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Ethno-floristic survey in sacred groves, Pudukottai district, Tamil Nadu- India

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Sacred groves serve as the conservation pockets of local biodiversity, medicinally and economically important plants for future uses. Ethnobotanically (Medicinal value), these areas remain unexplored and no comprehensive account on local traditional knowledge is available. In order to explore the medical values of the sacred groves an ethno-floristic survey in sacred groves was done to identify medicinal plants used by folklore and rural communities in Pudukottai District, Tamil Nadu. The Result revealed with a total of 89 species of medicinal plants belonging to 51 families. Fabaceae was dominant family with 5 species followed by Mimosaceae, Apocynaceae, Lamiaceae, Caesalpiniaceae and Solanaceae families with 4 species each. Among these, 6 species are used to treat Eczema, 3 species to cure cut and wounds, 2 species to cure Hepatitis, 2 species are used in treatment of Jaundice and one species (*Azadirachta indica*) for curing mumps. Apart from these species, several other species are known to be used in various treatments like healing wounds, throat infection, diarrhea, itches, skin diseases, cure headache, stomach ulcer, tumor, ear-ache, eye pain, diabetes, colds and coughs in general. Sacred groves remain unexplored and no comprehensive studies in ethno-botanical issues, so the conservation of medicinal plants diversity of these groves is therefore most important.

Key words: Ethno medicine, medical plants, folk medicine, sacred groves, indigenous knowledge, Pudukottai.

INTRODUCTION

Over three-quarters of the world population relies mainly on plants and plant extracts for health care. India is one of the leading countries in Asia in terms of the wealth of traditional knowledge systems related to the use of plant species and has an concept of using plants for medicinal purpose was been from very ancient period started before 2500 and 500 BC. Indian subcontinent is a vast repository of medicinal plants that are used in traditional medical treatments, around 20,000 medicinal plants have been recorded (Dev, 1997), but only 7,000 - 7,500 plants are being used by traditional communities for curing different diseases (Perumal Samy and Ignacimuthu, 1998, 2000; Kamboj 2000). The medicinal plants are listed in various indigenous medicinal systems such as *Siddha* (600 species), *Ayurveda* (700 species), *Amchi*

(600 species) and *Unani* (700 species) (Rabe and Staden 1997). Major pharmaceutical industries depend on the plant products for the preparation of medicines (Anbarashan and Padmavathy, 2010).

In last century, roughly 121 pharmaceutical products have been discovered, based on the information obtained from the traditional healers. Indias indigenous population can be given better access to efficacious drug treatment and improved health status (Manandhar, 1985, 1987). Currently 80% of the world population depends on plant-derived medicine for the first line of primary health care for human alleviation because it has no side effects and safe (Azaizeh et al., 2003).

In South India especially in Tamil Nadu, the local rural people have an indigenous old tradition of preserving small patches of old growth forests as a part of their culture and religious belief, these forests are called as Sacred Groves, locally as "Kovil kadugal", they are rich in biodiversity (Sukumaran, 2002; Anbarashan and

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Padmavathy, 2010). They are composed of several floras with medicinal, rare, endemic, threatened, timber and fuel wood yielding plants (Sukumaran and Raj, 2007; Sukumaran et al., 2007a). About 60% of the plants present in groves are medicinal, of which merely 28% serves as folk medicines. Sacred groves serve as the conservation pockets of local biodiversity, medicinally and economically important plants for future uses (Sukumaran et al., 2006, 2007b). Recently, these forests are under threat due to various human developmental activities, thus made the wild entobotanical species to decline in these areas. Ethnobotanically, these areas remain unexplored and no comprehensive account of local tradition is available (Anbarashan and Padmavathy, 2010). In order to explore the uniqueness and importance value of medical plants, as well as to bring attention of the worldwide conservationist, this survey was conducted.

METHODS

Pudukottai district covers an area of 4663 km² which has a coast line of 39 km. It located between 78.25' and 79.15' of the East of Longitude and between 9.50' and 10.40' of the North of Latitude. Various types of soil like red loamy, coastal alluvium, delta alluvium, red late rite, deep black and red sandy are found in this region. The mean annual rain fall was 1,033 mm and the dry season lasts for six months (January to June), and receives less than 60mm rainfall on monthly average. The mean annual maximum and minimum temperature is 33.4 and 25.4°C. The floristic vegetation of the sacred groves stands as a typical tropical dry evergreen forests.

