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Ethno-botanical Survey on Medicinal Plants from selected Laterite Hillocks in Malappuram District, Kerala, India.

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ABSTRACT

Midland laterite hills are beautiful natural gifts, giving a curvaceous shape to the entire landscape, with plenty of vegetations and a rich array of animals. The laterite hills are the most imposing but extremely threatened topographical floristic and faunistic feature of northern Kerala. Major part of Malappuram district comes under midland region with numerous hills and dales. Vast stretches of laterite capped hillocks are the characteristic feature of Malappuarm district. Geologically and ecologically important midland lateritic hillocks of Northern Kerala are slowly vanishing as the soil and rock are enormously scrapped off to meet the demand of land developers. The rich biodiversity together with the threats associated with the area reiterates the need for conserving the area on a war footed basis. The present survey has been carried out in selected laterite hillocks in Malappuram district, Kerala. A total of 67 plants belonging to 37 families have been found to have medicinal value in this ethnobotanical survey. The plants have been enumerated with botanical name, family name, common name, habit, plant parts used, ingredients, mode of application and medicinal uses. The medicinal plants includes herbs (25), shrubs (13), climbers (15) and trees (12) and various parts as like root, bark, stem, leaf, seeds, fruit, rhizome, flowers and whole plant are used for curing various ailments. Mode of application varies depending upon their plant parts used and ingredients chosen.

KEY WORDS: Laterite hill; Vegetations; ethnobotanical

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INTRODUCTION

The environment of Northern Kerala is governed by its peculiar geographic features. A unique feature of this region is the presence of laterite hillocks which give fascinating undulations for the midland terrain in particular. Such hillocks are present up to Malappuram district towards south and they are spread to South Karnataka towards north. There are many theories on the formation of laterite hills. According to Prescott and Pendleton ¹, it is formed by the oxidation and precipitation of iron. Berger and Beadle ² suggest the formations as a result of the accumulation of iron by way of deposition from highland waters. Malappuram literally means an elevated place on the top of hills. The district has a unique importance in the geological history. Laterite was first identified in the area near Angadippuram Railway Station by Francis Buchanan ³. This is the type area of Laterite.

The area from Malappuram district to Kasaragod district in Kerala is typically formed of laterite hills, which also serve as a major ecosystem for many plants and animals besides serving as good watershed areas. The system enriched by ecological diversity might be the reason for early inhabitation in the midland of this region ⁴. A laterite hill plateau can be considered as an amphibious ecosystem. The alternation of very wet and dry conditions creates an unusual ecological situation that supports a unique biota. To survive in such an ecosystem a species must be able either to tolerate a wide range of conditions, or to grow and reproduce in a short time, the wet phase providing the favourable environment for many species. The wet phase of the Laterite hillocks is the more active in terms of the appearance of plant and animals ⁵. An analysis of the biological spectrum reveals the fact that, majority of the herbaceous members appears along with the first showers, flourish during the monsoon season, complete their life cycle towards the end of the rainy season and enter into the dormant phase by shedding their fruits/seeds or in the form of rhizomes. Soil cover is very thin on the laterite plateaus. Owing to the absence of large trees on such plateaus they appear almost barren during winter and summer. The dry phase is characterised by the presence of highly adapted, xerophytic plants such as Polycarphaea, Lepidagathis, Chamaesyce, etc. They may remain fresh to some extent of the summer season, and may dry up leaving the perennial rootstock.

The lateritic hillocks in the Northern Kerala are highly neglected areas from conservation point of view since they remain apparently barren for at least 7 months (November-May). Secondly, majority of the flora (90%) comprises herbaceous annuals and hence they are not considered important when compared to the woody green cover as in forest ecosystems. The lateritic hills of Northern Kerala is not indolent in reporting new species as around 7 new angiosperm species reported in past years ^{6,7}.

Padmanabhan presented a comprehensive account of the laterite hillocks of northern Kerala ⁴. It highlighted the socio-ecological significance of the laterite ecosystem in depth. Madhu et al reported a number of valuable endangered medicinal plants present in Madayipara hillock in Kannur and their therapeutic usages ⁸. That was the first study from laterite hillock based on ethnobotanical aspect. Compared to Kannur and Kasaragod, studies on laterite hills lesser in the district of Malappuram. There was a study on flora in Malappuram district conducted by Babu ⁹, and thenceforth there was no study on laterite hills in Malappuram district.

