Journal of Medicinal Plants Studies
www.PlantsJournal.com

ISSN (E): 2320-3862
ISSN (P): 2394-0530
https://www.plantsjournal.com
JMPS 2024; 12(1): 225-230

Received: 02-12-2023
Accepted: 08-01-2024

R Bhuvaneswari
Department of Botany, Thanthai Hans Roever College (Autonomous), Perambalur, Tamil Nādu, India

S Sasikumar
PG & Research Department of Botany, Periyar EVR College (Autonomous), Tiruchirappalli, Tamil Nādu, India

R Dhandapani
PG & Research Department of Botany, Government Arts College, Ariyalur, Tamil Nādu, India

R Ramanathan
PG & Research Department of Botany, Government Arts College, Ariyalur, Tamil Nādu, India

Corresponding Author:
R Bhuvaneswari
Department of Botany, Thanthai Hans Roever College (Autonomous), Perambalur, Tamil Nādu, India

An observation of antihyperlipidemic Indian medicinal plants in Perambalur district, Tamil Nadu, India

R Bhuvaneswari, S Sasikumar, R Dhandapani and R Ramanathan

Abstract
This paper reports an ethnobotanical study that focused on the traditional medicinal plants by local communities to treat hyperlipidemia. Ethnobotanical study of antihyperlipidemic medicinal plants was carried out from June, 2010 to July, 2011, in Perambalur district of Tamil Nadu, India. A total number of 78 medicinal plant species belonging to 70 genera and 40 families used by traditional medicine men to treat hyperlipidemia. It is therefore, necessary to preserve this indigenous knowledge on traditional medicines, proper documentation, identification of plant species, and method of preparation. To save antihyperlipidemic medicinal plants from further loss, involving local communities in cultivation of most utilized medicinal plants is recommended. Further research on the isolation and characterization of plant active phytocompounds could lead to the discovery of new potential drugs.

Keywords: Hyperlipidmia, Traditional medicinemen, Ethnobotanical, Tamil Nadu, Folklore, Atherosclerosis

Introduction
The World Health Organization (WHO) has recently defined traditional medicine (including herbal drug) as comprising therapeutic practices that have been in existence, often for hundreds of years, before the development and spread of modern medicine and are still in use today (WHO, 1991) [25]. Herbal medicines are being used by about 80 per cent of the world population primarily in the developing countries for primary health care. They have stood the test of time for their safety, efficacy, cultural acceptability, and lesser side effects (WHO, 1993) [26]. India harbours a wide range of medicinal and aromatic plants mostly used in Ayurvedic, Unani, Siddha, Homeopathic and other alternate medicinal practices such as folk medicine, home remedies, household remedies, naturopathy, and tribal medicine. The plants used in alternate medicine are awaiting a touch of modern knowledge. Ethno-botanical studies have added about 1680 species of medicinal value in the existing list of medicinal plants in India. The direct utilization of plant material is a feature of traditional systems of medicine not only in India, but also in developed countries like Europe, U.S.A. and Western countries (Chaudhuri, 2007) [2]. The knowledge of folklore tradition in handed down orally from one to generation to others (Sinha, 1996) [23]. The plant based traditional knowledge has become a recognised tool in search for new sources of drugs and nutraceuticals (Sharma & Majundar, 2003) [22].

The traditional knowledge of medicinal plants in India is enormous since many centuries based on different practical measures. It has been reported that traditional healers used more than 3000 plant species. Medicinal plants are considered to be the basic health care of rural households from the ancient days. A large number of medicinal plants are un-investigated (Vinoth & Manivasagaperumal, 2014) [24]. Although, so many ethno-botanists are being done their research work in India (Jain 1963, 1965, 1987, 1991, 1996 [8-12]; Chaudhuri & Trivedi, 1976 [2] & Jain & Sikarwar, 1997 [6]; Kumar & Pandey, 1998 [13]; Kumar *et al*., 2004 [14]; Jain *et al*., 2006 [5]; Manjunatha *et al*., 2009 [15]; Namsa *et al*., 2011 [21]; Murthy, 2012 [19]; Algesboopathi, 2013 [1]). A lot of important information and indigenous knowledge have already been lost due to knowledge hold with older generations could not be transmitted to younger generations and remains unrecorded. Research interest has been focused on various herbs possessing hypolipidemic property to reduce atherosclerosis that may be useful adjuncts in helping reduce the risk of cardiovascular disease (CVD).

