PROJECT ON

INDIGENOUS USES OF PLANTS AS MEDICINAL AND SOCIO RELIGIOUS RESOURCES IN MAHE (U.T. OF PUDUCHERRY)

By

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FORWARD

I am happy to note that the PG Department of Plant Science has undertaken a research project on Indigenous Uses of Plants as Medicinal and Scio Religious resources in Mahe, U.T of Puducherry, funded by Dept. of Science Technology and Environment, Govt. of Puducherry

The research team headed by Dr. K.K Sivadasan, Principal Investigator, Associate Professor of Botany and Mr. Girish Kumar E, Co-investigator, Assistant Professor of Botany, PG Department of Plant Science, Mahatma Gandhi Govt. Arts College, Mahe has undertaken extensive study on the indigenous uses of plants medicinal and socio-religious resources.

The data generated through this research project will be useful for Mahe and Puducherry administration, environmentalist, traditional herbal medical practitioners, researchers and students, NGOs, Policy makers and others who are involved in conservation of biodiversity and research in the field of identification of new drugs.

I congratulate the research team for successful completion of the research project which has direct value in herbal medicines and indigenous culture. I thank Department of Science Technology and Environment, Govt. of Puducherry for the financial support.

PRINCIPAL

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6	Abstract The present work reveals detailed studies on plants utilized in indigenous herbal medicines for various ailments, post natal care of mother and child and analysis of their potentialities based on the available phytochemical and pharmacological studies. The study further gives thrust on plants used in socio religious functions including traditional cultural activities like Theyyam and survey on the availability and conservation of these plant resources. A seminar was conducted to give awareness regarding the finding of the project, value added products like squaline, cultural heritage and importance of conservation of plant resources.	
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Preface

Chapter 1

Indigenous Medicines and Nutraceuticals

Chapter 2
Socio religious uses of plants

PREFACE

Interest on evaluation and documentation of indigenous knowledge on plants as resource of medicines and nutraceuticals is increasing in both developing and developed countries. The world Health Organization (2003) has estimated that 80% population of the developing countries is unable to afford pharmaceutical drugs and rely on traditional herbal medicines to sustain their primary health care needs. In fact it is well known that, even in developed countries the use of traditional medicines is quite prevalent. Modern pharmacopeia still contains at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. India has a long history of health practices depending on the medicinal plants which are of three types, namely Ayurveda, Nattuchikitsa (local or indigenous medicines and treatment) and Gothrachikitsa (Tribal medicines and treatment). Over the last century, the tribal medicine (ethno botany) has evolved into a specific discipline, which threw light on the people–plant relationship in a multidisciplinary manner in the perspective of ecology, economic botany, pharmacology and public health. Herbal medicines are assumed to be of great importance in the primary healthcare of individuals (Rasiya Begum and Nayar, 2011) and communities in many developing countries as the herbal medicines are comparatively safer than synthetic drugs. Plant-based traditional knowledge has become a recognized tool in search for new sources of drugs and nutraceuticals (Sheldon et al., 1997, Ghosh, 2003). As a result, the trade of herbal products in the national and international market is also growing as nutraceutical or pharmaceutical ingredient. In India Ayurveda treatment is more popular in Kerala and in many cases the treatment is influenced by traditional folk medicines including '*marma*' and '*kalari*'. The medicinal plants used in Indian Systems of Medicine, *Ayurveda*, *Unani* and *Siddha* are well documented. There are over 45,000 species of vascular plants reported from India. Of these more than 10,000 plants were known as either ayurvedic or ethnic medicines. Though utilization of biodiversity as a medicinal resource is well documented for Indian System of Medicine – Ayurveda, very little research works were carried out for the documentation of plants used for traditional medicinal practices by the indigenous communities. It is interesting to note that when Ayurveda was vested with Brahmins or few upper caste people and the indigenous people were kept away from even studying

scripts, these indigenous people practiced their own herbal medicines and this treasure of knowledge may have developed parallel to Ayurveda or even before the development of Ayurveda. Along the social reformation, indigenous people also got opportunities to study Ayurveda. Indigenous knowledge on herbal medicine is used for all kinds of health care such as cold, cough, sprain, rheumatism, spondylitis, bone fractures, snake bites, pre and post natal care of mother and child etc., In addition to the importance in health care, plants are used as an important ingredient for various cultural activities including customs and tradition, rituals, worships, decorations, folk lore costumes etc., The direct local use of plant resources contributes to the preservation of species and habitats and can be used as the basis for conservation policies centered on indigenous management regimes and utilization.

Based on traditional knowledge on medicinal plants, pre and post natal care of mother and the child is practiced among the people of *Mahe* and Kerala along with modern medicine. This 'women folk knowledge' on health care is the part of indigenous medicine or '*nattuchikitsa*'. Experienced elderly women still continue to play a vital role in mother and child care in rural areas. It is customary to bring pregnant ladies to their ancestral homes on 7^{th} month of pregnancy to get proper care under the supervision of mother and or other senior ladies of the house. Mother and child will be sent back to in-law's home when baby is 3 month old. Earlier deliveries were attended by traditional birth attendants, who will also help to supervise pre and post natal care. Presently pre and post natal care of mother and child is confined to certain traditional nutraceuticals, medicated bathing water and medicines for abdominal pain and accumulation of gas. It is a tradition that during *Karkitaka* (a Malayalam month during South West monsoon) people prepare a nutraceutical porridge supplemented with Trigonella and may or may not be modified with medicinal plants parts for the rejuvenation and enhancement of defense mechanism.

The concept of religion and culture are equally vague and full of complexities and ambiguities. Thoughts about religion brings to our mind ideas about god, worship, festival, belief, rituals, customs and traditions etc., But none of these constitute the essence of religion. Religion is to be understood as a practical system of belief in something which human beings consider to be beyond themselves and which binds them together so as to organize their life into some sort of

socio religious community (Basil, 2004). There were two main categories of shrines in Kerala, *kshetras* and *kavus (sacred groves)*. The first category, the *kshetras* are dedicated to deities of the Hindu pantheon, Siva, Vishnu, their consorts and incarnations and to Ganapathi. The second category of *kavus* are shrines of dieties like Bhadrakali, Vettakkorumakan, Ayyappan, and non-brahmin dieties like Muththappan, Kuttichathan (Innes and Evans 1908), Sarpa (snake god) etc.,. Kavus also served the purpose of preserving the equilibrium of ecology. All these shrines were later under the control of Brahmins and other upper caste people. Members of Scheduled caste, once considered as untouchables and even slaves are the traditional artists meant for folk performance *Theyyam*, a form of god in *kavus* and devotees are worshiping the artist with costumes regardless of his caste and rush to him for the blessings and to tell their agonies and happiness to the deity. This may indicate that these shrines may be once praying places of these indigenous people. All costumes are preparing by these artists during off season by using light wood from Erythrina and during the performance body is decorating with tender coconut leaves. Other cultural or social performances were connected to harvest or agriculture. For all these social performance the major ingredients are of plant or animal in origin. People uses plants for the purpose to fulfill worships, customs and traditions, rituals, festivals and other socio religious uses.

In Mahe also plant resources are utilizing for the indigenous health care such as healing of fever, skin diseases, orthopedic treatments, gynecology, and pre and post natal care of mother and child and for the socio religious functions and traditional cultures. But documentation to preserve the treasure of knowledge and scientific evaluation of such information found to be scanty. In these circumstances a research project proposed to Department of Science Technology and Environment, Government of Puducherry by Dr. K.K Sivadasan and Girish Kumar E, PG Department of Plant Science with following objectives:

Objectives

- Collect the information from the local old people regarding the utility values of plants in indigenous medicines and social values.

- Identify the plants used for various crude drugs and in various cultural activities including plants used in custom and traditions and other religious functions.

- Phytochemical analysis of selected medicinal plants to evaluate the chemical basis for the nutraceutical and pharmaceutical potentialities of the plants using in indigenous health care.

- Survey of the availability of the plants used for indigenous medicines and socio religious functions.

- Conduct awareness programme for the conservation of phytodiversity at least related to indigenous uses.

Department of Science Technology and Environment, Government of Puducherry selected the project and grant was sanction and released. As the project work carried out on indigenous knowledge on herbal medicine and socio religious functions, the team spent more time with informants to collect valuable information from the unexplored treasure of knowledge. *The crude preparations explained here is not for the purpose of direct use by the readers but for the purpose of documentation and further detailed research. However all the preparations explained here are based on the direct uses by indigenous people in the area. If any commercial product is bringing out from this project, due privilege should be given to the local informants as per the biodiversity policies of Government of India.*

The project report contains four chapters giving emphasis on Indigenous herbal medicines and nutraceuticals, socio religious uses of plants, phytochemical studies of selected plants and survey on the availability of plant resources and need of conservation.

CHAPTER 1

INDIGENOUS MEDICINES AND NUTRACEUTICALS

1.1. INTRODUCTION

Interest on evaluation and documentation of indigenous knowledge on plants as resource of medicines and nutraceuticals is increasing in both developing and developed countries. The world Health Organization (2003) has estimated that 80% population of the developing countries is unable to afford pharmaceutical drugs and solely rely on traditional herbal medicines to sustain their primary health care needs. In fact it is well known that even in developed countries the use of traditional medicines is quite prevalent. Modern pharmacopeia still contains at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. As a result, the trade of herbal products in national and international market is also growing. India has a long history of health practices depending on the medicinal plants which are of three types, namely Ayurveda, Nattuchikitsa (local or indigenous medicines and treatment) and Gothrachikitsa (tribal medicines and treatment). Over the last century, the tribal medicine (ethno botany) has evolved into a specific discipline, which could throw light on the people–plant relationship in a multidisciplinary manner in the perspective of ecology, economic botany, pharmacology and public health. Folk herbal medicines have recently been receiving heightened interest all over the world. Such age old healthcare systems have been developed in different corners of the world where people live in close interaction with nature (Katawa and Galav, 2005). Herbal medicines are assumed to be of great importance in the primary healthcare of individuals (Rasiya Begum and Nayar, 2011) and communities in many developing countries as the herbal medicines are comparatively safer than synthetic drugs. Plant-based traditional knowledge has become a recognized tool in search for new sources of drugs and nutraceuticals (Sheldon et al., 1997, Ghosh, 2003). Kerala is known for Ayurvedic treatment and in many cases the treatment is influenced by traditional folk medicines, '*marma*' and '*kalari*'. The medicinal plants used in Indian Systems of Medicine, *Ayurveda*, *Unani* and *Siddha* are all well documented. There are over 45,000

species of vascular plants reported from India. Of these more than 10,000 plants were known as either ayurvedic or ethnic medicines. Though utilization of biodiversity as a medicinal resource is well documented for Indian System of Medicine, Ayurveda, very little research works were carried out for the documentation of plants used for traditional medicinal practices by the indigenous communities.

1.2 MATERIALS AND METHODS

Mahe (Fig.1), a coastal region of U.T of Puducherry is situated on the west coast of Indian Peninsula between $11^0 42'$ and $11^0 43'$ Northern latitude and 75^0 31' and 75^0 33'. Eastern longitude surrounded by Kannur and Kozhikode districts of Kerala. The health care data were collected through frequent field visits and interviews with aged people to gather knowledge on indigenous use of plants for pre and post natal mother and child care, cough, cold and other ailments. Ingredients of each formulation, details of method of preparations, dosage, restrictions if any and way of administration of herbal preparations etc., were collected. Collected information regarding the plant resources used for the health care via indigenous medicines and nutraceuticals were analysed for their binomial, family and other usefulness based on the standard literatures.

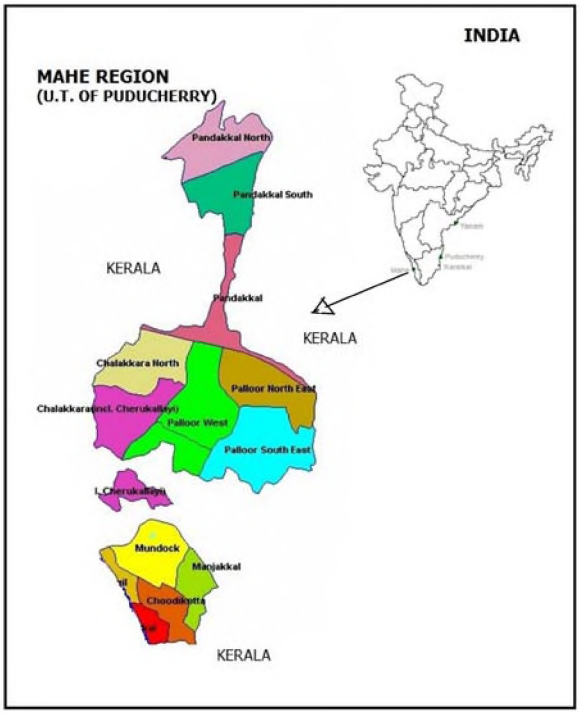


Fig.1

1.3 RESULTS AND DISCUSSIONS

From the period of civilization, man had tried to identify the plants and animals around him, their potential use and means to domesticate the useful part of biodiversity. Identification of crop plants, medicinal plants, domestic animals etc., has paved way for social life. Identification of medicinal values, preparation of crude drugs, proportion of each plant for the drug and selection of the plant parts were done by the forefathers and such information were transferred from generation to generation. Before the formation of religion and caste, such knowledge were distributed to all. But unfortunately in India along with implementation of casteism and caste related slavery, restrictions for the sharing of knowledge had evolved and the castes, termed as lower castes, were prohibited from reviewing the script to know the treasure of knowledge in various areas. Though restrictions were evident, the knowledge gathered by indigenous people were transferred through "dialogues and conversations", within the races. But other races had no restrictions on documenting the knowledge gathered by the society. Unfortunately documentation of such traditional indigenous knowledge and scientific evaluation is scanty. In this context, indigenous herbal medicines for various ailments, pre and post natal care of mother and child, nutraceuticals used by the people of the area, analysis of potentialities of such uses with the help of reported information on phytochemistry, pharmacology and pharmacognosy of the herbs used were explained in detail.

1.3.1 PRE POST NATAL CARE OF MOTHER AND CHILD

Traditional knowledge on medicinal plants for pre and post natal care of mother and the child is practiced among the people of Mahe and Kerala along with modern medicine. This '**women folk knowledge**' on health care is the part of indigenous medicine or '*nattuchikitsa*'. Experienced elderly women still continue to play a vital role in mother and child care in rural areas. It is customary to bring pregnant woman to their ancestral homes on 7^{th} month of pregnancy to get proper care under the supervision of mother and or other elderly women of the house. Mother and child will be sent back to in-law's home when baby is three month old. Earlier, deliveries were attended by traditional birth attendants, who will also help to supervise pre and post natal care. Presently pre and post natal care of

mother and child is confined to certain traditional nutraceuticals, medicated bathing water and medicines for abdominal pain and accumulation of gas.

1.3.1.1 PRE NATAL CARE

On 7th month of pregnancy, ladies will be brought to their own ancestral house for pre and post natal care. Pre natal care is mainly concentrated on general health, reduction of morning sickness and to improve general health and physical changes for easy delivery. Herbal preparations used in indigenous medicines are either from a single plant (single preparations) or a mix of different plant materials (compound preparations).

1.3.1.1a. Single preparations

***Aegle marmelos* (Koovalam),** Fam. Rutaceae

Decoction prepared in 200ml of water with about 25gm of roots is taken twice a day to reduce morning sickness.

From the literature it is known that the plant is used traditionally for the treatment of jaundice, constipation, stomach ache, diarrhea, dysentery, fever, asthma, inflammation, acidity, ulcers, eye diseases, thyroid disorders (Dinesh et al., 2011, Sharma et ., 2011 Chakraborthy et al., 2012,). Phytochemical and pharmacological studies have shown that leaf extract has antidiabetic, antiproliferative, hepatoprotective and antifertility effects (Vijay et al., 2010).

***Aerva lanata* (Cheroola),** Fam. Amaranthaceae

Whole plant decoction is mixed with one glass of cow milk and boiled till it reached the volume of the milk. Half or one glass of this is consumed in the early morning and evening from 7th month of pregnancy for smooth delivery. Similar type of administration is also mentioned in Ayurveda.

There are reports of traditional use of *Aerva lanata* as expectorant, diuretic and anthelmintic, antidiabetic, antihyperglycemic, anti-hyperlipidemic and anti-inflammatory agent. The plant is used for arresting hemorrhage during pregnancy, headache, to dissolve kidney and gall bladder stones, for uterus clearance after delivery and to control excessive lactation. Medicinal properties may be due to the presence of various secondary metabolites such as flavonoids, alkaloids, steroids, polysaccharids, tannins, saponins etc. (Rajesh et al., 2011, Devi Rajeswary et al., 2012, Aruna et al., 2013). In many parts of India it is used for the nephropathic treatment and against kidney stone. Experimental evidences on animals

(Annie et al., 2004) support the use of the plant as nephroprotecitve agent. Similarly hepatoprotective role of *Aerva lanata* was also experimentally proved in hepatotoxic rats (Manokaran et al., 2008).

***Bacopa monnieri* (Brahmi)** Fam. Scrophulariaceae

Fresh, three tea spoon of whole plant juice is given orally twice a day to pregnant ladies for getting relief from the abdominal pain. Whole plant decoction is given for increasing foetal growth.

Bacopa preparations are normally used in Ayurveda and other indigenous herbal preparations as neurotonic, memory enhancing, anti-inflammatory, analgesic, antiepileptic agent. Results of many of the pharmacological studies supported that *Bacopa monnieri* had many pharmacological effects (Ali Esmail, 2013) which include central nervous system effects, antioxidant, gastrointestinal, endocrine, antimicrobial, anti inflammatory, analgesic and cardio vascular effects. Phytochemical studies have shown that Bacopa contains many active constituents (Misra et al, 2009) such as alkaloids like Brahmin, herpestine, saponins, steroidal saponins, Bacosides A and B (the major chemical constituent believed to be having memory enhancing action) (Chatterji et al., 1965).

***Biophytum sensitivum* (Mukkutti),** Fam. Oxalidaceae

About 100gm of plant paste is cooked with a mixture of 50gm rice flour and palm sugar and taken internally 2-3 times daily to improve general health.

Biophytum is used traditionally in a number of ailments such as joint pains, inflammations, fever, malaria, wounds, stomach ache, diabetes, gonorrhea, tuberculosis, convulsion, tumor, burns, asthma, insomnia, arthralgia, cervical spondylitis, degenerative joint diseases, degenerative neck diseases etc., (Teja Sri et al., 2013). Phytochemical studies have shown that the major pharmacologically active constituents are amentoflavone and a polysaccharide fraction, BP 100 III. Pharmacological studies showed that Biophytum has antioxidant, immunomodulatory, anticancerous, anti-inflammatory, chemoprotective, antidiabetic and wound healing potential.

***Cocos nucifera* (Thengu),** Fam. Arecaceae

50gm inflorescence paste cooked with a mix of 100gm rice flour and palm sugar is eaten 2-3 times daily for improved general health.

It is quite evident that the flowers or inflorescence had potent therapeutic value on the areas of anti bacterial, larvicidal, antioxidant, dietary, anti- inflammatory, hepatoprotective and anticancerous. The phytochemical screening of the flowers demonstrated the presence of alkaloids, flavonoids, phenols, phytosterols, tannins, amionoacids and carbohydrates (Diana and Kanchana 2012).

***Curcuma longa* (Manjal)** Fam. Zingiberaceae

Rhizome juice along with lemon juice and sugar is given orally to women for relief from morning sickness.

Turmeric is a common spice used in India and its wound healing properties is known from ancient period onwards. Pharmacological studies proved that turmeric has got broad spectrum actions and is anthelmintic, hepatoprotective, neuroprotective, anti-inflamatory, anti-allergic, antiasthmatic, anti-diarrhoeal and anticancerous agent. Turmeric is capable of reducing cholesterol, symptoms related with arthritis, cardiovascular diseases, diabetes, respiratory disorders, and cough (Jaggi la, 2012l; Vasvda krup eta al., 2013). Phytochemistry showed presence of alkaloids, carbohydrates, glycosides, phytosterols, saponins, curcumins etc., (Handral et al., 2013).

***Mimosa pudica* (Thottavati)** Fam. Mimosaceae

100gm of root paste is cooked with a mix of 50gm rice flour and palm sugar and consumed 2-3 times daily for general health.

Recent studies proved the effect of root extract for the treatment of gynecological disorders like vaginal and uterus complaints and fatigue (Srivastava et al, 2012 and Joseph et al., 2013), bleeding (Gunvanti and Sheth, 1986) and even for checking child birth (Srivastava, et al., 2012). Mimosa is also used for the treatment of leprosy, dysentery, inflammation, burning sensation, asthma, leucoderma and blood diseases. The plant contains a toxic alkaloid mimosine but its effect was not properly evaluated. The phytochemical screening showed the presence of bioactive compounds such as terpenoids, flavanoids, glycosides, alkaloids, quinines, phenols, tannins, saponins and coumarins (Gandhiraja et al., 2009).

***Moringa pterygosperma* (Muringa)** Fam. Moringaceae

100ml of decoction of leaves with sugar is taken 1-3 times daily for developing appetite.

This cultivated edible plant is used as antispasmodic, stimulant, expectorant and nutraceutical. Pharmacologically it is antimicrobial, anti-inflamatory, analgesic, anticancer, antifertility, hepatoprotective, cardiovascular, antiulcer, antiallergic, and antioxidant agent. Phytochemical studies showed that it contain glycosides, phenols, sterols and flavanol glycoside (Garima Mishra et al., 2011).

***Punica granatum* (Mathalam/ Urumampazham)** Fam. Punicaceae

Seed juice along with liquorice, honey and ghee are taken daily for easy delivery.

Punica granatum has been traditionally used in different countries for the treatment of skin infection. Flowers, fruits and its peeling are used as astringent, haemostatic, antibacterial, antifungal, antiviral, anticancer and as remedy for cut wound, bronchitis, diarrhea, digestive problems, men sex power enhancer, dermal infected wounds and diabetes. Pomegranate is used as antiparasitic agent, a blood tonic and to heal aphthae and ulcers (Julie Jurenka, 2008, Chakraborty Manodeep et al.,2012). This hepatoprotective resource (Akram Jamshidzadeh et al., 2012) is normally used to improve haemoglobin in blood. Phytochemical studies showed that the major constituents are ellagic acid, ellagitannins, punicic acid, flavanoides, anthocyanidins, anthocyanins and estrogenic flavanols and flavones (Garachh Dipak et al., 2012).

1.3.1.2 POST NATAL CARE

Earlier, deliveries were monitored by traditional birth attenders and they were considered as treasures of the knowledge on traditional pre and post natal care of mother and child. Nowadays deliveries are in the hospitals and the mother and child will be brought to ancestral house of mother for natal care. Indigenous care will be started either on 5^{th} day or 15^{th} day depending on the nature of delivery; whether normal or caesarian. Based on the recommendation of the gynecologist certain precautionary measures are followed for mother and child care.

Post natal care found to be concentrated for curing body ache, to check the bleeding from uterus, to clean uterus, to rejuvenate the body, enhancing lactation and improving general health.

1.3.2a Single preparations

***Adhatoda vasica* (Atalotakam)** Fam. Acanthaceae

Half a glass leaf extract is mixed with boiled water and is given daily after delivery for curing body ache. In Ayurveda Adhatoda is used for cough and respiratory related problems.

In Ayurveda the plant has been used for the treatment of bronchitis, leprosy, blood disorders, heart troubles, sore eyes, fever and gonorrhea (Sampath kumar, et al., 2010). Indigenous people also used the plant for the purpose to treat cough and cold (Kharaijam et al., 2013) and mode of preparation of decoction is found to be different. Adhatoda contain alkaloids, tannins, saponins, phenolics, flavanoides, micro and macro elements such as potassium, calcium, iron, copper, zinc, chromium, vanadium and manganese indicating the therapeutic efficacy and potentiality to develop future medicines (Manoj kumar et al., 2014).

***Capsicum frutescence* (Kanthari mulaku)** Fam. Solanaceae

Fruit is mixed with dried coconut and the paste is along with food to clean the uterus after the delivery.

***Clitoria ternatea* (Sankupushpam)** Fam. Fabaceae

White flowers of the plant crushed and mixed with honey are taken 2 teaspoonful daily in early morning to clean the uterus after delivery and also to check the bleeding from uterus.

The juice of the flower is reportedly used in insect bites and skin diseases, the paste of the flowers is applied to cure infections of eyes and the entire plant is used as antidote for snake bite (Nandkarni, 1954). Experimental evidences have proved that the extract of flowers is analgesic and antiinflamatory (Shyamkumar and Bhat Ishwar, 2012) and hepatoprotective (Kuppan Nithianantham et al., 2013) in nature. It is reported that flower contain delphinidin-3, 5-diglucoside, delphinidin-3β-glucoside, kaemphferol and P-coumaric acid (Anonymous, 2005). All plant parts are medicinally important and this may be due to the presence of various active principles such as terpenoid, flavonoid, tannin and steroids. The major phytoconstituents found in the plant is pentacyclic triterpenoids such as taraxerol and taraxerone (Trease and Evans, 1983). Chauhan et al., 2012 reviewed various phytoconstituents present in different parts of the plant.

***Curculigo orchioides* (Nilappana)** Fam. Hypoxidaceae

Fresh tuberous root paste mixed with one glass of cow milk is taken orally to get relief from stomach pain after delivery.

The rhizome, as well as tuberous roots of the plant has been extensively used in indigenous medicine in India, Pakistan, China and some other Asian countries for the treatments of asthma, skin diseases, bronchitis, jaundice, cancer, and diarrhea. The plant is used as nutritive tonic and used as agent of cooling, diuretic, aphrodisiac. The active compounds reported are flavones, glycosides, alkaloids, steroids, saponins, triterpenoids, tannins, cardiac glycosides, and other secondary metabolites (Asif, 2012, Patil et al, 2012).

Gynecological applications were not reported earlier but its antiinflamatory effects were experimentally proved (Asif and Ankush kumar, 2010).

***Evolvulus alsinoides* (Vishukranthi)** Fam. convolvulaceae

Flower ground with honey is taken orally to avoid excess bleeding after delivery.

Reviews showed that the plant was used as antipyretic, antiseptic, aphrodisiac, febrifuge, stomachic, tonic and vermifuge agent. The plant is used in East Asia, India, Africa and Philippines to treat dysentery, fever, cough, cold, haemorrhage, asthma, bronchitis, venereal diseases such as syphilis and for controlling 'night emissions' and to promote wound healing (Singh 2008, Lekshmi and Reddy, 2011, Omogbai and Eze, 2011). Phytochemical studies showed that the plant contain anthraquinones, phytosterol, polyphenol, tannins, alkaloids, triterpenes, kaempferol-3-O-β-D glucopyranoside, coumarin etc., (Elangovan et al., 2013). Experimental evidence showed that the plant extract is a potent cardioprotective (Sudhakumari et al., 2012) and it may be used for therapy of neurodegenerative diseases due to free radical scavenging property of the antioxidant in the plant (Subrahmanian et al., 2011).

Gynecological applications were not reported earlier.

***Leucas aspera* (Thumpa)** Fam. Lamiaceae

Consumption of ground leaves with palm sugar helps to clean the uterus after delivery.

Leucas aspera is used traditionally as an antipyretic and insecticide. Review showed that the plant is used in pharmacological activities like antificungal, antioxidant, antimicrobial, antinociceptive, cytotoxic activity and an antidote to snake venum (Srinivasan et al., 2011) and to treat typhoid (Sharad, 2014), psoriasis, chronic skin

eruptions, chronic rheumatism (Kirtikar and Basu, 1991). Phytochemical studies showed that the plant contain fatty acid estres, fatty acid amide, triterpene, diterpene, phytol (Anandan et al., 2012), alkaloids, saponins, phenols, flavonoids and glycosides (Latha et al., 2013).

