ABSTRACT

As trees are the dominant biotic component of any forest ecosystem it plays an important role in the plant kingdom and greatest contributors of food, shelter, fuel, medicine along with a friendly environment for sustaining life on earth. The aim of the present study is to explore the medicinal tree wealth in Choolannur Pea Fowl Sanctuary, Kerala, India. Frequent field trips were made for the exploration and identification of tree species present in the deciduous forest of the sanctuary. It was observed that the nearby villagers of the study area have been using 45 plants belonging to 22 families as a remedy for various illnesses. The plant species used against different human ailments have been enumerated in the present paper and each species has been provided with botanical name followed by voucher number, family name, local name, plant part used and medicinal properties.

Keywords: Exploration and identification; forest ecosystem; medicinal tree wealth; Kerala; deciduous forest; plant species; human ailments.
1. INTRODUCTION

Medicinal plants are living and irreparable resources that is exhaustible if over used and sustainable if used with care and wisdom. The importance of medicinal plants is being mentioned since ancient time. Human beings were dependent on medicinal plants for their health problems since thousands of years. Medicinal plants used as remedies for human diseases contain chemical components of therapeutic value that produce physiological action on the human body [1]. Even after the induction of 200 years of modern system of medicine, about 90% people in rural India take the help of local health practitioners for the treatment of various diseases [2]. However, at present medicinal plants are looked upon not only as a source of health care but also as a source of income [3]. These plants generated commercial demand for pharmacopeial drugs and their products in India [4]. The knowledge of medicinal plants has been accumulated in the course of many centuries based on different medicinal systems such as Ayurveda, Unani and Siddha. In India, it is reported that traditional healers use 2,500 plant species and 100 plant species serve as regular sources of medicine [5]. Since herbal drugs obtained are safer in the treatment of various diseases [6,7], during the last few decades there is an increasing interest in the study of medicinal plants and their traditional use in different parts of the world [8].

Out of the 1200 species of plants used in this sector, 75% are collected from the forests. The Ayurvedic and Siddha pharmaceutical companies located in Kerala could meet 50% of the raw drags from the forest of Kerala. Among these medicinal plants, trees species are quite different and vulnerable. In India, many tree species have potential for multiple uses. The livelihood, economy and the sociocultural life of the tribal people are directly linked with forest trees. Apart from the therapeutic uses, trees provide various products like, wood, fodder, shelter, fibre, resin, oils and numerous other products used for subsistence and industrial purposes. Hence the medicinal value of these tree species is being veiled by other significant economic qualities. Therefore, many valuable species are becoming endangered due to overexploitation from wild [9] not only for getting medicines and for various other purposes. As a consequence, the study about status of wild tree species is crucial. This study was carried out to investigate the status of wild tree species of medicinal value in the forest of Choolannur Pea Fowl Sanctuary, Kerala, India along with their traditional uses.

![Fig. 1. Geographic location of the study area](image-url)
2. MATERIALS AND METHODS

Several field explorations were conducted in the deciduous forests of Choolannur Pea Fowl sanctuary. Ethnobotany- A Method Manual was followed as a general source of guidelines for the present study. Several literature pertaining to the districts, people, vegetation, forest types and flora were surveyed to gain a preliminary knowledge about the respective aspects. Interviews were conducted with traditional healers and local people of Choolannur regarding medicinal plant names and their uses during field visits. Information was learned from healers using semi-structured interviews with a questionnaire. Review of literature was carried out to interpret and analyse the data collected during the study. The information recorded in the field was compared with important works pertaining to Indian medicinal plants and ethnobotany such as, Uttarakhand Medicinal Plants Database [10], FRLHT Indian medicinal plants database [11] and Biodiversity documentation for Kerala, Part C: Flowering plants [12]. The voucher specimens collected are deposited in the Sir Syed College, Thaliparamba herbarium. The plants are enumerated alphabetically with their botanical name, voucher number, family, vernacular name, parts used and medicinal property.

3. RESULTS AND DISCUSSION

Since time immemorial, plants have been an indispensable source of medicines for humans [13] and constitute a major economic resource of most countries of the world. In the study area, the use of traditional medicine is widely accepted. This is evident from the number of plant species identified as medicinal. The use of trees instead of shrubs recorded high number of plants being used for traditional medicine and it could be as a result of their availability throughout the year. The parts of plants commonly used are the leaves and bark. This is due to the availability of these plant parts during the rainy and dry seasons [14,15]. It was observed that most of the plant species have multiple uses and was used in treating and curing different ailments which included wound healing, Skin diseases, fever, asthma, anti cancerous and ulcer among others [14] eg: Azadirachta indica A. Juss., Stereospermum colais (Buch.-Ham. ex Dillw.) Mabb. and Cassia fistula L. The medicinal use of plants leaves and roots in the management and treatment of diseases has been an age long practice [16].

