Chapter 1

Introduction

1. 1 Ethnobotany

The term Ethnobotany was first coined by Harshberger in 1895. Ethnobotany can be defined as the total natural or traditional relationship and interactions between man and his surrounding plant wealth. It has been interpreted differently; some treat it synonymous with Economic Botany, while others with traditional medicine. In broad sense it includes all aspects of relationship of plants with man. It includes the study of foods, fibres, dyes, tans, medicines, other useful and harmful plants, taboos, avoidances and even magico-religious beliefs about the plants. It has the recognition as a multi – disciplinary science, comprising many interesting and useful aspects of plant sciences, history, anthropology, culture and literature. During recent decades studies focused on various aspects of plants resulted in the birth of various sub disciplines namely ethnotaxonomy, ethnomycol ogy, ethnoembryology, ethnopteridology, ethnlichenology, ethnoecology, paleoethnobotany, ethnomedicobotany and various interdiscipli nary subjects like ethnopharmacology, ethnomedicine, ethnogynaecology, ethnopaediatrics, ethnoagriculture, ethnobiology, ethnotoxicology, ethnonarcotics and archaethnobotany (Jain, 1997).

The history of development of ethnobiology is as old as human civilization, but the scientific evaluation of the subject is very recent. Detailed ethnobotanical explorations and their scientific interpretation pave the way for elucidation of numerous little known or unknown uses of plants, some of which may have potential of wider usage, leading to conservation of genetic resources.

1. 2 Traditional Knowledge

Traditional knowledge is a community based functional knowledge system, developed, preserved and refined by generations through continuous interaction, observation and experimentation with their surrounding environment. In brief it is a system developed over years of observation, trial and error, inference and
inheritance. Different ethnic people by virtue of their distinct culture, belief, taboos, totems, religious rites, traditional habits of food and medicine, have accumulated enormous knowledge about the sustainable use of plant species available to them in their native lands. Traditional knowledge is highly secretive, mystical and extremely localized as these knowledge and practices are passed on orally. It is a dynamic system, ever changing, adapting and adjusting to the local situations and has close links with the culture, civilization and religious practices of the communities (Rajasekharan, 2008). Traditional knowledge of any society presents a unique picture on the beliefs, norms and culture of the society to which they belong (Vidhyarthy & Gupta, 2004).

India has one of the oldest, richest and most diverse cultural traditions known as folk traditions associated with the use of medicinal herbs and it is still a living tradition in India. The long and intimate association of our ancestors with their flora and their dependence made them the kings of extensive knowledge, which is still available in some parts of the country for scientific scrutiny and adoption for posterity.

1.3 Plants as medicine

Seeking relief from sickness is as natural as eating. Plants are the basis of life on earth and are central to people’s livelihoods. The relation between healing plants and human beings dates back to pre-historic era. Use of plants to alleviate human sufferings and as health rejuvenators is perhaps as old as humans themselves. Plants have traditionally served as man’s most important weapon against a vast variety of pathogens. Medicinal plants are the nature’s gift to human being to make disease free healthy life. These are reservoirs of curative elements and are mines of useful drugs. Plants are considered as state-of-art chemical laboratories, capable of biosynthesizing a number of biomolecules belonging to different molecular families having various properties to humans and many of which proved to be precursors of other drugs (Biswas et al., 2002; Deshkar et al., 2008).

Green plants represent a reservoir of effective chemotherapeutics and can provide valuable source of natural antimicrobials. Medicinal plants have provided a
good source of a variety of compounds such as phenolics, nitrogen compounds, vitamins, terpenoids and some other secondary metabolites, which are rich in valuable bioactives such as antioxidant, anti-inflammatory, anti-tumour, antimutagenic, anticarcinogenic, anti bacterial or antiviral activity (Maridass & Britto, 2008).

In spite of tremendous development in the field of allopathy during the 20th century, plant still remain one of the major sources of drug in modern as well as traditional system of medicine throughout the world (Rawat et al., 2008). Phytotherapy is the use of plant materials to prevent and treat ill health or promote wellness. The practice dates antiquity, yet remains current as the drugs from plants are fairly innocuous and relatively free from toxic effects (Sen et al., 2009).

