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Medicinal plants in the selected sacred groves of Kodungallur, Thrissur district, Kerala

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Abstract

Sacred groves are virgin forests and acts as site for *in situ* conservation of bio-resources and shows near-climax vegetation of trees and associate groups of organisms, managed as a part of local cultural tradition. The study was conducted in the selected sacred groves of Kodungallur Taluk in Thrissur district, Kerala. The present study revealed a total of 89 taxa belonging to 83 genera and 43 families of flowering plants. Leguminosae is the dominant family followed by Asteraceae. These groves contain trees, shrubs, herbs and climbers representing Vulnerable and Endemic species. In these plants 98.88% plants are medicinal and used in different systems of medicines. Native medicinal plants are available in undisturbed areas like groves. Medicinal plant species are present inside the groves and used in the treatment of various diseases in Ayurveda, Folk, Unani, Siddha, Homeopathy and Traditional systems for common ailments like cough, ulcers, bronchitis, skin diseases, etc.

Keywords: Medicinal flora, sacred groves, Thrissur, Kerala

1. Introduction

Groves are repositories of biological wealth of the nation ^[1]. Sacred groves are found all over the world. Many sacred groves in India are known to harbour significant number of plants with medicinal value. In India there are about 17000 sacred groves are present. Due to urbanization, industrialization and rationalization, scarcity of land leading to the depletion of the cover and shrinkage of these areas as a result the large chunk of the areas are diverted for other activities and only a small portion maintained near the temple ^[2]. The indigenous tribes of Meghalaya and indigenous settlers in the central valley of Manipur in the North eastern part of India have the age-old tradition of preserving small patches of forests and trees as part of their culture and religious beliefs. It also been reported to exist in the states of Assam, Arunachal Pradesh and Nagaland also. The traditional doctors have been using Medicinal herbs and shrubs since time immemorial ^[3].

In Kerala it is the common practice among Hindus to assign a part of their land near the Tharavadu or house as the abode of goddess Durga or serpent god Naga or Shasta and the place is called Kavu or Sarpa kavu. It is considered as the islands of biodiversity and relics of past vegetation. These contain large numbers of Rare, Endemic, Endangered and Threatened floras and faunas. It also includes economically and medicinally important plants. Iringole kavu in Ernakulam District of Kerala having an area of 20 hectares is one such, which has been protected due to strong religious faith ^[4].

Total number of sacred groves in Kerala to be around 2000 ^[5] and have found 722 species of flowering plants ^[6]. In Kerala about 79% of Sacred Groves are small that is below 0.02 ha in extent ^[7]. There are five hundred and seventy six kavu present in the Northern districts of Kannur and Kasargod ^[8]. Many of the groves are ecological units with a wide range of ecological function and serves as repository of genetic diversity ^[9]. They are on a path of gradual decline and disappearance, due to various socio-economic factors. Their presence in the agricultural lands, fragmentation of the grove-owning families and loosening belief of the younger generation on the deities and associated traditions are the major reasons ^[10]. Well conserved sacred groves are comparable to the regional natural forests for various ecological attributes ^[7, 11, 12]. In this paper we have made an attempt to enumerate the medicinal importance of plants in selected sacred groves of Kodungallur Taluk, Thrissur.

Study Area

The study was carried out in the sacred groves of Kodungallur Taluk in Thrissur district,

Kerala state. Study area includes Ayyalath Nagayakshi Kavu, Kumaramangalath Kavu, Chemathi Kavu and Kalapparambath Kavu (Plate 1). The area of sacred groves, latitude/longitude,

locality of sacred groves and main deities are listed in table 1. The management of these kavu is under the control of different families. The main deity is Nagam.



Ayyalath nagayakshikavu



Kumaramangalath kavu



Chemathi kavu



Kalapparambath kavu

Plate 1: Selected sacred groves in Thrissur District.