1.3.1.2b Compound preparations

Apart from the single preparation, many compound preparations are used by local communities for post natal care of mother and child. These preparations contain number of herbal ingredients for different formulations, which used for easy digestion, relief from gastric problems, improving health, rejuvenation and sharpening of body, herbal shampoo, medicated water for bath etc., Compound preparations were named in local terms and are **Ullikkatti, Mukkoottu, Mangaram, Vevuvellam, Thahli, Karimazhi** and **Potimarunnu.**

Ullikkatti: Ullikkatti is the first formulation served to mother at home on 5th day or 15th day of delivery depending on nature of delivery whether it is normal or cesarean for 3 to 5 days. Half of the preparation will be consumed in the morning in empty stomach and remaining half in the evening. 25 gm. Garlic (*Allium sativum*) and equal quantity of small onions (*Allium cepa*) are fried in a pan with scrapings of Jagiri (vellam) from *Saccharum officinale* or palm sugar (Chakkara) from *Borassus flabellifer*. Padmasalia community does not use small onion. Some communities have modified this preparation by adding a table spoon of Jeerakam (*Cuminum cyminum*). *Ullikkatti* which is given for easy digestion and relief from gastric problems

Mukkoottu: The meaning of the term *mukkoottu* in Malayalam is combination of three and as it means the formulation normally contain coconut oil (*Cocos nucifera*), gingelly oil (*Sesamum indicum*) and turmeric powder (*Curcuma longa*). Some people use only coconut oil and turmeric powder to make this massaging oil. Others have modified the formulation by adding ground Uluva (*Trigonella foenum – graecum*) and ghee. This formulation is boiled to remove the water content if any and after cooling, the oil will be kept in air tight bottles. Oil massaging is done half an hour to 2 hours before bath. This oil massaging is believed to be capable of shapening the body of new borne and to reinstate the relaxation of abdominal muscle of mother. But for the baby oil message is normally done just before bath.

Mangaram: *Mangaram* is a fibrous paste like combination of bark of mango tree (*Mangifera indica*) as a major ingredient and use in the place of soap and scrubber. In one formulation, bark of mango tree and fresh turmeric (*Curcuma longa*) are ground together with little amount of curd and in some formulations bark of Moringa (*Moringa pterygosperma*), entire Panal (*Glycosmis pentaphylla*) and twine of Kurumulaku (*Piper nigrum*) are added additionally. Some groups prepare *mangaram* by dried powder of the bark of mango tree mixing with turmeric and curd. *Mangaram* is found to be replaced by green gram (*Vigna radiata*) powder by some people.

Vevuvellam: Medicated bathing water known as *vevuvellam* is prepared by boiling water with *nalppamaram* barks of four trees such as Aththi (*Ficus glomerata*), Iththi (*Ficus gibbosa*), Arayal (*Ficus religeosa*) and Peral (*Ficus benghalensis*). Studies showed (Mandal et al., 2010, Padmaa, 2009) that the barks of these species of Ficus are antibacterial, analgesic and anti-inflammatory. Addition of the bark of Pachhotti (*Symplocos cochinchinensis* ssp. *laurina*) is recommended in Ayurveda along with *nalppamaram* and then the combination will be known as *Panchavalkam*. Some of the formulation was observed with same combination, modified by the addition of Ramachcham (*Vetiveria ziznioides*) and or Mattal (mid vein of leaf of *Cocos nucifera*). Another formulation is by using leaves of Panal (*Glycosmis pentaphylla*), Kurumulaku (*Piper nigrum* var. *nigrum*), Mavu (*Mangifera indica*), and Pilavu (*Artocarpus integrifolius*). Some of the formulations are same as explained by Rajith et al., 2010 from South Kerala.

Thahli: Thahli is the shampoo, which normally prepared from the leaves of Chembaruthi (*Hibiscus* sp.) and some communities use leaves of Patakizhangu (*Cyclea peltata*) or Kurunthotti (*Sida rhombifolia*).

Karimazhi (Kanmazhi): Black eyebrow paste locally known as Karimazhi is prepared by accumulating soot from the flame of sun dried cotton cloth pieces (which were soaked in lime, *Citrus medica* var. *acida* juice) in gingelly (*Sesamum indica*) oil. The flame is allowed to make black soot on earthen thatching tiles or on pieces of earthen pot and this black powdery material is made into a paste with the help of gingelly oil and use to darken eyebrow and bindhi (Pottu) of mother and child. In some cases along with lime juice extract of Tulsi (*Ocimum tenuiiflorum*) is also added to soak cotton clothes.

Potimarunnu: Potimarunnu an indigenous nutraceutical is served to mother twice in a day from 15th or 18th day onwards after delivery. High diversity was observed for potimarunnu combinations among the people with regard to communities and regions. Cereals and pulses are the main ingredients used along with some medicinal and or spices and condiments. 14 types of combinations (Table-1 and 2) are popular in this area. Among the major communities, high diversity in the combinations of potimarunnu is observed in Thiyya communities while Muslim communities do not show much variation. Thiyya community usually seeks groom or bride from nearby areas of Kannur and Kozhikode districts and hence this women knowledge on indigenous potimarunnu will be transferred from the location of the bride, when she became a mother and looked after by elderly women of the ancestral house. Muslim communities follow the custom of staying of daughters and their families with maternal ancestral house and the post natal care of mother and the child is generally looked after by common experienced old ladies. Other communities are lesser in number and hence representative information only was collected.

Among the formulations studied for potimarunnu (Table 1 & 2), Dheevara community and one among the combinations of Thiyya community (1TH Pnd 1) show much difference in their combinations compared to other formulations. The formulations of Dheevara do not include cereals and gram, various medicinal plants or spices and condiments instead contains. Thiyya of Pandakkal (1TH Pnd1) used grains and grams for the formulation without spices and condiments or medicinal plants. Viswakarma modified the potimarunnu by the addition of Kayam (*Ferula asofoetida*). Out of 32 plant species used as the ingredients of various combinations of potimarunnu Gothambu (*Triticum aestivum*), Uzhunnu (*Vigna mungo*), Uluva (*Trigonella foenum-graecum*), Thettamparal *(Strychnos potatorum*), Jeerakam (*Cuminum cyminum*) and Ellu (*Sesamum indicum*)are used in all combinations along with Jagiri (*Saccharum officinarum*) or palm sugar (*Borassus flabellifer*) and Kothampalari / Malli (*Coriandrum sativum*), Karimjeerakam (*Nigella sativa*), Sathakuppa (*Anethum graveolens*) and Manjal (*Curcuma longa*) are present in 90% combinations. Thus these 11 species can be considered as the base of all combinations and remaining combinations are found to be modified by adding either cereals or pulses or medicinal plants. Among these *Triticum aestivum* and *Vigna mungo* are the major source of carbohydrate and protein. Other nine ingredients are either known as

astringent, refrigerant, demulcent, emetic, diuretic, digestive, stomachic, anthelmintic, aphrodisiac, ophthalmic, appetizer, tonic, relieve colic and used as remedy for constipation and insomnia, as well as for easing pain of child birth (Sharma and Mujundar, 2003), protective roles (Verma et. al., 2011 and Arun Kumar et al., 2011), cholesterol lowering (Leena Kansal, et al., 2011) and contain ascorbate and folate content. The phytochemical studies (Joshi et al., 2012 Mallikarjuna et al., 2007 and Shanmugha Priya and Subrahmanian, 2006) support the chemical basis for the wide use of these plants as therapeutic agent for treating various ailments in folk medicine. These indicate that potimarunnu is not a simple nutraceutical, but an integrated food supplement with pharmaceuticals.

Potimarunnu, herbal combinations which are used by the people from time immemorial for the purpose to rejuvenate the mother from physical and hormonal changes were not mentioned in Ayurveda as a part of post natal care of mother (*soothikacharya*). But some of the ingredients used in potimarunnu are obviously ingredients of various ayurvedic preparations. This may indicate that this indigenous health knowledge may be developed in parallel to Ayurveda. All ingredients are fried separately and then powdered to make *potimarunnu*. The nutraceutical preparation in south Kerala known as *Kurukkumarunnu* (Rajith et al., 2010) is different in their combination even though it is used for post natal care.

Pettulehyam is a modified Potimarunnu formulation by cooking the powdered ingredients with coconut milk and ghee. In some preparations *Strychnos potatorum* and *Trigonella foenum- graecum* are ground separately after soaking in water and the filtered semi solid extract will be boiled and other powdered ingredients will be added to make pettulehyam. Some serve 'Uluva kanji' (*Trigonella foenum-graecum*) for few days before the start of potimarunnu to mother.

Traditional knowledge on medicinal plants for pre and post natal care of mother and the child is practiced among the people of Mahe along with modern medicine. This 'women folk knowledge' on health care is the part of indigenous medicine or '*nattuchikitsa*'. Presently the initiation of the post natal care varies in days with the type of delivery, whether it is normal or cesarean and starts with a formulation of onion and garlic, *ullikkatti* which is given for easy digestion and relief from gastric problems for 3 to 5 days from 3rd

or 10th day onwards depending on the nature of delivery. Massaging of the body of mother and baby will be done with an oil formulation namely, '*mukkoottu*' made up of coconut oil, gingelly oil and turmeric with modifications. This oil massaging is believed to be capable of □shapening the body of new borne and to reinstate the relaxation of abdominal muscle of mother. Medicated water called '*vevuvellam*', which is believed to have wound healing, anti-inflammatory and analgesic properties is used for bathing. Instead of soap, a fibrous paste like combination with the bark of Mango tree as a major ingredient called '*mangaram*' or the powder of green gram is used. An indigenous nutraceutical with pharmaceutical characters called '*potimarunnu'* or '*pettulehyam*' is served twice in a day from 15th or 18th day onwards to mother. High diversity was observed for potimarunnu combinations among the people with regard to communities and regions. Among the dominant communities, maximum diversity is observed in Thiyya community and this may be due to the transfer of knowledge from nearby regions of Kannur and Kozhikode districts of Kerala via marriages and the pregnant ladies will be brought to their ancestral family for pre and post natal care and the nursing of the mother and child will be supervised by senior ladies of the same family. Minimum diversity for the *potimarunnu* combinations is seen among the Muslim community and this may be due to the custom of staying of daughters and their families with maternal ancestral house and the post natal care of mother and the child is generally looked after by common experienced old ladies, *eettukarathikal* for many families. Nearly 46 species of medicinal plants belonging to 43 genera and 23 families are used for the preparation of various formulations including single formulation for ullikkatti, 2 formulations for *mukkoottu*, 2 formulations for *vevuvellam*, 2 formulation for *mangaram* and 14 formulations for *potimarunnu*. Reported phytochemical studies support the chemical basis for the wide use of many of the ingredients of potimarunnu as therapeutic agents or nutraceuticals. All these preparations show variations from that of the preparations for healthcare of mother and child in the practice of Ayurveda, indicating that the development of indigenous knowledge is unique and parallel to Ayurveda.

1.3.1.3 FORMULATIONS FOR CHILD CARE

Various medicinal plants are using for child care and some of common usages are:

***Azadirecta indica* (Veppu)** Fam: Meliaceae

Leaf paste is applied on body for scabies and itching. Leaf extract prepared after moist heating of the leaf used as a remedy for cough with honey or sugar candy.

***Cocos nucifera (*Thengu)**

Coconut oil used for massaging the babies for soft skin. Coconut oil is one of the ingredient of Mukkoottu, which is using for shapening the body of child and mother. Pharmacological and phytochemical reports were supporting the use of coconut oil .

***Curcuma anguistifolia* (Kattu Koova)** Fam. Zingiberaceae

Dried rhizome powder obtained after traditional way of processing boil with water and sweetening with sugar candy using for treatment of dysentery.

Pharmacological and phytochemical studies revealed its medicinal and nutraceutical values. The product is antiinflamatory (Yoshioka et al, 1988), anticoagulant, antimicrobial, anti-allergic and hepato protective agent. It is used in the treatment of diarrhea and contains phenolics, flavonoids and different antioxidants (Guneshwar and Haripyaree, 2012, Gita and Basistha, 2014).

***Plectranthus amboinicus* (Panikoorkka)** *Syn*: *Coleus aromaticus* **:** Fam: Lamiaceae

Leaf extract along with honey or sugar will be given orally to get relief from cough and cold.

This medicinal plant used to treat malarial fever, hepatopathy, renal and vesicular calculi, cough, chronic asthma, bronchitis, helminthiasis, colic convulsions and epilepsy and arthritic inflammations, indigestion, nervous tension, urinary infections and tooth ache. It is reported the presence of triterpinic acid, methyl euginol, thymol, flavones, eucalyptol, chlorogenic acid, rosmarinic acid (Warrier et al., 1995, Prakash et al., 2012, Vaishali et al., 2013).

1.3.2 COUGH AND FEVER

***Adhatoda vasica (*Atalotakam)** Fam: Acanthaceae

The juice of leaves along with cow's milk is consumed for cough and fever. Leaves will be fried with rice and powdered will be given orally 3-4times daily along sugar candy powder. Leaves will be heated in moist condition and the extract mix with honey will be

administrated orally for 2-3 times daily. This will be practiced when cough with excess amount of mucous.

***Allium cepa* (Ulli)** Fam: Liliaceae

The extract of onion with piper nigrum and honey is taken orally for cough. The extract obtaining after 12 hours of the cut onion mixed with scraped jagiri, lime juice and honey. This will give relief from cough and related respiratory problems. Normally formulation will be given morning in empty stomach and evening. 2-3 table spoons extract for kids and 4-6 table spoons for adults.

***Aloe vera* (Kattar vazha)** Fam: Agavaceae

Leaf extract with turmeric and honey is using to get relief from cough and fever.

Traditionally *Aloe vera* gel used for the treatment of wounds, minor burns, skin irritations, constipation, cough, ulcers diabetes, headaches and arthritis (Pankaj et al., 2013). It is reported that marketed as a remedy for cough, gastritis and cancer and is a powerful detoxifier, antiseptic and tonic for the nervous system. Studies showed that Aloe improves digestion and has immune-boosting and antiviral properties. External application of the extract may be effective for genital herpes and psoriasis but injection to the patients suffering from cancer is not effective (Rajeswari et al., 2012). The extract contains a large range of vitamins- vitamin B12, thiamine, riboflavin, niacin, vitamin A, choline, vitamin C, folic acids, carotenes and minerals like boron, calcium, chloride, chromium, iron, magnesium, potassium etc.

***Andrographis paniculata* (Kiriyath)** Fam. Acanthaceae

Whole plant extraction used to reduce fever.

Review studies reported that it is as prominent medicinal herb used in many ayurvedic formulations and folk medicines in India, China and South East Asia. Some of the therapeutic applications are in the use of plant in the treatment of asthma, gonorrhea, piles, dysentery and dyspepsia, blood purification, influenza, gastric complaints, pharyngitotonsilitis, fever, loss of scalp hair, myocardial ischemia, diabetes, jaundice, herpes, tuberculosis and various skin diseases (Dhiman Anju et al., 2012). The plant is immunostimulant, antimalarial, antifertility, anti-inflammatory antityphoid agent (Datta Kumar Animesh et al., 2012), antihyperglycaemic and analgesic antipyretic (Dhiman Anju

et al., 2012). Plant contains andrographolide, diterpenes, flavonoids, xanthones, norridoides (Agbonlahor Okhuarobo et al., 2014).

***Biophytum sensitivum* (Mukkutti)**

The whole plant ground mixed with honey is administrating for cough (see page 5 for other medicinal uses and Phytochemistry).

***Glycosmis pentaphylla* (Panal)** Fam: Rutaceae

The leaf is boiled and taken orally to reduce the fever

In the folk medicine Glycosmis pentaphylla is used in the treatment of diabetes, gonorrhea (Gupta et al., 2011) fever and liver complaints.. Experimental evidences support the plant extract is a potent anti-arthritis and anti-diabetic agent (Ramesh and Vijaya, 2012), antihelminitc (Namita and Pankaj, 2011) and analgesic (Shams Ud Doha et al., 2012). It is reported to contain arborinine (Quader et al., 1999), glycozolicine and glycosamine (Jash et al., 1992).

***Kaempferia galanga* (Kacholam)** Fam: Zingiberaceae

The dried tuber is powdered and given in the dose of 3-6grams thrice a day to reduce prolonged cough and cold. Similar preparation also seen 'Siddha vaidya'

Pharmacological activities of *Kaempferia galanga* such as anti-inflammatory, analgesic, nematicidal, mosquito repellent, larvicidal, vasorelaxant, sedative, antineoplastic and apoptotic, antimicrobial, antioxidant, antiallergic and wound healing properties and the responsible active constituents with the possible mechanism were reviewed (Muhammed et al., 2011). The plant is used traditionally in the treatment of indigestion, cold, pectorial and abdominal pains, headache, stomach ache, nasal blocs and asthma and hypertension. It is reported that the plant contain steroids, triterpenoids, alkaloids, flavonoids, carbohydrates, resin, protein and saponins (Rajendra et al., 2011).

***Ocimum tenuiiflorum* (Thulasi)** Fam**:** Lamiaceae

The leaves boil with black pepper, dried ginger and palm sugar is taken for the relief from cough and cold. The steam from the boiling leaves also practicing to reduce the effect of cold and related nasal problems.

In Uttaranchal similar formulations using for cold and cough with Ocimum, pepper, ginger, cardamom and syzygium (Kala et al., 2005).

***Piper nigrum* (Kurumulaku)** Fam: Piperaceae

Formulation with powdered pepper, dried ginger and Thippali in honey is taken orally to reduce cough and cold.

Pepper is used in Ayurvedic cough syrups for its potent anti-tussive andti bronchodilator properties. It is used as anti-inflammatory, antimalarial, antileukemia agent (Majeed, 1999, Gayatri and Sahu, 2011). Piperin is the major alkaloid present in both *Piper nigrum* and *Piper longum* and responsible for the pungency.

Plectranthus amboinicus* (Panikoorka) Syn. *Coleus aromaticus

Leaf extract with sugar or honey is taken orally. Coleus extract drops placing the center of head is also practicing to reduce the cough and running nose. (other pharmacological uses given in page 14).

***Zingiber officinarum* (Inchi/ chukku)** Fam: Zingiberaceae

A teaspoon of dried zingiber, *chukku* with honey advised for twice or thrice in a day. The combinations were also modified with pepper and Thippali.

Ginger has been using both as Ayurvedic and Chinese medicine for curing heart problems, treat stomach upset, diarrhea, arthritis, lung diseases, nausea, cough and cold, and throat infection. It is also used as a disguise the taste of medicines, promotes the release of bile from the gall bladder. The plant has anticancer, anticoagulant, antiemetic, antiinflamatory, antinociceptive, antioxidant, cardiovascular, gastrointestinal, antiussive, immunomodulatory, antimicrobial, antihypocholesterolemic, antihypolipidemic, antigenotoxic and radio protective effects. (Rajesh kumar Misra et al., 2012, Subhash kumar Gupta and Anand Sharma, 2014).

1.3.3 GAS TROUBLE AND OTHER STOMACH PROBLEMS

***Aegle marmelos* (Koovalam)**

Root paste is used for gastric related stomach problems (see page 4 for further details)

***Azadirachta indica* (Veppu)** Fam: Meliaceae

Paste of seeds of Azadiracta along with leaves of Ocimum, dried ginger and pepper is taken orally twice a day to reduce stomach pain.

Active compounds present in different parts of the plant are antiinflamatory, antiallergenic, antiarthritic, antipyretic, hypoglycemic, antigastric, spermicidal, antifungal,

antiviral, antibacterial, immunomodulatory, cardiac, diuretic, hepatoprotective,antimalarial, and antitumor agents (Debjit Bhowmik et al., 2010, Tomar Lokeshwar et al., 2011).

***Bacopa monnieri* (Brahmi)**

Whole plant juice is administrating for stomach disorders for all age groups. For the young children the extract is preparing after the whole plant covered by plantain leaf and then kept in firewood flame (See page 5 for other details).

***Cardiospermum halicacabum* (Uzhinja)** Fam: Sapindaceae

Leaves are fried and applied on stomach for menstrual disorders and related stomach pain

The plant is used in Ayurveda and folk medicine for the treatment of rheumatism, lumbago, earache, fever, nervous diseases, snake bites, chronic bronchitis (Nandakarni, 1976, Jayanthi et al., 2012) and in hair oil for treating dandruff, alopecia and for darkening hair (Jini Varghese et al., 2010). It is analgesic, anti-inflammatory, antiarthritic, antimicrobial, atifungal, antiparasitic, antipyretic (Syed Atif Raza et al., 2013) and antihyperglycemic (Chinnadurai Veeramani et al., 2012). Cardiospermum reported to have saponins, quebrachitol, apigenin, proanthocyanin, phenolics, and alkaloides (Gopal et al., 2014, Arunkumar et al.,2013).

***Leucas aspera* (Thumpa)**

Leaf extract is taken in the early morning to reduce gas trouble (see page 9 for other uses).

***Zingiber officinale* (Inchi/ chukku)**

Fresh ginger extract with honey or powdered dried ginger is using for indigestion. Chewing of ginger is also found to be practicing to reduce indigestion problems and related stomach pain (for details of other medicinal uses see page 18).

***Punica granatum* (Mathalam)**

Dried bark boiled in water is consumed to cure stomach disorders (see also page 7).

1.3.4 SKIN DISEASES

***Achyranthes aspera* (Katalati)** Fam: Amaranthaceae

Root paste of Achyranthes using as a remedy for stomach pain. Similar treatment is also reported with little modification (Chopra, 1933).

Achyranthes has long been used in the treatment of cancer, leprosy, asthma, fistula, piles, arthritis, sound insect and snake bite, dandruff, hepatitis, renal disorders, dermatological disorders, gynecological disorders, gonorrhea, malaria, fever, cough,

diabetes, opthalmia, rabies hysteria and has been used as antimicrobial, larvicidal, antifertility, immunostimulant, hypoglycemic, hypolipidemic, anti-inflammatory, antioxidant, diuretic, cardiat stimulant, antihypertensive, analgesic, antinoiceptive, and hepatoprotective (Abhijit Dey, 2011). It is reported the presence of saponins A and B, flavanoides, alkaloids, sterols, betain, glycosides, ecdysteron, oleic acids and achranthine (Dwivedi et al., 2008). Achyranthes contain Fe, Cu, Ca and Na and it is expected that these nutrients may also play an important role in maintenance of health (Aparna Saraf and Aruna Samant, 2013).

***Aloe vera* (Kattarvazha)**

The pulp is applied externally for skin diseases, allergies and against itching on abdomen during pregnancy and after delivery. (see page 16 for other details)

***Abrus precatorius* (Kunni)** Fam: Fabaceae

Seed paste is used externally for skin diseases.

Seeds are highly poisonous and in Ayurveda leaves are used as nerve tonic, laxative, expectorant and aphrodisiac agent while the experimental studies on rats showed that crude mixture of seed showed antifertility effects Talukder et al., 2011). Pharmacological studies reported that the plant is antidiabetic, anti-inflammatory, antibacterial, antitumour, analgesic, anti-migrane and antimalarial (Chandrakar and Sharma, 2014, Anant and Maitreyi, 2012). The roots and leaves are reported to contain glycyrrhizin, triterpenoid and abrusosides,

***Aristolochia indica* (Garudamooli)** Fam: Aristolochiaceae

Crushed roots for itching.

The plant is used to treat cholera, fever, bowl troubles, ulcers, leprosy, poisonous bites and also used as emmengogue, abortifacient, antineoplastic, antiseptic, anti-inflammaotry, antibacterial, antioxidant and phospholipase A_2 inhibitor. The plant contain steroids, glycosides, alkaloids, flavonoids, saponins, triterpenoids. Aristolindiquinone, ishwarol etc., (Rakesh Das et al.,2010, Pramod and Jayaraj, 2012, Bawankule Chaturvedi, 2014).

***Azadirachta indica* (Veppu)**

Leaves along with turmeric powder is boiled in water and such medicated water is using for bath to cure skin diseases. (see page 15 and 18 for other details)

***Centella asiatica* (Kudangal)** Fam: Apiaceae

The leaf paste is applied externally for skin diseases.

Clinical tests have formulated several benefits of Centella asiatica extract for wound healing, burns, and skin diseases, in gastrointestinal disorders and treatment of leprosy, lupus, scleroderma, cholera, hepatitis, jaundice, eczema, veins diseases and for treatment of psoriasis. The reviews on medicinal, pharmacological and phytochemical studies reported that the plant has neuroprotecitve, cardiovascular, immunomodulatory, antidepressant, hepatoprotective, anticancer and antidiabetic properties (Arora et al., 2002, Seevartnam et al., 2012, Kanchan and Preeti, 2013). It contains triterpenes composed of many compounds including asiatic acid, madecassic acid, asiaticosside, centelloside, centic acnd and cennellicacid, glycosides, alkaloids, volatile and fatty oils, flavanoides, tannins, resin, chloride, sulphate, phosphate, iron, calcium, magnesium, sodium and potassium (Amar Jyoti Das, 2011). Centella usually using as the agent to enhance memory and learning hence it is called as 'Brahmi' or brain food in Northern India. Centella asiatica with Withanina somnifera also recommended for the patients suffering from stroke

Plant is also using as nerve tonic.

***Calotropis gigantea* (Erukku)** Fam: Asclepiadaceae

The latex obtained from the plant is applied externally to remove the warts.

There are reports of medicinal values of Calotropis for the treatment of asthma, fever, indigestion, cold, eczema, elephantiasis, epilepsy, dyspepsia, leprosy, migraine, piles, rheumatism, skin diseases, spleen disorder, mental disorders, wounds and ulcers. It is used as analgesic, antifertility, anti-inflammatory, anthelmintic, anti-cancer, antiviral, antibacterial and antitumor agent.. The plant contain alkaloids, triterpenoids, glycosides, phenolic compounds, flavonoids, saponins, sterols, resins and polyuronoids (Vipin Bulani et al., 2011, Sureshkumar et al., 2013, Sarkar et al., 2014). Choeden et al., 2006 experimentally proved the anti-cancerous property of the latex of *Calotropis procera*.

***Tabernaemontana alternifolia* (Pala)** Fam: Apocynaceae

Latex from the plant is applied externally to remove thorns when they enter into the body.

All parts of the plant is used local medicines in India for the treatment of cancer, diarrhea, syphilis etc. It contain high percentage of magnesium, calcium, iron copper and manganes (Pranav S Chandrachood et al., 2009).

***Tamarindus indica* (Puli)** Fam**:** Caesalpiniaceae

The leaves and bark boiled in water and this medicated water using for bath to reduce various skin diseases. Same type of bathing also advised for muscular or body pain and inflamation.

Leaves are useful in swellings, fevers, scaldering of urine, gastropathy, helminthiasis, wound, ulcers, jaundice, scabies, tumors, ringworm, boil, small pox, otalgia and conjunctivitis. Ripe fruit is used in scurvy, atony of liver, stomach and intestine, constipation. Seeds are useful in giddiness, vertigo, hepatopathy, diabetes vaginopathy and in burning sensation. Leaves, flowers, fruits and seeds are having hepatoprotective, analgesic, antipyretic, laxative, anticancerus, hypolidemic and wight reducing activities (Mohd Tariq et al., 2013, Pnar Kuru, 2014). Phytochemical studies reported the presence of phenolic compounds, cardiac glycosides, tartaric acid, pectin, acetic acid, citric acid, formic acid, fatty acids like palmitic acid, oleic acid, linoleic acid and eicosanoic acid (Deepak et al., 2014).

1.3.5 DIABETES

***Aegle marmelos* (Koovalam)**

Leaves are ground with water and taken early morning to reduce the sugar level. It is considered as natural insulin. In Ayurveda usage of Koovalam for the same purpose was mentioned. (see page 14 and 17 for other uses or details)

***Biophytum sensitivum* (Mukkutti)**

Decoction of leaves is administrating for the treatment diabetes. (see page 5 and 17 for other details)

***Curcuma longa* (Manjal)**

Turmeric powder is mixed with water is taken orally to reduce diabetes. (See page 6, 10, 11, 12)

***Curculigo orchioides* (Nilappana)**

Rhizome paste along with milk is taken to reduce diabetes. (see page 9)

***Phyllanthus amarus* (Keezhar nelli)** Fam: Euphorbiaceae

Paste of whole plant with turmeric powder mix with honey advised to take early morning before breakfast.