The data obtained from the survey is compiled in table, where the plant species are arranged in alphabetical order. A total of 45 species belonging to 41 genera and 22 families have been reported for the treatment of human diseases. For each species scientific name, voucher number, family, local name, parts used, and medicinal property are provided. Among the 22 families recorded, the dominant families were Fabaceae and Moraceae with five species (11%), Apocynaceae, Combretaceae, Anacardiaceae and Rutaceae with 3 species each (7%). 2 species (4%) from Euphorbiaceae, Oleaceae, Burseraceae, Verbenaceae, Bignoniaceae, Sapindaceae and Loganiaceae are found to be medicinal species (Fig. 2). Of the 22 families, 9 represent single species each (2%). Bark was the most used (32%) part, followed by leaves (27%), fruits (17%), root (14%), seeds (6%), stem (3%), and whole plant (2%) in decreasing order (Fig. 3). The herbal preparations were in the form of juice, decoction, powder and paste. Even though, all the recorded medicinal plants are available in the study area, the occurrence of Strychnos potatorum L.f., Commiphora caudata (Wight & Am.) Engl. and Lannea coromandelica (Houtt.) Merr. are scarce.

Most of the species collected from the study area was traditionally used for gastrointestinal disorders. Around 17 species (37.8%) was in this category. Common among them are, Alstonia scholaris (L.) R. Br., Cassia fistula L., Diospyros melanoxylon Roxb., Ficus racemosa L., Garuga...
most significant plants from the study site were Pipal (Ficus racemosa L.), Wrightia tinctoria (Roxb.) R. Br., Tabernaemontana alternifolia L. and Azadirachta indica A. Juss. Among the 45 plants species having therapeutic potential, the most commonly used species for treatment of snakebite was Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guill. & Perr. with highest use value among practitioners followed by Chionanthus mala-elengi (Dennst.) and Streblus asper Lou. The findings of this study suggest that some medicinal plants are promising sources of several chemical constituents.

During the study it was observed that species like Phyllanthus emblica L., Tabernaemontana alternifolia L. and Wrightia tinctoria (Roxb.) R. Br., which were once plentiful in Choolannur sanctuary area are now becoming rare. This is due to lack of adequate knowledge regarding judicious exploitation of these plants. The reported species are wild except Santalum album L. which was planted by the Department of Forest in connection with social forestry. The most significant plants from the study site prescribed by the majority of the traditional medicinal practitioners were Terminalia cuneata Roth., Pongamia pinnata (L.) Pierre., Ficus racemosa L., Wrightia tinctoria (Roxb.) R. Br., Tabernaemontana alternifolia L. and Azadirachta indica A. Juss. Among the 45 plants species having therapeutic potential, the most commonly used species for treatment of snakebite was Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guill. & Perr. with highest use value among practitioners followed by Chionanthus mala-elengi (Dennst.) and Streblus asper Lou. The findings of this study suggest that some medicinal plants are promising sources of several chemical constituents.

In this connection, mass awareness among the local populace should be generated regarding conservation of the medicinal plants. The unprecedented interest and demand for plants with medicinal properties and potency for treatment of various ailments is causing over exploitation of such plant genetic resources in the study area. Many of these plants in the study area are threatened now due to constraints of population and natural hazards. Therefore, documentation of traditional knowledge is the only way out to preserve the plants of this area. The present finding is the first record of medico botanical knowledge in the study area. The information given in the present study will be helpful for the pharmacognosist, botanist and pharmacologist for the collection and identification of the plant for their research work. The survey may create awareness on the importance and conservation of medicinal plants among young budding botanists.