Table 1: Location and Deities of Sacred groves

Sacred groves	Taluk	Panchayath	Area in Ha.	Latitude/ Longitude	Deity
Ayyalath Nagayakshi Kavu (AYL)	Kodungallur	S.N. Puram	0.247	8.5878° N, 76.97708° E	Nagayakshi, Nagam
Kumaramangalath Kavu (KMK)	Kodungallur	S.N. Puram	0.247	8.5878° N, 76.97708° E	Nagam
Chemathi Kavu (CHM)	Kodungallur	Perinjanam	0.618	10.3139° N, 76.1486° E	Nagam
Kalapparambath Kavu (KPB)	Kodungallur	Kaippamangalam	0.247	10.3167° N, 76.1333° E	Nagam

Materials and Methods

Sacred groves were selected from Kodungallur Taluk in Thrissur District for the study. Each grove was visited during different seasons between June 2013 and February 2016, analysed the floristic composition and flowering twigs were collected. Field observation like habit, phenology of the plant, colour, texture and smell of leaves, local names and local uses available were noted in the field book. Plants were identified with the help of floras like, *Flora of Presidency of Madras* [13] and *Flowering plants of Thrissur district* [14]. Angiosperms including trees, shrubs, herbs and climbers were considered for the study and herbarium sheets were prepared and verified with the help of Kerala Forest Research Institute (KFRI), Peechi and Calicut University Herbarium (CALI). IUCN categories are used to evaluate the plants and arranged in to RET species (IUCN, 2012) and medicinal importance of plants

were noted. Major threats of groves are identified and noted. The voucher specimens were deposited in the herbarium of Department of Botany, Sree Krishna College, Guruvayur, Kerala.

Results

The present study was conducted in the sacred groves of Kodungallur Taluk, Thrissur District namely Ayyalath Nagayakshi Kavu, Kumaramangalath Kavu, Chemathi Kavu and Kalapparambath Kavu (Plate 1 and Table 1). Sacred groves possess diverse gene pool of many forest species. The selected groves comprise 89 species of angiosperms coming under 83 genera and 43 families. Of these plants 20.22% are trees, 16.85% shrubs, 42.70% herbs and 20.22% climbers representing 2 Vulnerable and 4 Endemic species. The herbaceous flora of groves is notable as it amounts to 42.70 %

of total flora. In these plants 98.88% plants are medicinal and used in different systems of medicines such as Ayurveda, Folk, Unani, Siddha, Homoeopathy and Tibetan. *Gloriosa superba* L. and *Aphanamixis polystachya* (Wall.) are vulnerable, *Briedelia stipularis* (L.) Blume, *Holigarna arnottiana* Hook.f., *Olea dioica* Roxb. and *Sida rhomboidea* Roxb. ex Fleming are Endemic species.

The family Leguminosae (Fabaceae) with 3 sub families (Papilionoideae, Caesalpinioideae, Mimosoideae) is the dominant family followed by Asteraceae. *Centrosema molle* Benth. and *Mikania micrantha* Kunth are important climbers and used for snake bites. Different parts of the plants such as leaves, roots, bark, latex, inflorescence, fruits, seeds and sometimes the whole plants are used for different medical purposes. Plants collected from sacred groves, family, collection number, habit, parts used and uses are listed in Table -2.

Ayyalath Nagayakshi Kavu is well protected with compound wall. Roads are necessary for development, but in Kumaramangalath Kavu partition of the road divides the grove in to two parts. These adversely affect the biodiversity inside the groves. In Chemathi Kavu compound walls are present only on two sides. In Kalapparambath Kavu and

Kumaramangalath Kavu compound walls are absent. Due to the absence of compound walls soil erosion is common and external human interference has increased and this affects the growth of groves. Invasive species like *Chromolaena odorata* (L.) King & Robins. and *Mikania micrantha* Kunth are present in Kumaramangalath kavu. *Mikania micrantha* Kunth is also present in Chemathi kavu. Overgrowth of these plants affects the growth of other plant species inside the groves. All these are the main threats present in these groves.