It is reported that *Phyllanthus amarus* has found to use in traditional healthcare for the treatment of diarrhea, dysentery, dropsy, jaundice, intermittent fevers, urinogenital disorders, scabies, wounds, kidney stone problems, urinary bladder disturbance, pain, gonorrhea and diabetes. Phytochemical studies reported that the plant contain alkaloids, flavonoids, tannins, lignins, polypheolic compounds and tetracyclic triterpenoids. Pharmacological studies showed that plant is having anticancer, antiamnesic, antioxidant, antinociceptive, antimicrobial, antileptospiral, antidiabetic, anti-inflammatory, nephroprotective and cardioprotective effects (Antara Sen and Amla Batra, 2013; Sonia Verma et al, 2014). Hydro-alcoholic extract of leaves of *Phyllanthus amarus* possess significant hypolipidemic activity at doses 300 and 500 mg/kg (Umbare et al., 2009).

The experimental studies on animal showed aqueous and hydroalcoholic extract of Phyllanthus amarus decrease the blood glucose level significantly (Moshi et al., 2001, Evi and Degbeku, 2011) and toxicity studies proved that plant material is nontoxic. This indicates that the indigenous use of *Phyllanthus amarus* for diabetic treatment is effective and safe.

***Psidium guajava* (Pera)** Fam: Myrtaceae

Leaves boiled in water is administrating orally in early morning. Psidium fruits were also found to be recommended for the same purpose.

***Tinospora cordifolia* (Chittamruthu)** Fam: Menispermaceae

The whole plant ground and taking orally before food in three times is believed to be reducing the sugar level.

The plant is used in folk medicine and Ayurveda for its antiperiodic, antispasmodic, anti-inflammatory, anti-arthritic, anti-malarial, anti-allergic and anti-diabetic properties (Nadkarni and Nandkarni, 1976). Phytochemical studies reported the plant contain alkaloids, diterpenoid lactones, glycosides, steroids and phenolic (Neeraja amd Elizabeth, 2013). In ethnomedicine the plant the whole plant, powdered root and stem bark, decoction of root and stem, juice of the root, juice or paste of leaves and stem are being used to treat fever, jaundice, diarrhea, dysentery, general debility, cough, asthma, leucorrhea, skin

diseases, fractures, eye disorders, bites of poisonous insects, venomous snake etc (Choudhary et al., 2013).

On experimental animals it is proved the effect of root extract in water to reduce glucose and lipid (Grover et al., 2000, Singh et al., 2003).

1.3.6 CHOLESTEROL

***Cinnamomum verum* (Patta/ karuvapatta)** Fam: Lauraceae

Cinnamomum decoction is used to reduce cholesterol. Small pieces of Cinnamomum bark is boiled in water and after overnight the decoction will be taken in the empty stomach. Cinnamomum powder with honey is also recommended for the same purpose. But unfortunately adulterants are available in plenty in the market and if adulterant Cassia is using in the place of Cinnamomum it will damage the liver.

It was reported that in Ayurvedic system cinnamon is used for abdominal pain with diarrhea, pain associated with amenorrhoea and dysmenorrhea, mild spastic conditions of the gastrointestinal tract, rhuematism and in folk medicine it is used in the treatment of impotence, frigidity, dysponea, inflammation of the eye, leucorrhoea, vaginitis, rheumatism, neuralgia, wounds, tooth ache and diabetes. Pharmacological studies reported that cinnamon has antioxidant, anti-inflammatory, antidiabetic, antimicrobial, antifungal, insecticidal, nematicidal, anti-cancer, cholesterol and lipid lowering activities. The active phytoconstituents of Cinnamomum are cinnamaldehyde, eugenol, camphor, terpene, cinnamyl acetate etc., (Das Manosi et al., 2013, Pasupuleti Visweswara Rao and Siew Hua Gan, 2014).

Pharmacological studies support the use of cinnamon to reduce cholesterol and lipid. It was reported the administration of cinnamon to mice positively affected lipid profile, by decreasing high densily lipoprotein (HDL) cholesterol level, and plasma triglycerides (Kim, et al., 2006).

***Cocos nucifera* (Coconut)**

Decoction prepared from the coconut shell using to reduce cholesterol.

Normally coconut shells are using to prepare charcoal or the powder for filtration purposes. It was reported that coconut shell charcoal can be used as alternative medicine for the patients who are suffered from kidney, goiter, prostate cancer, myeloma and breast cyst

(Loneza et al., 2013). But information regarding the use of coconut shell for the reduction of cholesterol found to be scanty.

1.3.7 EYE DISEASES

***Ocimum tenuiiflorum* (Thulasi)**

Leaf extract is applied on eyes to get relief from pain.

Different parts of plant are used in Ayurveda and Siddha systems of Medicine for prevention and cure of many illnesses and everyday ailments like common cold, headache, cough flue, earache, fever, colic pain, sore throat, bronchitis, asthma, hepatic diseases, malaria fever, as an antidote for snake bite and scorpion sting, flatulence, migraine headaches, fatigue, skin diseases, sound, insomnia, arthritis, digestive disorders, night blindness, diarrhea and influenza. The plant contain euginol, carvacrol, sesquiterpine, antioxidants, flavonoids, apigenin, glucuronide, etc., Clinical studies showed that the plant is having anticancer, chemopreventive, radioprotective, antioxidant, antihypertensive and cardioprotective, antimicrobial, immunomodulatory, hepatoprotective, anti-inflammatory, antifertility, antidiabetic, antiulcer, antipyretic, antiarthritic, anticateract and memory enhancer activity (Govind Pandey and madhuri S, 2010, Ekta Singh et al., 2012)

***Biophytum sensitivum* (Mukkutti)**

Leaf extract is used for eye diseases. (For other pharmacological phytochemical aspects see the page 5, 17, 22)

***Vernonia cinarea* (Poovamkurunnila)** Fam. Asteraceae

Leaf extract used for the treatment of eye diseases.

Traditionally the plant was used for tonsillitis, stomach pain, diarrhea, intermittent fever, eczaema, herpes, ringworm and elephantiasis. Leaves are useful in conjunctivitis and lacrimation and plant juice for piles. Seeds are useful in worm infestation, cough, psoriasis, abortion, leukoderma and in other skin diseases. The plant is having anti-cancerous property. The plant has reported to contain saponins, triterpene, phenolics etc., Different parts of plant showed different activities such as antipyretic, antimicrobial, nephroprotective (Sasidharan and Saravanan, 2010; Dipali et al., 2014).

***Coriander sativum* (Malli)**

Washed coriander tied in a towel or fabric piece kept in freshwater for overnight and the water used to wash eyes to get relief from Madras eye.

In addition to use as an ingredient of food preparation, there are reports of utilization of Coriander seeds as medicine in flatulence, indigestion, vomiting and other intestinal disorders. It is also used in bleeding piles, rheumatism, neuralgia, cephalgia and locally in eye infection. Coriander is also used as an ingredient in many ayurvedic medicines prescribed for curing indigestion, diarrhea and urinary troubles (Anonymous, 2004) and for the relief of anxiety and insomnia in Iranian folk medicine. Fruits contain flavonoids, coumarins, isocoumarins, phthalides, phenolic acids, linalool and essential oils. Coriander has been reported to exhibit several pharmacological effects such as antifertility, antiproliferative, hypotensive, antihyperlipidemic, antihyperglycemic, antidepressant, antimutagenic, antidiabetic, digestive stimulant and protective roles as antioxidant. (Leena Kansal et al., 2011, Verma et al, 2011). It's use for eye diseases were already reported from other regions also (Kasra Mourofi, 2010).

***Cynodon dactylon* (Karuka)** Fam: Poaceae

Leaf juice administrating considered as eye tonic.

Medicinal values of Cynodon was reviewed and it was reported that due to the high medicinal values the plant, it is using externally for skin complexion, wounds, hemorrhages, burning sensation and dispigmentation of skin, piles, eye diseases, nasal bleeding, headache, epilepsy and internally it is used for epilepsy, hysteria, piles, diarrhea, prostatitis, syphilis, urinary tract infection. The plant extract check uterine bleeding, strengthens uterus, averts abortion and augments of foetal growth. It is having diuretic, antiarthrits, anticacnerous, antioxidant, antiulcer, immunomodulatory, hyperglycemic and hyperlipidemic properties (*Datta K Animesh* et al., 2012). The plant contain minerals, oxides of magnesium, phosphorus, calcium, sodium, potassium, vitamins, triterpenoides, alkaloids, flavanoids, luteoline, ergonovine and ergonovinine.

1.3.8 TONSILITIS AND OTHER KIND OF THROAT PAIN

***Emilia sonchifolia* (Muyal chevi/ cheviyan)** Fam: Asteraceae

Emilia Sonchifolia used for throat pain in various ways either 20gms of whole plant ground with 5gms Sodium chloride (common salt) and the paste is applying on the neck or

paste of five to six leaves applying on the neck and chewing of a single leaf is advising to reduce all kinds of throat pain including tonsillitis or the whole plant ground with pepper and the formulation is advised to take orally or dropping the extract of the leaves on the center of head (*Moorddhav*). The hair oil prepared with the extract of Muyalchevian leaves also utilizing at least 20 minutes before the bath for fifteen days are also recommended for the tonsillitis treatment.

It was reported that the plant is used in the treatments of asthma, intermittent fever, breast cancer, inflammation, cough rheumatism, cuts, wounds (Chopr et al., 1986), night blindness and sore throat. A decoction of this plant is used as febrifuge in infantile tympanites and bowl complaints (Yadav and Mamta Raj, 2012, Rahman et al., 2012) Emilia also used for the treatment of dysentery (China and Africa), sore throat, tonsillitis, stomach ache, conjunctivitis (Nigeria) were also reported from other countries (Essien et al., 2009).

1.3.9. LIVER HEALTH

***Desmodium triflorum* (Nilamparanta)** Fam: Fabaceae

A hand full of whole plant is tied in a piece of fabric cooked with 2-3 table spoon of broken rice and after complete extraction of plant material to the rice soup then remains of plant with fabric will be removed. The preparation will be taken orally in the early morning in the empty stomach for the liver problems.

In the folkloric and traditional medicines it was reported to use in the treatment of liver congestion, chronic ulcers, dysentery, diarrhea, urinary retention, snake bite and moderate to strong stomach ache (Gosal et al., 1971, Lai et al., 2010). The plant is reported to contain ursolic acid, vitexin, genistin, fucosterol and diholosy flavane, β phenylamine, indole-3- acetic acid, Tyrumine, trigonelline, hypaphorine and choline (Adinarayana and Syamsundar, 1982, Gavalapu et al., 2013).

***Thespesia populnea* (Poovarasu)** Fam: Malvaceae

Leaves of the plant ground with diluted milk administrating internally to reduce alanin transaminase or SGPT, which is indicative of health of liver. Broken dried leaves also recommend making drinking water and use to improve health of liver.

It is reported that the decoction of the bark is commonly used for the treatment of skin and liver diseases. The bark, leaves, flowers and fruits are useful in cutaneous

infection such as scabies, psoriasis, eczema, ring worm and gunea worm. Various plant parts are useful in the treatment of urethritis, gonorrhea, dysentery, cholera, diabetes. The phytochemical studies revealed that plant contain gossypol, tannin, coloring material, lupeol, lupenon and acacetin, quercetin, vanillic syringic, melilotic and ferulic acid. Four naturally occurring quinones such as thespone, thespesone, mansonone-D and mansonone-H have been extracted from the heart wood of the plant (Parthasarathy et al., 2009). The anti-inflammatory, astringent, asthma and diarrhea activities of the plant cab be attributed to their high flavonoids, steroids, alkaloids, tannins, terpenoids and saponins (Savithramma et al., 2011).

1.3.10 MUSCULAR PAIN OR SPRAIN (KALARI & MARMA)

Traditional orthopedic practice is one of the key specialties of traditional medicines in many developing countries especially in rural areas. These include large array of practices such as management of fracture, dislocation, primary care of patients suffering from chronic musculoskeletal conditions like arthritis, post-polio residual paralysis and congenital deformities. These orthopedic practices often include special understanding of anatomy such as vital points in the body (marma and kalari) as well special types of massaging techniques and herbal medicinal preparations for the fast healing of wounds and strengthening of bones (Unnikrishnan, Lokesh and Darshan, 2008). In many countries these practices have been formally recognized as in the case of Osteopathy and Chiropractic. According to Government of India census (2001), there are six lakh traditional orthopedic practitioners inhabit in villages of India. Mahe and surrounded Kerala known for such traditional orthopedic practices. In Mahe "Udaya Kalari" established by CH Sreedharan Gurukkal and followed by P. Suresh Gurukkal is known for the orthopedic treatments. Herbal medicinal preparations especially massaging oils are preparing by present orthopedic practitioner.

In addition local people using following plants for the relief from inflammation and muscular pain

Moringa pterygosperma (**Muringa**) Fam. Moringaceae

Moringa bark ground with common salt will be applied over the inflammation caused by muscular sprain to reduce inflammation and pain.

The leaves as well as the flowers, roots, gums, fruits and seeds are extensively used for treating inflammation (Mahajan and Mehta, 2008), cardiovascular action, liver diseases (Rao and Misra, 1998) and hematological, hepatic and renal function (Mazumdar et al., 1999). The leaves are traditionally known for various biological activities, including hypocholesterolemic, antidiabetic, antitumor, antihyperglycemic, hypotensive and nephroprotective agent and agent to reduce gastric ulcers and regulate thyroid hormone status (Paliwal et al., 2011). It was experimentally proved that active principles from the plant are effective against leukemias and hepatocarcinoma (Khalafalla et al., 2010) on rats.

***Glycosmis pentaphylla* (Panal)** Fam: Rutaceae

Paste of leaves is applying externally over the inflammation formed due to the muscular sprain.

Glycosmis is using in the indigenous treatment of cough, jaundice, inflammation, rheumatism, anemia and helminthic infestation (Namita et al., 2011). The plant has antioxidant, galactagogue, immune stimulant, larvicidal activity, antipyretic and hepatoprotective activities (Jaya Raju and Rao, 2010). In folk medicine, the bark of the plant is sued for the treatment of diabetes and gonorrhea. The bark extracts found to be reducing complications of diabetes and arthritis in rats (Ramesh and Vijaya, 2012).

(For other uses see pages 11 and 17)

***Tamarindus indica* (Puli)** Fam:

Leaves of the tree boiled in water and take bath in the water with light temperature to get rid of pain due to muscular sprain.

Leaves are useful in giddiness, vertigo, hepatopathy, diabetes, general debility, vaginopathy and in burning sensation (Prajapati and Kumar, 2005, Mohd Tariq *et al.*, 2013), inflammatory swelling, tumors, ringworm, small pox, eye diseases. Phytochemical studies showed that phenolic compounds, cardiac glycosides, tartaric acid, pectin, fatty acid, mucilage and essential elements. Pharmacological studies reported that plant is antidiabetic, hypolipidemic, antioxidant, antimicrobial, antihelminthetic, hepatoprotective, analgesic, antipyretic and anticancer activities (Deepak et al., 2014).

(Use of leaves for skin disease explained in page 22)

1.3.11 KIDNEY STONE

***Scoparia dulsis* (Kallurukki)** Fam: Scrophulariaceae

Scoparia dulsis is used for the treatment of kidney stone by administrating decoction of the whole plant. A handful of whole plants will be cut into pieces and boiled in three glasses of water until the amount of water reduced to half. The decoction will be administrated for three days continuously then continue the same after 30days for another three days repeating the same for 3rd time. Continuous use of few plants ground in milk for one month is also found to be administrating.

This exotic plant is used in Paraguay as crude drug to improve digestion and protect stomach. It is also reported for the treatment of fever, hypertension, cough, bronchitis and dysentery (Muthumani et al., 2010). Phytochemical screening reported that the plant contain diterpenoids, flavonoids, tannins, alkaloids, triterpenes, hexacosonol, β-sitosterol, ketone, dulcitone and amellin, an antidiabetic compound (Ramesh et al., 1979, Hayashi, 1998). The plant has antidiabetic, antioxidant, hepatoprotecitve (Langeswaran et al., 2012) and urolithiatic effect (Shamina and Jishamol, 2014).

1.3.12 MEDICATED DRINKING WATER

Majority of the people are using boiled water with parts of various herbs as the drinking water. Various ingredients such as Ginger, Hemidesmus, Catechu, Sappan, Vetiveria, etc., used are commonly called "**Dahasamini**" with meaning that materials can reduce feeling of thirsty.

***Zingiber officinarum* (dried- Chukku)**

Dried rhizome, ***Chukku*** will be one of the ingredients of the medicated water. In South Malabar regions the medicated drinking water even named as ***chukkuvellam*** after the vernacular name of dried ginger. Phytochemical, pharmacological and medicinal values of the zingiber are already given in page 18 and 19.

***Hemidesmus indicus* (Nannari)** Fam: Asclepiadaceae

Dried roots which give attractive smell and taste to the boiled drinking water and due to medicinal values it became a major ingredient of the medicated drinking water.

The roots are used as antipyretic, antidiarrhoea, astringent, blood purifier, diuretic, refrigenrant and tonic (Nadkarmi, 1989). Roots are useful in blood diseases, dysentery,

respiratory disorders, skin diseases, syphilis, fever, leprosy, leucoderma, itching, asthma, eye diseases, epileptic fits in children, kidney and urinary disorders, loss appetite, burning sensation and rheumatism (Mukherjee, 1953, Chopra etal., 1956). Phytochemical studies reported that plant contain hemidesmol, resin and glucoside, tannin and resin (Anoop, 2008).

***Acacia catechu* (Karingali)** Fam: Mimosaceae

Small pieces of Catechu wood are another ingredient of the drinking water either as a single ingredient or as one of the ingredients to give light brown colour.

There are reports about the pharmacological, pharmaceutical and phytochemical reports which support the utilization of the plant parts as an ingredient of the medicated drinking water. Decoction of bark is largely used as an astringent douche in gonorrhea, cystitis, vaginitis, leucorrhoea, prolapse of the uterus, piles (Nadkarni, 2005, Farzana et al., 2014) sore throat, wound healing. It is antibacterial, anticancer, anti-diarrhoea, anti-inflammatory, antimicrobial, antioxidant, antipyretic, anti-ulcer, hepatoprotective, and hypoglycemic. The major chemical constituents are flavonoids, epicatechin, phloroglucinol, alkaloids, glycosides, tannins and sugars (Monu et al., 2014).

***Caesalpinia sappan* (Pathimukham/ chapangam)** Fam: Caesalpiniaceae

Pieces of Caesalpinia wood used as a medicinal dye to give light red colour to the medicated drinking water.

According to Ayurveda, the heartwood is bitter, astringent, sweet, acrid, refrigerant, vulnerary, depurative, constipating, sedative and haemostatic. It is useful in the treatment of burning sensation, wounds, ulcers, leprosy, skin diseases, diarrrhoea, dysentery, epilepsy, convulsions, menorrhagia, leucorrhoea, diabetes and haemoptysis (Kirtikar and Basu, 1989, Warriers et al., 1993, Badami et a., 2004). Plant contains steroids, glycosides, saponins, flavonoids, tannins and phenolics and triterpenoids. Pharmacological reports were summarized by various authors and it showed that the plant is anti- anaphylactic, antibacterial, anticoagulant, anti-complementary, antifungal, anti-inflammatory, antiviral (Badami et al., 2003) and anti-cancerous (Hemalatha et al., 2011).

***Vetiveria zizanioides* (Ramacham)** Fam: Poaceae

Vetiveria is an integrated part of the medicated drinking water for attractive taste and coolinery effect.

In Ayurveda the plant is used to treat many skin disorders and is known to have calming effect on the nervous system. In ethno medicine the plant have traditionally been used by the tribes for treating boils, burns, epilepsy, fever, scorpion sting, snake bite, sores in the mouth, headache, weakness, sprain, rheumatism, urinary tract infection and acidity relief (Archana and Aswani, 2013). The oil extracted from the plant is used as fragrant material, traditional medicine and insecticide from the ancient period onwards. The plant contains benzoic acid, furfurol, vetiven, vetivenyl vetivenate, a-amorphene, khusimol etc,. The plant is digestive carminative stomachic, constipating, haematinic, expectorant, antispasmodic, antiasthmatic, antigout, anthelmintic, antimicrobial, diuretic (Bharat Bhushan et al., 2013), anti-inflammatory, antiseptic, aphrodisiac, tonic and sedative (Balasankar et al., 2013).

1.3.13 KARKITAKA KANJI

Karkitaka kanji is nutraceutical porridge like preparation made from grains, gram and medicinal herbs administrating during Malayalam month, *Karkitaka*, which normally fall in either June or July or August month covering a part of South West Monsoon. It is considered that special consideration should be given to the body during this month by providing various healthcare like supplementation of nutraceuticals and rejuvenation of body by ayurvedic/ traditional massaging etc.,

Ingredients of *Karkitaka Kanji*

Some of the ingredients used in *Potimarunnu*, which serving to mothers during post natal care are using as major ingredients and it may be due to the nutraceutical values of the same cereals and grams.

Cajanus cajan (Thuvara), *Dolichos unifolorus* (Muthira), an indigenous variety of *Oryza sativa* (Njavara ari), *Panicum miliare* (Chama), *Setaria italica* (Thina), *Triticum aestivum* (Gothambu), *Vigna anguiculata* (Mampayar), *Vigna mungo* (Uzhunnu), *Vigna radiata* (Cherupayar), *Trigonella foenum- graecum* (Uluva), *Sesamum indicum* (Ellu), *Vernonia anthelmintica* (Kattujeerakam), *Foeniculum vulgare* (Perumjeerakam), *Nigella sativa* (Karimjeerakam), *Cuminum cyminum* (Jeerakam) and palm sugar from *Borassus officinarum* (Panam chakkara). All the ingredients will be cooked and served before breakfast and or in the evening.

In some region of Southern part of Kerala, Karkitaka Kanji prepared by cooking rice, Trigonella and green gram in the extracts from whole plant of *Mimosa pudica*, *Cardiospermum halicacabum*, *Phyllanthus amarus* and bark of Moringa. This will be served with or without palm sugar.

1.3.14. HAIR OIL AND SHAMPOOS

Applying coconut oil on head and massaging is found to be common in Kerala before bath. People are very much interest on hair oil that can reduce hair fall and whitening of hairs. Various preparations were noticed and base of all oil is coconut oil and variation is with other herbal ingredients.

Type 1: *Phyllanthus emblica* (1kg), Coconut milk (from half of a coconut), *Indigofera tinctoria* (200gm), *Murraya koenigii* (few leaves) and coconut oil (1kg). Extract of *Phyllanthus emblica* fruits will be added gently to heating coconut oil kept an iron vessel in a stove with medium flame. When water content is seems to reduce, ground leaves of Indigofera and curry leaves are added and then followed by coconut milk. Boiling of oil will continue up to the complete removal of water content.

Type 2: Extract of *Aloe vera* and *Eclipta alba* added to coconut oil kept in iron vessel in the stove, when coconut oil just had little temperature. In another formulation it is found that *Eclipta* is replaced by *Emilia sonchifolia*.

Type 3: Coconut oil is boiling with few black pepper, pieces of small onions and few leaves of *Ocimum tenuiiflorum.*

Leaves of *Lawsonia inerme* are also found to be supplemented to the said oils to improve dying character of the hair oil.

Shampoos made from *Hibiscus rosa-sinensis*, *Cyclea peltata*, *Ipomoea* ***obscura*** etc are using as herbal shampoo, locally called as *Thahli.*

In addition to the above, flowers of *Spilanthes agmella* was used to reduce toothe ache.

1.4. CONCLUSION

Among the practice of herbal medicines, scientific evaluation and documentation of indigenous medicines is found to be scanty. In folk medicines the information of utilization of various plants for ailments and health concerns are normally transferred from generation to generation through oral instructions and hence majority of the information was are already lost along with demise of traditional practitioners. Many of Ayurveda centers in

Kerala utilizing indigenous medicines and indigenous knowledge such as "Kalari and Marma" with practice of Ayurveda and got its own name as Kerala Ayurvedics. This indigenous knowledge on health concerns may be even developed before or the arrival of Ayurveda among the indigenous communities or developed parallel. However as per the present day information it can be analysed that both were found to be adopted knowledge from the other and used for better results. The present chapter concentrated on the documentation of indigenous uses of plants for health concerns related to pre and post natal care of mother and child, remedies for cough and fever, gastric and other stomach problems, skin diseases, eye diseases, tonsillitis and throat pain, muscular pain, kidney stones, cholesterol, diabetes, liver health and medicated water for bath for mothers after delivery and herbal oil for massaging the bodies of mother and baby, hair shampoos, medicated drinking water and nutraceutical *Karkitaka kanji* for general health of all.

More attention and pre natal care of mother starts from seventh month of pregnancy at ancestral house of the woman under the supervision of experienced old ladies of the house, or relatives or old berth attenders if any in the nearby area. Once traditional birth attenders were available in all communities but majority were found to depend upon the experienced ladies or berth attenders of socially and economically poor. Herbal preparations are administrating to reduce morning sickness, increase appetite, improve general health, excess bleeding and body pain after delivery. Body massaging oil, *mukkoottu* used for sharpening of the baby and mother and *vevuvellam,* medicated water for bath. Studies proved that the ingredients used in *vevuvellam* contain antibacterial and anti-inflammatory properties. Based on the available phytochemical and pharmacological studies of the ingredients present in *potimarunnu*, traditional nutraceutical contain all nutrients such as carbohydrate, protein, minerals, and vitamins, digestive promoting agents and components to reduce gastric and thus it forms as the best nutraceutical. Tender leaves of *Clearodendrum infortunatum* used by the people as napkins to clean the babies after toileting. Ground rhizome of *Cyperus rotundus* in milk is found to provide kids as vermifuge. Though there are variations in the ingredients and compositions of *potimarunnu* for different communities of the region, major ingredients are found to be same. It is interesting that the knowledge on pre and post natal care of mother and child found to a relics of *women folk knowledge*.