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**Fig. 2. Percentage distribution of families from the study area**
Table 1. Taxonomical and medicinal details of tree species recorded from the study area

| No | Botanical Name                      | Voucher No: | Family   | Vernacular name       | Parts Used | Therapeutic properties                                                                 |
|----|------------------------------------|-------------|----------|-----------------------|------------|----------------------------------------------------------------------------------------|
| 1  | *Acacia catechu* (L.f.) Willd.      | SSC4        | Fabaceae | Karingali, Kadiram, Cutch tree | Bark       | Astringent, cooling and digestive, beneficial in cough and diarrhea [17]                 |
| 2  | *Albizia amara* (Roxb.) Boivin.    | SSC12       | Fabaceae | Chalavagai, Nenmenivaka | Leaves     | Antioxidant [18]                                                                        |
| 3  | *Alstonia scholaris* (L.) R. Br.   | SSC14       | Apocynaceae | Daivappala, Ezhilamppala | Bark, leaves | Malaria, jaundice, gastrointestinal troubles, cancer, etc. [19]                       |
| 4  | *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr. | SSC16       | Combretaceae | Kalkanjiram, Korattykanjiram | Bark       | Diarrhea, dysuria, cough, colic, liver complaints, snake bite and skin diseases [10]   |
| 5  | *Antidesma ghaesembilla* Gaertn.   | SSC21       | Euphorbiaceae | Kattupulinchi, Poothuruval | Leaves     | Blood nourishment and headache [20]                                                    |
| 6  | *Artocarpus gomezianus* Wall. ex Trecul ssp. *zeylanicus* Jarrett. | SSC23       | Moraceae | Chima, Kattukadaplavu | Fruit      | Anti-inflammatory, antiviral, anticancer and anti-HIV properties [21]                   |
| 7  | *Azadirachta indica* A.Juss.       | SSC25       | Meliaceae | Ariyaveppu, Ayurveppu | Root, Stem, Leaves, Fruits | Anti-fungal, anti-aging, antibacterial, Anti-diabetic, anti-hypertensive, anti-inflammatory, antioxidant and antispasmodic [22] |
| 8  | *Careya arborea* Roxb.              | SSC28       | Lecythidaceae | Peru, Pezhu | Bark       | Tumours, bronchitis, epileptic fits and skin diseases [23]                               |
| 9  | *Chionanthus mala-elengi* (Dennst.) | SSC34       | Oleaceae | Kalidala, Mala-elengi | Whole plant | Used against snakebite[24]                                                             |
| 10 | *Cassia fistula* L.                | SSC48       | Fabaceae | Kanikonna, Konna | Root, Bark, Seeds, Leaves | Laxative, cathartic, emetic, astringent, tonic, febrifuge, purgative, asthma, skin diseases, leprosy, tuberculosis and syphilis [25] |
| 11 | *Comminphora caudata* (Wight & Arn.) Engl. | SSC49       | Burseraceae | Idinjil, Kilimaram | Leaves     | Anti-inflammatory [26]                                                                  |
| 12 | *Diospyros melanoxylon* Roxb.      | SSC59       | Ebenaceae | Beediylamaram Kari | Fruit      | Relieving flatulence and to check excessive bile secretion [27]                         |
| No | Botanical Name                  | Voucher No: | Family     | Vernacular name | Parts Used | Therapeutic properties                                                                 |
|----|--------------------------------|-------------|------------|-----------------|------------|----------------------------------------------------------------------------------------|
| 13 | *Ficus benghalensis* L.        | SSC64       | Moraceae   | Alamaram        | Bark, Leaves | Diabetes, impotency, leucorrhoea [28]                                                   |
| 14 | *Ficus callosa* Willd.         | SSC67       | Moraceae   | Kadaplavu       | Bark        | Antioxidant, radical scavenging activities [29]                                         |
| 15 | *Ficus racemosa* L.            | SSC71       | Moraceae   | Atthi, Atthi-al | Bark        | Skin and vaginal diseases and ulcers [30]                                               |
| 16 | *Garuga pinnata* Roxb.         | SSC72       | Burseraceae| Anakkara        | Leaves, Bark| Stomachic and expectorant and to cure diarrhea, opacities of the conjunctiva [31]       |