Apart from the synthetic modern drugs like clofibrate, lovastatin, there are efforts to find out herbal drugs possessing lipid lowering activities (Mohamed & Koriem, 2014) [18]. Therefore, the aim of the study was, to documentation of traditional knowledge of utilization. Medicinal plants used by traditional and folklore people for hyperlipidemia in Preambular district, Tamil Nadu, India.

Materials and Methods

Study area

Perambalur district is situated at the middle of Tamil Nadu, in the peninsular India. It is surrounded by Cuddalore and Villupuram district on the North, Tiruchirappalli district on the South, Salem district on the west and Ariyalur district on the east (web). As per 2001 census, the total population of Perambalur district is 4, 93, 646. The density of population in the district is 322 per sq. km. Perambalur district is centrally located in Tamil Nadu and is 267 km away, in southern direction, from Chennai. The district has an area of 3691 sq.km. Spread between 10.54′ and 11.30′ degree Northern latitude and 78, 40′ and 79.30 degree of the Eastern longitude. This district is having three taluks and 142 revenue villages. Monthly temperature is always above 27 °C. The normal annual rainfall is 1141.3 mm. It is an inland district without coastal line. The district has Vellar River in the North and it has well marked natural divisions. The Pachamalai hills situated on the North boundary of Perambalur is the most important hills in the district. Field visits were conducted in different localities such as Villamuthur, Siruvachur, Ladapuram, Padalur, Chettikulam, Arumbavur and Malayalapatti (Fig.1).