It is assumed that there are many medicinal and non medicinal species have to be reported from these sites as reported from laterite hillocks in Kannur district ^{10,11}. The problems demanding our immediate attention is the threat which questions the very existence of the hillocks. It is nothing but mining activity. There is intense rock and soil mining going on in the mid-land of this region. This process is not checked by the authorities who seem to be not bothered of its after effect. The existing rules are openly violated. The local people are also not aware of the ecological impact. Hence this study is an attempt to draw the attention of the society to the grave mistake of the transformation of the natural landscapes. The present study made an attempt to present a checklist of medicinal plant diversity of selected laterite hillocks in Malappuram district with ethnobotanical importance.

MATERIALS AND METHODS

Even though biodiversity surveys had been undertaken on this laterite hillock, this is for the first time a survey exclusively for medicinal plants of ethnomedical and traditional importance has been carried out by the Department of PG studies and Research in Botany, Sir Syed College, Taliparamba, Kannur. The work was carried out on selected laterite hillocks in Malappuram district (Fig 1). The district lies between North latitudes 10°40' and 11°32' and East longitude 75°50' and 76°36'. The Nilgiris of Tamil Nadu in the east and Lakshadweep Sea in the west provide natural boundaries. In the north it is bounded by Kozhikode and Wayanad and in the south by Palakkad and Trichur districts. The area lying between the coastal plain in the west and the high ranges in the east is occupied by midlands. Laterite is the most important lithologic unit of the district and is widely seen almost all along the midland region of the district. The thickness of the laterite goes upto 25 m at places. Different laterite hills were identified by the help of local peoples. The study sites are confined to different blocks in Malappuram district. They are, Perinthalmanna, Kuttipuram, Kondotti, Manjeri, Malappuram and Areakode (Fig 1).

Extensive field visits were made during June 2016 to May 2018. The objectives of the study were clearly explained and verbal consent is obtained by interviewer from each informant. Data were collected using questionnaire, interviews and discussions. Traditional medicines used for promoting healing diseases were gathered from the villagers and experienced individuals practicing indigenous medicines. Questionnaires are used to collect information from the informants. The questionnaires used included the following information: Common name, Habit, Plant parts used, Ingredients and Mode of application and their Medicinal uses. Each claim was verified 4 or 5 times with different persons from different localities. The common names of plants and dose or mode of administration were documented from the field.

RESULTS AND DISCUSSION

During the present investigation, it was noted that 67 medicinal plant species belonging to 37 families used by the natives of various laterite hillocks in Malappuram district for the treatment of various ailments. These were enumerated with their medicinal importance (Table 1). Out of the 67 plant species studied, 60 (90%) were dicotyledons, 6 (9%) were monocotyledons and 1 pteridophyte. The plants of maximum use recorded belong to Fabaceae (9 species) followed by Euphorbiaceae (5 species) then Lamiaceae, Malvaceae and Rubiaceae (3 species each) then Amaranthaceae, Verbenaceae, Myrtaceae, Melastomataceae, Convolvulaceae, Liliaceae, Apocynaceae and Moraceae (2 species each) only one species was represented by Anacardiaceae, Combretaceae, Ulmaceae, Simaroubaceae, Ranunculaceae, Menispermaceae, Araceae, Sapindaceae, Nyctaginaceae, Poaceae, Rutaceae, Periplocaceae, Scrophulariaceae, Smilacaceae, Selaginellaceae, Annonaceae, Caryophyllaceae, Hypoxidaceae, Passifloraceae, Lauraceae, Meliaceae, Oleaceae and Commelinaceae (Fig 4). The common health ailments treated in the study area were skin problems, wound, toothache, gastritis, urinary troubles, arthritis, anaemia, headache, cough and cold, fever, sprains, diabetes, diarrhea, respiratory problems, jaundice etc.

