. (T107)	Asteraceae	Kutthan pacchilai	Leaf juice along with the leaves of *Aloe vera* and *Plectranthus mollis* combined with honey and ghee is taken to cure stomachache	Aesculetin, behenic acid, β-sitosterol, butanedioic acid, caffeine, tannic acid, vanillic acid and etc.
Biophytum candolleanum W. (T166)	Oxalidaceae	Perumanivatti	Paste of leaf along with the leaves of *Aristolochia tagala*, *Toddalia asiatica* and rhizome of *Cynodon dactylon* combined with castor, coconut and gingelly oils is applied externally to cure venereal diseases	Not available
Borreria ocymoides DC (T09)	Rubiaceae	Kodi-amman paccharisi	Juice of leaf is mixed with the leaves of *Garcinia pictoria* and stem bark of *Syzigium cumini* and heated with the gingelly oil to prepare a paste and applied on affected places to cure wounds	Isohamnetin
Bridelia retusa (L.) Spreng. (T33)	Euphorbiaceae	Siruvalli	Paste of leaf along with the leaves of *Curculigo orchioides* and the oils of castor, coconut and gingelly is mixed and applied externally to cure wounds	Triterpenes, ketone and tannins
Carmona retusa (Vahl.) Masam. (T135)	Cordiaceae	Seethevi thalai	Leaf powder is used as tooth cleaning powder. Powder of leaves, unripened fruit and root is mixed with the leaves of *Acacia nilotica*, *Piper betle* and seeds of *Areca catechu* and used to cure toothache and give strength to the teeth	Chlorogenic acid and antimutagens
Caryota urens L. (T54)	Arecaceae	Kundal panai	Paste of young plant stem along with the fruits of *Phyllanthus emblica* and *rhizome* of *Curculigo orchioides* is taken to strengthen the body	Sucrose, reducing, sugar, alcohol and acetic acid
Cayratia pedata Juss. (T76)	Vitaceae	Siru valli kodi	Powder of leaf, fruit and stem is taken with the leaves of *Ocimum basilicum*, rhizome of *Alpinia calcarata* and *Withania somnifera* to get relief from gastric complaints	Sterol and waxy acids
Ceropegia candelabrum L. (T163)	Asclepiadaceae	Perun-kodi	Decoction of leaf and stem is taken with the leaves of *Vitex negundo*, stem bark of *Thespesia populnea* and *Crataeva adansonii* twice a day to cure one-sided headache	Steroids, polyphenols, sugars and potassium
Cipadessa baccifera Miq. (T01)	Meliaceae	Maramalli	Decoction of leaves is taken with the leaves of *Tragia involucrata* and *Aristolochia talaga* to cure scorpion, insect and snake bites	Not available

Table 1 (*Continued*)