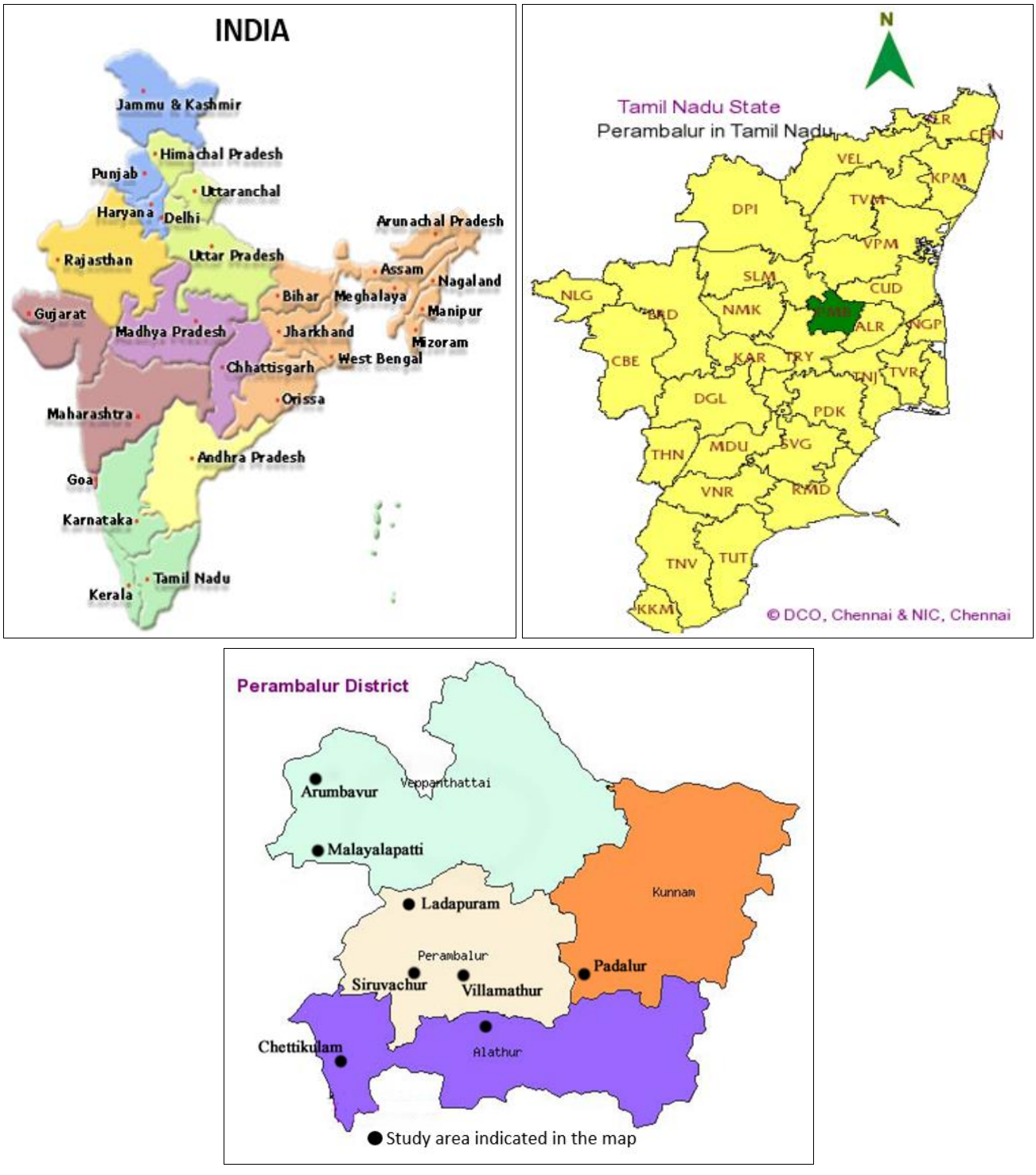

Fig 1: Study area map of Perambalur district

Field visits

The field visits were conducted from June, 2010 to July, 2011 and each field trip was for nearly five days. Information about the plants possessing hypolipidemic activities were collected from the traditional medicine men. Data on hypolipidemic activity medicinal plants were collected according to the methodology suggested by Jain (1964) [7]. Ethnobotanical data (local name and medicinal uses) were collected through interviews and discussions among the traditional practitioners in the study area. Data were also collected through questionnaires in their local language. Medicinal plants were normally collected during the season in which they are available in plenty. Information was collected through interview with 12 persons aged between 40 to 78, who had the traditional knowledge of plants. In addition to the vernacular names questions were also asked about each plant prescribed, such as part of the plant used, medicinal uses, detailed information about mode of preparation (i.e., decoction, paste, powder and juice); form of usage either fresh or dried plants were also collected. The medicinal plants were identified (local name), photographed and sample of specimens were collected for the preparation of herbarium.

Plant identification

The study plants were identified with the help of floras (Gamble, 1935; Mathew, 1983; 1999) [3, 16-17] and their identities were also verified with the help of the specimens available at the Rapinat Herbarium, St. Joseph's College, Tiruchirappalli, Tamil Nadu, India. Nomenclature of the plants were as per the floras of Tamil Nadu (Nair *et al.*, 1983; Henry, Kumari, and Chithra, 1987) [20, 4].

Results

Through the field visits, 78 species of anti-hyperlipidemic medicinal plants distributed in 70 genera belonging to 40 families used by traditional medicine men in study area were collected and enumerated according to alphabetical order of binomials. Each plant is described with its binomial name, family, local name, habit, parts used and medicinal observations were tabulated are presented (Table 1; Plate 1 and 2).

Table 1: Enumeration of antihyperlipidemic medicinal plants in Perambalur district, Tamil Nadu, India