Periodic ethno-floristic field surveys were carried out in sacred groves, Pudukottai, Tamilnadu during June 2009 to January 2010. The local people with indigenous knowledge on medicinal plants were contacted through frequent field visits in various villages of Pudukottai, with the help of village head and local traders. The information was collected by group discussions and interviews with them in their local language (Tamil). Each of the plant material was assigned a field note books and documented as to Binomials with family, local name, part used and therapeutic uses, plant parts that were identified as having use in ethno-botany were collected and identified by referring to standard flora (Hooker, 1884; Gamble, 1936; Henry et al., 1987; Matthew, 1983). All the voucher specimens were maintained in the herbarium at Pondicherry University Puducherry (India).

RESULTS AND DISCUSSION

Eighty-nine plants belonging to 51 families are identified as traditional folklore medicinally used species. Fabaceae was found to be dominant family with 5 species followed by Mimosaceae, Apocynaceae, Lamiaceae, Caesalpiniaceae and Solanaceae families with 4 species each. Six families represented by 2 species and 33 families represented by single species. Plants are enumerated with botanical names; family, local names (Tamil) and uses of different plant part in various ailments are given below:

1. *Albizia lebbbeck* (L.) Benth, Mimosaceae, Vagai. A leaf paste is applied to cure eczema.
2. *Aegle marmelos* Corr.ex. Roxb., Rutaceae, Vilvam. A Leaf paste is applied topically to heal wounds. The dried and powdered leaves are used for diabetes.
3. *Alstonia venenata* (R.Br). Apocynaceae, Paalai. The milky latex is used to heal wounds and cuts.
4. *Allium cepa* L., Alliaceae, Vengayum. Juice thus obtained from the bulbs is applied topically on the cuts and wounds until cure.
5. *Ammannia baccifera* L., Lythraceae, Neermalneruppu. A leaf paste is applied to relieve swelling.
6. *Anisomeles malabarica* (L.) R. Br. ex Sims., Lamiaceae, Peithumbai. A paste of the leaves is applied to cure eczema.
7. *Annona squamosa* L. Annonaceae, Sitapali. The young fruits are dried and made into a powder. A spoonful of this powder, mixed with water, is taken internally to cure dysentery.
8. *Argemone mexicana* L. Papaveraceae, Narimirati. The yellow latex is used to cure ulcers of the lips, pimples and for wound healing.
9. *Aristolochia bracteolata* Lam., Aristolochiaceae, Aduthinna palai. Fresh leaves are ground in to a paste and mixed with butter milk and applied topically on the itches and rashes until cure.
10. *Andrographis paniculata* (Burm.f.) Wallich ex Nees. Acanthaceae, Nilavaambu. A handful of leaves is taken and an extract is made, which, mixed with milk, is taken internally to cure snakebites.
11. *Abrus precatorius* L. Fabaceae, Kundumani. A paste of the seeds is used to cure eczema.
12. *Aloe vera* (Linn.) Burm. Agavaceae, Sotru katrazhai. Fresh juice is used as cathartic and for cooling. It is also used in treating fever eye infections and ulcer.
13. *Achyranthes aspera* L. Amaranthaceae, Naayuruvi. The boiled leaves are consumed to relieve internal piles and the roots are used as a brush to relieve pain and clean the teeth.
14. *Acalypha indica* L. Euphorbiaceae, Kuppaimeni. A leaf paste, mixed with common salt, is used to cure eczema and chest pain.
15. *Alternanthera sessilis* L. Amaranthaceae, Ponnanganni. It is used as a treatment for headache. It is also used to treat hepatitis and asthma.
16. *Azadirachta indica* (A.Juss). Meliaceae, Vembu. Seed oil is used in skin diseases and in lice. Bark is useful in malarial fever. Tender twigs are used as tooth brush. Leaf paste applied for mumps.
17. *Acacia catechu* (Linnf.) Willd(Khair). Mimosaceae, Karunkali. The bark of the tree is used in chronic diarrhea.
18. *Bambusa arundinacea* (Willd). Poaceae, Moongil. Young leaves and terminal bud of bamboo along with turmeric and the leaves. Aloe Vera is ground and the paste is applied to the fractured bones for two weeks to join quickly.