Table 1.1 Ingredients of **potimarunnu** using by different communities in different regions of Mahe

Sl No	Ingredients		Amount (gram)						
	Scientific names & (Family)	Local names	TH Pnd 1	TH Pnd 2	TH Pnd 3	TH Plr	TH Chal	TH Mah	Viswa karma
1	Anethum graveolens L (Umbelliferae)	Sathakuppa		20	25	25	25		25
2	Arachis hypogaea L., (Fabaceae)	Nilakkatala		200	200		125		
3	Cajanus cajan Linn. Millsp. (Fabaceae)	Thuvara	500					--	
4	Capsicum annuuam (Solanaceae)	Valmulaku							
5	Cicer arietinum (Fabaceae)	Katala			200	200	250	250	100
6	Cinnamomum zeylanicum Blume (Lauraceae)	Karuvappatta						--	
7	Coriandrum sativum Linn. (Umbelliferae)	Malli/ Kothampalari		200	100		125	250	500
8	Cuminum cyminum L (Umbelliferae)	Jeerakam			25	100	25	20	25
9	Curcuma longa Linn (Zingiberaceae)	Manjal		25		200	100	50	100
10	Dolichos unifolorus Lam (Fabaceae)	Muthira	500				250		100
11	Elettaria cardamom L (Zingiberaceae)	Elakka							
12	Eleusine coracana Geartn (Poaceae)	Muthari/ ragi							50
13	Eugenia caryophyllata (Myrtaceae)	Grampoo							
14	Foeniculum vulgare Mill (Umbelliferae)	Perumjeerakam				25	25	20	25
15	Hordeum vulgare L (Poaceae)	Barley	500						
16	Lepidium sativum L., (Cruciferae)	Ayyali/ asali		20		100	50		25
17	Myristica fragrans Houtt. (Myristicaceae)	Jathiyka							10

18	Nigella sativa	Karimjeerakam		20					25
19	Oryza sativa Linn (Poaceae)	Ari/ avil	1000			2500	1500	1000	500
20	Panicum miliare (Poaceae)	Chama	500						
21	Piper nigrum var. nigrum (Piperaceae)	Kurumulaku					125		
22	Saccharum officinarum (Poaceae) OR Borassus flabellifer (Arecaceae)	Vellam (Sarkkara) OR Chakkara		1000	1000	2500	1000	1000	1000
23	Sesamum indicum L (Pedaliaceae)	Ellu		1000	1000	1000	1000	1000	1000
24	Setaria italica (Poaceae)	Thina	500						
25	Strychnos potatorum L (Loganiaceae)	Thettamparal		100	200	250	125	100	100
26	Terminalia catappa (Combretaceae)	Badam		100			100		
27	Trachyspermum roxburghianum (Umbelliferae)	Ayamodakom		20		25		20	25
28	Tribulus terrestris L (Zygophyllaceae)								
29	Trigonella foenum – graecum L (Fabaceae)	Uluva		200	100	500	250	200	200
30	Triticum aestivum L (Poaceae)	Gothambu	500	500	250	100	250	500	500
31	Vernonia anthelmintica (Asteraceae)	Kattujerakam		20	25		50	50	25
32	Vigna anguiculata (Fabaceae)	Mampayar					250		
33	Vigna mungo (L) Hepper (Fabaceae)	Uzhunnu	500	200	250	250	250	300	200
34	Vigna radiata (L) Walp (Fabaceae)	Cherupayar	500				250	200	
35	Zingiber officinale (Zingiberaceae)	Chukku							10

Table 1.2 Ingredients of potimarunnu using by different communities in different regions of Mahe

Sl No	Ingredients		Amount (gram)						
	(Scientific names)	Local names	Salia	Dhee	Chakli	Vaniya	Chri	Ms	Nair
1	Anethum graveolens L	Sathakuppa	25	50	25		25	25	25
2	Arachis hypogaea L.,	Nilakkatala					100		100
3	Cajanus cajan Linn. Millsp.	Thuvara						100	100
4	Capsicum annuuam	Valmulaku		10			10		10
5	Cicer arietinum	Katala	200		250		200	200	200
6	Cinnamomum zeylanicum Blume	Karuvappatta						20	
7	Coriandrum sativum Linn.	Malli/ Kothampalari	250		250	500	200	200	250
8	Cuminum cyminum	Jeerakam	25	50	25	200	25	25	25
9	Curcuma longa Linn	Manjal	100	100	100		50	50	100
10	Dolichos unifolorus Lam	Muthira				500	200	100	
11	Elettaria cardamom L	Elakka					25	25	10
12	Eleusine coracana Geartn	Muthari/ ragi							
13	Eugenia caryophyllata	Grampoo						10	
14	Foeniculum vulgare Mill	Perumjeerakam	25	50			25	25	25
15	Hordeum vulgare L	Barley							
16	Lepidium sativum L.,	Ayyali/ asali	50		25	100	25	25	
17	Myristica fragrans Houtt.	Jathiyka		50			25	25	25
18	Nigella sativa	Karimjeerakam		50	25		25	25	
19	Oryza sativa Linn	Ari/ avil			250		200	200	200
20	Panicum miliare	Chama							
21	Piper nigrum var. nigrum	Kurumulaku	10	10			10		10
22	Saccharum officinarum OR Borassus flabellifer	Vellam (Sarkkara) OR Chakkara	2000		1000	3000	2000	2000	2000
23	Sesamum indicum L	Ellu	1000		1000	2000	200	200	500

24	Setaria italica	Thina							
25	Strychnos potatorum	Thettamparal	200	200	250		100	200	200
26	Terminalia catappa	Badam	50			400	100	100	
27	Trachyspermum roxburghiana	Ayamodakom		250	25		25	25	25
28	Tribulus terrestris L	Njerinjil					50		
29	Trigonella foenum – graecum L	Uluva		250	250	500	200	200	100
30	Triticum aestivum L	Gothambu	250		250	1000	200	250	250
31	Vernonia anthelmintica	Kattujeerakam	25	50	25	50	25	25	25
32	Vigna anguiculata	Mampayar					200	100	
33	Vigna mungo (L) Hepper	Uzhunnu	250		250		200	200	200
34	Vigna radiata (L) Walp	Cherupayar					200	100	200
35	Zingiber officinale	Chukku		10			10		10

Expansions of abbreviations :

Communities : TH= Thiyya, Viswakarma-Viswakarma; Salia- Padmasalia; Dhee- Dheevara; Chakli- Chakliya; Vaniya- Vaniya, Chr- Christians; Ms- Muslims; Nair- Nair;

Regions: Pnd- Pandakkal 1, 2 &3; Plr –Palloor; Chal- Chalakkara; Mah- Mahe.

CHAPTER 2

SOCIO RELIGIOUS USE OF PLANT DIVERSITY

2.1 INTRODUCTION

The relationship between man and plant communities is as old as his hunger and long before science was born, our ancestors studied the plants around them to meet their basic requirements, which laid foundation of civilization (Pandey and Verma, 2005). During the civilization many plants which were utilized in food, beverages, medicines, etc were also utilized to fulfill various believes and myths and in culture. The plants used by the people in different social and religious customs are known as socio-religious plants (Ahirwar, 2010). Thoughts about religion bring to our mind ideas about god, worship, festivals, belief, rituals etc., and the concept of religion and culture are equally vague and full of complexities and ambiguities (Basil Pohlong, 2004). But there is no doubt regarding the utility of biodiversity for the culture and religious functions. The plants used for socio-religious functions are selected by the people based on the availability of the plants in the area, where the human society thrives. Documentation of these plants will be helpful for the conservation by popularizing the economic potential and the importance of their existence for the extraction of value added products in future. India has a long history of the utilization of biodiversity and conservation of the same through traditional indigenous knowledge. But very little work was done on these aspects such as socio-religious importance of plants in Bundelkhand, MP (Ahirwar, 2013), Dasapushpa and management of cancer (Arun raj et al., 2013), Sacred plants and their role in health care of people of Almora, Uttarakhand (Vijay and Joshi, 2010), Dasapushpam, traditional uses and medicinal potentialities (Jini Varghese et al., 2010), Plants used in Ganapathi homam in Pondicherry (Pragasam et al., 2010) and Plants in Havana (Subrahmanya Prasad and Ravindran, 2010). The present chapter focuses on the survey of Plants used for various socio-religious functions such as worships, customs and traditions or rituals, indigenous culture and other potential values.

2.2 MATERIALS AND METHODS

The data were collected through the survey and interviews. Collected information regarding the plant resources used for socio-religious functions were analysed for their binomial, family and other usefulness based on the standard literatures.

2.3 RESULTS AND DISCUSSION

During the survey 54 plants were identified as socio-religious plants in the area. Their vernacular name and socio-religious uses are given (Table 2.1). Out of these, 26 plants (48%) are medicinal and used either in Ayurveda or Indigenous medicine while remaining are either used as source of food, wood, beverage or horticultural.

2.3.1 HERBS USED FOR WORSHIPS

Dasapushpa: Members of Dasapushpa (dasa means ten),the ten sacred plants, are using in religious rituals such as 'Ashtamangalya' , 'Sahasra kalasam', 'Prathishta mahotsava' and wearing on head by women on 'thiruvathira' day of 'Dhanu' for prosperity. In addition to these the members are used for the worship of Lord Ganesha. 'Mukkutticharthu', Karuka archana, last rites etc.. The members are *Aerva lanata* L (Amaranthaceae), **Cherula,** *Biophytum sensitivum* L (Oxalidaceae), **Mukkutti**, *Cardiospermum halicacabum* L (Sapindacea), **Uzhinha**, *Curculigo orchioides* Gaertn. (Hypoxidaceae), **Nilappana**, *Cynodon dactylon* L (Poaceae), **Karuka**, *Eclipta prostrate* L (Asteraceae), **Kanjanni**, *Emilia sonchifolia* L (Asteraceae), **Muyalcheviayan**, *Evolvulus alsinoides* L (Convolvulaceae), **Vishnukranthi,** *Ipomoea obscura* L (Convolvulaceae), **Thiruthali** and *Vernonia cinarea* L (Asteraceae), **Poovamkurunnila.** All these members are known medicinal plants for the treatment of kidney stone, diabetes, and tonsillitis. They are also used in gynecological treatments and pre and post natal care of mother and child.

Nalpamara: Four species of Ficus such as *Ficus benghalensis* L var. *benghalensis*, **Peraal,** *Ficus gibbosa* Blume var. *parasitica* (Moraceae), *Ficus recemosa* L (Moraceae), *Ficus religiosa* L (Moraceae) are together called as Nalpamara (nalu means four) are important in the performance of hawana like *sudarshana homam* and the same time barks of these trees are known for their medicinal properties and hence using in the treatment of skin diseases. The bark of these trees used to prepare the medicated bathing water,

Vevuvellam. For the performance of Homam or various hawanas woods of *Artocarpus integrifolius* Wight (Moraceae), **Pilavu** and twigs of *Butea monosperma* Lam (Fabaceae) are using.

Aegle marmelos L

Locally known as **Koovalam** used in Ganapathi homam, worship Lord Siva and never for Lord Vishnu. It is believed to be a sacred plant which can washout all sins of a human my simple touch on the plant.

Areca catechu L **(Kaungu / Atakka)** Fam: Arecaceae

Fruits used for **Dakshina** (a performance to honour elders by giving Arecanut, betel leaf, *Piper betel* and a coin or currency) to elders during various ceremonies. Fruits also used as an ingredient of worship materials for Ganapathi and '**Kalasam**' for Muthappan. The inflorescence is used in '**Thalapoli**' (a procession to the temple with flowers and small lamp on a plate) by girls for the festivals of Goddess and for Snake Gods. Earlier spathe was used as underwear by the priests of Hindu community during some worship. Leaf sheaths were used as spoons during the transfer of materials at the time of worships. Leaf sheaths are also used to make some of the costumes during the performance of Theyyam. In southern part of Kerala leaf sheath is used to make masks for **Padayani**, another folk performance like Theyyam in Northern Kerala.

Cocos nucifera L

Coconut is a common commodity for socio religious functions and rituals. Coconut with a part of husk, which keeps on a vessel surrounded with leaves of Mangifera considering as representation of Lord Ganapathi. At the time of starting of ceremonies especially starting the construction of house, digging of well etc., the coconut will be broken with iron sickle without losing the much liquid endosperm. Movement and settling of Ixora flowers kept on the coconut water collected on one of the half of the coconut will be used to predict the hindrance if any to finish the works. Coconut pieces will be used as a part of Prasadam. One half of coconut will be used as a lamp to light during ceremonies related to last rites. Coconut shells, husks and dried spathes (spadices) are used as fuel during the cremation. Ghee filled coconuts are the most important ingradient of "***irumudikettu***" of the pilgrims to Sabarimala. Coconut inflorescence with heap of paddy in measuring cylinder, "**Nirapara**" is an unavoidable decoration during the marriage

ceremonies with 'Nilavilakku'. Tender leaves are used to decorate the areas, where festivals, rituals and other traditions were held. Husks and spadix used for various homams.

Curcuma longa L

Powder used for the worship of Lord Snakes, goddess and to make 'Kurusi (Guruthy)' in Kali temples and local 'Muthappan kavu' during performance of 'Theyyam and Thira'. Rhizome powder also used as prasadam to make marking on the forehead.

Hydnocarpus pentandra **(Marotti)** Fam: Flacourtiaceae

Shells of fruits are used as small lamp called "chirathu". The lighted chiraths will be used to decorate all parts of temples during **Lakshamdeepam** (numerous lamping ceremony) or festivals. Now such decorations were replaced by earthen **chiraths**.

Imperata cylindrica **(Darbha)** Poaceae

Used in worships like "*Aavahanam*" (transfer the holy spirit to idol) and in last rite.

Mangifera indica L (Anacardiaceae)

Leaves, small twigs are the ingredients of various homams. The wood is also used as fuel for the cremation. Leaves are also used to make **Poorna Kumbhas** for **Sahasrakalasa**

Musa paradisiaca L **(Vazha)** Fam: Musaceae

Fruits are using for all kinds of worships including "archanas", worships. Serving of the prasadams and food during ceremonies are in leaves of banana. Sometime body of the deceased will be kept on full length leaf. Plant with fruits and inflorescence kept in the entrance of the venue, where marriage ceremony or festivals are conducted

Ocimum tenuiiflorum L

All kinds of worships.

Oryza sativa L

Paddy filled in a measuring cylinder called 'para' with inflorescence of coconut and lighted 'Nilavilakku' during auspicious occasion like marriage ceremony, inaugural functions etc., called '**Nirapara and Nilavilakku'**, Their presence believed to bring best things in future. Rice flake or perched rice or paddy used in various worships, especially during Ganapathi homam. During the performance of last rites, rice is using with sesame. It is one of the major ingredients of all kinds of prasadams like 'payasam', 'nivedyachoru' etc. Giving of rice as food for the first time for a baby (after three months of age) is

conducting as a ceremony (**choroonu**). First writing ceremony is on rice called '**ariyilezhthu**'. On the marriage occasion parents and seniors blessing the bride and groom by pouring few rice on their head. Half fried rice with pepper is given to devotees as the part of offerings from St. Theresa Church Festival

Saccharum officinarum L **(Karimpu)** Fam: Poaceae

Stem is an ingredient of Ganapathi homam. The '**kalkandi**', the sugar kandi and 'vellam' or jagiri made from sugar cane are used to prepare various types of "prasadams".

Santalum album L **(Chandanam)** Fam: Santalaceae

Wood paste is covering the idols, 'chandanacharthu' as part of worship. Sandal paste from the temple after 'chandanacharthu' is a 'prasadam' for devotees to make specific mark on forehead. During cremation sandal wood pieces are also kept with other fuels

Sesamum indica L **(Ellu)** Fam: Pedaliaceae

An ingredient for the last rites, ball of rice with "thilam" is important.

Flowers of *Ixora coccinea (*Rubiaceae), **Chekki**, Jasminum *sambac* L (Oleaceae), Mulla, *Leucas aspera* (Willd.) (Lamiaceae), **Thumpa**, *Bauhinia acuminate* L (Caesalpiniaceae), *Calotropis gigantea* (L) (Asclepiadacea), **Erukku**, (Lord Siva worships only), *Chrysanthemum* sp. (*Tenacetum* sp.) (Asteraceae), *Clitoria ternatea* L (Fabaceae), **Sankupushpam**, (special for Lord Vishnu and Lord Ayyappa (blue colored flowers)), *Tagetes erecta* L (Asteraceae), *Plumeria alba* (Apocynacea), **Chempakam** Worships for Goddess, *Rosa* (Rosaceae) etc., are normally using for the various worships in the temples (Table 2.1).

Table 2.1 Taxonomic details and uses of plants in various socio-religious customs

Sl No	Scientific name & Family	Vernacular name	Uses
1	*Aegle marmelos* L Rutaceae	Koovalam	Ganapathi homam, to worship Lord Siva and never for Lord Vishnu.
2	*Aerva lanata* L Amaranthaceae	Cherula	To administer last rites (Bali)
3	*Albizia lebbeck* L Mimosaceae	Vaaka	Paste of the bark is applied on the idol of Lord Krishna called 'Vakacharthu'
4	*Areca catechu* L Arecaceae	Kavungu	Fruits as 'Dakshina' to elders during various ceremonies, as an ingredient of worship materials for Ganapathi and 'Kalasam' for Muthappan. The

			inflorescence is used in 'Thalapoli' by girls for the festivals of Goddess and for Snake Gods.
5	*Artocarpus integrifolius* Wight Moraceae	Pilavu	Wood is used for all types of 'Homam'. Fruit is kept for "Vishukani", a decoration with vegetables and fruits collected from the agricultural field along with 9 cereals (Navadhanya) and inflorescence of *Cassia fistula* in a brass vessel with idol or photograph of Lord Krishna and indigenous mirror made from alloy or normal mirror.
6	*Bauhinia acuminata* L Caesalpiniaceae	Mantharam	As a commodity of worships
7	*Biophytum sensitivum* L Oxalidaceae	Mukkutti	One of the members of 'Dasapushpa' ten sacred plants, which are used in 'Ashtamangalya' , 'Sahasra kalasam', 'Prathishta mahotsava' and to wear on head by women on 'thiruvathira' day of 'Dhanu'month for prosperity. Flowers are used for the worship of Lord Ganesha. 'Mukkutticharthu' made from the plant is special during Thiruvathira festivals.
8	*Butea monosperma* Lam Fabaceae	Plasu	Flowers for worships, small branch cuttings are kept on South, North & West directions of Homakundam (Never on East side) during Ganapthi homam.
9	*Calotropis gigantea* (L) Asclepiadacea	Erukku	Lord Siva worships.
10	*Cardiospermum halicacabum* L Sapindacea	Uzhinja	A member of Dasapushpas
11	*Cassia fistula* L Caesalpiniaceae	Kanikkonna	For "Vishukani"
12	*Chrysanthemum* sp. (Tenacetum sp.) Asteraceae	Jamanthi	Onam floral decoration and as part of floral garland as offerings at Mahe church festival.
13	*Clitoria ternatea* L Fabaceae	Sankupushpam	All worships, especially for Lord Vishnu and Lord Ayyappa (blue colored flowers)
14	*Cocos nucifera* L Arecaceae	Thengu	Coconut with lower part of husk is kept on a vessel with leaves of Mangifera on the periphery considering as

			representation of Lord Ganapathi. At the time of start of ceremonies, especially, the construction of house, digging of well etc., the coconut will be broken with iron sickle without losing the liquid endosperm. Movement and settling of Ixora flowers kept on the coconut water collected on one half of the coconut will be used to predict the hindrance if any to finish the works. Coconut pieces are used as a part of Prasadam. One half of coconut will be used as a lamp to light during ceremonies related to last rites. Coconut shells, husks and dried spathes (spadices) are used as fuel during the cremation. Ghee filled coconuts are the major materials of "irumudikettu" of the pilgrims to Sabarimala temple. Coconut inflorescence with heap of paddy in a measuring cylinder, "Nirapara" is an unavoidable decoration during the marriage ceremonies with 'Nilavilakku'. Tender leaves are used to decorate the areas, where festivals, rituals and other traditions are held. Husks and spadix are used for various homams.
15	*Curculigo orchioides* Gaertn. Hypoxidaceae	Nilappana	One of the members of "Dasapushpas"
16	*Curcuma longa* L Zingiberaceae	Manjal	Powder used for the worship of Snake gods, goddess and to make 'Kurusi (Guruthy)' in Kali temples and local 'Muthappan kavu' during performance of 'Theyyam and Thira'. Rhizome powder is used as prasadam to make spot on the forehead.
17	*Cynodon dactylon* L Poaceae	Karuka	For last rites, Lord Ganapathi homam
18	*Eclipta prostrata* L Asteraceae	Kanjanni	One of the members of 'Dasapushpas'
19	*Emilia sonchifolia* L Asteraceae	Muyalchevi	One of the members of 'Dasapushpas'
20	*Evolvulus alsinoides* L	Vishnukranthi	One of the members of 'Dasapushpas'

	Convolvulaceae		
21	*Ficus benghalensis* L var. *benghalensis* Moraceae	Peraal	One of the members of "Nalpamara" and used for Sudarsana Homam along with other three Ficus species.
22	*Ficus gibbosa* Blume var. *parasitica* Moraceae	Itthi	One of the members of 'Nalpamara'
23	*Ficus recemosa* L Moraceae	Atthi	One of the members of 'Nalpamara'
24	*Ficus religiosa* L Moraceae	Arayal	One of the members of "Nalpamara", For doing pradakshina (walk around the tree)which is believed to be equal to visit to temples.
25	*Hydnocarpus pentandra* (Buch.-Ham) Flacourtiaceae	Marotti	Shells of fruits are used as small lamp called "chirathu". The lighted chirathus are used to decorate all parts of temples during Lakshamdeepam or festivals. Now such decorations are replaced by earthen chirathus.
26	*Imperata cylindrica* Poaceae	Darbha	Used in worships like "Aavahanam" (transfer of the holy spirit to idol) and in last rites.
27	*Ipomoea obscura* L Convolvulaceae	Thiruthali	One of the member of "Dasapushpas"
28	*Ixora coccinea* Rubiaceae	Chethi	All worships, homams
29	*Jasminum sambac* L Oleaceae	Mulla	Worships, part of floral garland for the marriages. Floral garland of Jasminum used for offerings in St. Theresa Church, Mahe
30	*Leucas aspera* (Willd.) Lamiaceae	Thumpa	Special ones for the floral decoration during Onam festival. Worship of Lord Siva
31	*Mangifera indica* L Anacardiaceae	Mavu	Leaves and small twigs are the ingredients of various homams. The wood is also used as fuel for the cremation. Leaves are also used to make Poorna Kumbhas for Sahasrakalasa
32	*Musa paradisiaca* L Musaceae	Vazha	Fruits for all kinds of worships including "archanas", worships etc., Serving of the prasadams and food during ceremonies are in leaves of banana. Sometimes body of the deceased will be kept on full length leaf. Plants with fruits and

			inflorescence are kept in the entrance of the venue, where marriage ceremony or festivals are conducted.
33	*Ocimum tenuiiflorum* L Lamiaceae	Thulasi	All kinds of worships.
34	*Oryza sativa* L Poaceae	Nellu / Ari	Paddy filled in a measuring cylinder called 'para' with inflorescence of coconut and lighted 'Nilavilakku' during auspicious occasions like marriage ceremony, inaugural functions etc., called 'Nirapara and Nilavilakku'. Their presence is believed to bring best things in future. Rice flake or perched rice or paddy is used in various worships, especially during Ganapathi homam. During the performance of last rites, rice is used along with sesame. It is one of the major ingredients of all kinds of prasadams like 'payasam', 'nivedyachoru' etc. Giving of rice as food for the first time for a baby (after three months of age) is conducted as a ceremony (choroonu). First writing ceremony is on rice called 'ariyilezhuthu'. On the marriage occasion, parents and elders bless the bride and groom by dropping few rice on their head. Half fried rice with pepper is given to devotees as the part of offerings from St. Theresa Church Festival, Mahe
35	*Piper betel* Piperaceae	Vettila	Betel leaves are the part of 'Dakshina' and as ingredient of Kalasam for 'Muthappan'.
36	*Plumeria alba* Apocynacea	Chempakam	Worship of Goddess
37	*Rosa indica* Rosaceae	Rosa	For floral decorations during Onam festival and floral garland for offerings at St. Theresa Church Festival, Mahe
38	*Saccharum officinarum* L Poaceae	Karimbu	Stem is an ingredient of Ganapathi homam. The 'kalkandi', the sugar kandi and 'vellam' or jagiri made from sugar cane are used to prepare various types of "prasadams".
39	*Santalum album* L	Chandanam	Wood paste is used to cover the idols,

	Santalaceae		'chandanacharthu' as part of worship. Sandal paste from the temple after 'chandanacharthu' is a 'prasadam' for devotees to make specific mark on forehead. During cremation sandal wood pieces are also kept along with other fuels.
40	*Sesamum indica* L Pedaliaceae	Ellu	An ingredient for the last rites, ball of rice with "thilam" is important.
41	*Tagetes erecta* L Asteraceae	Chettipoo	Floral carpets during Onam festival.
42	*Vernonia cinarea* L Asteraceae	Poovamkurunnila	One of the members of Dasapushpa

42 plants belong to 27 families were given in the above table which are used in various socio-religious functions in Mahe. Normally people are purchasing all these plants from the shops, which sell 'pooja' materials and this is due to lack of awareness regarding the location of plants, unable to identify these resources and poor representation of the plants. Some of these socio religious plants documented from the region are found to be used as resources for indigenous postnatal mother and child care (Sivadasan et al., 2014). All types of flowers are used for the floral decorations (floral carpets) for Onam festival in Mahe and Kerala indicating the utility of local plant resources in the culture. Presently availability of local flowers has been reduced very much and people use flowers brought from nearby States. Similarly 'vishukkani', which is considered as manifestation of local agrobiodiversity has been now replaced by the fruits brought from other States. All these show the reduction of local biodiversity and hence their conservation is inevitable. Lack of local agrobiodiversity has taken its toll on the food habit of the population which has led to life style diseases. Plants like *Aerva lanata* and *Vernonia cinerea* are used by the people in Benin of West Africa for the purpose to bring luck (Solene Briere, 2011) while in Mahe and Kerala the former is used to offer the last rites and latter to bring prosperity. Utilization of medicinal or other potential plants for socio religious rituals may be recommended by the ancestors for the purpose of conservation and easy availability of these plants for future. Traditional or indigenous knowledge in the utilization of biodiversity has been given much importance for their conservation.

2.3.2 TREES ASSOCIATED WITH BIRTH STAR

Because of believe and myth many temples in our country have Star, Planet and Zodiac forests contain a large number of native tree species ideally suited to tropical stress and draught (Chandrakant et al., 1990). Based on birth star each person is supposed to conserve a tree, a bird and an animal for the wellbeing. Priest Informants of Mahe given idea regarding the trees associated with birth star. In Kerala Forest Departments are providing such plants to all institutions, temples etc., for the establishment of *star forest*. But Majority of the people of Mahe are not having much idea about *star forest* and the people know about it are in the view that present day generation are not ready to follow such customs of conservation of birth star trees (Table 2.2) and many of such species are not even present in the region. Hence it is planned and started to establish *star forest* in the campus of Mahatma Gandhi Govt. Arts College Mahe by the investigators in and around the green house and botanical garden of the College for the purpose of the conservation of these plants.

Table 2.2 List of plant species to be conserved by each birth star.

	Birth star	Common name of plant	Binomial of the plant	Family
1	Aswathy	Kanjiram	*Strychnos nux- vomica*	Loganaceae
2	Bharani	Nelli	*Phyllanthus emblica*	Euphorbiaceae
3	Karthika	Atthi	*Ficus racemosa*	Moraceae
4	Rohini	Njavel	*Syzygium cumini var. cumini*	Myrtaceae
5	Makayiram	Karingali	*Acacia catechu*	Mimosaceae
6	Thiruvathira	Karimaram	*Diospyros condolleana*	Ebenaceae
7	Punartham	Mula/Illi	*Bambusa bambos*	Poaceae
8	Puyam	Arayal	*Ficus religiosa*	Moraceae
9	Ayilliam	Naga	*Mesua ferrea var. ferrea*	Clusiaceae
10	Makam	Peral	*Ficus benghalensis*	Moraceae
11	Puram	Chamatha	*Butea monosperma*	Fabaceae
12	Uthram	Itthi	*Ficus tinctoria*	Moraceae
13	Atham	Ambazham	*Spondias pinnata*	Anacardiaceae
14	Chitra	Koovalam	*Aegle marmelos*	Rutaceae
15	Chothi	Neermaruthu	*Terminalia arjuna*	Lythraceae
16	Vishakam	Vayyankatavu	*Flacourtia montana*	Flacourtiaceae
17	Anizham	Elanji (Elanhi)	*Mimusops elengi*	Sapotaceae
18	Thrikketta	Vetti	*Aporosa lindleyana*	Euphorbiaceae
19	Moolam	Vellapine	*Vateria indica*	Dipterocarpacea
20	Pooratam	Vanchi	*Salix tetrasperma*	Salicaceae
21	Uthratom	Pilavu	*Artocarpus integrifolius*	Moraceae

22	Thiruvonam	Erukku	*Calotropis gigantea*	Asclepiadaceae
23	Avittom	Vanni	*Prosopsis julifflora*	Mimosaceae
24	Chathayam	Kadambu	*Neolamarkia cadamba*	Rubiaceae
25	Pururttathi	Mavu	*Mangifera indica*	Anacardiaceae
26	Uthruttathji	Aryaveppu	*Azadirachta indica*	Meliaceae
27	Revathi	Athilippa	*Madhuca neriifolia*	Sapotaceae

The analysis showed that in some places *Piper longum* is using in the place of *Syzygium cumini*, *Soymida febrifuge* in the place of *Ficus benghalensis*, *Aporosa lindleyana* is replaced by *Pinus longifolia*, *Vateria indica* by *Canarium strictum*, *Azadirachta indica* is replaced by *Borassus flabellifera* and *Poropsis juliflora* is replaced by either *Acacia ferruginea* or by *Moringa oleraceae*. This indicates that changes were there in different locality based on the availability of the species. All the trees/plants mentioned above are having different uses either as medicine, food, firewood, wood or worshiping materials. The concept of conservation may come for the purpose to make easy availability of these species.

2.3.3 FOR CUSTOMS AND TRADITION

The religious worship and customs and tradition or rituals are interconnected and are monitored by the priests in many occasions except the celebrations like Onam and Vishu organising at home.