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Achyranthes aspera* L.	Amaranthaceae	Nayuruvi	Herb	Leaves and roots	Decoction	Anticholesterol
2.	*Abutilon indicum* (Lam.) Sweet.	Malvaceae	Thutti	Shrub	Leaves	Paste	Blood Purifier and Antilipidemic
3.	*Acalypha fruticosa* Forssk.	Euphorbiaceae	Siruchenni	Shrub	Leaves	Powder	Skin disease and Blood Pressure
4.	*Acorus calamus* L.	Acoraceae	Vasambu	Shrub	Roots	Paste	Hypolipidemic and Anti-insecticides
5.	*Adenia wightiana* (Wall. ex Wight & Arn) Engler.	Cucurbitacae	Appakovai	Climber	Leaves and young fruits	Powder	Antihyperglycaemic and Anticholesterol
6.	*Aegle marmelos* (L.) Correa.	Rutaceae	Vilvam	Tree	Leaves and fruits	Juice	Anticholesterol and Antihyperglycaemic
7.	*Aerva lanata* (L.) Juss ex Schult.	Amaranthaceae	Poolapoo	Herb	Entire plant	Powder	Diuretic and Hypolipidemic
8.	*Alangium salviifolium* (L.f.) Wangerin.	Alangiaceae	Alingi	Tree	Bark	Decoction	Antihyperlipidemic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Allium cepa* L.	Amaryllidaceae	Vengaayam	Herb	Bulbils	Paste	Antidiabetic and Blood pressure
2.	*Allium sativum* L.	Amaryllidaceae	Poondu	Herb	Bulbils	Paste	Anticholesterol
3.	*Alternanthera sessilis* (L.) R.Br.	Alstroemeriaceae	Ponnaganni keerai	Herb	Leaves	Juice	Antiobesity and Cardiovascular disease
4.	*Amaranthus viridis* Linn.	Amaranthaceae	Araikkeerai	Herb	Leaves	Decoction	Blood pressure and Cardiotonic
5.	*Ananas sativus* Schult.	Bromeliaceae	Annasipalam	Shrub	Fruits	Juice	Blood pressure and Heart tonic
6.	*Artocarpus heterophyllus* Lam.	Moraceae	Palamaram	Tree	Bark	Powder	Antilipidemic
7.	*Asparagus racemosus* Willd.	Asparagaceae	Satha moolam	Shrub	Tubers	Powder	Aphrodisiac and Antilipidemic
8.	*Azadirachta indica* A. Juss.	Meliaceae	Veppammaram	Tree	Leaves and Bark	Paste	Antidiabetes and Blood pressure
9.	*Boerhavia diffusa* L.	Nyctaginaceae	Mookkarattai	Herb	Leaves	Decoction	Diuretic and Antilipidemic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Brassica juncea* (L.) Czernj.	Cruciferaeceae	Kadugu	Herb	Seeds	Powder	Antianxiety and Obesity
2.	*Canavalia virosa* (Roxb.) Wight & Arn.	Papilionaceae	Kattu thammattai	Climber	Young fruits	Powder	Hypertension
3.	*Canthium parviflorum* Lam.	Rubiaceae	Kaarai	Shrub	Leaves	Paste	Wounds and Hypertension
4.	*Cardiospermum halicacabum* L.	Sapindaceae	Mudakkathan	Climber	Leaves	Decoction	Antiinflammatory and Anticholesterol
5.	*Carica papaya* L.	Caricaceae	Pappali	Tree	Mature fruit	Juice	Blood pressure and Hypolipidemic activity
6.	*Cassia absus* L.	Caesalpiniaceae	Karunkollu	Herb	Seeds	Powder	Obesity and Blood pressure
7.	*Catharanthus roseus* (L.) G.Don.	Apocynaceae	Nithya Kalyani	Shrub	Root	Decoction	Cancer and Blood Pressure
8.	*Centella asiatica* (L.) Urban.	Apiaceae	Vallarai	Herb	Leaves	Paste	Blood pressure and Antihyperlipidemic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Cissus quadrangularis* L.	Vitaceae	Perandai	Climber	Stem and Leaves	Paste	Antiobesity and Blood pressure
2.	*Coriandrum sativum* L.	Apiaceae	Kothamalli	Herb	Seeds, Leaves	Decoction	Anti-anxiety and Blood pressure
3.	*Cucumis pubescens* Willd.	Cucurbitaceae	Sukkangai	Climber	Young fruits	Powder	Anticholesterol
4.	*Cuminum cyminum* L.	Apiaceae	Siragam	Herb	Seeds	Decoction	Antihypertension
5.	*Cynodon dactylon* (L.) Pers.	Poaceae	Arugampul	Herb	Leaves	Juice	Blood purifier and Diuretic
6.	*Eclipta prostrata* (L.) L.	Asteraceae	Karisalanganni	Herb	Entire plant	Powder	Anticholesterol
7.	*Emblica officinalis* Gaertn.	Euphorbiaceae	Nellikkai	Tree	Fruits	Powder	Diabetes and Antihyperlipidemic
8.	*Enicostema axillare* (Lam.) A. Raynal.	Gentianaceae	Vellarugu	Herb	Entire plant	Powder	Antilipidemic
9.	*Evolvulus alsinoides* (L.) L.	Convolvulaceae	Vishnu kirandi	Herb	Entire plant	Decoction	Anticholesterol