1.3.1 Medicinal plant sector in India

Tropical regions of the world are not only rich in plant diversity, also have to face intense threat from predators and diseases, making the plants to evolve a rich variety of defensive chemicals in the form of glycosides, terpenoids, glucosinolates, saponins, flavonoids and tannins which are much valued in the medical field (Caldecott, 1987). India with sixteen agro climatic zones and with an estimated 47,000 different plant species is one among seventeen mega biodiversity countries of the world.

India has an over 3000 year old medicinal heritage based on herbs. Being a tropical country, India is sitting on a gold mine of well recorded and traditionally well practiced knowledge of herbal medicine. It is the largest producer of medicinal plants and is rightly the ‘Botanical garden of the world’ or is a varietals emporium of medicinal plants and their genetic resources (Mohammad et al., 2010).

India is one of the world’s richest medicinal plant heritages. Around 8000 species of plants referred to by over 2,00,000 vernacular names are used by the people of India in local health cultures for human, veterinary and agriculture related applications across her ten biogeographic zones, 25 biotic provinces and 4635 ethnic communities. Majority of the knowledge of these plants is undocumented and
transmitted through oral tradition. Around 1800 species are systematically documented in the codified Indian systems of medicine, Ayurveda – 700, Sidha – 500, Unani – 400 and Amchi or Tibetan – 300, which are expressed in thousands of medical transcripts (Anon., 2003c; Sasidharan & Muraleedharan, 2003). More than 1200 raw drugs originating from more than 880 plant species have been recorded in active trade in India, of which 41% herbaceous, 26% trees, 17% shrubs and 16% climbers (Begum & Ved, 2003).

Out of over 45,000 species of vascular plants known in India, the folk system uses about 5,000 species with about 25,000 formulations, whereas the tribal medicine involves use of over 8,000 plants with about 1,75,000 specific preparations. The clinical indigenous systems of Indian medicine prescribe 10,000 designated formulations (Pushpangadan & George, 2010). There are currently about 2,50,000 registered medicinal practitioners of the Ayurvedic system, the total for all traditional systems being nearly 2,91,000 as comparable to 7, 00,000 of the modern medicines (Ali, 2009). There are reports of 1956, 1864 and 1793 plants as medicines in different systems of medicine from Karnataka, Kerala and Tamil Nadu respectively (Anon., 2000a).

In Kerala, there are about 7000 A class, 6000 B class Ayurvedic practitioners, 5000 unregistered folk medicine practitioners, 750 licensed and 1000 unregistered medicine manufacturing units (Pushpangadan et al., 1998). About 450 raw drugs used for the commercial production of 500 Ayurvedic medicines. In North Kerala, drug industry consumes 11,350 tones of 140 major drugs annually. 45% of raw drugs collected from forest, 14% from non-forest area, 14% from cultivation, 8% through import, 20% from both forest and non-forest areas (Sasidharan & Muraleedharan, 2003).

1.3.2 Medicinal plant trade

According to WHO estimates, the present demand for medicinal plants in international market is US $ 14 billion a year and by the year 2050 is poised to grow to US $ 5 trillion. Presently more than 1.5 million practitioners are using the traditional medicinal system (Anon., 2002b; Aneesh et al., 2009). Global trade of
medicinal plants is projected between US $ 30 and 60 billion with a 7% annual growth rate, with 2.5 % share from India (Prabhuji et al., 2009).

A total of 960 plants are in trade in India, of which 178 show an annual trade of >100 MT. These 960 medicinal plants form the source of 1289 botanical raw drugs in trade. Annual demand of botanical raw drugs was 3, 19,500 MT for the year 2005 – 06 with annual trade value of 1068.70 crores and with an annual turnover of 8800 crores (Ved & Goraya, 2007). Market for ayurvedic medicines is estimated to be expanding at 20% annually (Verma & Singh, 2008).