19. *Calophyllum inophyllum* L. Clusiaceae, Punni, Seed oil applied externally in rheumatism and skin affections. A decoction of it employed for indolent ulcers. Bark juice used as a purgative.
20. *Cassia auriculata* L. Caesalpiniaceae, Aavaram. Dried and powdered flowers are used for cleaning the hair, reducing body heat and cures diabetes.
21. *Citrus aurantifolia* (Christm.) Swingle, Rutaceae, Elumicchai. Juice of the fruit with few drops of pure honey is administered orally to get rid of throat infection.
22. *Cynodon dactylon* (L.) Pers. Cyperaceae, Arugampul. The juice of the whole plant is used to reduce body heat and to lower the blood pressure.
23. *Catharanthus roseus* G. Don. Apocynaceae, Nithya kalyani. Whole plant is powdered and mixed with cow's milk and taken orally to treat diabetes.
24. *Cissus quadrangularis* L. Vitaceae, Pirandai. A paste of the whole plant is taken for improving the digestion and inducing appetite.
25. *Caesalpinia pulcherrima* (L.) S. W. Caesalpiniaceae, Maikondrai. A seed paste is applied to cure toothache.
26. *Cardiospermum halicacabum* L. Sapindaceae, Mudakathan. A leaf paste is applied for joint pain or leaves are prepared in the form of a soup and consumed to cure rheumatic pains.
27. *Centella asiatica* L. Apiaceae, Vallarai. The dried plant is powdered and this powder, mixed with hot water, is taken for gas troubles; the dried plants are used in the diet of children for improving their memory.
28. *Cataranthus pusillus* (Murr). Apocynaceae, Mukkuthipoo. A leaf paste is applied externally for tumors.
29. *Caesalpinia bonducella* (Flem). Caesalpiniaceae, Kalakai. A decoction of the leaf is used as nutritional tonic.
30. *Calotropis gigantea* (L.) R. Br. Asclepidaceae, Erukku. Milky latex is applied on the wounds on legs of livestock.
31. *Clitoria ternatea* L. Fabaceae, Sangupushpam. Root powder is mixed with water and taken orally to treat indigestion, eye diseases and headache.
32. *Carica papaya* L. Caricaceae, Pappali. The milky latex of the plant is applied to teeth in order to relieve inflammatory pain.
33. *Coccinia grandis* (L.) J. Voigt, Cucurbitaceae, Kovai. The leaf extract, mixed with milk, is used in cases of jaundice.
34. *Datura metel* L. Solanaceae, Oomathai. Few drops of leaf juice is poured into ear to treat earache.
35. *Dioscorea oppositifolia* L. Dioscoreaceae, Vallikizhangu. Boiled root tubers are taken orally to reduce body heat.
36. *Euphorbia hirta* L. Euphorbiaceae, Amman patcharisi. Leaf paste mixed with goat's milk is consumed to stop diarrhea and dysentery.
37. *Enicostemma littorale* Blume, Gentianaceae, Vellarugu. Powder of the shade dried leaves is mixed with hot water and taken orally to cure itches.
38. *Eclipta prostrata* L. Asteraceae, Manjal karisalanganni. A leaf extract is applied to the head to relieve dandruff and to blacken gray hair.
39. *Eclipta alba* L. Asteraceae, Karisalaanganni. Plant is used for the treatment of hepatitis.
40. *Eucalyptus tereticornis* (Smith) Myrtaceae, Thylamaram. The vapours of boiled leaves are inhaled for coughs and a cold. The oil from the plant, mixed with coconut oil, is applied to the chest to relieve a dry cough and chest pain.
41. *Erythrina indica* (Lam). Papilionaceae, Kalyana murungai. The leaves and flowers, are used to cure epidemic skin diseases.
42. *Ficus benghalensis* L. Moraceae, Aalamaram. Stem latex is applied topically on heel cracks.
43. *Ficus religiosa* L. Moraceae, Arasamaram. The intake of dried leaf powder (mixed with water) helps to get relief from body pain.
44. *Ferula asafoetida* H. Karst., Apiaceae, Perungayam. Asafoetida and dried ginger are mixed and ground in to a paste with water. The paste thus obtained is applied externally on the swellings to get relieve from pain.
45. *Gymnema sylvestre* (Retz). Asclepiadaceae, Sirukurinjan. Leaves dried in shade and powdered are taken for Diabetes to reduce Blood sugar.
46. *Gloriosa superba* L. Liliaceae, Kanthal malar. The pasted tubers are used as an abortifacient. Leaves are used to destroy head lice.
47. *Hemidesmus indicus* (R. Br). Apocynaceae, Nannari. The leaf, root extract is used for blood purification.
48. *Hibiscus rosa-sinensis* L. Malvaceae, Sembaruthi. Shade dried and powdered flowers are used for cleaning the hair and to prevent hair loss.
49. *Heliotropium indicum* L., Boraginaceae, Thel kodukku. Juice thus obtained from the fresh leaves is poured in to the eyes to get rid of from irritation.
50. *Ichnocarpus frutescens* (L.) R.Br., Apocynaceae, Udarkodi. Latex of the plant is applied topically on painful tumors to reduce pain and retard growth.
51. *Ixora coccinea* L. Rubiaceae. Hundred grams of the dried flowers are boiled in coconut oil and the oil extract is applied externally twice a day to treat eczema.
52. *Jasminum angustifolium* (L). Wild Oleaceae, Kattumalli. Leaves and flowers made into a paste and applied externally to remove the clot of breast milk.
53. *Lawsonia inermis* L. Lythraceae, Maruthani. A leaf paste is applied to cracks of the feet it also has a cooling effect on the body.
54. *Leonotis nepetaefolia* (L.) R. Br. Lamiaceae, Theanthumpai. A leaf paste is used for eczema.
55. *Leucas aspera* (Willd). Lamiaceae, Thumbai. The vapours from the boiled leaves are inhaled to relieve coughing and colds.
56. *Marsilea minuta* L. Marsileaceae, Aarakkerai. The dried and powdered leaves, mixed with hot water, are taken in cases of diabetes.