The important medicinal plants which are collected from Laterite hillocks are listed in the Table (Table 1). The plants are arranged in order of their botanical names, followed by the family, local name, Habit, Parts used and Mode of administration. Distribution analysis of Plants habit, revealed that maximum medicinal plants were belonging to Herb (25) followed by Climber (16), Shrub (13) and Tree (13) respectively, indicating that more than 38% of the plants were herbs followed by climbers 24%, shrub 20% and tree 19% (Fig 2). Different parts of the medicinal plants viz., stem, leaves, root, fruits,

Table 1. Medicinal plants with taxonomical description and traditional medicinal knowledge recorded in study areas

| S.No | Plants | Family | Local name | Habit | Parts Used | Mode of administration |
|------|--|-----------------|------------------|---------|--------------|--|
| 1 | <i>Aerva lanata</i> (L.) Juss. ex Schult. | Amaranthaceae | Cherula | Herb | Leaves | Decoction of <i>Curcuma longa</i> , <i>Strychnos potatorum</i> , <i>Salacia oblonga</i> and <i>Aerva lanata</i> is given twice a day in order to treat diabetes. |
| 2 | <i>Clerodendrum infortunatum</i> L. | Lamiaceae | Periyilam | Herb | Leaves, bark | Leaves of <i>C. infortunatum</i> along with leaves of <i>Catharanthus roseus</i> are crushed in water and a teaspoonful of this preparation is taken before meals in order to treat diabetes |
| 3 | <i>Helicteres isora</i> L. | Malvaceae | Valampiri | Shrub | Fruit | The fruit juice is taken twice a day for diabetes. |
| 4 | <i>Holigarna arnottiana</i> Hook. f. | Anacardiaceae | Cheru | Tree | Bark | Highly diluted Bark decoction mixed with milk and turmeric used in mild skin problems. |
| 5 | <i>Leucas aspera</i> (Willd) Link | Lamiaceae | Thumba | Herb | Leaves | Leaves pasted with water and taken for Gastritis |
| 6 | <i>Euphorbia hirta</i> L. | Euphorbiaceae | Attuvattappala | Herb | Root | Root powder and also root decoction used to cure respiratory problems |
| 7 | <i>Stachytarpheta indica</i> (L.) Vahl | Verbenaceae | Kadapananth | Shrub | Root | Root decoction mixed with milk and taken for dysentery |
| 8 | <i>Syzygium caryophyllatum</i> (L.) Alston | Myrtaceae | Njara | Tree | Fruit, Bark | Fruit is Edible. Raw fruit and bark decoction used for diabetes. |
| 9 | <i>Callicarpa tomentosa</i> (L.) Murr. | Verbenaceae | Kattuthekku | Shrub | Root | Root powder, jaggery, and milk mixed well and taken orally for digestive problems |
| 10 | <i>Calycopteris floribunda</i> (Roxb.) Lam. | Combretaceae | Pullanni | Climber | Leaves | Leaf extract heated and mixed with milk used for common fever. |
| 11 | <i>Caesalpinia mimosoides</i> Lam. | Fabaceae | Chingamullu | Climber | Root | The roots along with ginger paste for anti-helminthic property |
| 12 | <i>Cassia occidentalis</i> (L.) Link | Fabaceae | Karinthakara | Shrub | Leaves | Leaf decoction along with milk used for digestive problems. |
| 13 | <i>Bridelia stipularis</i> (L.) Blume | Euphorbiaceae | Cherupanachi | Shrub | Bark | Bark heated with water and given for children for fever, cough. |
| 14 | <i>Ixora coccinea</i> L. | Rubiaceae | Kattuchethi | Shrub | Flower | The flower crushed with milk and taken when body feeling excess of heat. |
| 15 | <i>Holoptelea integrifolia</i> (Roxb.) Planch. | Ulmaceae | Aavel | Tree | Bark | Bark paste externally applied on ringworms and scabies |
| 16 | <i>Ailanthus triphysa</i> (Dennst.) Alston | Simaroubaceae | Matti | Tree | Bark | Bark decoction with milk taken for bronchitis. |
| 17 | <i>Memecylon umbellatum</i> Burm. f. | Melastomataceae | Kayampoomaram | Shrub | Leaves, Root | Leaf paste used in snake bite. Root decoction is used for abnormal menstrual periods. |
| 18 | <i>Naravelia zeylanica</i> (L.) DC. | Ranunculaceae | Thalavedanavalli | Climber | Stem | Stem grinded and smelled when in cold and headache |