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Ficus benghalensis* L.	Moraceae	Aalamaram	Tree	Bark	Powder	Antilipidemic
2.	*Ficus glomerata* Roxb.	Moraceae	Athimaram	Tree	Young fruits	Powder	Anticholesterol and Blood purifier
3.	*Ficus religiosa* L.	Moraceae	Arasamaram	Tree	Bark	Powder	Antilipidemic
4.	*Gymnema sylvestre* (Retz.) R. Br. ex. Schult.	Asclepiadaceae	Sirukurunjan	Climber	Leaves	Paste	Antidiabetic and Antihyperlipidemic
5.	*Gynandropsis gynandra* (L.) Briq.	Capparidaceae	Nalla velai	Herb	Leaves	Paste	Blood pressure
6.	*Hemidesmus indicus* (L.) R.Br.	Asclepiadaceae	Nannari	Climber	Leaves	Decoction	Liver disorder, Anticholesterol
7.	*Hibiscus cannabinus* L.	Malvaceae	Pulichakeerai	Herb	Leaves	Decoction	Antilipidemic
8.	*Hibiscus rosa-sinensis* L.	Malvaceaei	Chembaruthi	Shrub	Flowers	Juice	Cardiovascular disease and antiobesity

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Hybanthus enneaspermus* (L.) F. Muell.	Violaceae	Ooridhal Thamarai	Herb	Entire plant	powder	Aphrodisiac and Antilipidemic
2.	*Indigofera mysorensis* Rottler ex Dc.	Papilionaceae	Kaattukollu	Shrub	Seeds	powder	Anti-obesity and Antilipidemic
3.	*Ipomoea batatas* (L.) Lam.	Convolvulaceae	Sarkkaraivalli	Climber	Leaves and Tubers	Decoction	Anticholesterol
4.	*Limonia acidissima* L.	Rutaceae	Vilampalam	Tree	Fruits	Juice	Anti-obesity
5.	*Lycopersicum esculentum* Mill.	Solanaceae	Thakkali	Shrub	Fruits	Juice	Hypolipidemic
6.	*Mentha piperita* L.	Lamiaceae	Puthina	Herb	Leaves	Paste	Blood pressure and Cardiovascular disease
7.	*Momordica charantia* L.	Cucurbitaceae	Paagarkaai	Climber	Young fruit	Juice	Antidiabetic and Blood Pressure
8.	*Moringa pterygosperma* Gaerth.	Moringaceae	Murungai maram	Tree	Leaves and Bark	Juice	High blood pressure and Hypolipidemic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part (s) used	Mode of preparation	Uses
1.	*Murraya koenigii* (L.) Spreng.	Rutaceae	Kariveppilai	Herb	Leaves	Decoction	Hypoglycaemic and Blood pressure
2.	*Ocimum tenuiflorum* L.	Lamiaceae	Tulasi	Shrub	Leaves	Powder	Diabetes and Blood pressure
3.	*Pergularia daemia* (Forssk.) Chiov.	Asclepiadaceae	Veliparuthi	Climber	Leaves	Powder	Cardiovascular diseases
4.	*Phyllanthus amarus* Schu. & Thonn.	Euphorbiaceae	Keelanelli	Herb	Entire plant	Paste	Hypoglycaemic and Hypolipidemic
5.	*Phyllanthus maderaspatensis* L.	Euphorbiaceae	Melanelli	Herb	Entire plant	Paste	Hypertension, Hypoglycaemic and Hypolipidemic
6.	*Physalis minima* L.	Solanaceae	Sodakkuthakkali	Herb	Leaves	Powder	Anti-hypertensive
7.	*Punica granatum* L.	Lythraceae	Maadhulai	Tree	Young fruits	Juice	Hypolipidemic
8.	*Raphanus sativus* L.	Apiaceae	Mullangi	Herb	Roots	Juice	Diuretic and Anticholesterol
9.	*Securinega virosa* (Willd.) Baill.	Euphorbiaceae	Pula	Tree	Leaves	Powder	Cardiovascular disease and Cardiovascular tonic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Semecarpus anacardium* L.	Anacardiaceae	Cherankottai	Tree	Seeds	Powder	Liver disorder and Antihyperglycaemic
2.	*Sesamum indicum* L.	Pedaliaceae	Ellu	Shrub	Seeds	Powder	Anticholesterol and Obesity
3.	*Sesbania grandiflora* (L.) Poir.	Fabaceae	Agathi	Tree	Leaves	Juice	Ulcer and Hypolipidemic
4.	*Solanum melongena* L.	Solanaceae	Kathari	Shrub	Young fruits	Powder	Hypolipidemic
5.	*Solanum nigrum* L.	Solanaceae	Manaththakkali	Shrub	Leaves	Juice	Ulcer and Hypertension
6.	*Solanum trilobatum* L.	Solanaceae	Thooduvalai	Shrub	Leaves	Decoction	Expectorants and Anti-obesity
7.	*Syzygium cumini* (L.) Skeels.	Myrtaceae	Naval	Tree	Fruits	Powder	Antidiabetic and Anticholesterol
8.	*Tamarindus indica* L.	Fabaceae	Puli	Tree	Fruits	Decoction	Antifungal and Antihyperlipidemic
9.	*Tephrosia purpurea* (L.) Pers.	Fabaceae	Avuri	Shrub	Leaves and roots	Powder	Skin disease and Antilipidemic