1.4 Traditional Medicine

According to WHO “Traditional medicine includes diverse health practices, approaches, knowledge and beliefs incorporating plant, animal, mineral based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness” (Anon., 2000b). According to a broad, generalized definition traditional medicine or alternative systems of medicine are the systems of medicine that not taught in the medical schools. It can also be defined as “sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness” (Anon., 2002b). According to another definition “traditional medicine comprises therapeutic practices that have been in existence, often for hundreds of years, before the development and spread of modern medicine and are still in use today” (Anon., 1991). The term traditional medicine is a heterogeneous one that refers to the broad range of natural healthcare practices which existed before the emergence of modern systems of healthcare (Pushpangadan et al., 2008).

The art of herbal medicine is extremely ancient, probably predates modern homosapiens (Inamdar et al., 2007). Traditional medicine practice dates to antiquity, yet remains current. In places where physicians cannot reach, people have invented their own concoction of herbs to deal with the common afflictions of daily life. In
ancient cultures, people methodically and scientifically collected information on herbs and developed well-defined herbal pharmacopoeias (Inamdar et al., 2007).

Native or local health traditions are the result of centuries of observation, selection and experimentation. They constitute the accumulated pool of medical wisdom, now coming under the category of ‘dying wisdom’ (Parrotta, 2001). Through trial and error, experimentation and even by intuitive methods, human communities have developed knowledge and practices for utilizing the natural resources in a sustainable way (Pushpangadan & Kumar, 2010). Traditional medicine has developed through experience of many generations, and has been primarily dependent on locally available plants, animals and other materials. In the course of time, these have assimilated fragments and local combinations of Ayurvedic and Yunani systems as well as tribal systems of medicine. Thus the traditional medicine may be called ‘folk medicine’ (Ghosh & Sensarma, 1997). It is traditional because the knowledge is deeply rooted in a specific socio-cultural context, which varies from one community to another (Okigbo et al., 2009). It is an evolutionary process as communities and individuals continue to discover new techniques (Patwardhan, 2005).

The terms complementary or alternative or non conventional medicine are used interchangeably with traditional medicine in some countries (Anon., 2000b). Traditional medicine remains widespread in developing countries, while use of complementary and alternative medicine (CAM) is increasing in developed countries (Anon., 2002b).

Traditional medical practices vary greatly from country to country and from region to region, as they are influenced by factors such as culture, history, personal attitudes and philosophy. In many cases, their theory and application are quite different from those of conventional medicine (Anon., 2000b). Millions of Indians use herbal drugs regularly as spices, home remedies, health foods as well as over the counter (OTC) as self medication or also as drugs prescribed in the non allopathic systems (Vaidya & Devasagayam, 2007). Folk medical traditions in Kerala believed to be originated about 3000 years back. Traditionally each and every village has 3 or
more folk healers. Many of them are so reputed that people from cities come to them for getting treatment (Rajasekharan et al., 1996).

Herbal medicines are being used by about 80% of the world population. They have stood the test of time for their safety, efficacy, cultural acceptability and lesser side effects. The chemical constituents present in them are a part of the physiological functions of living flora and hence they are believed to have better compatibility with the human body. They also offer therapeutics for age-related disorders like memory loss, osteoporosis, immune disorders, diabetic wounds etc for which no modern medicine or only palliative care is available (Kamboj, 2000). In India, over 4,86,548 registered practitioners, 7,843 licensed manufacturers, 9,380 licensed pharmacies, 23,028 dispensaries, 3,004 hospitals and 482 colleges support the traditional systems; further there are about 7,00,000 mid wives, 60,000 bonesetters, 60,000 herbal healers and many others who specialize in dentistry, poisons, sexual disorders and many more (Natesh, 2001).

In Africa up to 80% of the population uses traditional medicine, while in China it accounts for around 40% of all health care delivered. 48% in Australia, 70% in Canada, 42% in USA, 38% in Belgium and 75% in France have tried traditional medicine at least once (Anon., 2002b). In Pakistan alternative therapies have been utilized by people as first choice for problems such as infertility, epilepsy, psychosomatic troubles and depression (Shaikh & Hatcher, 2005).