Botanical name (voucher specimen number)	Family	Local name	Parts used, mode of preparation, ethnomedicinal uses and some other plants used as ingredients	Major chemical constituents*
Cissus trilobata Lam. (T167)	Vitaceae	Moovilai kodi	Powder of leaf and root is mixed with the stem bark of *Crataeva adansonii*, stem of *Coscinium fenestratum*, *Naravelia zeylanica* and seeds of *Abrus precatorius*. The mixture is heated with castor, coconut and gingelly oils and applied externally on affected places to treat rheumatism	Not available
Crotalaria pallida Aiton. Hort. (T139)	Fabaceae	Kooman salangai	Powder of leaf and root bark is taken with the leaves of *Wrightia tinctoria* and *Tragia involucrata* to make *paste* and is applied externally to treat skin diseases	Galactomannan and crotolarol
Desmodium triangulare (Retz.) Merr. (T145)	Fabaceae	Kaattu thuvarai	Paste of leaf is applied externally along with the leaves of *Aloe vera* and *Scilla indica* to prevent falling of hair	Phenethylamine, salsolidine, hordenine, tyramine, candicine and choline
Diospyros ebenum Koen. (T178)	Ebenaceae	Beedi elai	Powder of whole plant is taken along with the leaves and fruits of *Trichopus zeylanicus*, rhizome of *Curculigo orchioides*, fruits of *Phyllanthus emblica*, *Terminalia bellirica* and honey to strengthen the body	Ceryl alcohol, lupeol, betulin, β-sitosterol, diospyric acid, triterpene and carboxylic acid
Ecbolium viride (Forssk.) Alston in Trimen. (T126)	Acanthaceae	Pachai-anagabaram	Juice of leaves along with leaves of *Naravelia zrylanica*, *Oxalis corniculata* and *Cryptolepis buchanani* is applied on head to reduce heat in the body and to cool the eye	Orientin, vitexin, isoorientin and isovitexin
Elephantopus scaber L. (T143)	Asteraceae	Yaanai chuvadi	Powder of leaf along with the leaves of *Toddalia asiatica*, and *Naravelia zeylanica* is heated with castor, coconut and gingelly oils and applied externally to cure rheumatism	Sesquiterpene lactone, isodeoxy elephantopin, stigmasterol and etc.
Eupatorium odoratum L. (T45)	Asteraceae	Ana vanthan chedi	Leaf paste along with cow's milk and oil of *Pongamia pinnata* is applied externally to cure wounds	A-pinine, cadinene, camphor, limonene, cadinol, citronellal, *p*–cymene and geraniol
Evolvulus alsinoides L. (T122)	Convolvulaceae	Vishnu-kranti	Powder of whole plant along with the leaves of *Wrightia tinctoria*, *Alstonia scholaris* and *Euphorbia hirta* is used to cure venereal diseases	Yellow neutral fat, alkaloid, organic acid and saline substances
Ficus retusa L. (T165)	Moraceae	Kottal	Fresh fruit is mixed with honey and is taken twice a day to improve the body stamina. The fruit is mixed with cow's milk and taken twice a day to cure sterility in men	Lupenyl acetate, glutinol, oleanolic acid, pentacyclic triterpenoids, taraxerol and friedelin
Helicteres isora (L.) W &A. (T 136)	Sterculiaceae	Valampuri or Edampuri	Decoction of unripe fruit mixed with the leaves of *Cocculus hirsutus*, *Aloe vera* and *Sanseivieria roxburghiana* is heated with castor oil and coconut oil and applied for hair growth	Malatyanine, cucurbitain B and cucurbitain C triterpenoids and etc.
Hemidesmus indicus R. Br. (T136)	Asclepiadaceae	Nannari	Powder of root along with the fruit of *Calophyllum inophyllum*, *Diospyros ebenum*, *Terminalia chebula*, *Terminalia bellirica* and *Phyllanthus emblica* and honey is taken to increase the semen production	Coumarin, hemidesmine, emidine, hemidesine rutin and etc.
Hemionitis arifolia (Burm.) Moore (T180)	Hemionitidaceae (fern)	Vatta suruli	Paste of leaf is mixed with the leaves of *Achyranthes aspera*, *Datura metel* and root bark of *Pongamia pinnata* and applied externally to cure rabies infection	Not available
Ipomoea obscura K. Gawl. (T152)	Convolvulaceae	Pillai thaali	Powder of stem, leaf, flower and root is taken along with the stem bark of *Ficus retusa*, root bark of *Alangium salvifolium* and leaves of *Aloe vera* to induce conception.	Indole compounds, iposcurines, alkaloid iposcurine-C and etc.
Kleinia grandiflora (DC) N. Rani (T149)	Asteraceae	Elai kalli	Powder of leaf and root bark is mixed with the leaves of *Cardiospermum halicacabum* and leaf juice of *Piper nigrum* to get relief from gastric complaints	Kaempferitrin, Kaempferol-β-sitosterol and etc.