Chassalia curviflora (Wall ex Kurz) Thw. is a common plant present in all the four groves. *Ageratum conyzoids* L., *Biophytum reinwardtii* (Zucc.) Klotzsch, *Caryota urens* L., *Cinnamomum verum* Presl, *Clerodendrum infortunatum* L., and *Dioscorea bulbifera* L. are present in any of the three groves.

Alstonia scholaris (L.) R. Br., *Aphanamixis polystachya* (Wall.), *Briedelia stipularis* (L.) Blume, *Caryota urens* L., *Clitoria ternatea* L., *Ficus racemosa* L., *Gloriosa superba* L., *Holigarna arnottiana* Hook.f., *Mecycylon randerianum* SM & MR Almeida, *Mucuna gigantea* (Willd.) DC., *Olea dioica* Roxb. and *Osbeckia muralis*. Naud. are other plants present here.

Table 2: Species recorded from sacred groves and Medicinal uses

Col. No.	Botanical name (Family)	Sacred grove (s)	Habit	Part (s) used	Medicinal Uses
242	<i>Acalypha indica</i> L. (Euphorbiaceae)	AYL	H	Whole plant	Worm infestation, burns, cough, constipation, skin eruptions, ulcers, bronchitis, ear and urinary diseases.
262	<i>Acmella calva</i> (DC.) R.K. Jansen (Asteraceae)	KPB	H	Whole plant	Antimicrobial, to relieve the toothache and other mouth related troubles, skin diseases and dysentery.
241	<i>Aerva lanata</i> (L.) Juss. ex Schult. (Amaranthaceae)	AYL	H	Roots, Whole plant	Urinary obstructions, bladder stones and haemorrhages associated with pregnancy.
66	<i>Ageratum conyzoids</i> L. (Asteraceae)	CHM, KPB, KMK	H	Roots, Whole plant	Diarrhoea, dysentery, gastro-intestinal ailments, wounds and sores.
3	<i>Albizia odoratissima</i> (L. f.) Benth (Mimosaceae)	AYL	T	Bark	Curing insect bites, ulcers, leprosy, skin diseases, cough, bronchitis, diabetes and burning sensation.
61	<i>Allamanda cathartica</i> L. (Apocynaceae)	KPB	C	Leaves, Bark	Leaves are used as a cathartic. Bark and its decoction are administered as hydragogue.
13	<i>Alstonia scholaris</i> (L.) R. Br. (Apocynaceae)	KMK	T	Bark, Leaves, Milky exudates	Diarrhoea, malarial fever, asthma, fever, leprosy, abdominal, skin, cardiac and respiratory diseases, ulcers, bronchitis, tumors and rheumatic swellings.
205	<i>Alternanthera brasiliiana</i> (L.) Kuntze (Amaranthaceae)	KMK	H	Leaf juice	Inflammation, cough, antidiarrhoeic, antiviral. Diabetes and Wound healing activity.
240	<i>Ampelocissus indica</i> (L.) Planch. (Vitaceae)	KPB	C	Roots	Eye diseases and ulcers.
152	<i>Anacardium occidentale</i> L. (Anacardiaceae)	CHM	T	Fruits, Seeds, Roots and Bark	Diabetes, poisoning and ulcers.
302	<i>Andrographis paniculata</i> (Burm. f.) Wall. ex Nees (Acanthaceae)	KMK	H	Whole plant	Malarial and intermittent fever, cough, worms, acidity, liver and skin diseases, dysentery, cholera, diabetes, influenza, bronchitis, itches and piles.
260	<i>Annona reticulata</i> L. (Annonaceae)	AYL	T	Fruits	Mental depression, spinal and cardiac disorders, anaemia, burning sensation, diarrhoea, dysentery, haemorrhage, fever, thirst, vomiting and cough.
4	<i>Aphanamixis polystachya</i> (Wall.) (Meliaceae)	AYL	T	Bark, Seeds	Enlargement of liver, spleen and abdominal complaints, tumors, sores and rheumatism.
68	<i>Areca catechu</i> L. (Arecaceae)	AYL	T	Roots, Leaves, Nuts	Urinary disorders anorexia, and prevent decay of tooth.
60	<i>Artocarpus heterophyllus</i> Lam. (Moraceae)	AYL, KPB	T	Roots, Leaves, Fruits, Seeds	Wounds, skin diseases, fever, ulcers, vata and pitta disorders.
156	<i>Asparagus racemosus</i> , Willd. (Liliaceae)	KPB, KMK	C	Tubers	Urinary, gynaecological and nerve diseases, hyperacidity, gastritis, intelligence and physical strength maintains youthfulness; increases breast milk, promotes sexual vigour, cures diseases on account of impurity of blood, piles and eye diseases.
207	<i>Bauhinia purpurea</i> L. (Caesalpinaceae)	CHM	T	Roots, Bark, Flower buds	Diarrhoea, dysentery, skin diseases, leprosy and intestinal worms.

