Wild edible plants of the sacred groves of the foothills of southern Western Ghats

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Abstract **-** The South Western Ghats are blessed with rich vegetation which comprises of ethnobotanical and economically important plants.Ethnobotanical survey was conducted in 48 tribal settlements; the field survey was carried out during the years 2018-2020 among the *Kanis* residing in and around the Kanniyakumari Wildlife Sanctuary, southern Western Ghats.The investigation revealed that a total of 50 wild edible fruit plants belonging to 31 families and 41 genera were found to be used as food by the inhabitants of the study area.Among the 50 species of edible plants collected from this area 49 species belong to Angiosperm and one species is Gymnosperm. Nineteen species of edible plants are eaten raw or ripe and 31 plants are cooked food. Results of the present study revealed that the wild edible plants of the sacred groves of the foothills of southern Western Ghats are used as supplementary, seasonal or survival food sources of *Kanis*, and hence play a role in combating food insecurity.

Keywords: Edible plants; Ethnobotanical survey; Food security; Sacred groves

INTRODUCTION

The South Western Ghats are blessed with rich vegetation which comprises of ethnobotanical and economically important plants.An organism of the vegetable kingdom suitable by nature for use as a food, especially by human beings. Not all parts of any given plant are edible but all parts of edible plants have been known to figure as raw or cooked food: leaves, roots,tubers,stems,seeds,buds, fruits and flowers. The most commonly edible parts of plants are fruit, usually sweet, fleshy, and succulent. Many edible plants are commonly cultivated for their nutritional value and referred to as vegetables.

Food and nutritional security are the key issues in developing countries due to insufficiency and poor access to food (Adebooye and Phillips, 2006; Andersen *et al*., 2003; Bhatt *et al*., 2017; Toledo and Burlingame, 2006). Globally, ethnobotanical surveys on underutilized, wild and non-cultivated plants indicate that more than 7000 species have been used for human food (Grivetti and Ogle, 2000). Likewise, 1069 species of wild fungi consumed worldwide are important sources of protein and income in rural areas (Boa, 2004). Conservation and sustainable use of biodiversity has traditionally been recognized as a key step to combat hunger and malnutrition in developing countries (Negi *et al*., 2011; Toledo and Burlingame, 2006).

Traditional knowledge has been used for centuries by indigenous local communities to manage natural resources under local laws, customs, and traditions. Many traditional societies all over the world revere and worship nature and consider certain plants and animals sacred. The sacred groves in the Western Ghats are small patches of ancient forest dedicated to local animistic deities (Gadgil and Vartak 1976; Chandran, 1992). These groves are a rich source of fruit bearing trees and small water bodies and act as habitat for several birds and reptiles.The present paper presents a case study of select sacred groves of Kanniyakumari wildlife sanctuary and the aim of the study was to document the tradition of sacred groves could protect many indigenous as well as ethnobotanically important plants for ensuring biodiversity conservation through community participation.

STUDY AREA

Kanniyakumari Wildlife Sanctuary is located in the Southwestern tip of Western Ghats. The predominant tribal inhabitants of the foothills of Southern Western Ghats are Kanis, belonging to the southern tribal zone. They are distributed along the Southeastern slopes, mostly in the higher rangesof theWestern Ghats, in large numbers. The natural vegetation of this region represents biomes ranging from Southern Thorn Forests, Dry Deciduous and Moist Deciduous, Semi Evergreen Forest to Evergreen Sholas with Grassy Downs. In due recognition of tremendous biological potential, Kanniyakumari forest division was declared as Kanniyakumari Wildlife Sanctuary in 2002 (Plate :1)