Table 1 (*Continued*)

Botanical name (voucher specimen number)	Family	Local name	Parts used, mode of preparation, ethnomedicinal uses and some other plants used as ingredients	Major chemical constituents*
Lantana camara L. (T12)	Verbenaceae	Unnichedi	Decoction and inhalation of leaf and root bark along with the leaves of *Psidium guajava*, *Adhatoda vasica* and *Eucalyptus globulus* is taken to get relief from cold and fever	Triterpene, lantanic acid, lantanine, lantalinilic acid lantadene A and etc.
Maesa indica W. var. *perrottetiana* Cl. (T188)	Myrsinaceae	Padar-kothamalli	Leaf juice is applied externally to stimulate hair growth. Juice of leaf, root bark and unripened fruit is applied on the body before bath to increase disease resiatance	Sitosterol, quercetin-3—rhamnoside and dimeric phenol-merol
Mallotus philippinensis (Lam.) Muell. Arg. (T199)	Euphorbiaceae	Kutthu senkalai	Decoction of stem bark and leaf is taken with the stem bark of *Madhuca longifolia*, root bark of *Phyllanthus emblica* and fruit of *Phoenix dactylifera* to cure hydrocele and stomachache	Flavones, chalcones—mallotus AB, tannins, cardenolides rottlerin isorottlerin, tannic acid, gum, volatile oil and etc.
Memecylon gracilis Bedd. (T187)	Melastomataceae	Kannai kaanchi	Leaf paste is applied externally on affected places of nail. Juice of root bark is taken with the stem bark of *Syzigium cumini*, leaf of *Solanum trilobatum*, rhizome of *Curculigo orchioides* and honey to increase the fertility in men	Not available
Merremia hastata Hall. (T108)	Convolvulaceae	Paaran-kodi	Powder of leaf, stem and root is taken with the powder of stem bark of *Acacia nilotica*, leaves of *Alstonia scholaris*, *Citrus medica* and *Euphorbia hirta*. The powder is used as tooth powder to cure tooth diseases	Flavonoids, diosemtin, luteolin, glucoside, luteolin glucoside and etc.
Mollugo pentaphylla L. (T158)	Molluginaceae	Mukkuttha malli	Leaf juice along with the cow's milk or rhizome juice of *Allium cepa* is applied on the eyes to get relief from eye diseases (three drops—thrice a day for 24 days)	Glycosyl flavine, carotene, vitamin, mollugenol, mollupentin and etc.
Mussaenda hirsutissima Hutch. (T05)	Rubiaceae	Siru mavilangam	Powder of leaf is heated with castor oil and applied externally to cure heel cracks. Powder of stem bark is taken internally with the fruit of *Ficus retusa* and young leaves to cure sterility in both men and women	Phenols, flavonoids, syringils, radicals and tannins
Ocimum basilicum L. (T125)	Lamiaceae	Kodi thulasi	Decoction from leaves, stem, inflorescence and root along with leaves of *Evolvulus alsinoides*, *Solanum surattense* and *Solanum trilobatum* is taken internally to get relief from cold, cough and fever.	Volatile oil consisting of safrole, ocimene, cineole, linalool, thymol and etc.
Ocimum canum Sims. (T154)	Lamiaceae	Naai thulasi	Decoction of leaf is taken with the leaves of *Ocimum basilicum* and *Eucalyptus globulus* to get relief from cold, cough and fever.	Essential oil, volatile oil, eugenols and etc.
Osbeckia zeylanica Willd. (T151)	Melastomataceae	Kaattu pavalam	Paste of whole plant is taken orally to improve body stamina and also increase the disease resistance	Not available
Oxalis corniculata L. (T61)	Oxalidaceae	Puliarai keerai	Leaf paste is taken with the leaves of *Aloe vera*, *Cocculus hirsutus* and *Phyllanthus amaras* to reduce the body heat	Flavonoids, votexin, isovitexin and etc.
Phyllanthus virgatus G. Forst. (T131)	Euphorbiaceae	Kutthu keelanelli	Paste of leaf is taken along with the leaves of *Ricinus communis*, *Centella asiatica* and *Calamus rotang* to cure jaundice and stomachache	Alkaloids – simplexine and phyllanthine
Pothos scandens L. (T116)	Araceae	Parattan kodi	Paste of leaf along with the fruit of *Capsicum annum* and rhizome of *Allium sativum* mixed with coconut oil is applied externally to cure wounds created during delivery	Not available
Pseudarthria viscida W & A. (T128)	Fabaceae	Perun – kuran payiru	Paste of leaf is taken with the stem bark of *Ficus glomerata*, *Ficus microcarpa*, and stem bark of *Suzygium cumini* combined with castor oil to get relief from cold and cough	Not available