| 17 | *Gmelina arborea* Roxb.        | SSC80       | Verbenaceae| Kumizhanpazham  | Bark, Root  | Hallucination, fever, dyspepsia, hyperdipsia, haemorrhoids, stomachalalgia, heart diseases, nervous disorders, pities and burning sensation [32] |
| 18 | *Hydnocarpus pentandra* (Buch.-Ham.) Oken. | SSC82     | Flacouriaceae| Kotti, Maravetti Marotti | Seeds    | Leprosy, skin diseases, eczema, dermatitis, tubercular laryngitis, chronic ulcers, dyspepsia, flatulence and verminosis[30] |
| 19 | *Lannea coromandelica* (Houtt.) Merr. | SSC83     | Anacardiaceae| Karasu, Uthi    | Brk, Leaves | Astringent, impetigenous eruptions, leprous ulcers and obstinate ulcers, swelling and body pains[25] |
| 20 | *Melicope lunu-ankenda* (Gaertn.) Hartley. | SSC85    | Rutaceae   | Kambili Kanala | Leaves     | Hypertension, diabetes mellitus, fever, menstrual disorders, and as a tonic[33]         |
| 21 | *Morinda pubescens* J. E.      | SSC91       | Rubiaceae  | Manjanathi      | Fruit      | Antimicrobial, antifungal, wound healing, antidiabetic and hepatoprotective activities [34] |
| 22 | *Naringi crenulata* (Roxb.)   | SSC94       | Rutaceae   | Manmatham       | Root, Fruit | Purgative, sudorific, intestinal fermentation, small-pox, malignant and persisant fevers and epilepsy [25] |
| 23 | *Olea dioica* Roxb.            | SSC101      | Oleaceae   | Edana           | Bark, Leaves| Febrifuge and emetic [30]                                                               |
| No | Botanical Name                  | Voucher No: | Family       | Vernacular name               | Parts Used | Therapeutic properties                                                                                       |
|----|--------------------------------|-------------|--------------|-------------------------------|------------|-----------------------------------------------------------------------------------------------------------------|
| 24 | *Oroxylum indicum* (L.) Benth. | SSC102      | Bignoniaceae | Palakapayani Payyazhantha     | Roots      | Astringent, antiinflammatory, antihelminthic, antibrонchitic, antileucodermatic, antirheumatic, antianorexic and for treatment of leprosy [35] |
| 25 | *Persea macrantha* (Nees) Kosterm. | SSC104      | Lauraceae    | Kulamavu Kulirmavu            | Bark       | Asthma, rheumatism and ulcers [36,37]                                                                          |
| 26 | *Phyllanthus emblica* L.       | SSC107      | Euphorbiaceae| Amalakam Nelli                 | Fruit      | Memory enhancing, ophthalmic disorders, lowering cholesterol level, antioxidant, immunomodulatory, antipyretic and analgesic[38] |
| 27 | *Pongamia pinnata* (L.) Pierre. | SSC109      | Fabaceae     | Ungu, Pongu                   | Bark, Root | Ulcers, rheumatism, leucoderma and scabies[39]                                                              |
| 28 | *Premna tomentosa* Willd.      | SSC111      | Verbenaceae  | Kozhukkattathekku Naithekku    | Leaves     | Diarrhoea, hepatic disorders, stomach disorders, dog bites, anaemia, rheumatism, diuretic and anti-inflammatory [40] |
| 29 | *Pterocarpus marsupium* Roxb.  | SSC115      | Fabaceae     | Karavenga, Venga              | Bark, Wood | Anti diabetic, depurative, hemostatic, and rejuvenating, antiinflammatory, headache, antipyretic, anti- helminthic, aphrodisiac, alexetic, mental aberrations and ulcers [41] |
| 30 | *Santalum album* L.            | SSC117      | Santalaceae  | Chandanam                     | Stem       | Diarrhoea with bleeding, intrinsic haemorrhage, bleeding piles, vomiting, poisoning, hiccoughs, initial phase of pox, urticaria, eye infections and inflammation of umbilicus [42] |
| 31 | *Sapindus trifoliatus* L.      | SSC118      | Sapindaceae  | Urunjikai, Soapinkaimaram     | Fruits     | Skin problems like Eczema and Psoriasis, asthma, cough, expectorant, anti inflammatory,                           |
| No | Botanical Name                  | Voucher No: | Family         | Vernacular name | Parts Used | Therapeutic properties                                                                 |