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|----|---|----------------|-----------------|---------|------------------|---|
| 19 | <i>Cyclea peltata</i> Hook. f. & Thoms | Menispermaceae | Padathali | Climber | Leaves | Leaf pasted with water applied on hair for conditioning. |
| 20 | <i>Pothos scandens</i> L. | Araceae | Paruvakodi | Climber | Leaves | Leaf paste is applied on burned places of skin. |
| 21 | <i>Syzygium cumini</i> L. | Myrtaceae | Njaval | Tree | Fruits, Leaves | Fruit taken raw to get rid of dysentery. Leaf juiced with water and applied on bleeding gums |
| 22 | <i>Achyranthes aspera</i> L. | Amaranthaceae | Kadaladi | Herb | Whole plant | The decoction of whole plant is used to bath children suffering from fever. Root paste is applied on forehead for headache. |
| 23 | <i>Cardiospermum helicacabum</i> L | Sapindaceae | Valliuzhinja | Climber | Leaves | The leaf juice is applied on boils and abscess |
| 24 | <i>Boerhaavia diffusa</i> L. | Nyctaginaceae | Thazhuthama | Herb | Leaves | Leaf extract is used internally in the treatment of jaundice and anaemia |
| 25 | <i>Cassia fistula</i> L | Fabaceae | Kanikonna | Tree | Leaves | The leaf juice is taken internally curing mouth sores and tonsillitis. |
| 26 | <i>Emilia sonchifolia</i> DC. | Asteraceae | Muyalchevian | Herb | Leaves | Leaf paste is used for tonsillitis and skin diseases. |
| 27 | <i>Eclipta prostrata</i> (L.)L | Asteraceae | Kayyunni | Herb | Whole plant | Plant extract is used for the treatment of dandruff. |
| 28 | <i>Emblca officinalis</i> , Gaertn. | Euphorbiaceae | Nelli | Tree | Fruits | Fruit helps to burn unwanted fat from the body. It is helpful in controlling diabetes. |
| 29 | <i>Evolvulus alsinoides</i> , L. | Convolvulaceae | Vishnukranthi | Herb | Whole plant | Ground and mixed with rice water and taken empty stomach to improve memory of ageing people. |
| 30 | <i>Derris scandens</i> (Roxb.) Benth. | Fabaceae | Ponnamvalli | Climber | Leaves | Leaves decoction is used in treating sprains. |
| 31 | <i>Cymbopogon flexuosus</i> (Nees ex Steud.) Wats. in Atkins. | Poaceae | Inchipullu | Herb | Leaves | Leaf juice is used to relieve the problems of rheumatic joints, sprains and tooth related problems. |
| 32 | <i>Crotolaria quinquefolia</i> L. | Fabaceae | Sen | Herb | Seed pod, Leaves | Seed pod is used for treating snake and millipede bites. Leaves often combined with those of <i>Crotolaria retusa</i> is taken internally or externally as a treatment for fever and scabies. |
| 33 | <i>Clitoria ternatea</i> L. | Fabaceae | Sankupushpum | Climber | Root | Root paste is applied on poison affected regions and also used for eye diseases |
| 34 | <i>Chromolaena odorata</i> (L.) R.M.King & H.Rob | Asteraceae | Communist-pacha | Shrub | Whole plant | Leaf juice is applied on wounds. Plant leaf and turmeric is ground well and is applied for skin diseases. |
| 35 | <i>Gloriosa superaba</i> L | Liliaceae | Menthonni | Climber | Root | Root paste is applied on the spot of scorpion bite and used for the treatment of head louse. |
| 36 | <i>Glycosmis pentaphylla</i> Corr. | Rutaceae | Kuttippannel | Shrub | Whole plant | The whole plant extract is used for respiratory and heart diseases |
| 37 | <i>Hemidesmus indicus</i> R. Br | Periplocaceae | Naruneendi | Climber | Root | Root decoction is taken for the treatment of diabetes |