Table 1 (*Continued*)

Botanical name (voucher specimen number)	Family	Local name	Parts used, mode of preparation, ethnomedicinal uses and some other plants used as ingredients	Major chemical constituents*
Richardia scabra L. (T133).	Rubiaceae	Pachai-amman paccharisi	Paste of leaf along with the leaves of *Wrightia tinctoria*, *Toddalia asiatica* and *Clitoria ternatea* combined with the coconut oil is applied externally to cure skin diseases	Emetin and starch
Ruellia prostrata Poir. (T127)	Acanthaceae	Kodi urinchi	Leaf juice along with the stem bark and leaf of *Strychnos nux-vomica* and leaf of *Andrographis paniculata* is applied to prevent the falling of hairs	Esters, sterols, lucine, tyrosine, valine, glycine, sitosterol and stigmasterol
Scleropyrum pentandrum (Dennst.) Mabb. (T144)	Santalaceae	Mul kirayan	Paste of stem bark and leaf is applied externally to cure skin diseases	Decanoic, lauric, palmitic, stearic, arachidic, behenic, oleic, erucic and linoleic acids
Solanum vagum Heyne. (T156)	Solanaceae	Pee - chundai	Leaf and root juice is mixed with water and taken with leaves of *Naravelia zeylanica* and *Aloe vera* to treat dry skin	Not available
Tabernaemontana heyneana Wall. (T120)	Apocynaceae	Kundalam paalai	Powder of leaf and stem bark along with the stem bark of *Ficus benghalensis* and *Madhuca longifolia*, is heated with coconut oil and applied externally to cure skin disease. Latex is taken along with the latex of *Carica papaya* and *Alstonia scholaris* to induce abortion	Alkaloid – tabernoxidine, coronaridine, voacangine and iboganine
Themeda triandra Forsk. (T80)	Poaceae	Peru manip-pul	Powder of whole plant along with gingelly oil along with the leaves of *Toddalia asiatica* and *Pongamia pinnata* is applied externally to cure wounds	Hydrocyanic acid
Trichopus zeylanicus Gaertn. (T81)	Trichopodaceae.	Arockia pachilai	Unripened fruit is immersed in honey for 10 days and then taken internally to get relief from asthma. Powder of leaves along with stem bark of *Mangifera indica* is taken orally to treat venereal diseases	Not available
Tridax procumbens L. (T10)	Asteraceae	Kinathupoondu	Paste of leaf along with the leaves of *Cocculus hirsutus*, *Scilla indica* and castor oil is applied externally to get relief from swellings	Lipids, β - amyrin, fucosterol, lupeol, sitosterol, luteolin, Palmitic, stearic acids and etc.
Urena lobata L. subsp. *lobata* (L.) Bross. Wal. (T201)	Malvaceae	Kodi thutthi	Decoction of root and leaves of *Adhatoda vasica*, *Alangium salvifolium* and *Coccinia grandis* is taken orally to cure snakebite	Tannins and phytins. Seeds—urease
Vernonia cinerea Less. (T174)	Asteraceae	Mookkuthi poondu	Powder from the whole plant along with the leaves of *Crataeva adansonii* and *Punica granatum* is heated with castor, gingelly and coconut oils and applied externally on breast to cure tumor in breast	β -sitosterol, triterpenoids, sterol, pyrethrine I, II, fatty acids, β-amyrin, and etc.
Zehneria maysorensis (W & A) Arn. (T193)	Cucurbitaceae	Vatta pagarkai kodi	Leaves along with leaves of *Erythrina variegata*, *Pongamia pinnata* and *Ricinus communis* taken in equal amount, powdered and is taken with honey to kill stomach worms	Not available
Zornia diphylla Pers. (T121)	Fabaceae	Melem-mari	Paste of whole plant along with stem bark of *Madhuca longifolia*, rootstock of *Begonia malabarica* and leaves of *Hybanthes enneaspermus* is taken internally to cure wounds in stomach (ulcer)	Magnesium, calcium and irons