|----|--------------------------------|-------------|----------------|-----------------|------------|----------------------------------------------------------------------------------------|
| 32 | Schleichera oleosa (Lour.) Oken. | SSC120      | Sapindaceae    | Poovanam        | Bark, Fruits | Astringent, anthelmintic and to treat menorrhea, malaria and dysentery [44,45]          |
| 33 | Semecarpus anacardium L. f.     | SSC121      | Anacardiaceae   | Cheru           | Fruit       | Antiinflammatory activity comparable to the reference standard aspirin [46]             |
| 34 | Spondias pinnata (L. f.) Kurz.  | SSC123      | Anacardiaceae   | Ambazham        | Bark        | Potent anthelmintic properties [47]                                                    |
| 35 | Sterculia guttata Roxb. ex DC.  | SSC125      | Sterculiaceae   | Aanathondimaram | Leaves      | Antiepileptic, Fever and diarrhea [48]                                                  |
| 36 | Stereospermum colais (Buch.-Ham. ex Dillw.) Mabb. | SSC127      | Bignoniaceae    | Pathiri         | Bark, Root  | Anodyne, antidiabetic, appetiser, constipating, diuretic, lithotropic, expectorant, cardio tonic, aphrodisiac, antiinflammatory, antibacterial, anti-cancer [49] |
| 37 | Streblus asper Lour.            | SSC130      | Moraceae        | Dindumaram      | Root, Bark  | Snake-bite, obesity, diarrhoea, dysentery, piles and epilepsy [50]                      |
| 38 | Strychnos nux-vomica L.         | SSC131      | Loganiaceae     | Kanjiram        | Seeds       | chronic dysentery, cholera, diabetes, emotional disorders, hysteria, epilepsy, intermittent fevers, gout, rheumatism, hydrophobia and insomnia [51] |
| 39 | Strychnos potatorum L.f.        | SSC134      | Loganiaceae     | Thettamaram     | Fruits, Root | Emetic, diaphoretic, astringent, leukeoderma, eye diseases, thirst, snake poisoning, hallucinations, aphrodisiac, tonic, diuretic and good for liver, kidney complaints [52] |
| 40 | Tabernaemontana alternifolia L. | SSC136      | Apocynaceae     | Kuruttupala     | Leaves, Bark| Venereal diseases, gonorrhoea, respiratory problems, nervous disorders, diabetes, chronic bronchitis, rheumatism, cardiotonic |
| No | Botanical Name                          | Voucher No: | Family       | Vernacular name           | Parts Used | Therapeutic properties                                                                 |
|----|----------------------------------------|-------------|--------------|---------------------------|------------|----------------------------------------------------------------------------------------|
| 41 | *Terminalia bellirica* (Gaertn.)       | SSC138      | Combretaceae | Thanni                    | Fruit      | Indigestion, acidity and to improve functions of stomach and intestine [28]             |
|    | Roxb.                                  |             |              | Thannikka                 |            | Hepatic, antibacterial, anthelmintic, antimicrobial, antitumoral, antioxidant, antiallergic, antifeedant, antifertility, anti-HIV activities, blood diseases, anemia, venereal and viral disease, fractures, ulcers [54] |
| 42 | *Terminalia cuneata* Roth.             | SSC139      | Combretaceae | Kulamaruthu               | Bark, Leaves | Dysentery, astringent, febrifuge, Bark tonic and aphrodisiac [25]                      |
|    |                                        |             |              | Neermaruthu               |            | Antidiabetic, anti-spasmodic, diuretic and anti-inflammatory activities [55]           |
| 43 | *Wrightia tinctoria* (Roxb.) R. Br.    | SSC140      | Apocynaceae  | Dhanthappala, Kotakappala | Bark, Seeds | Dressing materials to treat wounds [56]                                                |
| 44 | *Zanthoxylum rhetsa* (Roxb.) DC.       | SSC141      | Rutaceae     | Kothumurikku              | Bark       | Antidiabetic, anti-spasmodic, diuretic and anti-inflammatory activities [55]           |
| 45 | *Ziziphus mauritiana* Lam.             | SSC142      | Rhamnaceae   | Elentha, Jujuba, Ilantha  | Leaves     |                                                                                       |
Fig. 3. Percentage distribution of plant part used