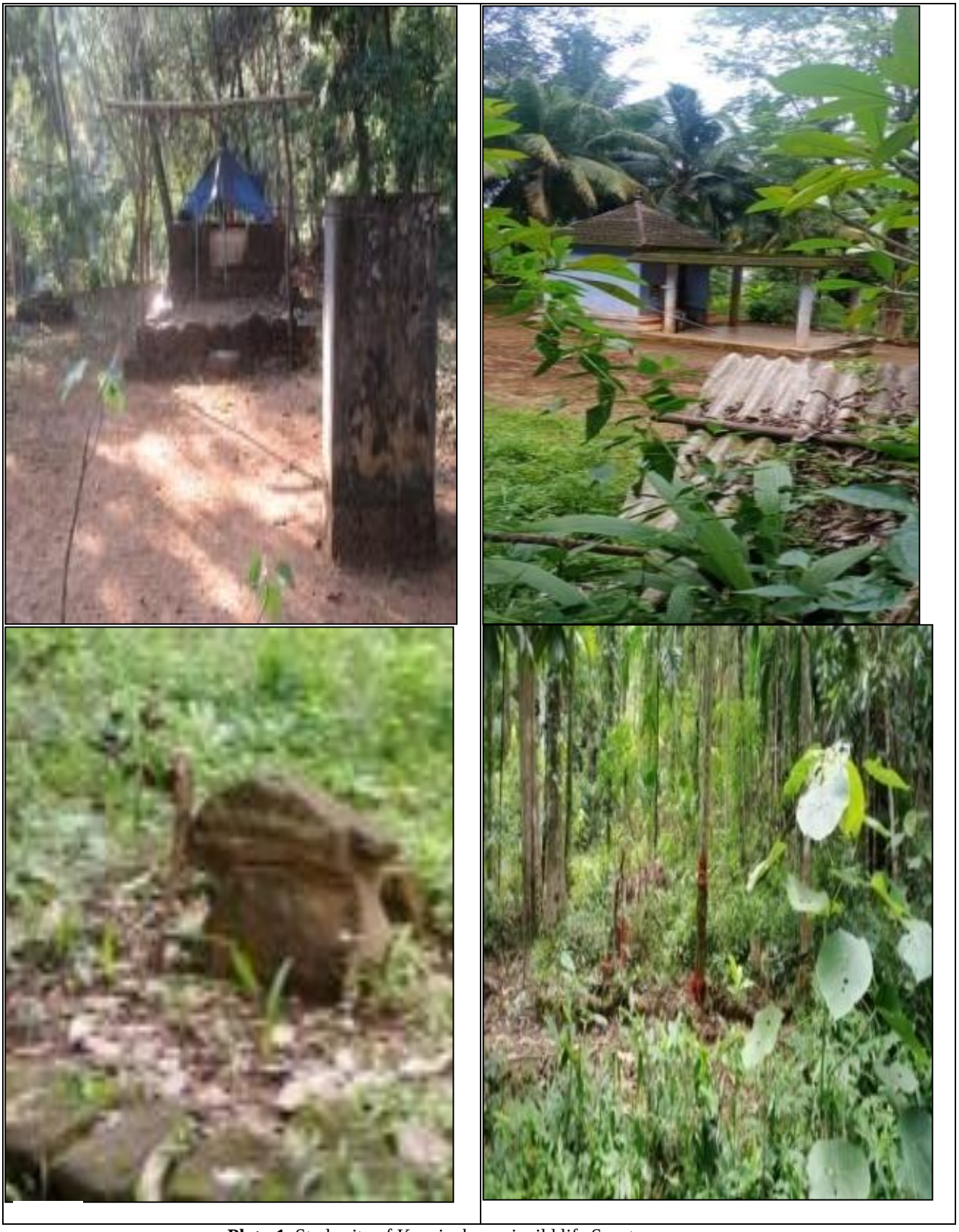

Plate:1. Study site of Kanniyakumari wild life Sanctuary

Kanis are black, slim and very attractive to look at with round head, curly hair and broad nose. They are generally short in stature with average height of 5 foot with markedly negroidfeatures.They have their own dialect, a corrupt form of Tamil and Malayalam, 'Malaibashai', the hill language.Usually the Kanis supplement their diet by gathering roots and tubers from the forest. They eat tubers like *Manihotesculenta*,*Dioscoreaoppositifolia*, *Ceropegia spiralis*, etc. They generally depend on wild edible plants and seeds for their food. Wild as well as cultivated tubers form their staple food. They do not eat beef. Seeds of *Artocarpusheterophyllus*, fruits of *Ochlandratravancorica*, fruits of *Baccaureacourtallensis*, endosperm of *Mangiferaindica*, cotyledons of *Entadarheedii*, and steam-cooked seeds of *Cycascircinali*sare eaten by the tribes.