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| 38 | <i>Ichnocarpus frutescens</i> R. Br. | Apocynaceae | Palvalli | Climber | Root | Root juice is used for the treatment of anaemia. |
| 39 | <i>Mimosa pudica</i> L | Fabaceae | Thottavadi | Herb | Leaves | The leaf paste is applied externally on wounds. |
| 40 | <i>Phyllanthus amarus</i> Schum. & Thonn. | Euphorbiaceae | Keezharnelli | Herb | Whole plant | Plant extract with rhizome paste of turmeric is used internally for skin diseases and jaundice. |
| 41 | <i>Rauwolfia serpentina</i> (L.) Benth.ex Kurz | Apocynaceae | Sarpagandhi | Shrub | Rhizome | Rhizome juice is used internally for high blood pressure and for the treatment of snake poison. |
| 42 | <i>Scoparia dulcis</i> L | Scrophulariaceae | Kallurukki | Herb | Root | Ground root is taken orally for kidney stone |
| 43 | <i>Sida rhombifolia</i> L. | Malvaceae | Kurunthotti | Shrub | Root | Root decoction is used for rheumatism, breathing problems and cough. |
| 44 | <i>Smilax zeylanica</i> L. | Smilacaceae | Kareelanchi | Climber | Root, Leaves | Decoction of root is taken to treat skin diseases. Decoction of leaves acts as blood purifier and improves sexual vigour |
| 45 | <i>Vernonia cineria</i> (L.) Less. | Asteraceae | Puvankurunal | Herb | Whole plant | Plant paste is used for joint pain |
| 46 | <i>Abutilon indicum</i> (Link)Sweet | Malvaceae | Thuthi | Shrub | Leaves | Leaf juice mixed with onion paste is taken for Piles |
| 47 | <i>Selaginella delicatula</i> (Desv. exPoir.) Alston. | Selaginellaceae | Kuruvevannasappu | Herb | Whole plant | Plant juice is mixed with the past of Spermacocae Hispida and apply for wound healing |
| 48 | <i>Tridax procumbens</i> L. | Asteraceae | Odiyancheera | Herb | Whole plant | Used for pitham, ulcer, antiinflammatory, haemorrhoids and wound healing |
| 49 | <i>Uvaria narum</i> (Dunal) Wall. ex Hook.f. & Thoms. | Annonaceae | Korandapazham | Climber | Root, Leaves | The paste of root and leaves to treat intermittent fevers, jaundice, rheumatic disorders, biliousness, skin diseases. |
| 50 | <i>Plectranthus barbatus</i> Andr. | Lamiaceae | Panikoorka | Herb | Leaves | Leaf juice is used for the treatment of stomachache and as a purgative. |
| 51 | <i>Oldenlandia corymbosa</i> L. | Rubiaceae | Parpadakapullu | Herb | Leaves | The leaves are pounded, soaked in warm water and the liquid drunk to treat stomach disorders |
| 52 | <i>Polycarpaea corymbosa</i> (L.) Lam. | Caryophyllaceae | Akkaramkolli | Herb | Whole plant | The paste form of the plant is useful in skin diseaes |
| 53 | <i>Naregamia alata</i> Wight & Arn. | Meliaceae | Nilanaragam | Herb | Leaves | Leaf juice is used for ear infection and itching of eyes. |
| 54 | <i>Asparagus racemosus</i> Willd | Liliaceaea | Sathavari | Climber | Tuber | Tuber juice is given internally for stomach ache. |
| 55 | <i>Curculigo orchioides</i> Gaertn. | Hypoxidaceae | Nilappana | Herb | Roots | Decoction is used as aphrodisiac |
| 56 | <i>Ixora brachiata</i> Roxb. ex DC. | Rubiaceae | Marachethi | Tree | Roots, leaves | Leaf and root juice show anti-inflammatory and antipyretic properties. |
| 57 | <i>Merremia tridentata</i> (L.) Hall. f. in Engl. | Covolvulaceae | Prasarani | Herb | Whole plant | Plant extract is applied for arthritis. |