In ancient India, Ayurveda, Siddha and Unani physicians were also pharmacists, they gathered their drugs from neighboring gardens and forests, prepared the medicines for their patients under their own supervision, ensuring the purity of drugs. As time went on, the profession of pharmacy was separated from medical practice. Traditional practitioners treat mainly with herbs, but also use dietary adjustment as well as primitive therapies like venesection, diaphoresis, enemas, emesis and massage (Borins, 1987). Majority of the healers use some combination of prayer, charms and massage. The herbalist combines the roles of pharmacist and medical doctor with the cultural, spiritual, religious beliefs of a region or people (Fabricant & Farnsworth, 2001). A majority of the cures in
ethnomedicine are multi-herbal in nature and they do not fit into the set of tests followed in the modern scientific evaluation (Bhandary & Chandrashekar, 2002). Traditional medicine has some strengths that western medicine lacking, namely the holistic view of the patients situation as it gives importance to psychological, spiritual and social aspects (Jager, 2005).

Herbal system of medicine is fully fledged system and it cannot be ruled out as quackery as ancient finding and documentation provide many leads for developing life saving drugs (Singh, 2007a). It won’t be any exaggeration to say that folk healers have played critical role in the healthcare of the masses, especially in the rural India.

1.4.1 Etymology and doctrine of signature

Local names given to plants by indigenous people in their local dialects often reflect a broad spectrum of information on their understanding of plants. While naming the drugs of plant origin, the ancient saints, referred them with the names, which were best suited to their physical appearance, habitat, therapeutic potency or resemblance to animals and house hold articles. Most often, the local names are given based on some salient features like appearance, shape, size, habit, habitat, smell, taste, colour, utility and other peculiar characters of the plants. Thus terms like Kakanasas (like nose of a crow) for Martynia annua seeds, Jal-pippali (water pepper) for Lippia nodiflora were used.

As a result of which, a single drug is known with many equivalent or alternate names. In many cases more than one botanical entity are attributed to single drug, leading to difficulty in identification. The factors responsible for this are:

a) **Doctrine of signature:** In ancient times, the specific habits, morphology, shape of different parts were linked to their possible pharmacological action. For example, if a plant grows as lithophyte in nature, it was considered to have similar potential action on renal calculi. This is how the name of the drug pashanbhed (intruding the stones) would have come into existence and
many vaidyas in different region must have attributed different lithophytes to the drug pashanbhed.

b) **Verbal communication:** In rural parts, the practice of communicating a remedy to their heirs by the healers only at the time of their death is still common. The possible communication gap between the two might have led to the use of different herbs by the followers.

c) **Different herbs used for one indication:** In ancient times, people in different regions would have used different herbs to cure the same ailment due to restriction in communication and endemism of plants.

These practical, meaningful, easily understandable and rememberable local names are disappearing rapidly along with the culture and tradition of the tribal groups of our country. Therefore, it must be recorded, preserved and documented before lost forever.

**1.4.2 Source of information**

Ancient saints and physicians clearly indicated the role of local or rural people in the identification and utilization of plant resources in their treatises. According to Shushruta, “medicinal plants should be recognized and identified with the help of cowherds, hermits, huntsmen and others who trek the forests as well as with the help of those who cull and eat the edible roots and fruits of the forests” S. S. Su. 37:11(Sharma, 2001). Charaka advised the physicians to seek help of those with more intimate knowledge of the natural world, “the goatherds, the shepherds and the cowherds and other foresters are well acquainted with the names and forms of plants” C. S. Su. 1:20 (Sharma, 2005).

Modern ethnobotanical explorations and drug discovery is also based on the knowledge of tribes and other rural knowledgeable persons. In this aspect present researchers agree with the greats like Shushruta. The time and stage of collection of the medicinal herbs and its age is of considerable significance with regard to their biological activity and efficacy. The human body readily accepts the herbal drugs. A medicinal plant can be useful against several ailments in different combinations. In
one combination it has one medicinal effect while in the other it has another effect. Such information can be obtained from only those who are well versed with the healing properties of plants (Sinha & Sinha, 2005).