METHODOGY

In order to explore the knowledge of edible wild plants used by Kani tribes, an ethnobotanical survey was conducted in 48 tribal settlements; the field survey was carried out during the years 2018-2020 among the Kanis residing in and around the Kanniyakumari Wildlife Sanctuary.Plant samples were collected by trekking in the forest and some of the plants were identified in the field itself. Photographs were taken. During collection the taxa were classified according to their habit: herb, shrub, tree, liana and climber. Plant samples were collected for the preparation of voucher specimens. Voucher specimens were deposited in the Department of Botany and Research Centre, Scott Christian College, Nagercoil. The Angiosperm Phylogeny Classification (APG 111, 2009) was followed to classify the taxa. The plant specimens were identified with the help of local and regional floras (Gamble and Fischer, 1956; Nair and Henry, 1983). Inorder to check the spelling, eliminate the use of older synonyms and ensure uniform nomenclature all plant names were verified using The Plant List (2013).

RESULT AND DISCUSSION

An inventory of wild edible fruit plants was made by field survey and means interviewing the tribal households of this region regarding the indigenous use of such resources.The tribal communities of Kanniyakumari have a long history of wild fruit gathering, many of them are eaten raw and ripe whereas few species are consumed during times of food scarcity.Some species are also cooked in to vegetables or pickled and shelved for many days to eat with day meals. A few species are also used as beverages and as cool drinks.

The investigation revealed that a total of 50 wild edible fruit plants belonging to 31 families and 41genera were found to be used as food by the inhabitants of the study area. These species have both dicotyledonsand monocotyledons. Among the 50 species of edible plants collected from this area 49 species belong to Angiosperm and one species is Gymnosperm.*Costuspictus*L. leaves are used to treat high medicinal value in diabetes. *Arengawightii*sap are extracted from the palm is used to treat white discharge in women.The flowering and fruiting phenology gave vital information on the seasonal availability of wild edible plants. About 19 wild edible plants were consumed raw and 31 plants are cooked food.

Family-wise distribution of edible plants shows that the family Moraceae and Fabaceae was the dominant family in terms of species richness (4 species), followed by are Dioscoreaceae , Anacardiaceae, Apocyanaceae, Rhamnaceae and Arecaceae (3 species), Rutaceae, Solanaceae,Lamiaceae,Phyllanthaceae,Piperaceae,Myrtaceae and Sapotaceae (2 species), whereas, 13 families(Annonaceae,Araceae,Caesalpiniaceae,Cycadaceae,Passifloraceae,Poaceae,Cucurbitaceae,Costaceae,Clusiaceae,Combretaceae,Liliaceae,Myristicaceae andSmilacaceae) are monospecific (Table1; Plate 2).

Aegle marmelos (L.) Correa

Annona muricata L.

Artocarpushirsutus Lam.

Caesalpinia mimosoides

Gloriosa superba L

Piper nigrum L.

Cycas cricinalis L.

Zizphus rugosa Lam.

Phyllanthus emblica L.