57. *Mimosa pudica* L. Mimosaceae, Thottarsinungi. Pinch of leaves paste is applied topically to cuts and wounds.
58. *Mukia maderaspatana* (L.) M. Roemer. Cucurbitaceae, Mususukai. The leaf extract is taken internally to cure piles; it is applied to the hair of the head to blacken gray hair.
59. *Morinda tinctoria* Roxb. Rubiaceae, Nuna. The leaf extract is used to cure dysentery.
60. *Moringa oleifera* Lam. Moringaceae, Murungai. The boiled leaves and flowers are eaten to increase fertility in men. A handful of bark juice of the plant is used to cure stomach pain.
61. *Musa paradisiaca* L. Musaceae, Vazhai. A plant extract is given for snake bite and also for burns.
62. *Mangifera indica* L. Anacardiaceae, Mamaram. Mixture of ¼ of the seed ground with cow's milk is taken to arrest excess bleeding during menses.
63. *Mimusops elengi* L., Sapotaceae, Sapota. Leaves are boiled with water and the decoction thus obtained is used as a cleansing agent for mouth to cure diseases of the gums and teeth.
64. *Murraya koenigii* L. Sprengel Rutaceae, Karu veppilai. Juice of tender leaves is taken orally to arrest vomiting.
65. *Momordica charantia* L. Cucurbitaceae, Paavakai. The fruit, seeds, vines and leaves are used for gastroenteritis, diabetes, tumors and some viral infection cures.
66. *Melia azadirarachta* L. Meliaceae, Malaivembu. The juice of the bark is taken internally in the early morning for three days in order to relieve stomach pain; it is also employed as an anti-helminthic.
67. *Myristica fragrans* Houtt., Myristicaceae, Jathikaai. The dried fruit is ground into powder and mixed with castor oil and administered orally to cure stomach ulcer.
68. *Nerium oleander* (Sol). Apocynaceae, Arali. Juice prepared from the stem bark is boiled with gingerly oil and two drops are poured into ear to treat ear pain.
69. *Opuntia dillenii* (Haw). Cactaceae, sappathikalli. Fruits edible used in whooping cough. Pulp also applied in ophthalmic and control spasmodic cough and expectoration.
70. *Ocimum canum Sims*, Lamiaceae, Naaithulasi. Leaf juice is taken for stomach upset.
71. *Pandanus odoratissimus* L.f., Pandanaceae, Thaazhai. Few drops of juice thus obtained from the fresh leaves are poured in to the ear to get relief from earache.
72. *Piper nigrum* L., Piperaceae, Milagu. Dried fruits are made into powder and applied topically on the fresh cuts and wounds until cure.
73. *Prosopis cinearia* L. Mimosaceae, Vanni maram. The plant flower is pounded, mixed with sugar and used during pregnancy as safeguard against miscarriage. The bark is used as a remedy for rheumatism, in cough cold, asthma. The bark is prescribed for scorpion sting.
74. *Pongamia pinnata* L. Fabaceae, Pongam. The seed oil is used to cure rheumatic pains and swellings.
75. *Phyllanthus amarus* Schum. and Thonn. Euphorbiaceae, keezhanelli. Leaf juice is administered to cure fever and jaundice.
76. *Polycarpaea corymbosa* L. Caryophyllaceae, Malligaimottuchedi. Roots, leaves paste is applied externally on wounds and cuts.
77. *Psidium guajava* L., Myrtaceae, Koyya maram. Young leaf buds are ground into a paste and mixed with hot water. The mixture thus obtained is administered orally to cure diarrhea.
78. *Sesbania grandiflora* (L.) Poir., Fabaceae, Agatthi. Juice of fresh leaves is mixed with coconut milk and the mixture thus obtained is applied topically on skin diseases until cure.
79. *Solanum torvum* Sw., Solanaceae, Sundai-kaai. Powder thus obtained from the shade dried leaves is mixed with hot water or cow's milk and administered orally to get relief from cold and cough.
80. *Solanum trilobatum* L. Solanaceae, Thoothuvalai. The leaf juice is used to treat cough and cold.
81. *Solanum nigrum* L. Solanaceae, Manathakkali. The leaf and fruit extract is used for de-worming and treating fever.
82. *Syzygium cumini* L. Myrtaceae, Naaval. The dried and powdered seeds, mixed with hot water are taken for reducing the Blood sugar level.
83. *Sida cordata*, (Burm. f.) Borssum. Malvaceae, Thuthi. The leaf juice is effective in treating diarrhoea during pregnancy. The pounded leaves are applied locally to relieve cuts and bruises.
84. *Tamarindus indica* L. Caesalpiniaceae, Puliyamaram. A paste of the seed coat is applied to a scorpion bite to relieve pain or the scratched seed is placed in a warm condition on the area of a scorpion bite to relieve pain.
85. *Thespesia populnea* (L.) Malvaceae, Poovarasu. Tender fruit mixed with castor oil and made in to a paste applied externally for skin disease.
86. *Vitex negundo* L. Verbenaceae, Notchi. Inhale boiled leaves vapour to relieve headache.
87. *Trigonella foenum-graecum* L., Fabaceae, Vendhayum. Powder thus obtained from the seeds is mixed with pepper and rhizome of *Acorus calamus* and boiled with sesame oil. The mixture thus obtained is applied topically on the head to get rid of human louse.
88. *Tinospora cordifolia* Miers., Menispermaceae, Seenthil kodi. Shade dried leaves are ground into powder and mixed with hot water and the mixture is taken orally in the treatment of diabetes.
89. *Zingiber roseum* (Rosc). Zingiberaceae, Inji. The juice of the rhizome, mixed with honey, is taken internally to improve digestion and to relieve giddiness.