200	<i>Biophytum reinwardtii</i> (Zucc.) Klotzsch (Oxalidaceae)	AYL, CHM, KPB	H	Whole plant	Urinary calculi, hyperdipsia, bilious fevers, wounds, asthma, stomachalgia, snakebite and insomnia.
157	<i>Boerhaavia diffusa</i> L. (Nyctaginaceae)	KMK	H	Roots, Whole plant	Stimulate the functions of heart and kidney; specific for jaundice, anaemia, sprue, cardiac diseases, hydrocele, pain, piles, urinary calculi, diabetes, general debility and oedema.
199	<i>Briedelia stipularis</i> (L.) Blume (Euphorbiaceae)	KMK, CHM	S	Roots	Urinary obstructions, bladder stones and haemorrhages associated with pregnancy.
209	<i>Canthium coromandelicum</i> (Burm. f.) Alston (Rubiaceae)	KPB	S	Roots, Seeds	Disorders of throat, alleviating <i>pitta</i> and dysentery.
198	<i>Carica papaya</i> L. (Caricaceae)	KPB	S	Fruits, Seeds, Leaves, Latex	Rheumatoid arthritis, anorexia, indigestion, dyspepsia, intestinal worms, inflammations, piles, cardiac diseases, oedema, fever, ringworm, skin diseases and leprosy.
6	<i>Caryota urens</i> L. (Arecaceae)	AYL, KMK, KPB	T	Shoot apex, Toddy	Diarrhoea, migraine and scorpion-sting poisoning.
150	<i>Cayratia pedata</i> (Lam.) A. Juss. ex Gagnep. (Vitaceae)	CHM	C	Whole plant	Uterine reflexes and cracked heels.
57	<i>Cayratia trifolia</i> (L.) Domin (Vitaceae)	CHM	C	Roots	Tumours, fever, cardiac disorders, ulcers, wounds, dropsy and haemorrhoids.
210	<i>Centrosema molle</i> Benth. (Fabaceae)	CHM, KPB	C	Seeds	Scorpion and snake bites. Antimicrobial and Wound Healing
7	<i>Chassalia curviflora</i> (Wall ex Kurz) Thw. (Rubiaceae)	AYL, CHM, KPB, KMK	S	Roots	Cough and malaria.
211	<i>Chromolaena odorata</i> (L.) King & Robins. (Asteraceae)	KMK	S	Leaves	Cuts and wounds to stop bleeding
10	<i>Cinnamomum verum</i> Presl (Lauraceae)	KMK, CHM, KPB	T	Bark, Leaf oil	Bronchitis, asthma, diseases of mouth, thirst, nausea, chronic cold, convulsions, cardiac and dental diseases, vomiting, diarrhoea, and restoring normal skin colour.
197	<i>Cleome burmannii</i> Wight & Arn. (Capparaceae)	KMK, CHM	H	Whole plant	Anti-inflammatory
122, 246	<i>Clerodendrum infortunatum</i> L. (Verbenaceae)	AYL, KMK, CHM	H	Leaves, Bark	Diabetes, leprosy, skin diseases and inflammations.