1.4.3 Difficulties in proper identification of medicinal plants

Major reasons for difficulty in identification of a drug are:

a) Use of certain terms for more than one plant.

b) Difference of opinion among the practitioners with regard to the botanical source to be taken for a Sanskrit name.

c) Absence of an authentic work containing morphological description of plants.

d) Loss of contact with plants in their natural habitat.

e) Steady decline in human expertise capable of recognizing the various medicinal plants.

Certain plants show very limited distribution. Even from very old days, in different regions, physicians started to make use of substitutes due to the unavailability of certain plants, on account of the gradual loss of contact with those plants which have limited distribution, the practice of using substitutes continued with the ultimate result that both the original and the substitutes come to be known under the same name (Mooss, 1983).

1.4.4 Mode of transfer

Residence of the indigenous group in the region of high biodiversity, extended interaction with the flora of the region and accurate transmission of plant lore from generation to generation made them repositories of oral traditions that reflect centuries of accumulated experience of plant use. About 12 – 13 thousand years back, to escape from the onslaught of the invaders and preserve the valuable heritage, the intellectuals of the country began to become very secretive. With the passage of time such secrecy led to orthodoxy, obscurantism and superstition
preventing not only its growth but also the erosion and corrosion of the inherited knowledge (Pushpangadan & George, 2010).

The ethnic races throughout the world have developed their own cultures, customs, cults, religious rites, taboos, totems, legends and myths, folk tales and songs, foods, medicinal properties, land and many more. Being a family tradition, the herbal knowledge of traditional vaidyas was primarily restricted to a few elders within the family. As a result, bulk of folk medicines remained endemic to certain regions or communities in the country. Due to the lack of communication, intermingling and breeding of ideas and varying way of life, many of these earlier remedies survived only by word of mouth from generation to generation (Behera & Misra, 2005). The healers generally pass on skills and experience in oral form to their sons or near relations and are guarded like secrets. The plants that are used are often kept secret by the practitioner so little information about them is recorded. Now days, the knowledge of the plants is confined to elder persons only.

1.4.5 Contribution to modern medicine

Information from indigenous traditional medicines has played vital role in the discovery of novel products from plants as chemotherapeutic agents. Plant alkaloids are the primary active ingredients of Ayurvedic drugs. The valuable medicinal properties of different plants are due to the presence of several constituents like saponins, tannins, alkaloids, alkenyl phenols, glycol-alkaloids, flavonoids, sesquiterpene lactones, terpenoids and phenol esters (Meena et al., 2009).

Modern drugs or most potent weapons like reserpine, tubocurarine, vincristine, aspirin, atropine, digitoxin, morphine, taxol, hyoscyamine, L-dopa and quinine come to the doctors originally not from a laboratory but from the forests as a result of inventions made on Rauwolfia sepentina, Chondrodendron tomentosum, Catharanthus roseus, Atropa belladonna, Ephedra, Digitalis purpurea, Papaver somnifera, Taxus baccata, Hyoscyamus niger, Mucuna pruriens and Cinchona officinalis (Caldecott, 1987). Traditional medicine have been used to treat malaria for thousands of years and are the source of artemisin and quinine derivatives, two
major groups of modern anti malarial drugs. Over 1277 plant species from 160 families are used to treat malaria and fever in the world (Willcox & Bodeker, 2004).

According to 1991 estimates, there are 125 clinically useful drugs of known constitution, isolated from about 100 species of higher plants. It has been estimated that about 5000 plant species have been studied in detail as possible sources of new drugs. It is also estimated that 60% of anti tumour and anti infectious drugs already in the market or undergoing clinical trials are of natural origin (Hamburger & Hostettmann, 1991). Today, approximately 70% of synthetic medicines are derived from plants (Mitra & Kannan, 2007).

1.4.6 Traditional medicine Vs Modern medicine

Drug is a biologically active molecule, which can act or react with a biological unit in the body to bring in a well defined result within the given time. Chemical magic bullets with the slogan ‘a pill for every ill’ overshadowed herbal medicament after the second world war. These are clinically tested for safety, cost effective, efficacious and culturally acceptable solutions to primary health care.