Fig. 4. Graphical representation of medicinal properties of different species

4. CONCLUSION

The present study reveals the therapeutic potential of 45 plant species belonging to 22 families, in which family Fabaceae and genus Ficus appeared highly useful plant groups by local people in the study area. Highest number of medicinally useful plants from family Fabaceae has also been reported in other studies [57,58] and the importance of genus Ficus has also been mentioned by other authors [59]. The study witness tropical climate wherein barks of the trees are enormously used (32%) for their therapeutic
These medicinal plant species unfortunately due to their over exploitation there is a great danger of their extinction. Hence, effort must be taken to protect these species in this area by involving the local communities in preservation and conservation aspects.

CONSENT
It is not applicable.

ETHICAL APPROVAL
It is not applicable.

ACKNOWLEDGEMENT
We thankful to all the traditional healers and rural people of Choolannur in Palakkad district of Kerala state for sharing their valuable information on traditional knowledge of medicinal plants. We also thankful to Peechi wildlife division of Kerala State Forest and Wildlife Department for giving a permission to enter the sanctuary for plant exploration.

COMPETING INTERESTS
Authors have declared that no competing interests exist.

REFERENCES
1. Nostro A, Germano MP, Dangelo V, Cannatelli MA. Extraction methods and bioautography for evaluation of medicinal plant antimicrobial activity. Lett. Appl. Microbiol. 2000;30:379-384.
2. Yadav SS, Patil SH. Traditional medicines and health care system of tribes of Satpuda region, Maharashtra State. New Botanist. 2000;27(1):51-65.
3. Dwivedi SN, Dwivedi Sangeeta, Patel Prakash Chandra. Status and conservation of threatened medicinal herbs, In Indian folk medicine Ed. P. C. Jaipur: Trivedi, Pointer publication; 2007;313-314.
4. Dwivedi Sumeet. Development of Standardisation Parameters of Guizotia abyssinica (L.f.) Cass. with Special Reference to its Pharmacological Approaches. Ph.D Thesis Submitted to SGGVU, Jaipur; 2014.
5. Revathi P, Parmelazagan T. Traditional knowledge on medicinal plants by the Irula Tribes of Hasnur Hills, Erode District, Tamilnadu. Indian J Ethnoleaflets. 2010; 14:136-160.
6. Ayyanar M, Ignacimuthu S. Medicinal plants used by the tribals of Tirunelveli hills, Tamil Nadu to treat poisonous bites and skin diseases. Indian Journal of Traditional Knowledge. 2005;4:229-236.
7. Sathyavathi R, Janardhan KJ. Folklore medicinal practices of badaga community in Nilgiri biosphere reserve, Tamilnadu, India. International Journal of Pharma Research and Development. 2011;3(2):50-63.
8. Chellaiah Muthu, Muniappan Ayyanan, Nagappan Raja, Savarimuthu Ignacimuthu. Medicinal plants used by traditional healers in Kancheepuram district of Tamil Nadu, India. J Ethnobiol. Ethnomed. 2006;2:43.
9. Rao MR, Palada MC, Becker BN. Medicinal and aromatic plants in agroforestry systems. Agroforest. Syst. 2004;61:107-122.
10. Kumar A, Kumar R, Sharma M, Kumar U, Prasad Gajula MNV, Singh KP. Uttarakhand Medicinal Plants Database (UMPDB): A Platform for Exploring Genomic, Chemical, and Traditional Knowledge. 2018;3(1):7.
11. Ved DK, Sureshchandra ST, Barve V, Sri Nivas V, Sangeetha S, Ravikumar K, Kartikeyan R, Kulkarni V, Ajith S. Kumar et al. FRLHT's ENVIS Centre on Medicinal Plants, Bengaluru; 2016. Available:envis.frlht.org / frlhtenvis.nic.in
12. Sasidharan N. Biodiversity Documentation for Kerala Part 6: Flowering plants, Kerala: Forest Research Institute, Kerala, India; 2004;702.
13. Dery BB, Otsyina R. The 10 priority medicinal trees of Shinyanga, Tanzania. Agroforestry Today. 2000;12(1):910.
14. Ampitan TA. Ethnobotanical survey of medicinal plants in Biu local government area of Borno state, Nigeria. Journal of Herbs and Medicinal Plants. 2013;2(1):7-11.
15. Ugboogu OA, Akinyemi OD. Ethnobotany and conservation of Ribako Strict Natural Reserve in Northern Nigeria. J of Forestry Res. and Mgt. 2004;1(1,2);83-93.
16. Sofowara EA. Medicinal Plants and Traditional Medicines in Africa. Nigeria; 1982;64–79.
17. Devi VG, John A, Devi RS, Prabhakaran VA. Pharmacognostical studies on Acacia...
catechu Willd and identification of antioxidant principles. Int J Pharm Sci. 2011;3:108-111.

18. Rajkumar T, Satheesh Kumar E, Sinha BN. Evaluation of antioxidant properties of Albizia amara leaves. International Journal of Advance Pharmaceutical and Biological Sciences. 2012;2:99-106.