Plate.2: Edible plants of the sacred groves in Kanniyakumari wild life Sanctuary

Due to short duration or short shelf life of wild edibles, the plants are consumed immediately or preserved (sun/shade dried) for use when nothing fresh is available either in the wild or homestead (Sundriyal and Sundriyal, 2003; Sawian*et al*., 2007; Jeeva, 2009; Geetha*et al*., 2015; Brintha and Jeeva, 2022). The *Phyllanthusemblica* is the most common species eaten raw, which is a rich source of vitamin C. Similarly, dried fruits are stored for future use, which is highly medicinal and used to cure cold, cough and other throat infections (Saini *et al*., 2022). Moreover, the *Phyllanthusemblica*, *Terminalia bellirica* and *Terminalia chebula* are jointly used in the preparation of famous Ayurvedic medicine known as 'Triphala'.Ayyanar and Ignacimuthu (2011) and Sukumaran *et al.*(2021) have reported that maximum species of medicinal plants are being used by the Kanis of Western Ghats.

Sukumaran and Raj(2010) reported Folklore medicinally important plant frequently used by the tribal communities of sacred groves in Kanniyakumari district. A total of 34 medicinal plants from 33 genera 29 families were enumerated. Most of the plants are used for earache, skin disease, fever, cold, headache,cough and ulcer. 29 families, 26 families monospecific. Plants of Rutaceae largely represented (4 species) followed by Euphorbiaceae and Sapotaceae.

CONCLUSION

Sacred Groves are not only the important repositories of ethno-medicinal edible plants species, but also act as an important element of biological diversity which are rich in floras and faunas. Sacred groves in general are found both in urban and rural areas. The Sacred groves of urban areas are sparsely populated due to deforestation and desertification, but the Sacred groves of the forest areas are densely populated which includes vast strips of land inhabited by climbers, herbs, shrubs and trees, with the presence of a village deity and is mostly situated near a perennial water source.. Conservation of Sacred groves are community based on religious faiths and beliefs. Through the present study we hope to convey that the surveys conducted on these sacred groves highlighting the medicinal plants associated with the sacred groves, which could provide a powerful tool for ensuring biodiversity conservation through community participation.

REFERENCE

1. Adebooye, O.C .andPhillips, O.T. 2006. Studies on seed characteristics and chemical composition of three morphotypes of *Mucunaurens* (L.) Medikus - Fabaceae. *Food chemistry*,95(4): 658 - 663.
2. Andersen, L.T., Thilsted, S.H. and Rangasamy, N.S. 2003. Food and nutrient intakes among pregnant women in rural Tamil Nadu, South India. *Public Health Nutrition* 6(2):131-137.
3. Aniosperm Phylogeny Group, 2009. An update of the Angiosperm Phylogeny Group of classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society*, 161(2): 105-121.
4. Ayyanar, M. and Ignacimuthu, S. 2011. Ethnobotanical survey of medicinal plants commonly used by Kani tribals in Tirunelveli hills of Western Ghats, India. *Journal of ethnopharmacology*, 134 (3): 851-864.
5. Bhatt, I.D., Rawat, S., Badhani,A. and Rawal,R.S. 2017. Nutraceutical potential of selected wild edible fruits of the Indian Himalayan region. *Food Chemistry*,215 :84 - 91.
6. Boa, E.R. 2004. Wild edible fungi: A global overview of their use and importance to people. *Series on Non-Wood Forest Products*, (No. 17), Forestry Department. FAO, Rome, Italy.
7. Brintha, T.S. and Jeeva, S. 2022. Diversity of wild edible plants traditionally used by the local inhabitants of south Indian State of Tamil Nadu. Indian Journal of Natural Science, 13(75).
8. Chandran,M.D.S., Gadgil,M. and Hughes,J.D. 1992.Sacred Groves of the Western Ghats of India.
9. Gadgil,M. andVartak,V.D.1976."The sacred groves of Western Ghats in India," *Economic Botany*, 30, 2: 152-160
10. Gamble, J.S. and Fischer, C.E.S. 1956. Flora of the presidency of Madras, Part III , Botanical survey of India.
11. Geetha, V.S., Appavoo, M.R., Vinuba, A.A. and Jeeva, S., 2015. Species richness of edible plants grown in homegardens of the foothills of Western Ghats. *Science Research Reporter*, *5*(2), pp.187-191.
12. Grivetti, L.E. and Ogle, B.M. 2000. Value of traditional foods in meeting macro-and micronutrient needs: the wild plant connection. *Nutrition Research Review.* 13:31- 46.
13. Jeeva, S., 2009. Horticultural potential of wild edible fruits used by the Khasi tribes of Meghalaya. *J Hortic For*, *1*(9), pp.182-192.
14. Nair, N.C. and Hentry, A.N. 1983. Flora of Tamil Nadu, India. Botanical survey of I ndia. Southern Circle, Coimbatore.