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|----|---|-----------------|-------------------|---------|---------------------|---|
| 58 | <i>Desmodium gangeticum</i> (L.) DC. | Fabaceae | Orila | Herb | Root | Anti Diarrheal, respiratory ailments, tonic |
| 59 | <i>Murdannia nudiflora</i> (L.) Brenan | Commelinaceae | Paravellamkudiyam | Herb | Root | Root juice is used against asthma |
| 60 | <i>Passiflora foetida</i> L. | Passifloraceae | Poochapazham | Climber | Fruit, Leaves | Neurological disorders, insomnia and edema. |
| 61 | <i>Ficus racemosa</i> L. | Moraceae | Atthi | Tree | Fruit, Leaves, Bark | For general weakness , Anti bacterial |
| 62 | <i>Melastoma malabathricum</i> L. | Melastomataceae | Athirani | Shrub | Leaves | The leaves are chewed up, pounded, and applied as paste on cuts or wounds |
| 63 | <i>Cinnamomum malabathrum</i> (Burm. f.) Blume | Lauraceae | Vayana | Tree | Bark, Leaves | Bark is stimulant, carminative, haemostatic and astringent. The leaves are carminative, and are used in colic and rheumatism. |
| 64 | <i>Macaranga peltata</i> (Roxb.) Muell.-Arg. in DC. | Euphorbiaceae | Vatta | Tree | Leaves, Bark | Leaves and bark decoction as a wash for sores. |
| 65 | <i>Saraca asoca</i> (Roxb.) de Wilde | Fabaceae | Ashokam | Tree | Bark, Flower | Root bark decoction is taken internally in case of irregular menstruation and chewing flowers is recommended for bleeding. |
| 66 | <i>Jasminum malabaricum</i> Wight | Oleaceae | Kadambavalli | Climber | Stem | Stem is crushed and the liquid obtained used raw when in eye trouble. |
| 67 | <i>Ficus exasperata</i> Vahl | Moraceae | Therakam | Tree | Root, Leaves, Fruit | Wound healing |

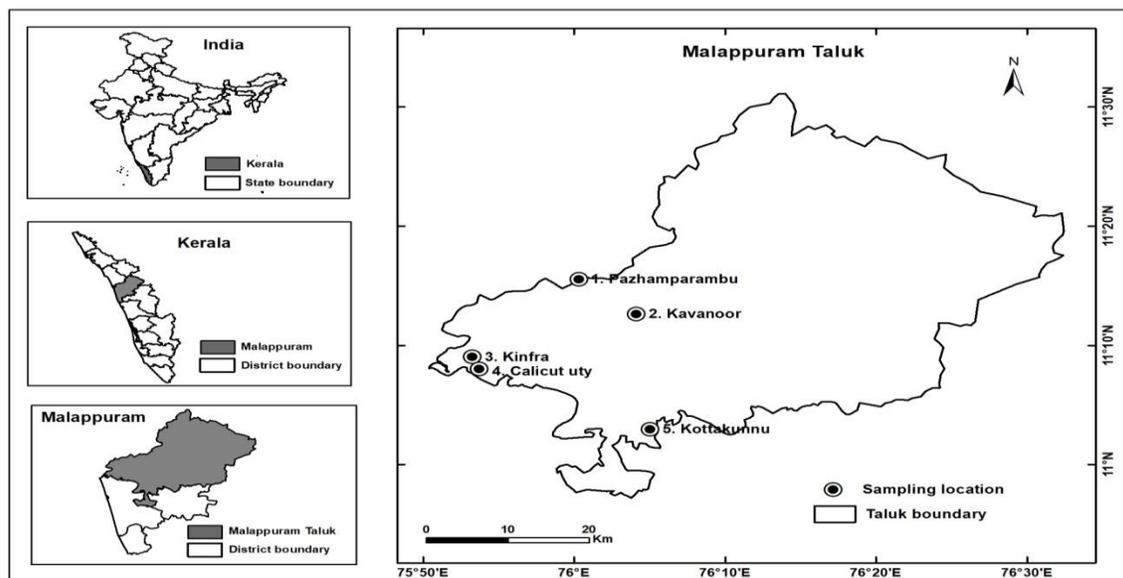


Fig: 1 Geographic location of study areas

seeds, rhizome, flowers, bark and whole plant itself were used as source of medicines. Distribution analysis of plant parts used as source of medicines revealed that plant parts like, root (18), stem (2), leaves (30), bark (10), seeds (1), fruits (6), rhizome (1), flowers (2), and whole plant (11). Percentage analysis of the plant part used were in following order Leaves (46%) > root (28%) > whole plant (17%) > bark (15%) > fruit (9%) > flowers (3%) = stem (3%) > seeds (2%) = rhizome (2%) (Fig 3).