2.3.3.1. **VISHU**: a festival or celebration connected with agriculture on 1st day of Malayalam month, *Metam*. The celebration starts by seeing ***Vishukkani***, a decoration with new vegetables and fruits collected from the agricultural field along with 9 cereals and grams (Navadhanya) and inflorescence of *Cassia* in a brass vessel with idol or photograph of Lord Krishna, new cotton dhoti, each coin of silver and gold or silver coin and gold ornament and indigenous mirror made from alloy or normal mirror (plate 12 h).

Plant diversity used for the *vishukkani* is fruits of *Artocarpus integrifolius (Chakka)*, *Anacardium occidentale (Rhuthik / Kasumanga)*, *Mangifera indica (Manga)*, *Cucumis sativus* f. *sativus (Vellari)*, *Vigna* species (*Vallipayar*), *Cocos nucifera (Thenga)*, *Areca catechu*, *Musa paradisiaca (Vazhapazham/ Kadali)*, grains or seeds of *Oryza sativa (Ari /Nellu)*, *Triticum aestivum(Gothambu)*, *Vigna radiata* var. *radiata (Cherupayar)*, *Vigna mungo (Uzhunnu)*, *Cicer arietinum (Katala)*, *Vigna unguiculata (Mampayar)*,

Macrotyloma uniflorum (Muthira), *Cajanus cajan (Thuvara)* and *Sesamum indicum (Ellu)* and Inflorescence of *Cassia fistula.* In addition to the Vishukkani *Anacardium occidentale* false fruit with nut, a small twig of *Mangifera indica* tender fruits with few leaves and inflorescence *Cassia fistula* are tied together and hanging in the entry of house either on door frame or top fittings in the sitout.

2.3.3.2. **ONAM** is another agriculture related festival celebrated as a harvest festival with a myth related to ***Mahabal***i (Maveli), an old sincere, honest king who was put down to "*Pathalam*" by incarnation of Vishnu, ***Vamanan*** and later permission was given to him to visit *Malayala Nadu* (the land where malayalm as the mother toungue) to see his subjects once in a year. All Malayalees regardless of their belief in different religion are eagerly waiting to receive him on the day of *Thiruvonam* and the celebration will be extended for ten days from *Attham* to *Thiruvonam* during the month of *Chingam*. In the great memories of *Mahabal*i all these 10 days of onam celebrations, floral decorations or floral carpets (**Pookkalam,** Plate 12g) will be arranged in the courtyard to receive people's King. Normally flowers from the nearby premises were used to make floral decorations. Flowers of *Lucas aspera* are considering as an unavoidable ones during the floral decorations. At present all flowers coming to the market are used to prepare floral carpets instead of local flowers, may be due to unavailability of local plants.

2.3.3.3. ST. THERESAS FESTIVAL, the festival conducting in St. Therasa's Church is considered as a festival of Mahe. All people of Mahe regardless of their religion and caste will flow to the premise of Church and participating some of the rituals especially related to festival including procession with idol of St. Therasa. People or Devotees purchase floral garlands and candles for keeping in the feet of idol as a part of their prayer. Church authorities will serve half fried rice (*Oryza sativa*) and pepper (*Piper nigrum*) and piece of garland already kept as symbol of the blessings. Floral garland contain *Jasminum olearaceae, Rosa sinensis* and *Tagetes erecta.*

2.3.3.4. MARRIAGE OCCASIONS: Though variations are there in the ceremonies connected with marriage of different religion and castes, all people are using various plant parts to make this function as a holy function. Hindu people will make ***Kalyana Mandapam*** decorated with flowers, **Nirapara** and Nilavilakku (Plate 12e) to witness the marriage ceremony, floral garland, bouquet, Sandal paste (*Santalum alba*), bettle leaf

(*Piper betel*), arecanut (*Areca catechu*), coconut (*Cocos nucifera*), mango leaves (*Mangifera indica*), various flowers, rice and paddy (*Oryza sativa*). **Nirapara** is a vessel filled with heap of paddy and decorated with inflorescence of coconut on the top. Betel leaves and arecanut to give **Dakshina** to elders. A partially husk removed coconut surrounded with *Mangifera* leaves on a brass vessel keeping on one side considering as **Lord Ganapathi**. Numerous verities of flowers with rice will kept in a vessel to bless couples by the relatives and friends. Muslims of the area are decorating the palm of bride with paste of *Lawsonia inerme* on previous day of marriage and even termed as **Myilanchi kallyanam**. All ladies who participating marriage functions normally very much fond of wearing garland of *Jasminum olearaceae* with dressed hairs.

2.3.3.5. LAST RITES: Hindu communities are found to use many plant parts for the last rite including cremation. Rice (*Oryza sativa*), Cherula (*Aerva lanata)*, Karuka (*Cynodon dactylon*), roots of Ramaccham (*Vetiveria zizanioides*), wood of Mango tree (*Mangifera indica)*, wood, husk, shell and spadics of coconut tree (*Cocos nucifera)*, Sandal wood (*Santalum album*), Chekki (*Ixora coccinea)* and Thulasi (*Ocimum tenuiiflorum)* are the major ingredients used in last rites. Cremation will be carried out with the help of wooden pieces of mango tree, sandal and coconut, coconut shells and spadix. Rituals and performance of last rites are similar to Northern Kerala, surrounding of Mahe but different from Southern Kerala, where these rituals will be performed under the guidance of a priest or similar person from the concerned community or other. Later rituals for the last rite after one year of crmation are same by doing *Bali* with Thilam / ellu (*Sesamum indica*), rice (*Oryza sativa*), Cherula (*Aerva lanata*) Thulasi (Ocimum), Chekki (*Ixora coccinea*) etc., under the guidance of a priest in temples or stipulated place for *Bali tharpanam*.

2.3.4 FOR INDIGENOUS CULTURE (THEYYAM)

From the civilization or from immemorial time onwards it can be seen a close relationship of belief on supernatural power and rituals with the biodiversity of their close environment. Early civilization valued nature and nature worships and was very constructive device for conservation of plant diversity. Some beliefs made the man to follow worships to supernatural powers, customs and traditions or rituals, festivals etc., Indigenous people had their own culture, worships etc., that was later modified by the rituals of Brahmins or priests of other religions. Formerly sacred groves were considered as

a worshiping place or shrine of ***Sasthavu/Ayyappan, Kuttichathan (Sasthappan), Gulikan, Mutthappan, Guru Karanavar, Pottan*** and or other local deities and the mode of worships were different. All kinds of such worships were monitored by non-Brahmins, but now many sacred groves or kavus are changing into temple by accommodating other god/goddess and Brahmin priests and thus kavus are now becoming synonyms for temple. Earlier many of kavus don't have roof and kept equilibrium with the environment. Various types of worships like **Kalasam** and performance of devoted folklore like **Theyyam** are the best example of the relics of indigenous culture and rituals.

Being Mahe is a part of Malabar, **Theyyam** is a popular ritual worship or one of the ancient traditional folk cultures of the area. It is believed to be originated during the earliest periods of Neolithic (Bridget and Raymond Alchin). Normally Theyyam are performing in sacred groves and in houses during housewarming ceremonies, utilizing local plants for the purpose to make costumes and colouring materials. Theyyam is performing during the festivals of six sacred groves and during house warming ceremonies in Mahe. The major places or sacred groves or ***kavu,*** where Theyyam performance conducted are Cheriyath Mandoli, Puthalathu, Vannathankandy, Koroth, Keezhanthoor, Chirikandoth, Bhadrakali Chembra, Varaprathu, and Pandakoolothu.

In Puthalam, **Theyyam** is usually performing by two communities such as *Malayan* and two groups of *Vannan* namely vatakkan (northern) and thekkan (southern). Both communities are belonging to **dalits** or **Scheduled castes.** The *Theyyasthanam* (Bhagavathy temple) is presently looked after by Mr. Pradeep Puthalam, the *Karanavar* and performance will be carried out by the permission of *Janmari*, who got the right of performance through the ancestry, Mr. P.P. Ramakrishnan. Theyyam performance will be carried out during *Kumbham* 20^{th} to 23^{rd} (March). There are 10 types of Theyyam are performing every year and are ***Bhagavathi, Pookuttichatthan*** (Plate 11d)***, Gulikan, Pampoori Kariyathan, Thalachilan, Marpoliyan*** (Plate 11e)***, Pothi*** *(similar to Devadaasi)*, ***Thalamooppan, Karnavar, and Bhootham***. Here performance will commence with a procession with tender coconut called *ilaneerkavu* from Cheriyath Mandoli (by Thiyya community) and bringing umbrella made up of Palm (*Borassus*) leaves with decorations by people of the community called *Kanisan*. Supply of tender coconut (Ilaneer or Karikku), tender coconut leaves (Kuruthola) and even toddy are the right of Thiyya community.

Temple is also owned by Thiyya community and this indigenous cultural unity is unique due to the alliance of *dalits* and *backward communities*. Nowadays Theyyam became a popular cultural commodity as the form of plots in National celebrations like Republic Day, tourisms, cultural festivals of Kerala, inauguration of Malls, Jewelleries and etc., thus indigenous devoted culture with the utilization of biodiversity got noteworthy place in national and international level.

Cheriyath Mandoli is another Theyyam performing worshipping place in Mahe, where the Theyyam are ***Ankakaran, Poothati, Thanoorappan, Cheriya Bhagavathy, Valiya Bhagavathy*** and ***Achiyum Kuttiyum (Kiriyatthan)***. Vannathankandy Gurusthan is a worshipping place near to Pallor spinning Mill and owned by Mr. Shadevan, a Theyyam performer and Janmari of another Kavu, Koroth. Here ***Guru Karanavar, Gulikan, Pottan Theyyam, Kuttichathan*** (***Sasthappan***), ***Muthappan*** and ***Vasoorimala*** are the major performing Theyyam. This is the only worshipping place or Kavu owned by a Dalit family. Koroth near to Paloor is famous for the performance of 35 to 40 numbers of ***Kuttichathan*** (***Sasthappan*** Plate11 a, b & c), other Theyyam are ***Gulikan*** (Plate10 c&e)***, Khandakarnan*** (Plate 10d&f)***, Chamundi / thee Chamundi (Vishnu moorthy*** Plate 11g***), Uchitta*** (Plate 11f) and ***Karanavar (***(Plate 10g). This worshipping place is looked after by Mr. Premachandran Nambiar and Janmari is Mr. Sahadevan of Malayantavita (Vannathan kandy). In Keezhanthoor, worshipping place near Chalakkara the performing Theyyam are ***Kuttichathan, Gulikan, Bhagavathy*** (Plate10b)***, Nagabhagavathy*** and ***Karanavar.***

For the performance of Theyyam and related rituals of Theyyam various plant species are using by the indigenous people of the area. Though the Theyyam are different in their costumes, performance and *thottampattu* (a song explaining the ritual to be performed), plant species which are utilizing for the different Theyyam are same in the origin. White markings on face and other visible part of body are made by rice (*Oryza sativa* - Plate 9e&f) paste with the help of various moulds, yellow by turmeric (*Curcuma longa*) powder or paste. The bangles (vala - Plate 8o), ear rings (kathila – Plate 8k), chains (kandabharanam – Plate 8j), Kuralaram (covering ornaments of chest – Plate 8l) etc., are made by wood of Erithrina (*Erythrina variegata*) due to its light weight, masks (mukham – Plate 8n) by either Erithrina or even by teak wood (*Tectona grandis*) or by spathe of Arecanut tree (*Areca catechu*). Structures made in wood with various carvings will be

coloured by pasting coloured papers with the help of gum made by the gum or resin of jack fruit boiled with bee wax. For the lady deities like ***Bhagavathy, Nagabhagavathy, Chamundi, Uchitta*** etc., artificial breast (Plate 9g) also made up of Erithrina wood. Twenty feet "*muti*" (Plate 9a &10e), a costume fixing on the head with support in the back are preparing artistically with tender coconut leaf lets on long stick of Arecanut stem and bamboo sticks. Costumes such as *arathattu* (around the waist – Plate 8i), *marati* (over the chest – Plate 8m) and *Nakhoram* (Nail fitted to palm Plate 10c) made up of bunch of tender coconut leaf lets are covering the waist and chest in many Theyyam.

Before the performance of Theyyam, one of the senior members of the group or guru (teacher) will conduct worship by making *rasikalam* (Plate 10a) and *gurusi* (Plate 10b,c&d). *Rasikkalam* made with leaf sheath of plantain (*Musa paradisiaca*), inflorescence of Arecanut palm (*Areca catechu*) and Coconut tree (*Cocos nucifera*), flowers of *Jasminum oleracea*, coconut shell and tender coconut. *Gurusi* is preparing by mixing turmeric powder with calcium carbonate in water, which turn into red then surface of this red water is covered with various forms of paddy or rice (*Oryza sativa*) perched paddy (**malar**), perched rice(**Pori**), rice flake (Aval), flower petals of *Ixora coccinea*, *Jasminum oleracea* and a small star with pieces of plantain leaf pieces. This utilization of plant parts in culture and believes indicate the deep relationship of people and nature

2.3.5. SOCIO RELIGIOUS PLANTS AND MEDICINAL VALUES WITH SPECIAL REFERENCE TO GYNAECOLOGICAL USES

Aegle marmelos **(Koovalam)**

Plant is used in religious functions like Ganapathi Homam, worship to Lord Siva to get heaven after eternal life is also believed to be a sacred plant that can washed out all sins by the touch of plant is using as an important resource to reduce morning sickness. Various other medicinal applications were also reported (Chapter 1; see pages 4, 18, 22, 43, 49)

Aerva lanata **(Cheroola)**

One of the members of 'Dasapushpa' ten sacred plants, which are used in 'Ashtamangalya' , 'Sahasra kalasam', 'Prathishta mahotsava' and to wear on head by women on 'thiruvathira' day of 'Dhanu' month for prosperity. Aerva is using during last

rites. This plant is used in to arrest haemorrhage during pregnancy, for uterus clearance after delivary and to control excessive lactation. Other potentials were also explained.

***Biophytum sensitivum* (Mukkutti)**

A Dasapushpa member used in socio religious functions as Aerva and used *Mukkutticharth* for Lord Ganapthy is used to improve general health for women, gonorrhea and insomnia.

***Cardiospermum halicacabum* (Uzhinja)**

The Dasapushpa member, used in the treatment of menstrual disorders and related stomach pain.

***Cocos nucifera* (Thengu)**

Tree with socio religious importance in all parts like tender leaves and toddy from inflorescence for traditional cultural activities like Theyyam performance, inflorescence for decoration in auspicious occasions as part of **Nirapara**, trunk, husk, shell and spadix used for cremation. Same time inflorescence also used to prepare indigenous nutraceutical for mothers after delivery named Thenginpookkula lehyam to improve general health. Coconut oil is an ingredient of *Mukkuttu*, the bathing oil for mother and child as part of post natal care.

***Curculigo orchioides* (Nilappana)**

A member of Dasapushpa and fresh tuberous root paste mixed with one glass of cow milk is taken orally to get relief from stomach pain after delivery.

***Curcuma longa* (Manjal)**

Powdered rhizome is used in all Sacred Groves and temples of Goddesses as part of 'prasadam' and the powder mix with calcium carbonate in water will give red colour and such red coloured solution is used during "Gurusi", worship. Rhizome juice along with lemon juice and sugar is given orally to women for relief from morning sickness. Turmeric is also as ingredient of Mukkoottu oil, mangaram and potimarunnu for the post natal care of mother and child.

***Evolvulus alsinoides* (Vishukranthi)**

The plant is a member of Dasapushpa and flower ground with honey is used to avoid excess bleeding after delivery.

***Ficus benghalensis* (Peral), *Ficus glomerata* (Atthi)**, (Syn. *F. racemosa var. glomerata*), ***Ficus gibbosa* (Itthi)** (Syn. F. gibbosa) and ***Ficus religiosa* (Arayal)** Fam. Moraceae are the ingredients of medicated bathing water known as *vevuvellam*.

***Vetiveria zizanioides* (Ramacham)**, Fam. Poaceae used for the last rites, homam is a ingredient of *vevuvellam*. *Sesamum indicum* (Ellu), Fam. Pedaliaceae, is used in last rites is an important ingredient of nutraceutical potimarunnu and the oil is the ingredient of Mukkoottu and Karimazhi.

2.4 CONCLUSION

When man began to afraid of natural phenomena or believe the nature or supernatural power, he started to keep a portion of valuable natural resources he likes for this *power*. The parts of plants or other valuable commodities from biodiversity, which were identified as potential medicine, food and fire wood or as aesthetic product due to the beautiful and aromatic nature by the man who lives with nature started to offer to the *powers* and used for cultural activities during the time of civilization and thus different socio religious functions were developed indigenously and modified. Presently such indigenous socio religious and cultural activities with the products of biodiversity were started to disappear and some even exist with indigenous people of the world. Present chapter explained how plant parts are using by the people of the area for worships to various *gods*, customs and traditions related with various ceremonies starting from rice eating ceremony to the last rite after the grave and various folk cultural performances. Ten plants were named as 'Dasapushpangal' are using for various religious functions and believed to bring prosperity by wearing these plant parts by the ladies, interestingly many of these species were also recommended for gynaecological remedies, pre and post natal care of mother and this sacredness may be given to them due to their potential uses and for the conservation. Various forms or products of rice and coconut are found to be using in many socio religious activities. The well-known folk performance in this region is called *Theyyam* and artists using different plant parts for costumes, make-up and decoration. Theyyam is also performed in connection with *kavus*, the temples without shrine and meant for second level of gods. *Kavus* or sacred groves are mini forests, which play an important role in microclimate.

CHAPTER 3

PHYTOCHEMICAL STUDIES OF SELECTED PLANTS

3.1 INTRODUCTION

Plants and animals, the two inseparable sides of the biological spectrum, inter depend each other for their co-existence. In this association, plants have got upper hand because of autotrophy and on which the animals depend on. Human civilization was enriched by the constant association with the plants in the form of food, shelter, clothes and medicines. In ancient times the only ways to cure diseases was by using plant and animal biodiversity. Plants are naturally gifted as they have the potential to heal life threatening diseases (Savithramma et al, 2011). Nature has provided a complete store house of remedies to cure all the ailments of mankind. Use of plants as a source of medicine has been inherited from the beginning of human civilization itself. Plants have become the basis for the development of medicines, i.e. they are the natural blue prints for the development of new drugs and also it is a phytomedicine for the treatment of diseases (lwu, 1993). Enormous quantum of research works have produced huge amount of data across the world which depict their therapeutic potentials and also their protective effects against various diseases. The knowledge of various phytochemicals has provided the basis for several traditional medicine systems like Ayurveda, Unani, Folk, and Chinese. Due to the rapid increase in the rate of advancement of illness and their diagnosis, the drug discovery from active constituents of plants has more importance. Phytochemicals occur naturally in medicinal plants, in their leaves, stems, roots, fruits or seeds that have defence mechanism and protection from various diseases. The curative properties of medicinal plants are mainly due to the presence of various complex chemical substances of different composition which occur as primary as well as secondary metabolites (Karthikeyan et al, 2009, Lozoya and Lozoya, 1989). Chlorophyll, protein, and common sugars include primary constituents and secondary products include alkaloids, flavonoids, terpenoids, saponins, tannins, glycosides etc. In recent years, chemical analysis and biological assays have begun to play an important role in ethno botanical studies (Jana et al, 2009) and indigenous herbal medicines. Such analysis has led to the discovery of novel bioactive phytochemicals.

The qualitative and quantitative estimation of the phytochemical constituents of medicinal plant is considered to be an important step in medicinal plant research (Kokate 1994). The drugs contained in medicinal plants are called active principles. Cowmann (1991) and Banso & Olutimayin (2001) reported that plants contain a variety of active principles. Most of the studies related with the indigenous uses of medicinal plants are qualitative.

Quantitative estimations of chlorophyll, carotenoids, lycopene, H_2O_2 scavenging effects, proteins etc. of six major medicinal plants which are used in indigenous medicines of Mahe region are studied. Chlorophyll has many health benefits due to its structural similarity to human blood and its good chelating ability. It has anti mutagenic and anti carcinogenic properties.H_2O_2 like free radicals are called pre oxidants that they attack macromolecules including protein, DNA and lipid causing to cellular / tissue damage. Lycopene is an effective component to alleviate or prevent the complications of diabetes (Aydin et al, 2012).

In the present investigation an attempt was made by quantitative estimation to study some of the phytochemicals of selected medicinal plants such as ***Cardiospermum halicacabum (****Uzhinja****)*** of family Sapindaceae which is one of the socio-religious plants as a member of Ten sacred plants (*Dasa pushpa*) and can be used for the treatment of rheumatism, stiffness of the limb, chicken pox, pulmonary affection, as anthelmitic, also is used with food in order to get colour, taste and its therapeutic properties, ***Desmodium triflorum (****Nilamparanta****)*** of Fabaceae which is effective against human pathogenic micro-organisms , and the reduction of SGPT (Serum Glutamic-Pyruvic Transaminase), ***Piper longum (****Thippali****)*** of Piperaceae which is used as a remedy for respiratory and digestive disorders, paralytic and arthritic disorders, acts as stimulants and to reduce cholestrol, ***Scoparia dulcis (****Kallurukki****)*** of Scrophulariaceae against diabetes, bronchitis, kidney stone, snake bite, stomach problems, and also as analgesic and antipyretic agents, ***Tabernaemontana divaricata (****Kuruttu pala****)*** of Apocynaceae which has anti cancerous properties, can enhance the cholinergic activity in both peripheral and central nervous system which has therapeutic benefits against Alzheimer's, against skin diseases, against eye sore and also as analgesic and astringent and ***Thespesia populnea (****Poovarasu/*

chenthamiru) of Malvaceae which is used against scabies, psoriasis, as liver tonic and to increase blood count (see chapter 1).

Different colours associated with higher plants (green leaves in the spring & summer, yellow or red leaves in the fall, orange colour of carrots etc.) are due to the presence of pigment molecules such as chlorophylls, carotenoids etc. Many works have thrown light on the pigment composition in medicinal plants. The studies on chlorophyll and carotenoids have investigated in leaves of *Sesbania rostrata, S. exaltata and S. sespan* where *S. exaltata* comprises of highest amount of both the pigments (Kadam, 2013). Studies on *Ocimum sanctum, Azadirachta indica, Murraya koeinigii,* and *Mentha arvensis* indicated that the highest chlorophyll content is in *Azadirachta indica* followed by *Murraya koeinigii* (Arathi et al., 2011). Works on *Cuminum* resulted in the presence of proteins, carotenoids, β carotenes etc. (Negi et al, 2003; Argolo et al., 2004; Stasiuk & Kozubek et al., 2010).The colour of red tomatoes (*Solanum lycopersicum L.*) is mostly from the carotenoid pigment lycopene which has protective effects against diabetes, cardiovascular problems and some cancers (Panther et al., 2013). Highly nutritional carotenoid compounds are seen in wheat grains (Blanco et al., 2011). Carotenoids are potent antioxidants and free radical scavengers (Grassmann et al., 2002). They can modulate pathogenesis of cancers and coronary heart disease (Van Poppel et al., 1995). The therapeutic properties of *Moringa* is well explained by its phytochemical compounds like β carotene, protein etc. Verma et al., 1976; Gupta et al., 1989, Sree ramulu et al., 1983). Studies on *Mimosa pudica* indicate that they are rich in proteins (W O Emery, 1934; E L Calaline 1950). *Jatropha curcuas* is a rich source of protein which is a valuable energy source (Malviya et al., 2011). Rathore et al 2010 indicates that H_2O_2 protects the tissues from damage and also indicates that β carotene is an excellent scavenger of singlet oxygen. Studies on *Kalanchoe pinnata* showed that they comprise lycopenes, β carotenes etc. and have got very powerful H2O2 Scavenging effects, etc. (Chandra Mohan et al., 2012).

3.2 MATERIALS AND METHODS

The samples were collected from selected six plants from different localities near Mahe.

Sl .no	Name of plant	Common name	Family	Habit
1	*Cardiospermum halicacabum L.*	Uzhinha	Sapindaceae	Herb
2	*Desmodium triflorum (L.)DC*	Nilamparanda	Fabaceae	Prostrate herb
3	*Piper longum* L.	Thippali	Piperaceae	Under shrub
4	*Scoparia dulcis* L.	Kallurukki	Scrophulariaceae	Herb
5	*Tabernaemontana divaricata (L.) R.Br*	Nandiarvattam	Apocynaceae	Shrub
6	*Thespesia populnea (L.)*	Poovarash	Malvaceae	Tree

The fresh weights of the sample were taken for the quantitative estimations. i.e. quantitative estimation of chlorophyll, carotenoids, lycopene, hydrogen peroxide scavenging effects, & protein.

3.2.1 Estimation of chlorophyll

The chlorophyll content in the various plants was estimated by the method of Witham et.al (1971). Chlorophyll was extracted from 1g of the sample using 20ml of 80% Acetone. The supernatant was transferred to a volumetric flask after centrifugation at 5000rpm for 5minutes. The extraction was repeated until the residue became colourless. The volume in the flask was made up to 100ml with 80% acetone. The absorbance of the extract was read in a spectrophotometer (Genesys 10-S, USA) at 645 & 663nm against 80% acetone blank. The amount of total chlorophyll in the sample was calculated using the formula,

Total chlorophyll =20.2(A645) +8.02(A663) ×V/1000×W

Where,

V= Final volume of the extract

W=Fresh weight of the leaves

The values are expressed as mg chlorophyll/g sample.

3.2.2. Hydrogen peroxide scavenging effects

The ability of the leaf extract to scavenge Hydrogen peroxide was assessed by the method of Ruch et.al (1989). A solution of H_2O_2 (40mM) was prepared in phosphate buffer. Leaf extracts at the concentration of 100µg/ml in distilled water were added to H_2O_2 solution

(0.6ml) and total volume was made up to3ml.The absorbance of the reaction mixture was recorded at 230 nm in a spectrophotometer (Genesys 10-S, USA). A blank solution containing phosphate buffer without H_2O_2 was prepared. The extent of H_2O_2 scavenging of the plant extracts was calculated as,

% of scavenging of H_2O_2 = (A0 - A1) ×100 /A0

Where,

A0 = Absorbance of control

A1 = Absorbance in the presence of plant extract

3.2.3. Estimation of lycopene

Lycopene was estimated by the method described by Zakaria et.al (1979). The experiment was carried out in the dark to avoid photolysis of carotenoids once the saponification was complete. The sample (0.5g) was homogenized and saponified with 2.5 ml of 12% alcoholic potassium hydroxide in a water bath at 60% for 30 minutes. The saponified extract was transferred to a separating funnel containing 10-15ml of petroleum ether and mixed well. The lower aquous layer was then transferred to another separating funnel and the upper petroleum ether layer containing the carotenoids was collected. The extraction was repeated until the aquous layer became colourless. A small amount of anhydrous sodium sulphate was added to the petroleum ether extract to remove excess moisture. The final volume of the petroleum ether extract was noted. The absorbance of the yellow colour was read in a spectrophotometer at 503nm using petroleum ether as blank. The amount of lycopene was calculated using the formula,

$$\text{Amount of lycopene} = \frac{3.12 \times OD \times \text{volume of sample} \times \text{dilution factor} \times 100}{1 \times \text{weight of sample} \times 1000}$$

The amount of Lycopene was expressed in mg/g of the sample.

3.2.4. Estimation of carotenoids

Carotenoids were estimated by Tan and Soderstrom method, (1989). 1g of the sample is homogenized using 15ml of Acetone, until the solution becomes deep green. Add a small amount of anhydrous sodium sulphate to remove water from extract. Measure the final volume. The absorbance of the extract was read in a spectrophotometer at several wavelengths, 661.6, 644.8, & 470nm, against an acetone blank.

The amount of carotenoids were calculated using the following equations,

Ca = 11.24A661.6 – 2.04A644.8

Cb= 20.13A644.8 – 4.19A661.6

Ca+b =7.05A661.6 + 18.09A644.8

$$Cx+c = \frac{1000A470 - 1.90Ca - 63.14Cb}{214}$$

Where,

Ca = concentration of chl.a in µg/ml of sample solution

Cb = concentration of chl.b in µg/ml

Ca+b =concentration of total chlorophyll

Cx+c = concentration of total carotenoids

3.2.5. Estimation of protein

The protein content in the various plants was estimated by using Bradford method (1976). Weigh accurately 200mg of BSA and dissolved in distilled water and make up to 100ml. Pipette out 1ml, 2ml, 3ml, 4ml& 5ml series of BSA in test tubes and make up to 10ml in each test tubes and a 10ml of water serve as blank. Then add 2 ml of dye in each test tube. Allow to stand for 5 minutes. Read the optical density in spectrophotometer.