15. Negi, V.S., Maikhur,R.K. and Rawat, L.S. 2011. Non-Timber Forest Products (NTFPs): A Viable Option for Biodiversity Conservation and Livelihood Enhancement in Central Himalaya. *Journal of Biodiversity and Conservation Research*,20(3): 545-559.
16. Saini, R., Sharma, N., Oladeji, O. and Sourirajan, A. 2022. Medicinal trees of North western region of Himalayas in Himachal Pradesh. *Journal of Ethnopharmacology*, 28 (2): 114 -117.
17. Sawian, J.T., Jeeva, S., Lyndem, F.G., Mishra, B.P. and Laloo, R.C., 2007. Wild edible plants of Meghalaya, North-east India. *Natural Products Radiance*, 6(5): 410-426.
18. Sukumaran, S., Sujin, R.M., Geetha, V.S. and Jeeva, S. 2021. Ethnobotanical study of medicinal plants used by the kani tribes of Pechiparai Hills, Western Ghats, India. *Acta Ecologica Sinica*,41(5): 365-376.
19. Sundriyal, M. and Sundriyal, R.C. 2003. Underutilized edible plants of the Sikkim Himalaya: Need for domestication. *Current Science*, 85 (6): 25
20. Toledo, A.and Burlingame,B. 2006. Biodiversity and nutrition: A common path toward global food security and sustainable development. *Journal of Food Composition Analysis*. 19(6 -7):477- 483.

Table 1. Commonly available wild edible plants in the selected sacred groves of study area