Table 1: Continued…

S. No.	Botanical name	Family	Local name	Habit	Part(s) used	Mode of preparation	Uses
1.	*Terminalia arjuna* (Dc.) Wight and Arn.	Combretaceae	Marudha maram	Tree	Bark and Leaves	Powder	Cardiovascular diseases and Antidiabetic
2.	*Terminalia bellirica* (Gaertn) Roxb.	Combretaceae	Thandrikkai	Tree	Seeds	Powder	Hypoglycaemic
3.	*Terminalia chebula* Retz.	Combretaceae	Kadukkai	Tree	Seeds	Powder	Cardiotonic and Anticholesterol
4.	*Tinospora cordifolia* (Wild) Hook. f. & Thomson	Menispermaceae	Seenthil	Climber	Leaves	Powder	Hypoglycaemic and Cardiovascular disease
5.	*Tribulus terrestris* L.	Zygophyllaceae	Nerunjil	Herb	Entire plant	Powder	Diuretic and Hypertension
6.	*Trigonella foenum-graecum* L.	Leguminosae	Venthayam	Herb	Seeds	Powder	Blood pressure and Antihyperlipidemic
7.	*Vicia faba* L.	Fabaceae	Beans	Shrub	Young fruits	Juice	Anticholesterol
8.	*Withania somnifera* Dun.	Solanaceae	Amukura	Shrub	Roots	Powder	Anti-lipidaemic
9.	*Zea mays* L.	Poaceae	Solam	Shrub	Seeds	Powder	Anticholesterol
10.	*Zingiber officinale* Roscoe	Zingiberaceae	Ingi	Shrub	Tubers	Decoction	Antihyperlipidemic

Discussion

Elevation of plasma lipoprotein concentration is called Hyperlipidemia. The plasmalipids of chemical significance are cholesterol (CH) and triglycerides (TG). The clinical sequal of hyperlipidemia are acute pancreatitis, a very serious and may be even fatal condition, and atherosclerosis manifesting in coronary artery disease or cerebrovascular accidents. Hyperlipidemia must be prevented and treated to safeguard against these life-threatening conditions.

The study plants are known to be used by native medicine men in different forms to treat hyperlipidemia. These plants are available everywhere, hence, can be procured, prepared and used as herbal medicines, which are natural, cheap and safe. So, the service of traditional medicine are the only alternatives. They are experienced, knowledgeable and capable of keeping the human health and serving them from death of hyperlipidaemia. There is no programme available with the government to utilize the service of these traditional medicine men and also to help to improve their economic status.

At the present time much of the wealth of knowledge is being lost as the traditional culture is disappearing. Hence, documentation traditional practices of herbal medicine will be coherence in future. There is an urgent need to study and document the precious knowledge of antihyperlipidemic medicinal plants. Scientific investigations through the evaluation of these antihyperlipidemic medicinal plants for their biological activity and isolation of phytoconstituents responsible for their medicinal properties which will give a let to develop new natural drugs molecules and research for the welfare of human beings.

Acknowledgements

The authors are thankful to informants, traditional medicine men and practitioners who provided the information and sharing their knowledge on antihyperlipidemic medicinal plants and species identifications.