* The chemical constituents for the plants were extracted from the literatures of Nadkarni (1976), Yoha Narasimhan (2000), Rastogi and Mehrotra (1990–1994), Bakshi et al. (1999) and Chatterjee and Pakrashi (1997).

of income. But unfortunately due to their over-exploitation there is a great danger of their extinction. Hence, efforts must be taken to protect these species in this area by involving the local communities in preservation and conservation aspects.

In addition, we surveyed pharmacopoeias and some major medicinal plants textbooks for the major chemical constituents of the ethnomedicinal plants studied in this paper. For some of the plants the chemical constituents

are not available. Of the 54 plants studied, major chemical constituents are reported for 42 plants (Table 1). Natarajan et al. (1999) studied ethnopharmacological plants from the Coimbatore district, Tamil Nadu, India. They also compared the traditional knowledge with modern biological science.

From this account it is clear that the Kani tribe, like other ancient tribals (Rajasingh, 1971), possess the ability to discern the character of various plants and their beneficial properties. It is interesting to note that such a way of life, particularly with respect to healthcare practices has hardly undergone any change even in the present days. Similar ethnobotanical studies have been reported in some other parts of India (Aminuddin and Girach, 1991; Borthakur, 1993; Negi et al., 1993; Jamir, 1997; Katewa and Arora, 1997; Reddy et al., 1997; Jain, 2004; Singh, 2004) and some other parts of the World (Jovel et al., 1996; Bonet et al., 1999; Grierson and Afolayan, 1999; Guarrera, 1999; Shinwari and Khan, 2000).

6. Conclusion

This study revealed that medicinal plants still play a vital role in the primary healthcare of the people. The information gathered from the tribals is useful for further researchers in the field of ethnobotany, taxonomy and pharmacology. This study offers a model for studying the relationship between plants and people, within the context of traditional medical system. The purpose of standardizing traditional remedies is obviously to ensure therapeutical efficacy. The value of using ethnomedical information is to initiate drug discovery efforts. This study also generated a broad spectrum of information concerning medicinal plants used by tribals. Due to lack of interest among the younger generation of tribals as well as their tendency to migrate to cities for lucrative jobs, we face the possibility of losing this wealth of knowledge in the near future. The Kani tribal healers are rapidly dying of old age, and with them their traditions.

An abundance of ethnomedical information on plant uses can be found in the scientific literature but has not yet been compiled into a usable form. The present study has indicated that the current healers will probably be the final generation of traditional healers in the Tirunelveli hills. It thus becomes necessary to acquire and preserve this traditional system of medicine by proper documentation and identification of specimens. The results of over-exploitation of medicinal plants is felt first by those involved with traditional healing, either as collectors, traders, traditional practitioners and herbalists. Traditional medicines also have the potential to form the basis of pharmaceutical drugs for the treatment of a range of diseases. Thus, the loss of these potentially valuable genetic resources ultimately affects the whole society.

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