The most common method of preparing medicines is decoction followed by paste and juice. It was also recorded that some plants used as a medicine in this region are not used elsewhere in the country. *Cynodon*

dactylon, *Acalypha indica*, *Aegle marmelos* and *Anisomales malabarica* are rarely used in other parts of country (Sukumaran et al., 2010) and these species are commonly used in the present investigation. Species like *Albizia lebbek*, *Anisomales malabarica*, *Abrus precatorius*, *Acalypha indica*, *Ixora coccinea*, *Leonatis nepetaefolia* are used to cure Eczema. *Mimosa pudica* L., *Argemone mexicana* L., *Alstonia venenata* (R.Br). are used to cure cut and wounds. *Alternanthera sessilis* and *Eclipta alba* are used to cure Hepatitis. *Phyllanthus amarus* and *Coccinia grandis* are used in treatment of Jaundice and *Azadirachta indica* for curing mumps. Several other plants were used for healing wounds, throat infection, diarrhea, itches, wounds and skin diseases, cure head-ache, stomach ulcer, tumor, ear-ache, eye pain, diabetes, cold and cough. The Therapeutic use of *Anisomales malabarica*, *Cardiospermum halicacabum* and *Cissus quadrangularis* reported from this district resembles previous reports (Sukumaran and Raj, 2010). Indigenous knowledge of folk is the important source of locating bio-resources of that locality. However people of the modern generation learn from their ancestors on the basis of keen observation only. The people have been using plant remedies against various ailments from time immemorial without knowing their effective constituents (Sukumaran and Raj, 2010; Anbarashan and Padmavathy, 2010).

Major issues like consistently increasing human habitation surrounding the sacred grove areas, poverty, illiteracy among large sector of the population, continuous area shrinking, over exploitation, site degradation and land conservation are to be considered while assessing the conservation significance of each scared grove sites (Anbarashan and Padmavathy, 2010). Fortunately scared grove sites help to preserve the biodiversity along with cultural values and religious taboos. Local people conserve the forests through a strict code of conduct on religious beliefs for several generations without any local administration and clearly defined management policy will make any minimal resources extraction (Parthasarathy et al., 2007). Cultural transformation, eroding cultural values and both view about nature especially among young generation has made this traditional management worse (Chandran et al., 1997) in many scared groves.

Conclusion

The local traditional folklore medical knowledge information was the basic source for preliminary selection of medicinal valued plants, so the conservation of medicinal plants diversity of these groves is therefore most important for the management and sustainable development in these fragile ecological and life support systems.

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