Drug in western medicine is like a bullet, aimed at a given target, which will hit the target whether it is desirable or not (Gangadharan, 2005). It attacks the target blindly, affecting the several related metabolic systems of the body, including the immune system, weakens it in the long run and makes the body more susceptible for future attacks, whereas, the traditional medicine is the process of strengthening the body’s immune system to fight the disease in the future also (Rawat et al., 2008). Modern medicine may help man to provide apparent physical health but is devoid of mental, social and spiritual health.

India has the unique distinction of having 6 recognized herbal systems of medicine namely, Ayurveda, Siddha, Unani, Yoga, Naturopathy and Homeopathy (Ravishankar & Shukla, 2007). Almost all drugs of herbal origin, works on the same biological principle in the body. It prepares the body’s own immune system adequately and strongly enough to fight out its enemies within. It strengthens the body organs and stimulates it to resume the normal functioning. Traditional
medicine is the process of strengthening body’s immune system to fight the disease in the future also. Medicinal plants possess not only curative and preventive properties but also nutritive properties. All herbal products have a wide range of biologically active alkaloids, glycosides and nutritive materials – vitamins, minerals, hormones, enzymes, amino acids, proteins, lipids and polysaccharides. Most important feature is that they contain the natural substances in naturally balanced state (Rawat et al., 2008). Clinical and pharmacological tests on the alkaloids extracted from well known and reputed medicinal herbs sometimes show distinctly negative results but when the entire chemical extract of the plant or plant parts used it shows positive results (Rawat et al., 2008).

The grave side effect caused by modern medicine sometimes more dangerous than the diseases, has gripped a sense of fear in the minds of people, who is now in great dilemma and anxiously looking back to nature and traditional medicine (Ekka & Dixit, 2007; Rawat et al., 2008). Modern medicine is of great help in emergencies, while traditional medicine helps a person for life (Sinha & Sinha, 2005).

1.4.7 Resurgence in herbal medicine

Towards the end of 20th century, there began a revival of interest in traditional medicine, mainly due to the increasing evidence or realization of the health hazards associated with the indiscriminate use of modern medicine. In recent years the demand for medicinal and aromatic plants has grown rapidly because of accelerated local, national and international interest. Now the herbal sector is facing worldwide buoyancy. Resurgence of public interest in the ethnomedicinal practices both in developing and developed countries is increasing, resulting in exponential growth in trade of herbal products both in national and international markets.

The increasing popularity in plant based drugs is now felt all over the world leading to a fast growing market for plant based drugs, pharmaceuticals, neutraceuticals, functional foods and even cosmacecticals. The use of medicinal plants as raw materials in the production of new drugs is ever increasing because of their potentiality in combating the problem of drug resistance in micro organisms.
Medicinal herbs are moving from fringe to mainstream use with a greater number of people seeking remedies and health approaches free from side effects caused by synthetic chemicals.

In recent years, traditional medicine has made a comeback for a variety of reasons. In the western world, as the people are becoming aware of the potency and side effects of synthetic drugs, there is an increasing interest in the natural product remedies. Modern medicine has become ever more technological. Care is seen to have been sacrificed in favour of cure (Natesh, 2001). There is a growing scientific and clinical evidence to prove that the herbal formulations, particularly the polyherbals of the traditional systems of medicine have minimal to almost nil side effects and are therefore safer than the synthetic drugs or even the isolated single natural compounds (Pushpangadan et al., 2005). Spiraling cost of orthodox medicines, high degree of treatment failure, toxicity, grave side effects, evolution of multi drug resistance microorganisms, inability of modern medicine to find effective cures for a number of disease and poor patient’s satisfaction made people to think about herbal therapies as alternatives to modern medicine (Oricha, 2009; Rahmatullah et al., 2010).