19. Nadkarni AK. Indian Materia Medica. Third ed. Mumbai, India: Popular Press Ltd; 1976;80–83.

20. Patil PC, Jadhav VB, Mahadkar SD. Pharmacognostical studies on leaf of Antidesma ghaesembilla Gaertn: A promising wild edible plant. Der Pharmacia Sinica. 2013;4(3):136-142.

21. Piyush Gautam, Ramesh Patel. Artocarpus lakoocha Roxb: An overview. European Journal of Complementary and Alternative Medicine. 2014;1(1):10-14.

22. Quraishi HA, Islam N, Iqbal A, Bhat SA, Ahmed J, Ashraf SS et al. Therapeutical and medicinal properties of Neem (Azadirachta indica) in context of Unani system of medicine: A review study. Journal of Drug Delivery and Therapeutics. 2018;8(6):394-399.

23. Gupta PC, Sharma N, Rao CV. Pharmacognostic studies of the leaves and stem of Careya arborea Roxb. Asian Pacific Journal of Tropical Biomedicine. 2012;2:404-408.

24. Saswat S Kumar, Bandana Padhan, Sharat K Palita, Debabrata Panda. Plants used against snakebite by tribal people of Koraput district of Odisha, India. Journal of Medicinal Plants Studies. 2016;4(4):38-42.

25. Ali MA. Cassia fistula Linn: A review of phytochemical and pharmaceutical studies. Int J Pharm Sci Res. 2014;5(6):2125-30.

26. Selvamani P, Latha S, Dhiya PS. Anti-inflammatory activity of extracts of Commiphora species and its polyherbal formulation. International Journal of Phytopharmacology. 2013;4(5):288-292.

27. Patrakar R, Ghiwire N B. Review on phytochemical and pharmacological aspects of Diospyros melanoxylon. Int J Innov Pharm Sci Res. 2017;5:64-73.

28. Kadavul K, Dixit AK. Ethnomedicinal studies of the woody species of Kalrayan & Shervarayan Hills, Eastern Ghats, Tamil Nadu. Indian Journal of Traditional Knowledge. 2009;8(4):592-597.

29. Van Kiem P, Cuong NX, Nhiem NX, Hang DTT, Nam NH, Ban NK et al. Chemical constituents and anti oxidant activity of Ficus callosa. Natural Product Communications. 2011;6(2):159-162.

30. Deepa MR, Sheema Dharmapal P, Udayan PS. Floristic diversities and medicinal importance of selected sacred groves in Thrissur district, Kerala. Tropical Plant Research. 2016;3(1):230–242.

31. Mohammad Rahman, Bilkis S, Begum Rasheduzzamman, Chowdhury Khondaker, Rahman M. Preliminary Cytotoxicity Screening of Some Medicinal Plants of Bangladesh. J Pharm. Sci. 2008;7:47-52.

32. Kumari Sangeeta, Singh DC, Khatoon Safina. A Precious Herb –Gmelina Arborea Linn. Its Medicinal Uses and Pharmacological Activity. International Journal of Ayurveda and Pharma Research. 2017;5(5):47-53.

33. Eliaser ME, Hui Ho J, Hashim NM, Rukayadi Y, Lian Ee GC, Abdul Razis AF. Phytochemical constituents and biological activities of Melicope lunu-ankenda. Molecules. 2018;23:2708.

34. Surendiran G. Antimicrobial and wound healing activity of Morinda tinctoria [M.Sc. Thesis]; University of Madras, Chennai, India; 2004.

35. Deka DC, Vimal Kumar, Chandan Prasad, Kamal Kumar, Gogoi BJ, Lokendra Singh, Srivastava RB. Oroxylum indicum– a medicinal plant of North East India: An overview of its nutritional, remedial, and prophylactic properties. Journal of Applied Pharmaceutical Science. 2013;3(1):S104-S112.

36. Kumar RS, Surana SS. Machilus macrantha Nees: A comprehensive review. Biosciences International. 2014;3(1):06-09.

37. Nadkarni KM. Indian Materia Medica. Vol. I. Mumbai: Popular Prakashan. 2000;759.

38. Khan KH. Roles of Emblica officinalis in medicine - A review. Bot Res Int. 2009; 2:218-218.

39. Prasad G, Reshmi MV. A Manual of Medicinal Trees. India: Agrobios; 2003.

40. Devi KP, Sreepriya M, Balakrishna K, Devaki T. Protective effect of Premna tormentosa extract (Verbenaceae) on membrane-bound phosphatases and inorganic cations transport in acetaminophen-induced hepatotoxicity rats. Journal of Ethnopharmacology. 2004; 93:371-375.