STD. NO	Volume of stock bsa solution	Volume of distilled water	Final concentration	Volume of coomassie reagent
Std.1	0ml	10ml	0mg/ml	.2ml
Std.2	1ml	9ml	2mg/ml	.2ml
Std.3	2ml	8ml	4mg/ml	.2ml
Std.4	3ml	7ml	6mg/ml	.2ml
Std.5	4ml	6ml	8mg/ml	.2ml
Std.6	5ml	5ml	10mg/ml	.2ml

Dilute the sample solution to a concentration that will fall in the range of standard curve and add it in test tubes. Add the reagent to each test tube and incubate for 5 minutes at room temperature and read the absorbance at 595nm wavelength. Plot the standard curve and determine the value of protein by multiplying the value from standard curve with dilution factor.

3.3 RESULTS & DISCUSSION

TOTAL CHLOROPHYLL

The total chlorophyll content per gram of leafwasextracted andquantified in the case of the selected six medicinal plants.

Sl no	Name of the plants	Amount of chlorophyll(mg/g)
1	*Cardiospermum halicacabum*	1.5306
2	*Desmodium triflorum*	1.5428
3	*Piper longum*	0.966
4	*Scoparia dulcis*	1.8014
5	*Tabernaemontana divaricata*	3.362
6	*Thespesia populnea*	3.9538

.

.The results indicated that chlorophyll content was showing much variability among the six plants. The least amount of chlorophyll was seen in *Piper longum*, and highest amount was found in *Thespesia populnea*. Tabernaemontana divaricata showed chlorophyll content closer to Thespesia populnea and *Cardiospermum halicacabum* and *Desmodium triflorum* showed more or less equal quantity of chlorophyll.

TOTAL CAROTENOIDS

The total carotenoids were extracted and quantified from the six plants.

Sl no	Name of the plants	Amount of carotenoids (µg/ml)
1	*Cardiospermum halicacabum*	0.7422
2	*Desmodium triflorum*	1.0695
3	*Piper longum*	0.1034
4	*Scoparia dulcis*	0.8356
5	*Tabernaemontana divaricata*	1.9052
6	*Thespesia populnea*	0.4895

The results indicated that Tabernaemontana divaricata shows the highest amount of carotenoids, and the Piper longum shows a highly variable amount of carotenoids.*Thespesiapopulnea* showed somewhat closer to *Piper longum*. The other four plants showed more or less equal quantity of carotenoids.

LYCOPENE

Lycopene content was extracted and quantified.

Sl no	Name of the plants	Amount of Lycopene (mg/g)
1	*Cardiospermum halicacabum*	1.4056
2	*Desmodium triflorum*	0.304
3	*Piper longum*	0.6558
4	*Scoparia dulcis*	1.363
5	*Tabernaemontana divaricata*	1.8968
6	*Thespesia populnea*	2.3562

The results indicated that there is an increase in the amount of lycopene in four plants studied (Cardiospermum, Scoparia, Tabernaemontana, Thespesia).But there is decrease in Piper & Desmodium. Among the six plants studied, the highest amount is found in Thespesia and Desmodium.

HYDROGEN PEROXIDE SCAVENGING EFFECTS

Sl no	Name of the plants	% of H_2O_2 scavenging
1	*Cardiospermum halicacabum*	0.5802
2	*Desmodium triflorum*	0.1912
3	*Piper longum*	0.8896
4	*Scoparia dulcis*	0.7561
5	*Tabernaemontana divaricata*	0.3752
6	*Thespesia populnea*	0.6342

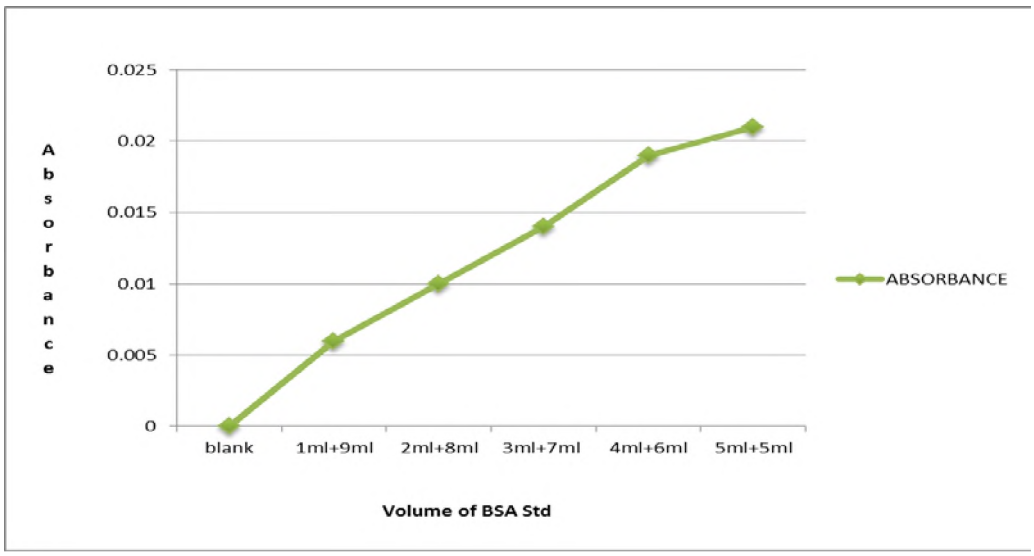
From the six plants taken, the percentage of H_2O_2 scavenging effect is not showing much variations.in case of Piper longum and the least amount is found in Desmodium triflorum.

TOTAL PROTEIN

The calibration curve from the absorbance readings of the standards was prepared and the protein concentration in the samples in mg BSA/ ml was calculated from the curve. This standard graph was used for calculating the protein content of the sample

Dil Std. no	Conc. Of BSA (µg / ml)	Volume of standard + distilled water	Volume of Coomassie reagent added(ml)	Absorbance
Std 1	200	1 ml	.2	.006
Std 2	200	2 ml	.2	.01
Std 3	200	3 ml	.2	.014
Std 4	200	4 ml	.2	.019
Std 5	200	5 ml	.2	.021

The concentration of the unknown sample was determined using the standard curve from the absorbance of unknown sample.



Sl no	Name of the plants	Amount of protein (mg/g)
1	*Cardiospermum halicacabum*	20
2	*Desmodium triflorum*	18
3	*Piper longum*	24
4	*Scoparia dulcis*	44
5	*Tabernaemontana divaricata*	28
6	*Thespesia populnea*	26

The total soluble protein were extracted and quantified. The results indicated that there is an increase in the protein content in case of Scoparia dulcis compared to other five plants. The least amount is found to be in *Desmodium triflorum.*

CARDIOSPERMUM HALICACABUM

Sl no		Amount
1	Chlorophyll	1.5306 mg/g
2	Carotenoids	0.7422 mg/g
3	Lycopene	1.4056 mg/g
4	H_2O_2 Scavenging effect	0.5802 mg/g
5	Protein	20 mg/g

DESMODIUM TRIFLORUM

Sl no		Amount
1	Chlorophyll	1.5428mg/g
2	Carotenoids	1.0695µg/g
3	Lycopene	0.304mg/g
4	H_2O_2 Scavenging effect	0.1912%
5	Protein	18mg/g

PIPER LONGUM

Sl no		Amount
1	Chlorophyll	0.966mg/g
2	Carotenoids	0.1034µg/g
3	Lycopene	0.6558mg/g
4	H_2O_2 Scavenging effect	0.8896%
5	Protein	24mg/g

SCOPARIA DULCIS

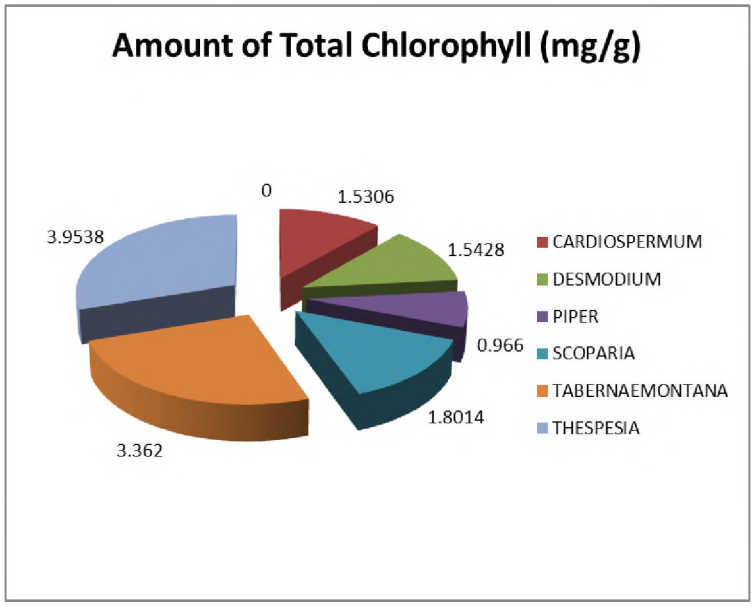
Sl no		Amount
1	Chlorophyll	1.8014mg/g
2	Carotenoids	0.8356µg/g
3	Lycopene	1.3630mg/g
4	H_2O_2 Scavenging effect	0.7561%
5	Protein	44mg/g

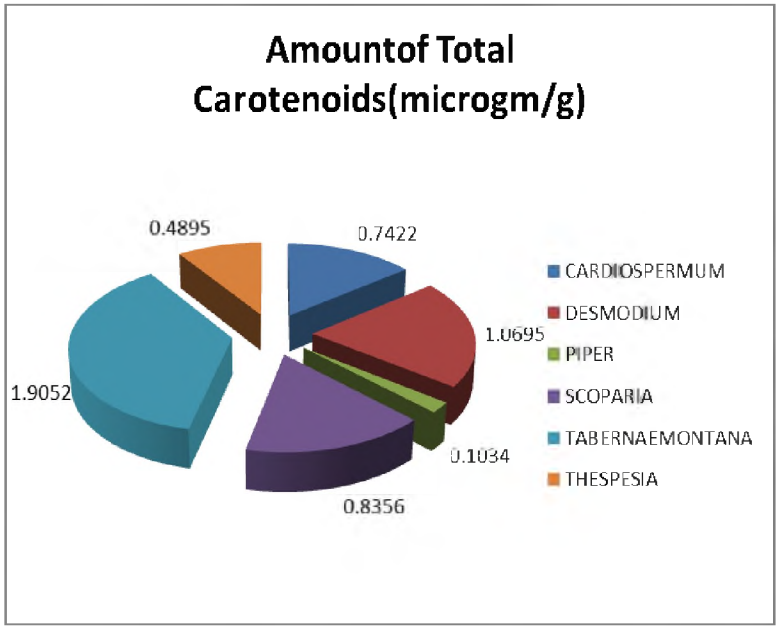
TABERNAEMONTANA DIVARICATA

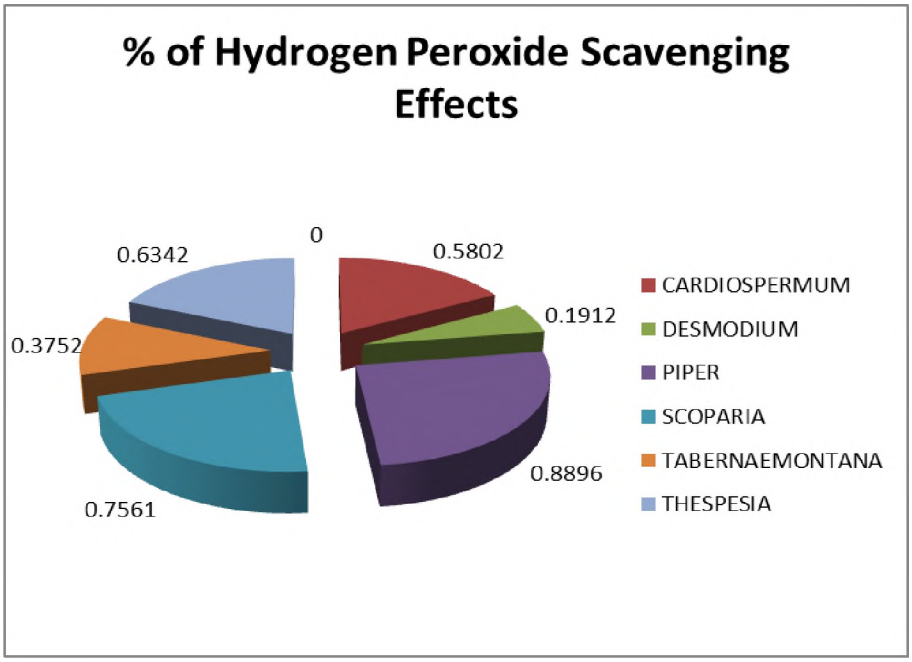
Sl no		Amount
1	Chlorophyll	3.362mg/g
2	Carotenoids	1.9052µg/g
3	Lycopene	1.8968mg/g
4	H_2O_2 Scavenging effect	0.3752%
5	Protein	28mg/g

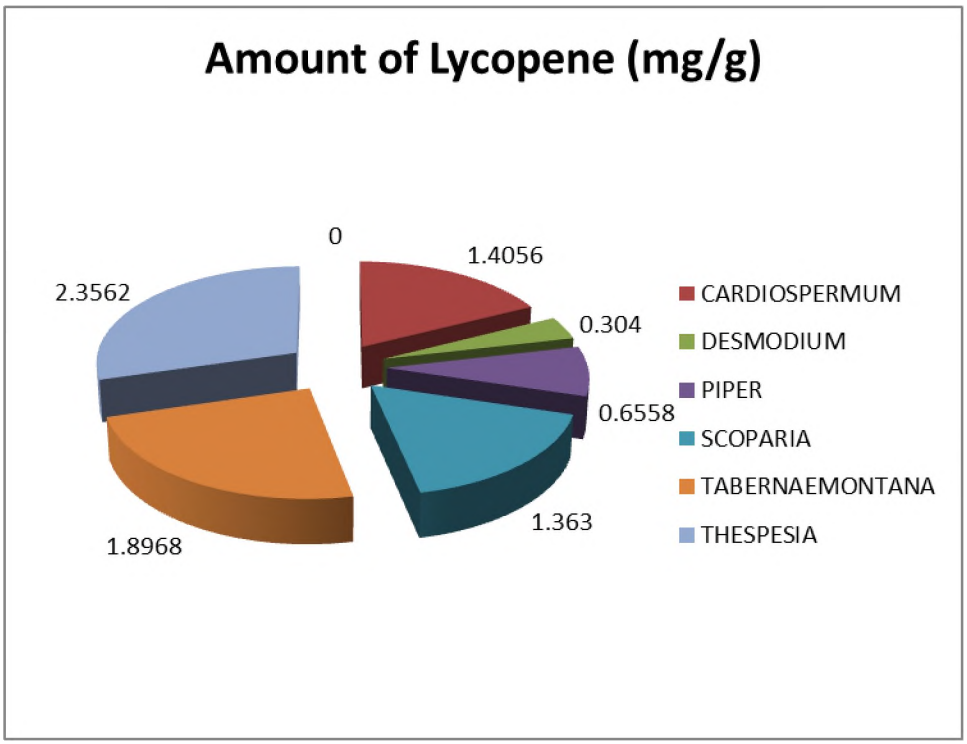
THESPESIA POPULNEA

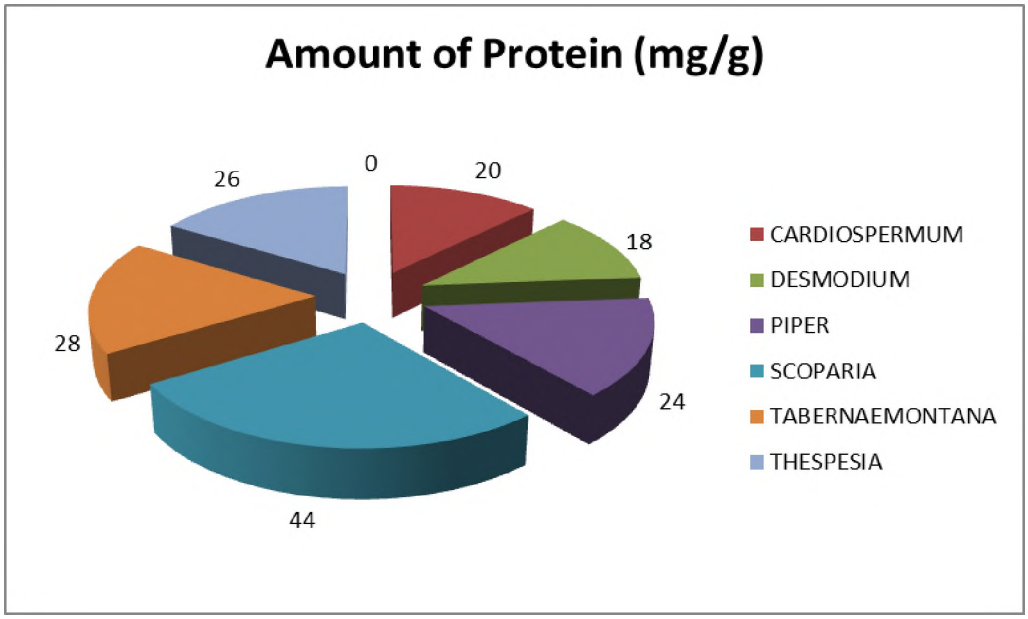
Sl no		Amount
1	Chlorophyll	3.9538mg/g
2	Carotenoids	0.4895µg/g
3	Lycopene	2.3562mg/g
4	H_2O_2 Scavenging effect	0.6342%
5	Protein	26mg/g

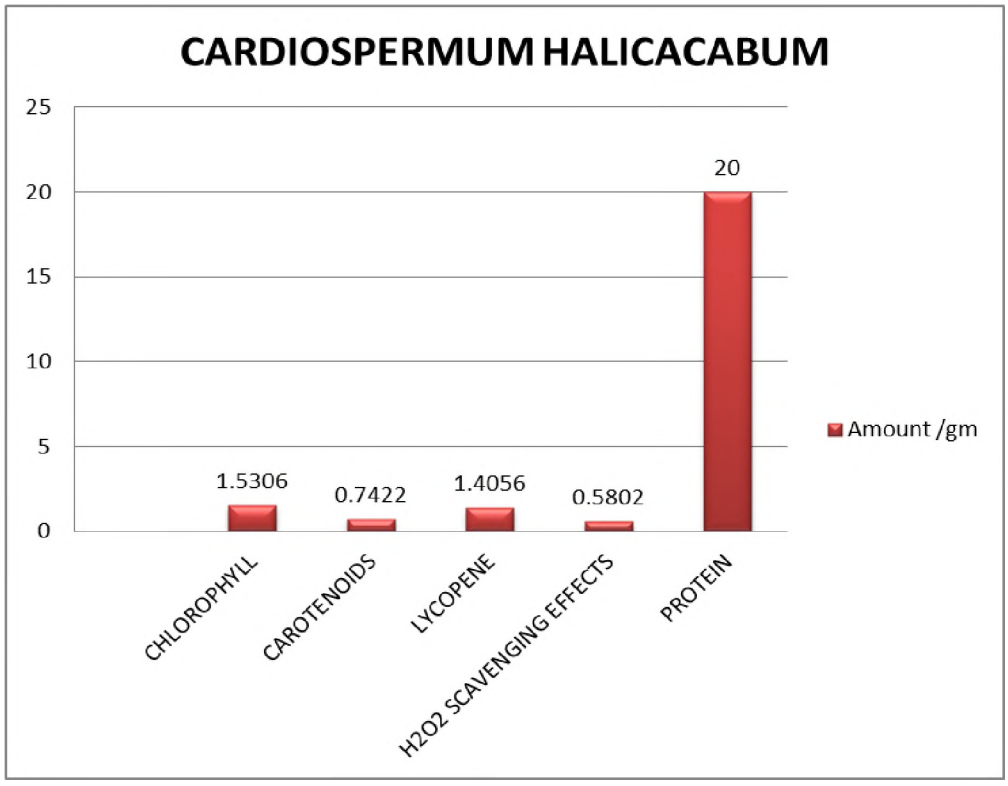

Amount of Total Chlorophyll (mg/g)
0
1.5306
1.5428
0.966
1.8014
3.362
3.9538
CARDIOSPERMUM
DESMODIUM
PIPER
SCOPARIA
TABERNAEMONTANA
THESPESIA

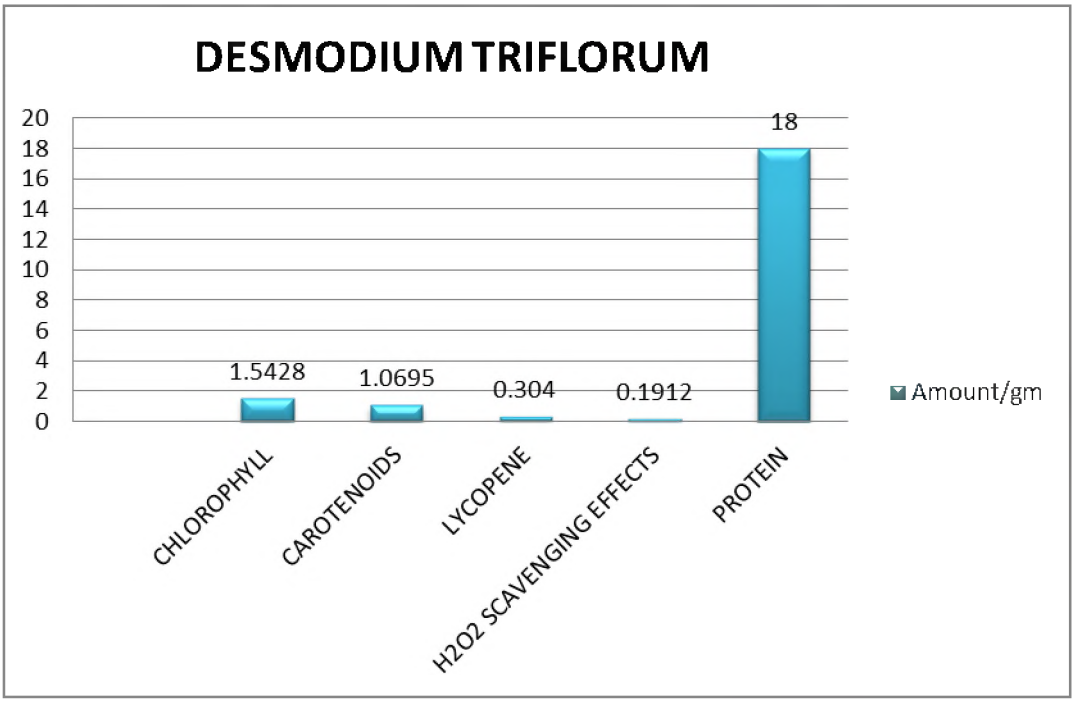

Amountof Total Carotenoids(microgm/g)
0.4895
0.7422
1.0695
0.1034
0.8356
1.9052
CARDIOSPERMUM
DESMODIUM
PIPER
SCOPARIA
TABERNAEMONTANA
THESPESIA

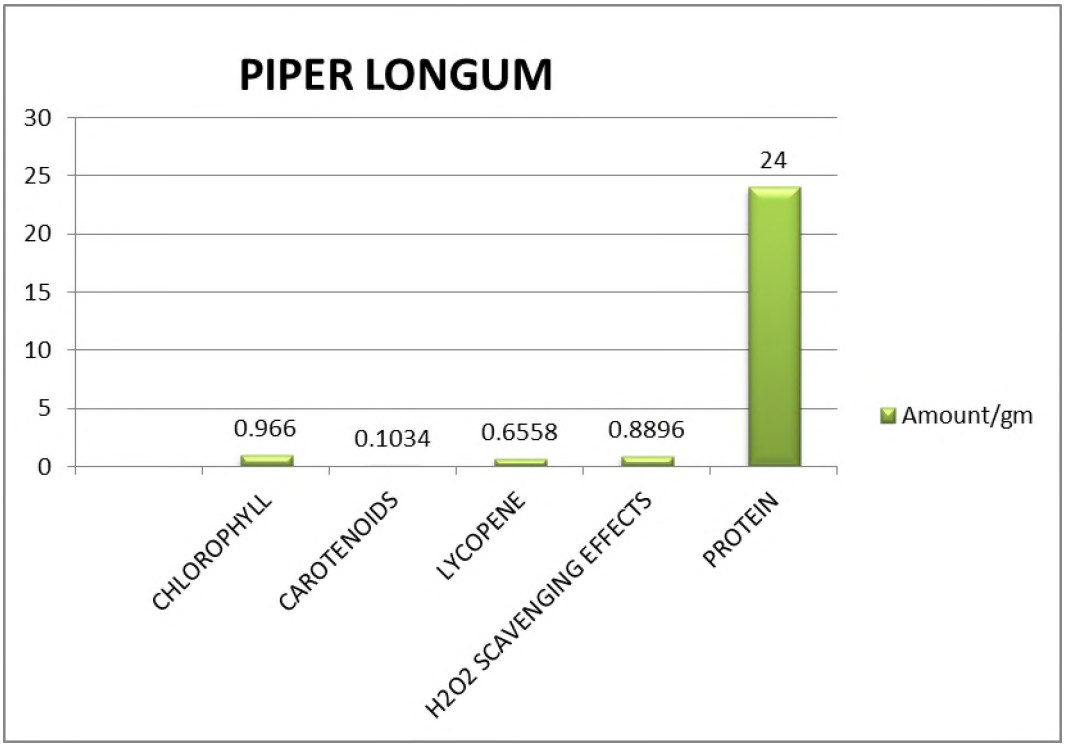

% of Hydrogen Peroxide Scavenging Effects
0
0.5802
0.1912
0.8896
0.7561
0.3752
0.6342
CARDIOSPERMUM
DESMODIUM
PIPER
SCOPARIA
TABERNAEMONTANA
THESPESIA

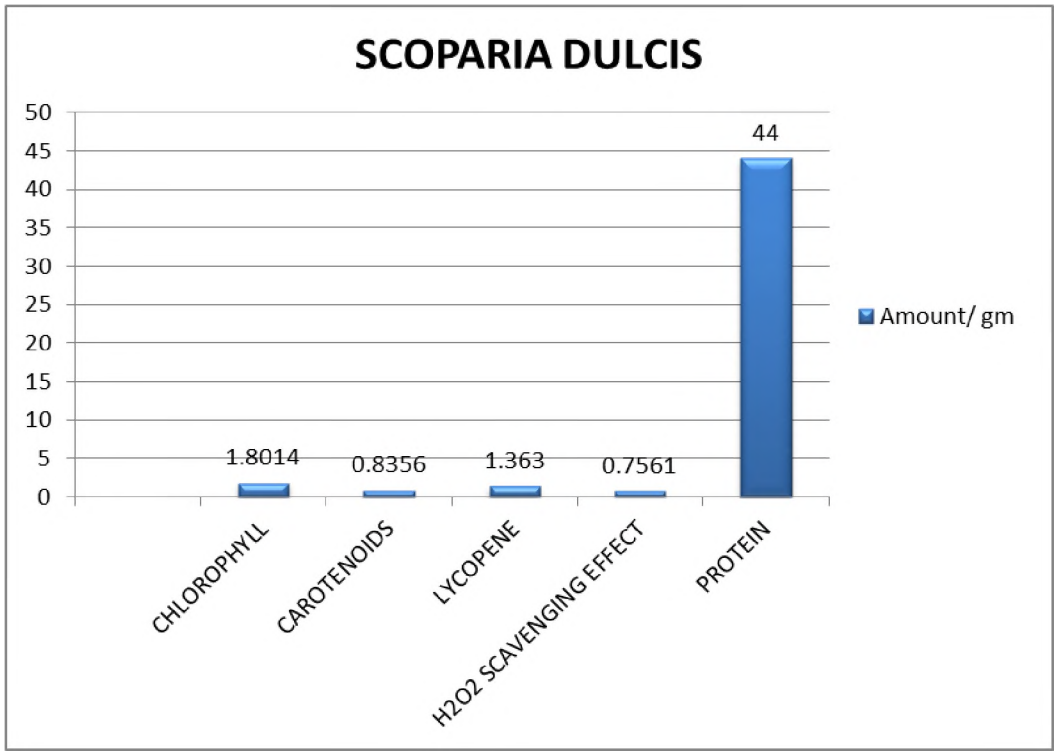

Amount of Lycopene (mg/g)
0
1.4056
0.304
0.6558
1.363
1.8968
2.3562
CARDIOSPERMUM
DESMODIUM
PIPER
SCOPARIA
TABERNAEMONTANA
THESPESIA