References

1. Alagesboopathi C. Ethnomedicinal plants used for the treatment of snake bites by Malayali tribals and rural people in Salem district, Tamil Nādu, India. International Journal of Bioscience. 2013;3(2):42-53.
2. Chaudhuri HN, Trivedi GN. On the occurrence of some medicinal plants in West Bengal. Bull. Botanical Survey of India. 1976;18(1-2):161-165.
3. Gamble JS. Flora of the Presidency of Madras. Vols.1-3. Calcutta: Botanical Survey; c1991.
4. Henry AN, Kumari GR, Chithra V. Flora of Tamil Nadu, India, vol.1-3. Coimbatore: Botanical Survey of India; c1987.
5. Jain JB, Kumane SC, Bhattacharya S. Medicinal flora of Madhya Pradesh and Chhattisgarh: A Review. Indian Journal of Traditional Knowledge. 2006;5(2):237-242.
6. Jain SK, Sikarwar RL. Prospective under Utilized Bioresources - Clues from Indigenous knowledge in Latin America. Journal of Indian Botanical Society. 1997;76:253-260.
7. Jain SK. The role of botanist in folklore research. Folklore. 1964;5(4):145-150.

8. Jain SK. Studies in Indian ethnobotany: Less known uses of fifty common plants from tribal areas of Madhya Pradesh. Bull. Botanical Survey of India. 1963;5(3-4):223-226.
9. Jain SK. Medicinal plant lore of the tribal of Baster. Economic Botany. 1965;19(3):236-250.
10. Jain SK. Glimpses of Indian Ethnobotany. Oxford and IBH Publishing Co., New Delhi; c1987.
11. Jain SK. Ethnobiology in Humanwelfare. Deep Publications, New Delhi; c1996.
12. Jain SK. Dictionary of Indian Folk Medicine and Ethnobotany. Deep Publications, New Delhi; c1991.
13. Kumar A, Pandey R. Tribals and utility of the medicinal plants in their day to day lives in Santhal Pargana, Bihar. Ecology and Environmental Conservations. 1998;4(1-2):65.
14. Kumar R, Suman NR, Dash SS. Traditional uses of plants by tribals of Amarakantak region, Madhya Pradesh, India. Journal of Traditional Knowledge. 2004;3(4):383-390.
15. Manjunatha G, Suryanarayana V, Dasar GV, Patil SK, Hedge N. Important Indigenous tree species of medicinally important and their utilization in Uttara Kannada district (Karnataka). My Forest. 2009;45(4):475-484.
16. Mathew KM. The Flora of the Tamil Nadu Carnatic. Tiruchirappalli, India: The Rapinat Herbarium, St. Joseph's College; c1983.
17. Mathew KM. The Flora of the Palani Hills. South India. Tiruchirappalli, India: The Rapinat Herbarium, St. Joseph's College; c1999.
18. Mohamed K, Koriem M. Antihyperlipidemic activity of the medicinal plants among Kadazan and Dusun communities in Sabah, Malaysia: A review. Asian Pacific; c2014.
19. Murthy EN. Ethnomedicinal plants used by Gonds of Adilabad district, Andhra Pradesh, India. International Journal of Pharmacy & Life Sciences. 2012;3(10):2034-2043.
20. Nair NC, Henry AN, Kumari GR, Chitra V. Flora of Tamil Nadu, India. Vol. I. Coimbatore, India: Botanical Survey of India, Southern Circle; c1883.
21. Namsa ND, Mandal M, Tangjang S, Mandal SC. Ethnobotany of the Monapa ethnic group at Arunachal Pradesh, India. Journal of Ethnobiology and Ethnomedicine. 2011;7:31.
22. Sharma PP, Majundar. Traditional knowledge on plants from Tormal Plateau of Maharashtra. Indian Journal of Traditional Knowledge. 2003;2:292-296.
23. Sinha RK. Ethnobotany the Renaissance of Traditional herbal medicine. Ina Shree Publisher, Jaipur, India; c1996. p. 242.
24. Vinoth B, Manivasagaperumal R. Ethnomedical Value of Plants in Nagapattinum District of Tamil Nadu, India. International Letters of Natural Sciences. 2014;17:103-110.
25. WHO. In Progress Report by the Director General, Document No.A44/20, 1991 Mar, 22nd.
26. WHO. Guidelines on the Conservation of Medicinal Plants. Switzerland: IUCN, Gland; c1993.