236	<i>Clerodendrum paniculatum</i> L. (Verbenaceae)	CHM	H	Whole plant	Vata, pitta, inflammation, wounds and skin diseases.
74	<i>Clitoria ternatea</i> L. (Verbenaceae)	CHM	C	Roots, Whole plant	Improve strength, digestive power, complexion, voice, intestinal worms, animal poisoning, cough, brain tonic, diabetes, skin, abdominal and uterine disorders. piles, sterility in female and epilepsy.
12	<i>Cocos nucifera</i> L. (Arecaceae)	KPB, KMK	T	Inflorescence, Fruits, Roots, Seeds	Bronchitis, helminthiasis, gastritis, haemorrhage, leucorrhoea, tumours, skin and uterine diseases, dysentery, diarrhoea, dehydration and diabetes.
162	<i>Colocasia esculenta</i> (L.) Schott (Arecaceae)	KPB	H	Rhizomes	Internal haemorrhages, adenitis, somatalgia, otalgia and general debility.
17	<i>Commelina clavata</i> Clarke (Commelinaceae)	KPB	H	Whole plant	Jaundice, skin diseases and cold.
266	<i>Corchorus aestuans</i> L. (Tiliaceae)	CHM	H	Leaves, Seeds	Pneumonia, wounds, stomach disorders, dysentery, haemorrhage, leprosy, itching and rat poisoning.
258	<i>Crotalaria retusa</i> L. (Fabaceae)	AYL	H	Roots, Leaves	Coughing up blood, fever, scabies, lung diseases and impetigo.
54	<i>Curculigo orchoides</i> Gaertn. (Hypoxidaceae)	AYL	H	Tubers	Skin and urinary diseases, piles, jaundice, asthma and diarrhea.
280	<i>Cyanotis axillaris</i> (L.) D. Don (Commelinaceae)	CHM	H	Whole plant	Whole plant is used for tympanitis and ascites.
214	<i>Cyathula prostrata</i> (L.) Blume (Amaranthaceae)	KPB	H	Whole plant	Dysentery, skin and urinary complaints, hiccough, enlargement of cervical glands, piles and anorexia.
11	<i>Derris scandens</i> (Roxb.) Benth. (Fabaceae)	CHM, KPB	C	Seeds, Leaves, Whole plant and Bark	Unripe beans loosen the bowels with gripe. Leaves reduced to plasma are good in erysipelas. The plant is used as a fish poison.
313	<i>Desmodium scorpiurus</i> (Sw.) Desv. (Fabaceae)	KMK	H	Leaves	Anti-inflammatory.
304	<i>Desmodium triquetrum</i> (L.) DC. (Fabaceae)	KMK	S	Whole plant	Extract of herbs used in piles
195	<i>Dioscorea bulbifera</i> L. (Dioscoreaceae)	AYL, KMK, KPB	C	Tubers	Ulcers, piles, leprosy, worm infestation, cardiac diseases, urinary calculi, dysentery and syphilis.
63	<i>Emilia sonchifolia</i> (L.)	KMK	H	Whole plant	Diarrhoea, cuts and wounds, intermittent fevers, asthma,