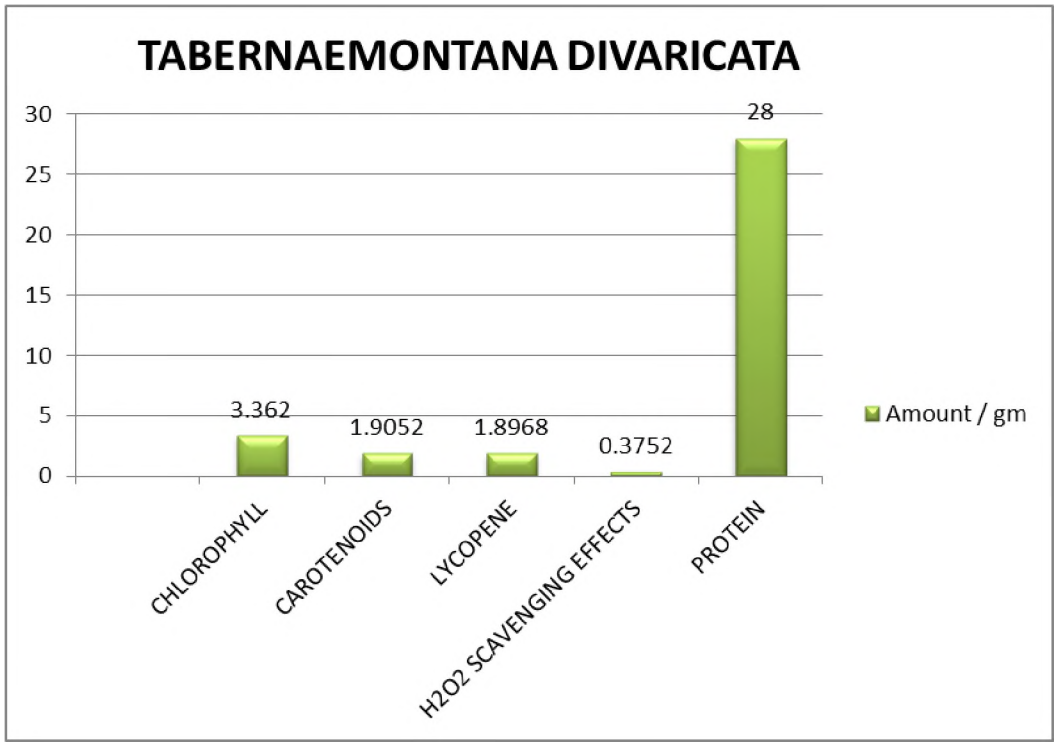

Amount of Protein (mg/g)
0
20
18
24
44
28
26
CARDIOSPERMUM
DESMODIUM
PIPER
SCOPARIA
TABERNAEMONTANA
THESPESIA

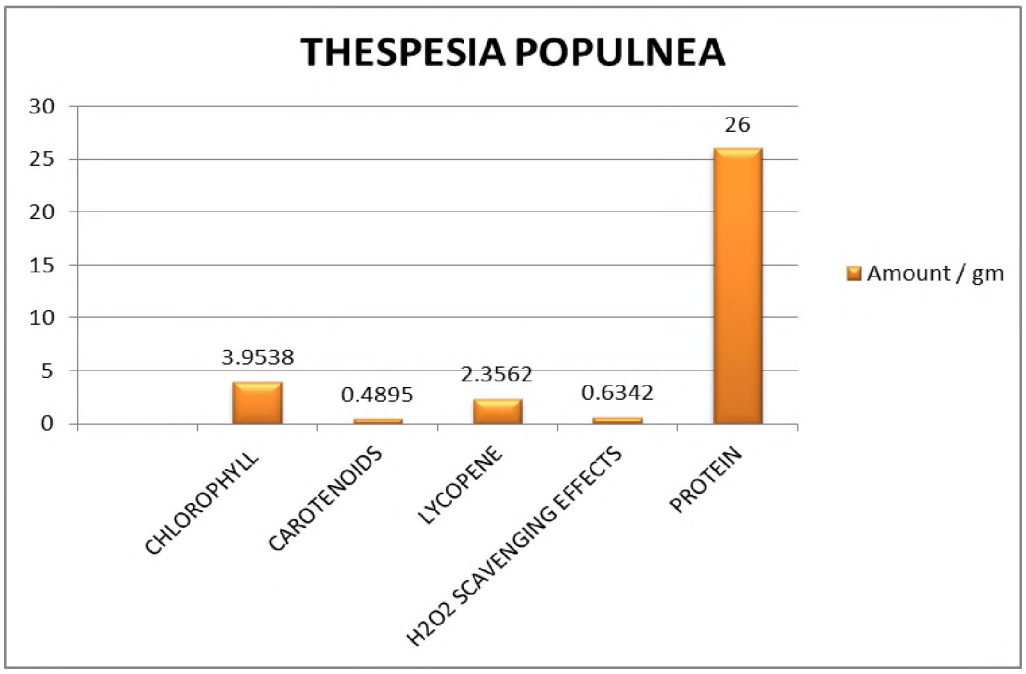

CARDIOSPERMUM HALICACABUM
25
20
15
10
5
0
1.5306
0.7422
1.4056
0.5802
20
CHLOROPHYLL
CAROTENOIDS
LYCOPENE
H2O2 SCAVENGING EFFECTS
PROTEIN
Amount /gm


DESMODIUM TRIFLORUM
20
18
16
14
12
10
8
6
4
2
0
1.5428
1.0695
0.304
0.1912
18
CHLOROPHYLL
CAROTENOIDS
LYCOPENE
H2O2 SCAVENGING EFFECTS
PROTEIN
Amount/gm

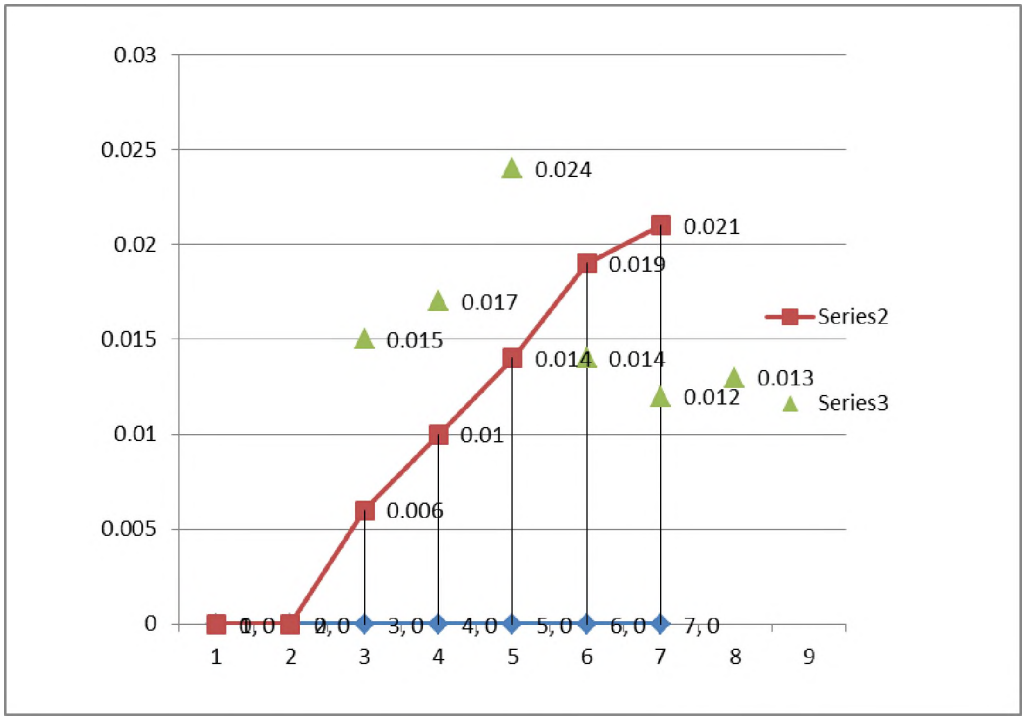

PIPER LONGUM
30
25
20
15
10
5
0
0.966
0.1034
0.6558
0.8896
24
CHLOROPHYLL
CAROTENOIDS
LYCOPENE
H2O2 SCAVENGING EFFECTS
PROTEIN
Amount/gm


SCOPARIA DULCIS
50
45
40
35
30
25
20
15
10
5
0
1.8014
0.8356
1.363
0.7561
44
CHLOROPHYLL
CAROTENOIDS
LYCOPENE
H2O2 SCAVENGING EFFECT
PROTEIN
Amount/ gm


TABERNAEMONTANA DIVARICATA
30
25
20
15
10
5
0
3.362
1.9052
1.8968
0.3752
28
CHLOROPHYLL
CAROTENOIDS
LYCOPENE
H2O2 SCAVENGING EFFECTS
PROTEIN
Amount / gm



Graph showing Total protein content



3.4 CONCLUSION

A quantitative study was conducted to estimate the chlorophyll, carotenoids, lycopene, protein, and percentage of H_2O_2 scavenging capacity of six selected medicinal plants of Mahe region. The plants selected were *Cardiospermum halicacabum* of family Sapindaceae, *Desmodium triflorum* of Fabaceae, *Piper longum* of Piperaceae, *Scoparia dulcis* of Scrophulariaceae, *Tabernaemontana divaricata* of Apocynaceae, and *Thespesia populnea* of Malvaceae. The study showed that *Thespesia populnea* showed maximum chlorophyll content per gram of the leaf, *Piper longum* showed the minimum of the same. *Tabernaemontana divaricata* showed the maximum of carotenoids and *Piper longum* showed the minimum. *Thespesia populnea* showed the maximum of lycopene and *Desmodium triflorum* showed the minimum. Percentage of H_2O_2 scavenging capacity is maximum in *Piper longum* and minimum in *Desmodium triflorum*. Total protein content is maximum in *Scoparia dulcis* and minimum in *Desmodium triflorum*. The study is a useful prelude for further investigations in this line.

CHAPTER 4

SURVEY ON THE AVAILABILITY OF PLANT RESOURCES FOR INDIGENOUS USES AND NEED OF CONSERVATION

4.1 INTRODUCTION

In Mahe information regarding the status of the plants used in indigenous herbal medicines and in socio-religious functions including the traditional cultures with special reference to the availability in the area are scanty. But preliminary floristic analysis of Mahe (Sasikala et al., 2009) and exploration of flora surrounding Kannur (Ramachandran and Nair, 1988) and Kozhikode (Manilal and Sivarajan, 1982) districts of Kerala are already reported. But survey of the plants used for indigenous medicines, traditional cultures and socio religious functions were not explored. Present chapter focusing on the survey of such plants to get information regarding the status of these plants with special reference to the availability. It is already known that knowledge on indigenous utilization of the biodiversity will open way to the conservation and preservation of biodiversity of the area by the community of the area. Conservation of sacred groves are the best examples of conservation by the local people to fulfill their believes. Now many institutions in Kerala around Mahe started to make star forests with assistance of Forest department by planting of 27 plant species, which are connected with each birth stars and this concept of conservation came to exist after the popularization of knowledge on plant species connected with belief and myth. As a result of this research project Mahatma Gandhi Govt. Arts College also proposed to start a star forest with an aim of conservation of plant species. It is also proposed to plant rare plants of Mahe region in Green House area of the college. As part of research project an awareness campaign cum seminar on the indigenous utilization plants was already held in the department, general public, farmers, students and teachers participated in this knowledge sharing programme. If one know about the medicinal or nutritional or other potential of a plant, it is true he/she will come forward to protect or conserve the plant; conservation of 'Tulsi' is an example of the same. The distributional record will help the public to get an idea about the availability of the species in their locality for the future use.

4.2 MATERIALS AND METHODS

After the collection of the information regarding the indigenous uses of plants as a resource for folk medicines, nutraceuticals and socio religious functions and culture, based on the vernacular names binomial and family of the plants were identified (Gamble, 1967, Sasidharan, 2004). A survey conducted to analyze the availability of these plants in the region. Numerical estimation was done after the region divided into four major areas such as Mahe, Chalakkara (including Cherukallayi), Palloor and Pandakkal. The data expressed as rare, common, frequent and abundant.

4.3 RESULTS AND DISCUSSIONS

Survey indicates that some of the plants are not even available in these areas but are using as a major ingredients of indigenous nutraceuticals, medicines or socio religious functions but these plant or plant materials are available in the shops. Rice, Ragi, Gingelly, Chama etc are found to be used in the indigenous preparations but are not cultivating now except rice for few acres. It was learned that these plants were cultivated in the area as major crop varieties. But now the agricultural fields were reclaimed as upland for constructions and majority of the people are not considering agriculture as a source of income. Millets and cereals other than rice and wheat are somewhat disappeared from the dining. Some other plants are represented by few numbers and presently their uses also found to be reduced (Table.4.1) in the field of socio religious functions eg. fruits *of Hydnocarpus pentandra* were used as natural *chirathu* or pots to make decorating lights during festivals and other socio religious celebrations were replaced by earthen *chirathu*.

Distributional pattern showed that 65 (47%) plants used either as resource for medicinal, socio religious or cultural purposes are purely wild (Fig.4d), 62 species are found to be cultivating varieties, out of which 40 plant species are used as either food or spices and condiments in the daily life of the area. Five plants using for indigenous medicines or sociocultural activities are found to be in the area as cultivating species as well as wild. Due to changes in the life style of the area agriculture was reduced very much and only one plant, *Cocos nucifera* is cultivating at least to satisfy the need of the area and remaining cultivated varieties are representing by few numbers which may satisfy the needs

of maximum 4-5 % of the people of the area. Meanwhile products of these cultivating plants are available to Mahe. In indigenous medicine there is a concept that "food itself is medicine (*Aaharam thanne marunnu*)" indicating proper utilization of food for better health and immunity. It is noted that the major components of the nutraceuticals like *karkitaka kanji* for all (during monsoon) and *potimarunnu,* for feeding mothers as part of post natal care of mother and child are composed of millets, cereals, grams, spices and condiments with some medicinal herbs (Chapter1) which satisfy requirements of all nutrients such as carbohydrate, protein, minerals and vitamins. Survey showed that 132 plant species are using either as a source of medicinal, nutraceutical or socio religious and cultural resources and 48 (37%) species are not available in the area but the products of the same are available in the shops. It is learned that many of these plants were cultivated earlier in the area and now majority of fields were reclaimed for construction of houses and other purposes. It is found that 34 species are rare and only 9 species (7%) are common and only 50 plant species (38%) is available very often or frequently and this indicating the importance of conservation the plant diversity of the region.

Analysis of the plant life forms (Fig. 4b) showed that trees and shrubs are contributing 28% each, herbs by 36% and remaining by climbers. 67% of the plant species are found to be perennial and remaining are seasonal (Fig.4c). Utilization of plant parts are varying with species for their uses, when leaves of 28 % plant species are using for indigenous stem and flowers contributing a maximum of 2% (Fig.4f). Analysis of the usage showed that 59 % of the plant species are used only for the purpose of medicinal uses and 21 % are using for socio religious and cultural uses while remaining 20 % are using for both purposes (Fig.4e). It indicates that 48 % of the plants used for the purpose of socio religious or cultural activities are medicinal and the importance of the conservation of these medicinally potential plants may be lead to think to connect such plants with that of believes and myth by ancestors.

Fig.4a Distribution of Plant diversity

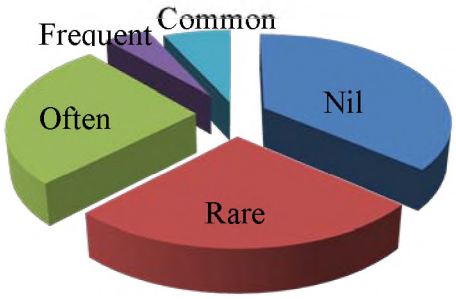


Fig.4b Life forms of plant species

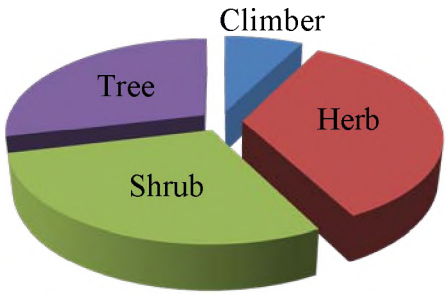


Fig.4c Occurance of species

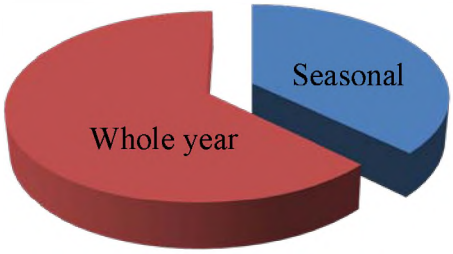


Fig.4d Status of the species

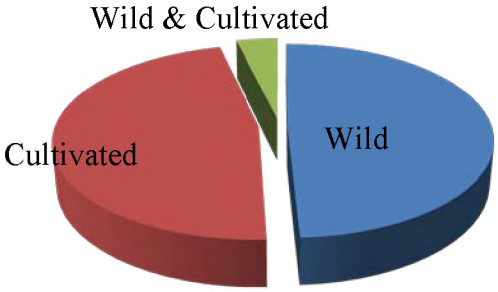


Fig.4e Plants used for IM&ISR

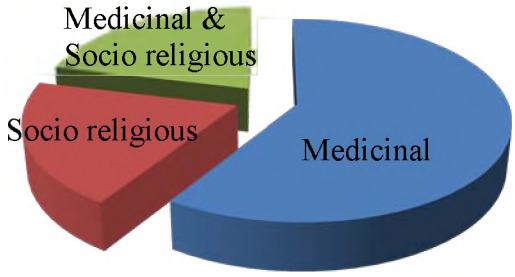


Fig.4f Plant parts used for IM&ISR

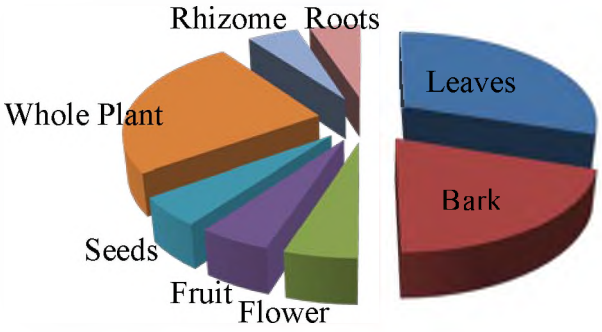


Fig.4g Plant parts used for socio religious

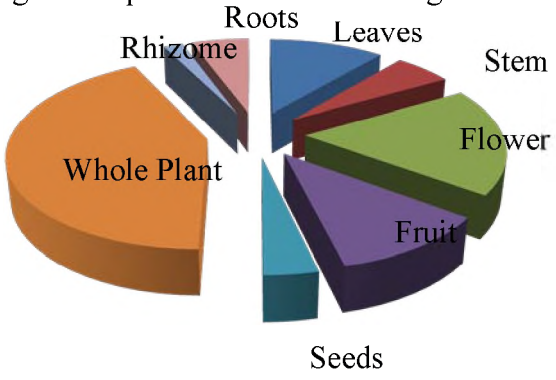
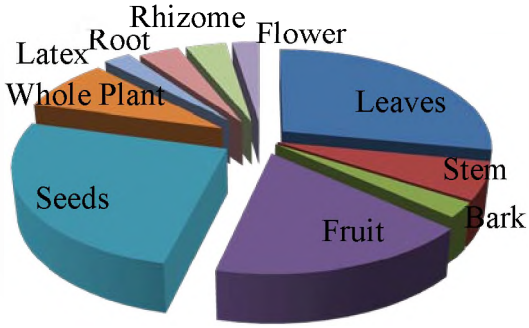


Fig. 4h Plant parts for Indigenous medicine



4.4 AWARENESS PROGRAMME

It is known that people will come forward for the conservation of biodiversity, if they get direct benefit from them or if they get an idea the species are giving them benefits in the field of medicine, food, socio religious uses etc. But now days majority of people are unaware of the potentialities of biodiversity in and around them. Hence as per the proposal a seminar was conducted for the students, teachers, stakeholders and general public regarding the indigenous utilization of plants. Dr. V. Ramassamy, Principal inaugurated the seminar, Dr. K.K. Sivadasan (Associate Professor and Principal Investigator) presented the project study report, Sujith Kumar (Deputy Director, Dept. of Agriculture, Mahe), made felicitation, Mr. Girish Kumar E (Assistant Professor and co-investigator) explained about the relevance of topic of seminar and conservation of biodiversity, Mr. C. P Ravindran (Associate Professor and HOD) presided over the function, Dr. M. Mari Bhat made welcome address and Dr. G. Pradeep kumar expressed vote of thanks for the function. Hamza Madikkai (Award winner of Folk Medicine, Kerala State) delivered a lecture regarding the importance of medicinal plants, how food became medicine and he introduced many medicinal plants to the participants, which he brought to the seminar hall with his assistants. Some patients also came to seminar hall to consult Folk medicinal practitioner Hamza madikkai. Professor M. Sreedharan (Rtd. Madappally Govt. College) explained various way of extraction of value added product and explained the utility value of squaline, a compound he isolated and recommended to cancer patients to increase appetite and Dr. K.M. Bharathan (Professor and Head, Cultural Heritage Studies, Malayalam University, Kerala) made lectures on Plants in culture and their representation, through his presentation he explained value of conservation of biodiversity for the cultural heritage.

4.4. CONCLUSION

During the survey 132 plant species belong to 59 families were identified as the ingredients of indigenous medicine or socio religious culture in Mahe region. Survey showed that majority of plant species (82 species, comprising 62%) used are not sufficiently available in the area due to rarity or lack of the plant species but interestingly their products are easily available. 67 plants are found to be cultivated varieties and out of this 53 plant species are using in indigenous medicines or socio religious and cultural

activities are edible as either staple food or spices and condiments supporting the view of major concept of indigenous medicine, "food itself is medicine". Once millets and cereals other than rice and wheat were also major part of staple food of the area and now these were completely disappeared from the dining and becoming ingredients of the special preparations such as *potimarunnu* and *Karkitaka kanji* and this deterioration of availability of the species are due to the changes in the life style by eating habit and reducing agriculture. Apart from the cultivated varieties only 15 plant species are insufficiently available in the area as wild species. Useful part of plants are also found to be varying with the uses, when leaves of 23 species are using in indigenous medicine it is only 6 plant species for Socio religious culture. Out of 54 plants used in socio religious cultural activities 26 are medicinal and this indicate that inclusion of medicinal plants for socio cultural activities may be for the purpose of conservation. However all plant species used for socio religious culture are found to highly useful as food, medicine, timber or fire wood. The rarity or absence of majority of the species using in indigenous medicine and socio religious culture urges the need of conservation. As the feeling of conservation of biodiversity can be generated through the awareness programme a seminar was organized as part of the project for students, teachers, stakeholders, traditional practitioners and general public. During the lecture on "Food itself is medicine" by Mr. Hamza Madikkai (Traditional practitioner and award winner of Folk Medicine, Kerala), he presented a number of medicinal plants, brought by him and participant got chance to see, identify and medicinal import ants of the plants. Importance of squaline for the cancer treatment, extraction and use of biochemical compounds from some wild plants for potential uses explained by Prof. Sreedharan and lecture in the area of Indigenous culture and uses of plants and conservation of biodiversity by Dr. K.M Bharathan were found to be useful for the participants. Principal investigator Dr. K.K. Sivadasan explained about the findings of the project and importance of biodiversity conservation of Mahe.