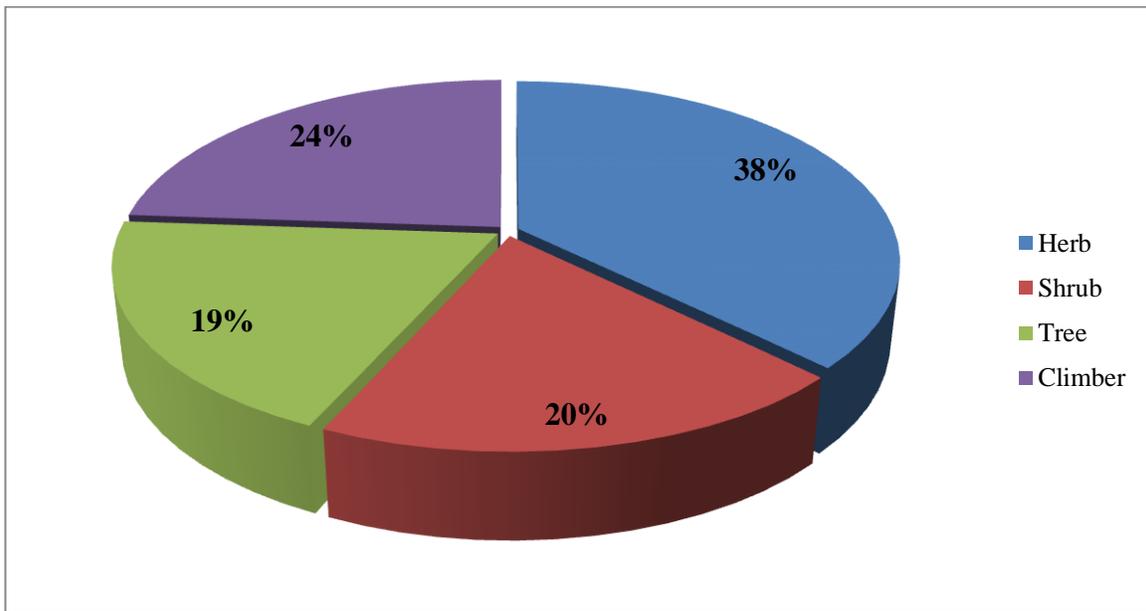


Fig: 2 Habit wise distribution of recorded ethnomedicinal plants

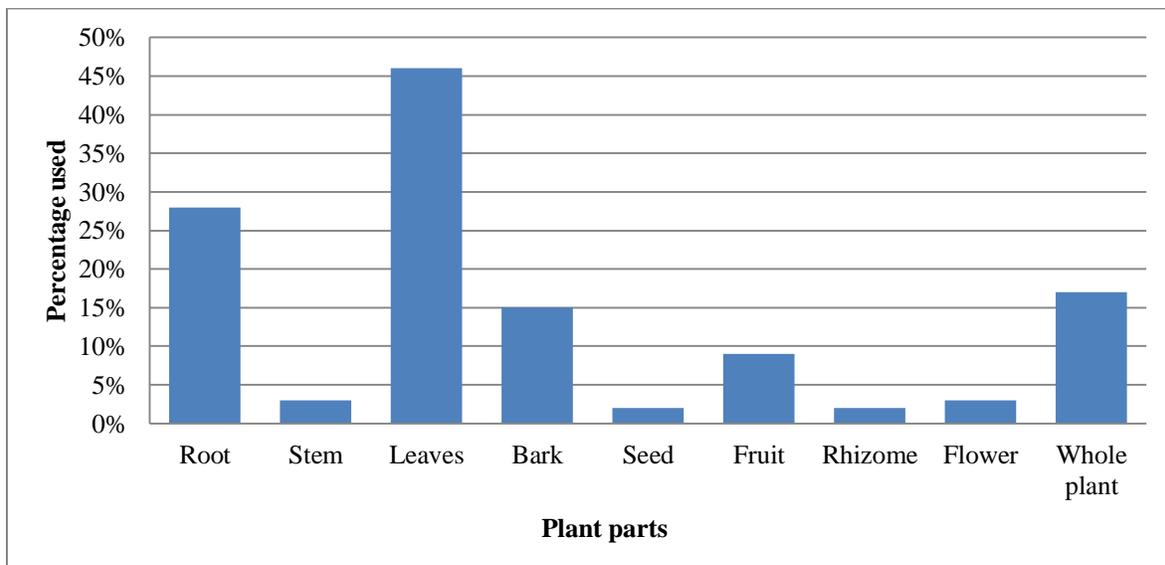


Fig: 3 Percentage of plant parts used for traditional medicinal care

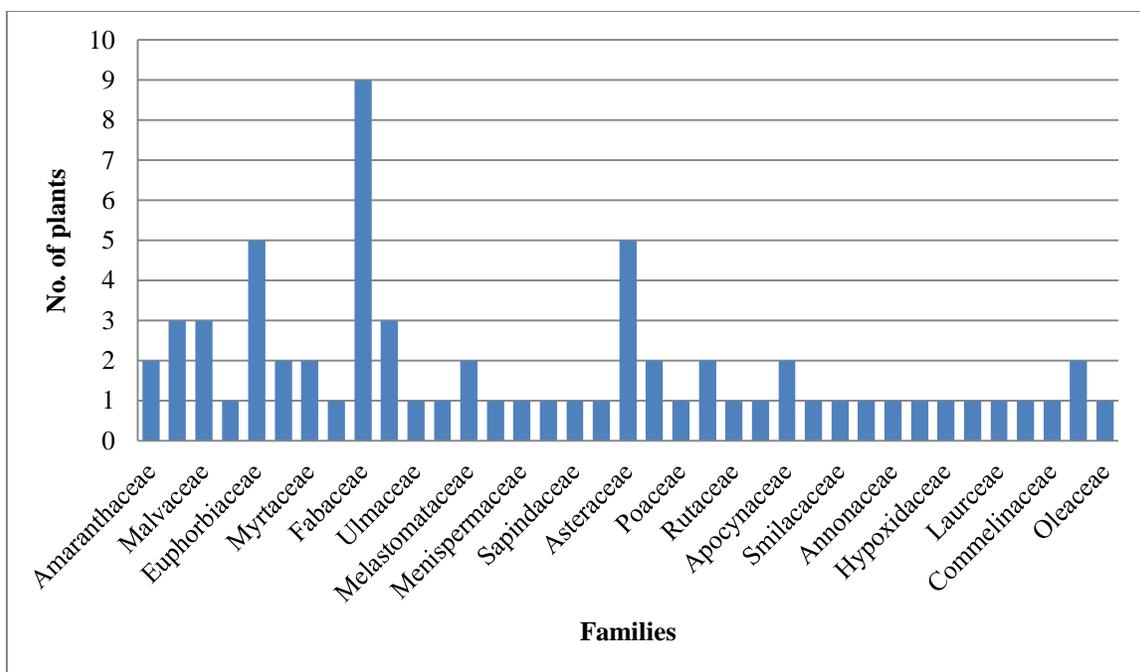


Fig: 4 Representation of families from the study areas

CONCLUSION

Documenting the indigenous knowledge through ethno botanical studies is important for the conservation and utilization of biological resources. Ethnobotanical survey has been found to be one of the reliable approaches in drug discovery. The present work is the result of an intensive and systematic survey of traditional knowledge and other economic values of the major plant species distribution in the laterite hills in Malappuarm district. Total 67 plant species were recorded after screening and these species were utilized by the local people for their potential home remedies and healthcare management of many diseases. Some of these diverse and unique herbal species were continuously exploited and threatened due to over exploration, pollution and climate change. Hence, there is an urgent need for their conservation before they get extinct. Sustainable management of existing endemic herbal resources is needed in that region.

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