	DC. (Asteraceae)				eyesores and night blindness.
51	<i>Ficus racemosa</i> L. (Moraceae)	KMK	T	Bark	Skin diseases, ulcers and vaginal diseases.
305	<i>Fimbristylis aestivalis</i> Vahl (Cyperaceae)	KMK	H	Rhizome	Cooling medicine, Combined with Cassia alata, the plant is used as a poultice on inflammations
232	<i>Gliricidia sepium</i> (Jacq.) Kunth ex Walp. (Fabaceae)	KMK, CHM	T	Leaves, Bark, Seeds	Headache, cold and cough.
50	<i>Gloriosa superba</i> L. (Liliaceae)	KMK, CHM	C	Tubers	Swelling, piles, oedema, leprosy, ulcers, pain in the bladder, itching, antidote against cobra poison and quick expulsion of the placenta after delivery.
217	<i>Grewia nervosa</i> (Lour.) Panigrahi (Tiliaceae)	KMK	S	Whole plant	Indigestion, eczema and itch, typhoid fever, dysentery and syphilitic ulceration of the mouth.
172	<i>Hemidesmus indicus</i> (L) R.Br. (Periplocaceae)	CHM	C	Roots	Dysentery, cough, bronchitis, uterine haemorrhage, wounds, leprosy, blood diseases, anaemia, jaundice, fever, thirst, vomiting, rheumatism, debility and skin diseases.
21	<i>Hibiscus hispidissimus</i> Griff. (Malvaceae)	KMK	S	Leaves and Roots	Improves digestion, inflammations, helminthiasis and dyspepsia.
174	<i>Holigarna arnottiana</i> Hook.f. (Anacardiaceae)	CHM	T	Fruits	Arthritis, tumours, leucoderma, ulcers, diabetes and leprosy.
154	<i>Hyptis suaveolens</i> (L.) Poit. (Lamiaceae)	AYL, KMK	H	Whole plant	Worm infestation, wounds and inflammations of the navel of the newborn and also emetic.
175	<i>Ichnocarpus frutescens</i> (L.) R.Br. (Apocynaceae)	KMK	C	Roots	Diabetes, fever, skin troubles and stones in bladder.
230	<i>Ipomoea pes-tigridis</i> L. (Convolvulaceae)	CHM	C	Leaves	Leaves used to boils, carbuncles, pimples, sores and as an antidote to dog bites.
80	<i>Ixora coccinea</i> L. (Rubiaceae)	KMK	S	Roots, Leaves, Flowers	Blood purifier, antiseptic, infantile skin ailments, diarrhoea, dysentery, fever, sores, chronic ulcers, eye troubles, scabies, cholera and gonorrhoea.
23	<i>Lagerstroemia speciosa</i> (L.) Pers. (Lythraceae)	CHM	T	Bark, Leaves, Flowers, Fruits	Diabetes.
48	<i>Leea indica</i> (Burm.f.) Merr. (Leeaceae)	CHM, KMK	S	Roots	Diarrhoea, dysentery, hyperdipsia, ulcer and skin diseases.
229	<i>Leucas aspera</i> (Willd.) Link, Enum. (Lamiaceae)	KMK	H	Whole plant	Worm problems, fever, cough, jaundice, psoriasis, respiratory, intestinal and skin diseases.
204	<i>Lindernia ciliata</i> (Colsm.) Pennell (Scrophulariaceae)	KMK	H	Leaves	Jaundice, The sap from the crushed leaves is given after childbirth in Peninsular Malaysia, and the plant is considered an effective cure for menorrhagia in Taiwan
64	<i>Lindernia crustacea</i> (L.) F.v. Muell. (Scrophulariaceae)	KMK	H	Whole plant	Biliousness affections and dysentery; in poultices for boils, sores, ringworm and itches, excess bile secretion, abdominal ailments and wound healing.
250	<i>Ludwigia hyssopifolia</i> (G. Don) Exell (Onagraceae)	CHM	H	Whole plant	Burns, gonorrhoea and catarrhal affections of childrens, promotes sleep, improves strength, increase semen and helps easy delivery.
120	<i>Luffa cylindrica</i> (L.) Roem. (Cucurbitaceae)	KMK	C	Leaves, Flower, Tender fruits	Abdominal, dental and blood disorders, cough, eczema, poisoning, emetic, cathartic, haematuria, syphilis and dermatopathy.
24	<i>Mangifera indica</i> L. (Anacardiaceae)	KMK	T	Bark, Tender leaves, Flowers, Kernels	Wounds, ulcers, diarrhoea, dysentery, rheumatism, burning sensation, haemorrhages, and stomatopathy.
295	<i>Memecylon randerianum</i> SM & MR Almeida (Melastomataceae)	KMK	S	Leaf infusion	Antibacterial and antidiarrhoeal properties.
119	<i>Merremia vitifolia</i> (Burm. f.) Hall. f. (Convolvulaceae)	KMK	C	Whole plant, Roots	Urethral discharges. Root eaten by tribals as a stomachic.
47	<i>Mikania micrantha</i> Kunth (Asteraceae)	CHM, KMK	C	Leaves	Snake bites, eliminating discomfort of hornet, bee and ant stings antimicrobial activity from the leaves
139	<i>Mimosa pudica</i> L. (Mimosaceae)	KMK	H	Whole plant	Urinary, uterine and skin complaints, piles, diarrhoea, leprosy, haemorrhage, wounds, oedema, and burning sensation.
268	<i>Mucuna gigantea</i> (Willd.) DC. (Fabaceae)	CHM	C	Seeds, Roots, Bark	Parkinson's Disease, gonorrhoea and schistosomiasis, rheumatic complaints, and used as a purgative.
269	<i>Murdannia pauciflora</i> (Wight) Brueck. (Commelinaceae)	CHM	H	Whole plant	Skin diseases
86	<i>Ocimum tenuiflorum</i> L. (Lamiaceae)	CHM	S	Whole plant	Cough, cold, bronchitis, dysentery, improves appetite, skin diseases, itches, ringworm, leprosy, intestinal worms, ulcers, poisonous affections and specific for all kinds of fevers.