Table 4.1. Plants used for Indigenous Medicine and Socio religious functions and their distribution in Mahe

Sl No	Binomial & Family	Vernacular name	Use	Distribution				Occurrence	Useful part	Habitat	Wild/ Cultivated
				Mh	Ch	Pl	Pnd				
1	*Abrus precatorius L.*, (Fabaceae)	Kunni	IM	C	C	C	C	WY	Sd	Cl	W
2	*Acacia catechu* (Mimosaceae)	Karingali	IM	---	---	---	---	WY	Tb	T	Cu*
3	*Achyranthes aspera* var. *aspera L* (Amaranthaceae)	Katalati	IM	O	O	O	C	S	WP	SH	W
4	*Adhatoda vasica L.*, (Acanthaceae)	Atalotakam	IM	O	O	O	O	WY	L	SH	Cu
5	*Aegle marmelos* (L) (Rutaceae)	Koovalam	IM, ISR	R	R	R	R	WY	L, Rt	T	Cu
6	*Aerva lanata* (L) (Amaranthaceae)	Cherula	IM, ISR	O	O	O	O	WY	WP	H	W
7	*Allium cepa* L (Liliaceae)	Ulli	IM	--	--	---	---		L	H	Cu*
8	*Allium sativum* L., (Liliaceae)	Velulli	IM	----	---	---	---		L	H	Cu*
9	*Aloe vera* (L) (Liliaceae/ Agavaceae)	Kattarvazha	IM	O	O	O	O	WY	L	H	Cu
10	*Anacardium occidentale* (Anacardiaceae)	Kasumavu (Rwithikmavu)	ISR	R	O	R	R	WY	F, Sd	T	Cu
11	*Andrographis paniculata* (Burm.f.) (Acanthaceae)	Kiriyath	IM	C	C	C	C	WY	L, WP	SH	W
12	*Anethum graveolens* L., (Apiaceae)	Sathakuppa	IM	---	---	---	---	S	Sd	H	Cu*
13	*Aporosa lindleyana* (Euphorbiaceae)	Vetti	ISR	----	----	----	---	WY	WP	SH	W Cu

14	*Arachis hypogaea* L., (Fabaceae)	Nilakkatala	IM	----	----	---	---	S	Sd	SH	Cu*
15	*Areca catechu* (Arecaceae)	Kavungu	ISR	O	O	O	O	WY	Sd	T	Cu
16	*Aristolochia indica* L., (Aristolochiaceae)	Garudamooli	IM	R	R	---	R	WY	L, Rt	Cl	W
17	*Artocarpus integrifolius* L., (Moraceae)	Pilavu	IM, ISR	C	C	C	C	WY	F, Tb	T	Cu
18	*Asparagus racemosus* Wild. (Liliaceae)	Sathavari	IM	O	O	R	O	WY	Tu	Cl	W
19	*Azadiracta indica* A. Juss (Meliaceae)	Aryaveppu	IM	R	O	R	O	WY	L, Sd	T	Cu
20	*Bacopa monnieri* (L) (Scrophulariaceae)	Brahmi	IM	---	----	R	R	WY	L	H	W
21	*Bambusa bambos* (Poaceae)	Illi	ISR	R	R	--	R	WY	Wh	SH	W,Cu
22	*Bauhinia sp* (Caesalpiniaceae)	Mantharam	ISR	R	R	R	R	WY	Fl	SH	Cu
23	*Biophytum sensitivum* L (Oxalidaceae)	Mukkutti	IM, ISR	F	F	F	F	S	WP	H	W
24	*Boerhavia diffusa* L (Nyctaginaceae)	Thazhuthama	IM	F	O	O	F	S	WP	H	W
25	*Butea monosperma* (Fabaceae)	Chamatha	ISR	---	----	---	R	WY	L, Tw	SH	W
26	*Caesalpinia sappan* L (Caesalpiniaceae)	Pathimukham	IM	R	R	---	R	WY	B, Tb	T	Cu
27	*Cajanus cajan* L (Fabaceae)	Thuvara	IM	---	---	---	--	S	Sd	SH	Cu*
28	*Calotropis gigantea* (L) (Asclepiadaceae)	Erukku	IM, ISR	R	R	R	R	WY	Lx, F	SH	W
29	*Capsicum frutescens* L. (Solanaceae)	Kanthari	IM	O	O	O	O	WY	F	SH	Cu
30	*Cardiospermum halicacabum* L., (Sapindaceae)	Uzhinja	IM, ISR	O	O	O	O	WY	L, WP*	ClH	W
31	*Carica papaya* L. (Caricaceae)	Pappaya	IM	O	O	O	O	WY	F, Lx L	GH	Cu

32	*Cassia fistula*(Caesalpiniaceae)	Kanikonna	IM, ISR	O	O	O	O	WY	Fl, F	T	W/Cu
33	*Centella asiatica* (L.) Urban (Apiaceae)	Kutangal	IM	O	C	O	O	S	L	H	W
34	*Chrysanthemum morifolium* (Asteraceae)	Jamanthi	ISR	---	----	---	----	S	Fl	H	Cu*
35	*Cicer arietinum* (Fabaceae)	Katala	IM, ISR	----	---	---	---	S	Sd	H	Cu*
36	*Cinnamomum zeylanicum* Pers., (Lauraceae)	Patta (Karuva patta)	IM	R	R	R	R	WY	B	T	Cu*
37	*Clerodendrum infortunatum* Wight, (Verbenaceae)	Periyala	IM	R	O	R	O	WY	L, Rt	SH	W
38	*Clitoria ternatea* L. (Fabaceae)	Sankupushpam	IM	R	R	R	R	WY	L	Cl	W
39	*Cocos nucifera* L (Arecaceae)	Thengu	IM, ISR	A	A	A	A	WY	L, Tb, IF, F	T	Cu
40	*Coriandrum sativum* L., (Apiaceae)	Malli	IM	----	----	---	---	S	Sd	H	Cu*
41	*Cucumis sativa* (Cucurbitaceae)	Kani Velleri	ISR	----	---	---	R	S	Fr	H	Cu
42	*Cuminum cyminum* L., (Apiaceae)	Jeerakam	IM	---	----	----	----	S	F	SH	Cu*
43	*Curculigo orchioides* Gaertn. (Hypoxidaceae)	Nilappana	IM, ISR	C	C	C	C	S	Wh Tu	H	W
44	*Curcuma anguistifolia* (Zingiberaceae)	Koova	IM	R	R	R	R	S	Rh	H	W
45	*Curcuma longa* L (Zingiberaceae)	Manjal	IM, ISR	R	O	O	O	S	Rh	H	Cu
46	*Cyathula prostrata* (Amaranthaceae)	Cherukatalati	IM	O	O	O	C	S	Wh	SH	W
47	*Cyclea peltata* (Lam.) (Menispermaceae)	Patathali	IM	R	O	O	O	S	L, Rh	Cl	W
48	*Cynodon dactylon* L (Poaceae)	Karuka	IM, ISR	C	C	C	C	WY	UPart	Cr	W
49	*Cyperus rotundus* L.	Muthanga	IM	C	C	C	C	S	Rh	H	W

	(Cyperaceae)										
50	*Desmodium triflorum* (L.) DC., (Fabaceae)	Nilamparanta	IM	O	C	O	C	S	Wh	Cr	W
51	*Diospyros condolleana* (Ebenaceae)	Karimaram	ISR	---	---	----	----	WY	Wh	T	W
52	*Eclipta alba* L., (Asteraceae)	Kanjanni	IM, ISR	O	O	O	O	S	UPart	H	W
53	*Elettaria cardamom L* (Zingiberaceae)	Elakka	IM	---	---	---	---	S	Sd	H	Cu*
54	*Eleusine coracana Geartn* (Poaceae)	Muthari / ragi	IM	---	---	---	---	S	Sd	H	Cu*
55	*Emilia sonchifolia* (L.) (Asteraceae)	Muyalchevian	IM, ISR	O	O	O	O	S	L UPart	H	W
56	*Erythrina variegata*	Murikku	ISR	---	R	--	R	WY	Tb	T	W
57	*Evolvulus alsinoides* L., (Convolvulaceae)	Vishnukranthi	IM, ISR	---	R	--	R	S	UPart	H	W
58	*Ferula assafoetida* (Apiaceae)	Kayam	IM	--	--	---	---	Wy	Res	T	W
59	*Ficus bengalensis* L., (Moraceae)	Peral	IM, ISR	R	R	R	R	WY	B	T	W
60	*Ficus gibbosa* Blume. (F. *tinctoria*) (Moracea)	Itthi	IM, ISR					WY	B	T	W
61	*Ficus glomerata* Roxb. (F. recemosa) (Moraceae)	Atthi	IM, ISR			R		WY	B	T	W
62	*Ficus religiosa* L., (Moraceae)	Arayal	IM, ISR	R	R	R	R	WY	B	T	W
63	*Flacourtia montana* (Flacourtiaceae)	Vayyankatavu	ISR	--	--	--	--	WY	Wh	T	W
64	*Foeniculum vulgare* Mill. (Apiaceae)	Perumjeerakam	IM					S	F	H	Cu*
65	*Glycosmis pentaphylla* (Retz.) DC (Rutaceae)	Panal	IM	R	O	R	O	WY	L	SH	W
66	*Hemidesmus indicus*	Nannari	IM	---	---	---	---	S	Rt	SH	W

	(Asclepiadaceae)										
67	*Hemigraphis alternata* (Burm.f.) (Accanthaceae)	Murikootti	IM		R			WY	L	Cr Sh	Cu
68	*Hibiscus rosa-sinensis* L (Malvaceae)	Chemparathi	IM, ISR	O	O	O	O	WY	L	SH	Cu
69	*Hordeum vulgare* L., (Poaceae)	Yavam (Barley)	IM					S	Sd	SH	Cu*
70	*Hydnocarpus pentandra* (Flacourtiaceae)	Marotti	ISR	R	---	---	R	WY	F	Ts	W
71	*Imperata cylindrica* (Poaceae)	Darbha	ISR	---	---	---	---	Wy	L	H	W
72	*Indigofera tinctoria* (Fabacea)	Neela amari	IM	--	---	---	---	Wy	L	SH	W, Cu
73	*Ipomoea obscura* (L) Ker-Gawl (Convolvulaceae)	Thiruthali	IM, ISR	R	---	---	R	WY	L, UPart	Cl	W
74	*Ixora coccinea* (Rubiaceae)	Chekki	ISR	C	C	C	C	WY	Fl	SH	W
75	*Jasminum sambacum* (Oleaceae)	Mulla	ISR	R	R	R	R	S	Fl	SH	Cu
76	*Kaempferia galanga* L (Zingiberaceae)	Kachcholam	IM	---	---	---	R	S	Rh	H	Cu
77	*Lawsonia inerme* (Lythraceae)	Mailanchi	ISR, IM	R	R	R	R	WY	L	SH	Cu
78	*Lepidium sativum* L., (Cruciferae)	Ashali	IM	---	---	---	---	S	F	SH	Cu*
79	*Leucas aspera* (Willd) Link (Lamiaceae)	Thumpa	IM, ISR	R	R	R	R	S	L, Fl	H	W
80	*Macrotyloma uniflorum* (Lam) Verde (Fabaceae)	Muthira	IM	---	---	---	---	S	Sd	SH	Cu*
81	*Madhuca neriifolia* (Sapotaceae)	Athilippa	ISR	R	R	R	R	WY	Wh	T	W, Cu
82	*Mangifera indica* L., (Anacardiaceae)	Mavu	ISR	O	O	O	O	WY	L, Ti	T	Cu
83	*Mesua ferrea* var. *ferrea* (Clusiaceae)	Nagamaram	ISR	---	---	---	---	WY	Wh	T	W

84	*Michelia champaca* L (Magnoliaceae)	Ponchembakom	ISR	R	R	R	R	WY	Fl	T	W,Cu
85	*Mimosa pudica* L., (Mimosaceae)	Thottavati	IM	F	F	F	F	WY	Wh	SH	W
86	*Mimusops elengi* (Sapotaceae)	Elenji (elenhi)	ISR	R	R	R	R	WY	Wh	T	W
87	*Moringa pterygosperma* Gaertn., (Moringaceae)	Muringa	IM	O	O	O	O	WY	B	ST	Cu
88	*Murraya koenigii* L., (Rutaceae)	Kariveppila	IM	O	O	O	O	WY	L	ST	Cu
89	*Musa paradisiaca* (Musaceae)	Vazha	ISR	F	F	F	F	WY	L. Fr	H	Cu
90	*Nigella sativa* (Rananculaceae)	Karimjeerakam	IM	---	---	---	---	S	F	H	Cu
91	*Neolamarkiana cadamba* (Rubiaceae)	Kadambu	ISR	---	---	---	--	WY	Wh	T	W
92	*Ocimum tenuiiflorum* L., (Lamiaceae)	Thulasi	IM	O	O	O	O	WY	L, Tw	SH	Cu
93	*Oryza sativa* (Poaceae)	Ari / Nellu	IM, ISR	---	---	---	---	S	Sd	H	Cu
94	*Panicum sumatrense* Roth ex Roem&schult (Poaceae)	Chama	IM	---	---	---	---	S	Sd	H	Cu*
95	*Phyllanthus amarus* Schum& Thom. (Euphorbiaceae)	Keezharnelli	IM	O	O	O	O	S	Wh	H	W
96	*Phyllanthus emblica* L., (Euphorbiaceae)	Nelli	IM	R	R	R	R	WY	Fr	T	W Cu*
97	*Piper betel* (Piperaceae)	Vettila	ISR	---	---	---	R	WY	L	SH	Cu
98	*Piper longum* L (Piperaceae)	Thippali	IM	---	O	R	O	WY	Fr	SH	W
99	*Piper nigrum* L. (Piperaceae)	Kurumulaku	IM	R	R	R	R	WY	Fr, Tw	Cl	Cu
100	*Plectranthus amboinicus* (Lour) (Lamiaceae)	Panikoorkka	IM	R	O	O	O	WY	L	SH	Cu
101	*Plumeria alba* (Apocynaceae)	Chempakam	ISR	R	R	R	R	WY	Fl	T	Cu
102	*Prosopis juliflora* (Mimosaceae)	Vanni	ISR	---	---	---	---	WY	Wh	SH	W
103	*Psidium guajava* L.	Pera	I M	O	O	O	O	WY	L	ST	Cu

	(Myrtaceae)										
104	*Punica granatum* L. (Punicaceae)	Urumampazham	IM	---	---	---	R	WY	Fr	SH	Cu*
105	*Ricinus communis* L. (Euphorbiaceae)	Aavanakku	IM	O	R	R	O	WY	Sd	SH	W
106	*Saccharum officinarum* L (Poaceae)	Karimpu	IM	---	---	---	---	S	St	H	Cu*
108	*Salix tetrasperma* (Salicaceae)	Vanchi	ISR	---	---	---	---	WY	Wh	T	W
109	*Scoparia dulsis* L (Scrophulariaceae)	Kallurukki	IM	O	O	O	O	WY	Wh	SH	W
110	*Sesamum indicum* L. (Pedaliaceae)	Ellu	IM	---	---	---	---	S	Sd	SH	Cu*
111	*Setaria italica* (Linn) Beauv. (Poaceae)	Thina	IM	---	---	---	---	S	Sd	H	Cu*
112	*Spilanthes agmella* (Asteraceae)	Palluvedana poo	IM	---	----	---	R	WY	Fl	H	W
113	*Spondias pinnata* (Anacardiaceae)	Ambazham	ISR	R	R	R	R	WY	Wh	T	W
114	*Strychnos nux-vomica* (Loganaceae)	Kanjiram (Kanhiram)	ISR	R	R	R	R	WY	Wh	T	W
115	*Strychnos potatorum* Linn. (Loganaceae)	Thettamparal	IM	----	----	---	----	WY	Sd	ST	W
116	*Syzygium cumini* var. *cumini* (Myrtaceae)	Njaval (Nhaval)	ISR	R	O	R	O	WY	Wh	T	W
117	*Tabernaemontana alternifolia* L., (Apocynaceae)	Pala	IM	R	O	R	R	WY	Lx	ST	W
118	*Tagetes erecta* (Asteraceae)	Chettipoo	ISR	--	---	---	---	S	Fl	H	Cu*
119	*Tamarindus indica* L., (Caesalpiniaceae)	Puli	IM	R	R	R	R	WY	L	T	W
120	*Terminalia arjuna* (Lythraceae)	Neermaruthu	ISR	--	---	--	R	WY	Wh	T	W
121	*Thespesia populnea* (L) (Malvaceae)	Poovarasu (Chenthamiri)	IM	R	R	---	R	WY	L	T	W

122	*Tinospora cordifolia* (Willd) (Menispermaceae)	Chittamruthu	IM	R	R	R	R	WY	Tw	Cl	W
123	*Trachyspermum roxburghiana* (Apiaceae)	Ayamodakam	IM	----	----	----	----	S	Sd	H	Cu*
124	*Trigonella foenum-graecum* L. (Fabaceae)	Uluva	IM	---	---	----	----	S	Sd	H	Cu*
125	*Triticum aestivum* (Poaceae)	Gothambu	IM,ISR	---	---	---	---	S	Sd	H	Cu*
126	*Vateria indica* (Dipterocarpaceae)	Vellapine	ISR	---	---	---	----	WY	Wh	T	W
127	*Vernonia anthelmintica* (L.) (Asteraceae)	Kattujeerakam	IM	---	---	---	----	S	Fr	SH	W
128	*Vernonia cinarea* L (Asteraceae)	Poovamkurunnila	IM	O	O	O	O	S	Wh	SH	W
129	*Vetiveria zizanioides* (Poaceae)	Ramacham	IM	---	R	R	R	WY	Rt	H	Cu
130	*Vigna mungo* (Fabaceae)	Uzhunnu	IM	--	---	---	---	S	Sd	H	Cu*
131	*Vigna radiata* (Fabaceae)	Cherupayar	IM	---	---	---	---	S	Sd	H	Cu*
132	*Vigna unguiculata* L (Fabaceae)	Mampayar	IM	R	R	R	O	S	Sd	Cl	Cu*
133	*Vitex negundo* (Lamiaceae)	Karinochi	IM	----	R	---	R	WY	L	Cl	Cu
134	*Zingiber officinale* L. (Zingiberaceae)	Inchi	IM	---	R	--	R	S	Rh	H	Cu

IM- Indigenous medicine, ISR- Indigenous socio-religious, F- Frequent, C- Common, O-Occasional, R-Rare, S- Seasonal, WY -Whole year, L-Leaf, B-Bark, St-Stem, Tb- Timber, Rt-Root, Rh-Rhizome, Sd- Seed, Fr- Fruit, Fl-Flower, WP-Whole plant, Lx- Latex, H-Herb, SH- Shrub, T-Tree, Cl-Climber, W- Wild, Cu- Cultivated, Cu* Cultivated but only products are available..

EXECUTIVE SUMMARY

Among the practice of herbal medicines, scientific evaluation and documentation of indigenous medicines is found to be scanty. In folk medicines the information of utilization of various plants for ailments and health concerns are normally transferred from generation to generation orally to close relatives and hence majority of the information was are already lost along with demise of traditional practitioners, who never got chance to teach and transfer this wealth to his son or sister's son. Many of centres that practice Ayurveda in Kerala utilizing indigenous medicines and indigenous knowledge such as "Kalari and Marma" with Ayurveda and got its own name as Kerala Ayurvedics. This indigenous knowledge on health concerns may be even developed before of the arrival of Ayurveda among the indigenous communities or developed parallelly. However as per the present day information it can be analysed that both were found to have adopted knowledge from each other for better results.

The present chapter concentrated on the documentation of indigenous uses of plants for health concerns related to pre and post natal care of mother and child, remedies for cough and fever, gastric and other stomach problems, skin diseases, eye diseases, tonsillitis and throat pain, muscular pain, kidney stones, cholesterol, diabetes, liver health and preparations of nutraceutical *Karkitaka kanji* for general health of all and medicated drinking water.

More attention and pre natal care of mother starts from seventh month of pregnancy at ancestral house of the woman under the supervision of experienced old ladies of the house or relatives or old birth attenders if any from the nearby area. Once traditional birth attenders were available in all communities but majority were found to depend upon the experienced ladies or birth attenders belonging to socially and economically poor background. Herbal preparations are administrates to reduce morning sickness, increase appetite, improve general health, and reduce excess bleeding and body pain after delivery. Body massaging oil, *mukkoottu* used for shapening of the body of baby and rejuvenation of the body of mother and *vevuvellam,* medicated water for bath is seems to be antibacterial. Studies proved that the ingredients *Nalpamara* (bark of four Ficus spp.) used in *vevuvellam* contain antibacterial and anti-inflammatory properties. Based on the available

phytochemical and pharmacological studies of the ingredients present in *potimarunnu*, it can be assumed that traditional nutraceutical contained all nutrients such as carbohydrate, protein, minerals, and vitamins, digestion promoting agents and components to reduce gastric problems and thus it forms the best nutraceutical. Though there are variations in the ingredients and compositions of *potimarunnu* for different communities of the region, major ingredients are found to be same. It is interesting that the knowledge on pre and post natal care of mother and child are mostly confined to ladies and hence it is the relics of *women folk knowledge*. Reduction of cholesterol by coconut shell decoction and improving liver health by the crude leaf preparation of *Thespesia populnea* and whole *Desmodium triflorum* are few examples of simple and effective use of indigenous medicine in Mahe and Kerala.

When man was apperhensive of natural phenomena and believed the nature or supernatural power, he started to keep a portion of valuable natural resources he likes for this *power*. The parts of plants or other valuable commodities from biodiversity which were identified as the medicine, food and fire wood or as aesthetic product due to its beauty and aroma were offered to the *powers* and used for cultural activities during the time of civilization and thus different socio religious functions were developed indigenously and modified. Presently such indigenous socio religious and cultural activities with the products of biodiversity were started to disappear from the world and hence conservation or preservation of indigenous or folk culture is considered as a major pillar of sustainable development. Second chapter explained how plant parts are usined by the people of the area for worships to various *gods*, customs and traditions related with various ceremonies starting from rice eating ceremony to the last rite after the grave and in various folk cultural performances. Ten plants were named as 'Dasapushpangal' and used for various religious functions and believed to bring prosperity by wearing these plant parts by the ladies during *Karkitaka* month and *Thiruvathira* day. Same time many of these species were also recommended for gynecological remedies, pre and post natal care of mother and this sacredness may be given to them due to their uses for ladies and with the aim of conservation. Various forms or products of rice and coconut are found to be used in many socio religious activities. The well-known folk performance in this region is *Theyyam* and

artists use different plant parts for costumes, make-up and decoration. The masks, chain, ear rings, breast and bangles are made from soft wood, Erythrina and gum used to paste coloured paper over these costumes is made from bee wax and resin of Jack fruit. All these items are prepared by the artists themselves and all artists including persons who play drum belong to Scheduled castes and temples or sacred groves where the performance takes place is owned by either Thiyya or Nair communities. Theyyam is generally performed in sacred groves (*kavus*) the temples without shrine and meant for second level of gods such as *Kuttichathan, Sasthav*, and *Devatha*. *Kavus* or sacred groves are mini forests which play an important role in conservation of microclimate. During the Celebration of *Vishu*, a festival to start agricultural activities after the harvest of indigenous vegetables, fruits including jack fruit are kept on a brass vessel with inflorescence of *Cassia anguistifolia* for the first sight in the day. Similarly floral decorations on the courtyard for ten days till *Thiruvonam* to receive the Asura king Mahabali is another celebration with indigenous plant materials. All auspicious functions will be held in front of *Nirapara and Nilavilakku*, a measuring cylinder, *para* filled with heap of paddy and coconut inflorescence with large lamp is another indigenous culture.

A quantitative study was conducted to estimate the chlorophyll, carotenoids, lycopene, protein, and percentage of H_2O_2 scavenging capacity of six selected medicinal plants of Mahe region. The plants selected were *Cardiospermum halicacabum* of family Sapindaceae, *Desmodium triflorum* of Fabaceae, *Piper longum* of Piperaceae, *Scoparia dulcis* of Scrophulariaceae, *Tabernaemontana divaricata* of Apocynaceae, and *Thespesia populnea* of Malvaceae. The study showed that *Thespesia populnea* showed maximum chlorophyll content per gram of the leaf, *Piper longum* showed the minimum of the same. *Tabernaemontana divaricata* showed the maximum of carotenoids and *Piper longum* showed the minimum. *Thespesia populnea* showed the maximum of lycopene and *Desmodium triflorum* showed the minimum. Percentage of H_2O_2 scavenging capacity is maximum in *Piper longum* and minimum in *Desmodium triflorum*. Total protein content is maximum in *Scoparia dulcis* and minimum in *Desmodium triflorum*. The study is a useful prelude for further investigations in this line.

During the survey 132 plant species belong to 59 families were identified as the ingredients of indigenous medicine or socio religious culture in Mahe region. Survey

showed that majority of plant species (82 species, comprising 62%) used are not sufficiently available in the area due to rarity or lack of the plant species but interestingly their products are easily available. 67 plants are found to be cultivated varieties and out of this 53 plant species used in indigenous medicines or socio religious and cultural activities are edible as either staple food or spices and condiments supporting the view of major concept of indigenous medicine, "food itself is medicine". Once millets and cereals other than rice and wheat were also major part of staple food of the area and now these were completely disappeared from the dining and have become ingredients of the special preparations such as *potimarunnu* and *Karkitaka kanji* and this deterioration of the species is due to the changes in the life style, eating habit and reducing agriculture. Apart from the cultivated varieties only 15 plant species are insufficiently available in the area as wild species. Useful part of plants are also found to be varying with the uses, when leaves of 23 species are used in indigenous medicine it is only 6 plant species for Socio religious culture. Out of 54 plants used in socio religious cultural activities 26 are medicinal and inclusion of medicinal plants may be for the purpose of conservation. However all plant species used for socio religious culture are found to highly useful as food, medicine, timber or fire wood. The rarity or absence of majority of the species used in indigenous medicine and socio religious culture urges the need of conservation.

As the feeling of conservation of biodiversity can be generated through the awareness programme a seminar was organized as part of the project for students, teachers, stakeholders, traditional practitioners and general public. During the lecture on "Food itself is medicine" by Mr. Hamza Madikkai (Traditional practitioner and award winner of Folk Medicine, Kerala), he presented a number of medicinal plants, brought by him and participants got chance to see, identify and aware medicinal importance of the plants. Importance of squaline for the cancer treatment, extraction and use of biochemical compounds from some wild plants for potential uses were explained by Prof. Sreedharan and lecture in the area of Indigenous culture and uses of plants and conservation of biodiversity by Dr. K.M Bharathan were found to be useful for the participants. Principal investigator Dr. K.K. Sivadasan explained about the findings of the project and importance of biodiversity conservation of Mahe.

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Plate-1

a)Abrus precatorius

b)Acacia catechu

c)Achyranthes aspera

d)Adhatoda vasica

e)Aegle marmelos

f)Aerva lanata

g)Allium cepa

h)Allium sativum

i) Aloe vera

j) Anacardium occidentale

k) Andrographis paniculata

l) Anethum graveolens

M) Aporosa lindleyaba

n) Arachis hypoghypogaea

o) Aristolochia indica

Plate- 2

a) Artocarpus integrifolius

b) Asparagus racemosus

c) Azadiracta indica

d) Bacopa monnieri

e) Bambusa bambos

f) Biophytum sensitivum

g) Boerhavia diffusa

h) Butea monosperma

i) Caesalpinia sappan

j) Cajanus cajan

k) Calotropis gigantea

l) Capsicum frutescens

m) Cardiospermum halicacabum

n) Carica papaya

o) Cassia anguistifolia

Plate-3

a) Centella asiatica

b) Cinnamomum

c) Clerodendrum infortunatum

d) Clitoria ternatea

e) Cocos nucifera

f) Coriandrum sativum

g) Cumminum cyminum

h) Curuligo orchioides

i) Curcuma longa

j) Curcuma anguistifolia

k) Cyathula prostrata

l) Cyclea peltata

m) Cynodon dactylon

n)Desmodium triflorum

o) Diospyros condolleana

Plate-4

a) Eclipta alba

b) Emilia sonchifolia

c)Erythrina variegata

d) Evolvulus alsinoides

e) Ficus bengalensis

f) Ficus tinctoria

g) Ficus glomerata

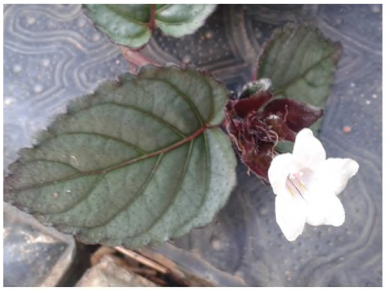
h) Ficus religiosa

i) Flacourtia montana

j) Foeniculum vulgare

k) Glycosmis pentaphylla

l) Hemidesmus indicus



m)Hemigraphis alternata

n) Hibiscus rosa-sinensis

o) Hordeum vulgare

Plate-5

a) Hydnocarpus pentandra

b) Impereta cylindrica

c) Indigoferea tinctoria

d) Ipomoea obscura

e) Ixora coccinea

f) Kaempferia galanga

g) Lawsonia inerme

h) Lepidium sativum

i) Lucas aspera

j) Macrotyloma uniflorum

k) Madhuka neriifolia

l) Mangifera var

m) Michelia champaca

n) Mimosa pudica

o) Moringa pterygosperma

Plate-6

a) Murraya koenigii

b) Nigella sativa

c) Ocimum tenuiiflorum

d) Oryza sativa (poaceae)

e) Panicum sumatrnese

f) Phyllanthus amarus

g) Phyllanthus emblica

h) Piper longum

i)Piper nigrum

j) Plectranthus amboinicus

k) Prosopsis julifflora

l) Psidium guajava

m) Punica granatum

n) Ricinus communis

o) Saccharum officinarum

Plate-7

a) Salix tetrasperma

b) Scoparia dulsis

c) Sesamum indicum

d) Setaria italica

e) Spilanthes agmella

f) Spondias pinnata

g) Strychnos nux-vomica

h) Strychnos potatorum

i) Syzygium cumini

j) Tabernaemontana alternifolia

k) Tamarindus indica

l) Terminalia arjuna

m) Thespesia populnea

n) Tinospora cordifolia

o) Trigonella foenum-graecum

Plate-8

a) Vateria indica

b) Vernonia anthelmintica

c) Vernonia cinerea

d) Vigna mungo

e) Vigna radiata

f) Vigna unguiculata

g) Vitex negundo

h) Zingiber officinale

i) Arathattu

j) Kandabaranam

k) Kathila

l) Kuralaram

m) Maradi

n) Mukham for gulikan

o) Vala

Plate-9

a) Muti for Naga bagavathi & Gulikan

b) Kurusi (1)

c)Kurusi (2)

d) Kurusi (3)

e) Make up

f) Make up

g) Make up for Bagavathi

h) Meleri

Plate-10

a) Rasikkalam

b) Bhagavathi

c) Gulikan With nakhoram (without mukham and muti)

d) Kandakarnan

e) Gulikan with muti

f) Kandakarnan without muti

g) Karanavar

Plate-11

a) Kuttichathan (1)

b) Kuttichathan (2)

c) Kuttichathan (3)

d) Pookkuttichathan

e) Marpoliyan

f) Uchitta

g) Vishnumoorthy

Plate-12

a) Mortar- porcelien

b) Mortar-granite

c) Mortar- wood

d) Gum

e) Nirapara Nilavilakku

f) Paddy decoration

g) Onam pookkalam

h) Vishukkani

INDEX

CANCER TREATMENT AND PLANTS (?) - RECENT REPORTS FROM KERALA

As per reports from Kerala presently *Annona muricata* (**soursop, Mullattha or mullanchakka**) and *Simarouba glauca* **(paradise-tree, dysentery-bark or Laxmitharu)** are using for the treatment of cancer. Many patients are in the view that consumption of the decoction of the leaves of these plants in alternate days. reducing the number of chemotherapy. It is interesting that both are native to Central America. Reports are there regarding research work on anti-cancerous properties of *Annona muricat*a but the compound annonacin, which is contained in the seeds of soursop, is a neurotoxin associated with neurodegenerative disease.

Annona muricata

Simarouba glauca