41. Dhayaney V, Sibi G. Pterocarpus Marsupium for the Treatment of Diabetes
and Other Disorders. J Complement Med Alt Healthcare. 2019;9(1):555754.
42. Rakesh Kumar, Nishat Anjum, YC. Tripathi. Phytochemistry and pharmacology of Santalum album I.: A review. World Journal of Pharmaceutical Research. 2015;4(10):1842-1876.
43. Meena Devi VN, Rajakohila M, Arul Mary Syndia L, Nagendra Prasad P, Arirahan VN. Multifaceted Uses of Soapnut Tree – A Mini Review. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2012;3(1):420.
44. Meshram N, Ojha M, Singh A, Alexander A, Sharma M. Significance and Traditional Medicinal Properties of Schleicher oleosa. Asian J Pharm Res. 2015;5(1):61–4. 12.
45. Prasad B, Subedi L. Medicinal Plant Diversity and their Pharmacological Aspects of Nepal Himalayas. Pharmacognosnays J. 2011;3(25):6–17.
46. Bhitre MJ, Patil S, Kataria M, Anwikar S, Kadri H. Antiinflammatory activity of the fruits of Semecarpus anacardium Linn. Asian J Chem. 2008;20:2047–50.
47. Panda BK, Patro VJ, Mishra US, Panigrahi BK. Comparative study of antihelmintic activity between acetone and ethanolic stem bark extracts of Spondias pinnata (Linn. F) Kurz. International Journal of Research in Ayurveda and Pharmacy. 2011;2(4):1383-1385.
48. Vikas Jogpal, Jyoti Gupta, Tarun Virmani. Investigation of antiepileptic property of Sterculia guttata leaves. Int. Res. J. Pharm. 2019;10(8):96-101.
49. Vijaya bharathi R, Jayasheere N, Kumudhavenu B, Thirumal M, Kishore G. Anti-diabetic Activity of Stereospernum colais (Bignoniaceae) Leaf Extracts. Int. J. Res. Pharm. Sci. 2012;3(4):657-660.
50. Prakash Sanjay. A review on chemical and pharmacological profiles of shakhotaka (Streblus asper lour.) Anveshana Ayurveda Medical Journal. 2015;1(4).
51. Kushwaha RK, Berval R, Sharma A. The therapeutic and toxicological effect of kupili (Styrchnos nux-vomica L.-)-A review. Ayushdhara. 2014;1:1-4.
52. Alwe JR, Alwe RS. Pharmacognostic Study of Styrchnos Potatorum Linn - A Review. International Ayurvedic Medical Journal. 2016;4(07).
53. Nachiket P Marathe, Mandar H Rasane, Himanshu Kumar, Ankur A Patwardhan, Yogesh S Shouche, Sham S Diwanay. In vitro antibacterial activity of Tabernaemontana alternifolia [Roxb] stem bark aqueous extract against clinical isolates of methicillin resistant Staphylococcus aureus. Ann Clin Microbiol Antimicrob. 2013;12:26.
54. Bachaya HA, Iqbal Z, Khan MN, Jabbar A, Gilani AH, Din IU. In vitro and in vivo anthelmintic activity of Terminalia arjuna bark. Int J Agric Biol. 2009;11:273–278.
55. Pai V, Savadi RV, Bhandarkar A. Pharmacognostic and phytochemical investigation of stem bark of Zanthoxylum rhetsa. Pharmacog J. 2009;1:33–36.
56. Bashir A, Ibrar K, Shumaila B, Sadiq A, Farrukh H. Screening of Zizyphus jujuba for antibacterial, phytotoxic and haemagglutination activities. Afr. J. Biotech. 2011;10 (13):2514-2519.
57. Hawkes JG. The origins of agriculture. Econ. Bot. 1970;24:131-133.
58. Purugganan MD, Fuller DQ. The nature of selection during plant domestication. Nature. 2009;457:843-848.
59. Cottee-Jone HEW, Bajpai O, Chaudhary LB, Whittaker RJ. Isolated Ficus trees deliver dual conservation and development benefits in a rural landscape. Ambio. 2015; 44:678-684.
60. Zschocke S, Rabe T, Taylor JLS, Jager AK, Van Staden J. Plant part substitution-a way to conserve endangered medicinal plants? J. Ethnopharmacol. 2000;71:281-292.

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