S. No	Botanical Name	Local name	Common name	Family	Mode of utilization
1.	*Aegle marmelos* (L.) Correa	Vilvam	Bael	Rutaceae	Raw and cooked
2.	*Ananas comosus* (L.) Merr.	Prethipazham	Pine apple	Anacardiaceae	Raw
3.	*Anacardiumoccidentale* L.	Kollampazham	Cashew	Ancardiaceae	Raw
4.	*Annona muricata* L.	Mullumuthri	Graviola	Annonaceae	Raw
5.	*Arenga wightii* Griff.	Alzathengu	Indian sagopalm	Arecaceae	Beverage
6.	*Artocarpous altilis*Fosberg.	Karichakkai	Breadfruit	Moraceae	Cooked
7.	*Artocarpus heterophyllus*Lam.	Chakkapazham	Jack Fruit	Moraceae	Raw and cooked
8.	*Artocarpus hirsutus* Lam.	Aynipazham	Wild Jack	Moraceae	Raw and cooked
9.	*Bambusa bambos* (L.) Voss.	Muzha	giant thorny bamboo,	Poaceae	Cooked
10.	*Caesalpinia mimosoides* Lam.	Appata	Pansi	Fabaceae	Cooked
11.	*Cassia occidentalis* L.	Peyathuvarai	coffee senna	Fabaceae	Cooked
12.	*Caryot aurens* L.	Chazhai	solitary fishtail palm	Arecaceae	Beverage
13.	*Capsicum annuum* L.	Kantharimulagu	Chilli	Solanaceae	Cooked
14.	*Carissa carandas* L.	Nullipazham	Karaunda	Apochynaceae	Raw
15.	*Ceropegia elegans*Wall.	Kammanamkizhangu	Elegansceropegia	Apocynaceae	Cooked
16.	*Cycas cricinalis*L	Chazhankai	Sago palm	Cycadaceae	Cooked
17.	*Coccina grandis* (L.) Voigt	Kovakkai	Ivy gourd	Cucurbitaceae	Raw and cooked
18.	*Costus pictus*L.	Sugar leaf	Yellow crepe ginger	Costaceae	Raw
19.	*Plectranthus amboinicus* L.	Navrapachallai	Indian borage	Lamiaceae	Cooked
20.	*Colocasia esculenta*(L.) Schott	Neellapalli	Wild Taro	Araceae	Cooked
21.	*Dioscorea oppositifolia* L	Kavalakizhanku	Lesser yam	Dioscoriaceae	Cooked
22.	*Dioscorea pentaphylla* Linn.	Noorakizhangu	Five Leaf Yam	Dioscoriaceae	Cooked
23.	*Dioscorea wallichii*Hook.f.	Neduvankizhangu	Yam Dioscorea	Dioscoriaceae	Cooked
24.	*Entada pursaetha* Dc.	Parandaikai	Sea Bean	Fabaceae	Cooked
25.	*Ficus carica* L.	Vittipazham	Common fig,Anjeer	Moraceae	Raw
26.	*Garcinia gummi-gutta*(L) Roxb.	Kodampuli	Cambodge Tree	Clusiaceae	Cooked
27.	*Gloriosa superba* L.	Kalapaikzhengu	Chenkanthal	Liliaceae	Cooked
28.	*Hemidismus indicus* (L) R.Br.exSchult	Narunattiveru	Indian Sarsaparilla	Apocyanaceae	Cooked
29.	*Mangifera indica* L	Mampazham	Mango	Anacardiaceae	Raw
30.	*Mimusops elengi* L.	Ellaenthi	Tanjong tree,	Sapotaceae	Raw
31.	*Murrayakoenigii* L.	Karivabillai	Kari leaf	Rutaceae	Cooked
32.	*Myristica fragrans* Houtt.	Jathikkai	Nutmeg	Myristicaceae	Cooked
33.	*Manilkara kauki* (L.)Dubard	Elengi	Tanjong tree	Sapotaceae	Cooked
34.	*Mucuna pruriens (*L)DC.	Koinkankai	Velvet Bean	Fabaceae	Cooked

35.	*Occimum sanctum* L	Tulsi	Holy basil	Lamiaceae	Cooked
36.	*Phyllanthus emblica* L	Nelli	Indian Gooseberry	Phyllanthaceae	Raw
37.	*Phyllanthus indofischeri*Bennet	Kattunelli	Emblicmyrobalan	Phyllanthaceae	Raw
38.	*Piper nigrum*L.	Nallamilagu	Black Pepper,	Piperaceae	Cooked
39.	*Piper betle* L.	Vettillai	Betel vine	Piperaceae	Raw
40.	*Passiflora foetida*Linn	Kurangupazham	Love-in-a-mist	Passifloraceae	Raw
41.	*Smilax zeylanica* L.	Theralli	Kumarika	Smilacaceae	Cooked
42.	*Solanum trilobatum* L.	Thoothuvalai	Pea Eggplant	Solanaceae	Cooked
43.	*Syzygium cumini* (L.) Skeels	Naval	Java Plum	Myrtaceae	Raw
44.	*Syzygium caryophyllatum* (L.)Alston	Karinijara	South Indian plum	Myrtaceae	Raw
45.	*Tamarindus indica* L.	Puzhi	Tamarind	Caesalpiniaceae	Cookies
46.	*Terminalia catappa*L.	Vatham	Indian almond	Combretaceae	Raw
47.	*Ziziphus jujuba* Mill	Ilanthai	Indian Jujube	Rhamnaceae	Raw
48.	*Zizphus rugosa* Lam	Thodalipazham	Wild Jujube	Rhamnaceae	Raw
49.	*Ziziphus nummularia* L	Kattuillanthi	WildJujube	Rhamnaceae	Raw
50.	*Phoenix loureiroi* Kunth	Chittenthal,	Dwarf date palm	Arecaceae	Raw