182	<i>Oldenlandia diffusa</i> (Willd.) Roxb. (Rubiaceae)	KMK	H	Whole plant	General weakness, biliousness, fever, gonorrhoea, toothache, depression, jaundice, cough, bronchitis and skin diseases.
252	<i>Olea dioica</i> Roxb. (Oleaceae)	KMK	T	Bark, Leaves	Bark and leaves used as a febrifuge and emetic.
306	<i>Osbeckia muralis</i> . Naud. (Melastomataceae)	KMK	H	Flower	Itching and skin diseases.
307	<i>Panicum notatum</i> Retz. (Poaceae)	KMK	H		
113	<i>Phyllanthus urinaria</i> L. (Euphorbiaceae)	KMK	H	Whole plant	Jaundice, cough, chronic dysentery, dyspepsia, indigestion, diabetes, urinary tract and skin diseases.
44	<i>Plumeria rubra</i> L. (Apocynaceae)	KMK	T	Roots, Bark, Latex	Ulcers, herpes and scabies; used in preparations of itch, rheumatism and gum troubles.
9	<i>Pothos scandens</i> L. (Araceae)	CHM	C	Whole plant	Skin diseases, boils, swellings, wounds, ulcers, dropsy, vomiting, flatulence, strangury and burning sensation.
309	<i>Sebastiania chamaelea</i> (L.) Muell.-Arg. (Euphorbiaceae)	KMK	H	Whole plant	Decoction given with ghee as a tonic; also applied in vertigo. Juice used in diarrhoea
271	<i>Sida cordifolia</i> L. (Malvaceae)	CHM	S	Roots	Dysentery rheumatism, neurological disorders, headache, tuberculosis and ophthalmia.
224	<i>Sida rhombifolia</i> L. (Malvaceae)	CHM	S	Roots	Dermatopathy, diarrhoea, tuberculosis, leucorrhoea, and burning sensation.
94	<i>Sida rhomboidea</i> Roxb. ex Fleming (Malvaceae)	KMK	H	Roots, Leaves	Fever, heart diseases, burning sensations, piles and inflammations.
107	<i>Spermocoe latifolia</i> Aubl. (Rubiaceae)	KMK	H	Whole plant	Antiinflammatory
310	<i>Sporobolus diander</i> (Retz.) P. Beauv. (Poaceae)	KMK	H	Leaves	Burns and Wounds
311	<i>Tridax procumbens</i> L. (Asteraceae)	KMK	H	Leaves	Dysentery, diarrhoea, haemorrhages from cuts, bruises and wounds.
134	<i>Triumfetta rhomboidea</i> Jacq. (Tiliaceae)	CHM, KMK	S	Whole plant	Dysentery, diarrhoea and leprosy.
35	<i>Vernonia cinerea</i> (L.) Less. (Asteraceae)	KMK	H	Whole plant	Malaria, fever, leucorrhoea, excessive bleeding, chronic skin diseases, dysuria, bladder stones, piles, worms and haematological disorders.

H: Herb; S: Shrub; T: Tree; C: Climber

Discussion

Sacred groves are natural forests and represent the ancient Indian way of *in situ* conservation of genetic diversity. It contains RET, medicinal and economically important species. They have an important role in preserving depleting resource elements such as medicinal plants. Some plant species in groves is considered as sacred. Sacred groves are believed to be a treasure house of medicinal, rare and endemic plants, as refugia for relic flora of a region and as centers of seed dispersal [15]. Natural vegetation is present inside the groves. Sacred groves act as indicators for natural vegetation and vital for well-being the society [16].

Groves are mainly associated with water bodies and this contains large number of floras and faunas. This helps to maintain the water table in particular area and a water source for plants and animals. The long lasting system of every village having a temple, a tank and associated sacred grove explains the ancient method of water harvesting and resource sharing system [17].

Centrosema molle Benth. and *Mikania micrantha* Kunth are important climbers and used for snake bites. Different parts of the plants such as leaves, roots, bark, latex, inflorescence, fruits, seeds and sometimes the whole plants are used for different medicinal uses. Collection of large number of plants for various purposes from groves causes destruction of natural gene pool and natural habitats inside the groves. Over-exploitation and unscientific collection of some medicinal plants causes threatening the resource and warrants sustainable harvesting by the local communities [18].

Many sacred groves of the State are treasures of rare and endemic species [19, 20, 12]. These groves contain 2 Vulnerable

and 4 Endemic species.

In Kalapparambath Kavu and Kumaramangalath Kavu compound walls are absent. Due to the absence of compound walls and land sliding at the time of heavy rain fall soil erosion takes place, soil fertility lost and it affect diversity of plants. Water has proven experimentally to be the most important in causing soil erosion with long-lasting results [21].

Invasive species like *Chromolaena odorata* (L.) King & Robins. and *Mikania micrantha* Kunth are present in Kumaramangalathu kavu and Chemathi kavu. *Mikania micrantha* Kunth is also present in Kumaramangalathu kavu. Establishment of invasive species causes changes in propagule pressure, availability of nutrients and light and not exclusively on habitat richness [22].

Conclusion

Groves are last fragments of natural ecosystem in the region and serving as natural nursery of wild, medicinal and economically important plants. It acts as reservoirs of biodiversity and preserving areas. Each grove has its own peculiarities with respect to other. Survey and documentation of floristic wealth is a prerequisite for conserving the depleting genetic resources and one of the bio-monitoring activities for restoration. The present study on these sacred groves indicates the presence of rich diversity of medicinal plants. The unscientific collection of medicinal plants and large scale human interference affect the medicinal flora of the sacred groves. Local level control has been vital to the protection of groves. Groves are the last refuge of many plants. So they are considered as natural gifts and can be conserved for requirement of society and also help in education and research.

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