1.4.8 Present status of Traditional medicine

The past 200 years have witnessed not only an acceleration in the rate of extinction of plants and animal species but also the erosion of traditional knowledge related to the medicinal uses of plants. The traditional knowledge is rapidly being lost with the modernization of the society, development of communication system, migration of people from villages to cities and accessibility of modern medicine (Ali, 2009). Now knowledge regarding the usage of plants is disappearing faster than the plants themselves (Alves & Rosa, 2007).

At present Traditional medicine is in a vulnerable state, with its pulse pulsating in remote areas. Traditional knowledge systems have started to disappear with the passage of time due to scarcity of written documents and relatively low income in these traditions (Kala, 2009a). With the erosion of the tribal cultures, the traditional healers have become a threatened category. The genetic diversity in medicinal plants
has diminished due to large scale destruction of natural habitats. The different reasons for such degradation both in traditional knowledge and medicinal plant diversity are:

a) Most of these wild medicinal plants are highly habitat specific, found only in forests and occupying highly specialized ecological niche with restricted distribution (Pushpangadan, 1992). Population explosion coupled with improved standard of living led to ruthless exploitation of these plants, resulting in imminent danger of extinction of these plants.

b) Potential causes of rarity of threatened species include low population size, habitat specificity, narrow distribution ranges, unscientific collection for commercial purposes, land-use disturbances, introduction of non native species, habitat loss and alteration, climatic changes, heavy live stock grazing, unregulated tourism, construction of dams and roads, explosion of human population and many more (Kala, 2005).

c) Over 70% of the plant collections involve destructive harvesting due to utilization of roots, bark, wood, stem and whole plant.

d) Alien species invasion and modern agricultural practices lead to local extinction of many plants.

e) Majority of healers are neglected lot and the tradition is dying out fast without patronage. The new generations in these families are averse to follow the low status and low income vocation and shift to materialistic life style and more attractive routine professions.

f) Rise in population, inadequate supply of drugs, prohibitive costs of treatment for common ailments, side effects of several allopathic drugs in current usage and development of resistance to currently used drugs for infectious diseases have led to unsustainable exploitation of plants for a wide range of human ailments (Bhattacharya & Hansda, 2003)
Due to various human activities such as deforestation, rapid industrialization, urbanization and other developmental activities, both natural vegetation as well as traditional culture in India is fast declining (Shivanna & Rajakumar, 2010). Over the years, physicians and patients have come to rely on plant drugs found in urban markets, that are supplied by professional plant collectors, who not uncommonly, adulterate these drugs with other plants and there by undermine drug quality and the credibility of the system (Parrotta, 2001). Unfortunately some of the popular medicinal plants which are locally available and frequently used have been usurped by the modern pharmaceutical and drug companies of India and world and are used for the preparation of modern herbal drugs and sold from the shelves of modern drug stores at exorbitant cost beyond the reach of common people. People are being psychologically exploited in the name of safe herbal drugs packed in modern cases.

With rapid industrialization and loss of ethnic culture and customs, most of the information on ethnomedicine will no doubt disappear within a short span of time.

1.4.9 Future of Traditional medicine

Now it has been realized that the medicinal herbs are going to play a very important role in the future materia medica of the world. The traditional herbal medicine have brought to light some of those rare wonder herbs which makes big promise to salvage the mankind from some of the deadly diseases (Rawat et al., 2008). Bioscientists consider ethnobiological knowledge system as a first effective means for identifying as well as locating alternative source leads for drugs and pharmaceuticals (Pushpangadan & Kumar, 2010). Pharmaceutical research is moving away from single molecule or single target approach to combinations and multiple target approaches (Wermuth, 2004) where the importance of traditional medicine arises.

In coming years there is an excellent opportunity for mega diverse and traditional medicine rich countries like India to offer a holistic healthcare programme for mankind. In the coming days traditional medicine has bright future due to following facts.
a) In the modern world several viral disease are spreading at an alarming rate and often new viruses of more virulent strains are originating.

b) Drug resistance cases are still on the rise, many older diseases like malaria and TB are resurfacing with a vengeance and newer ones are emerging.

c) The average life expectancy is going up the world over, which is associated with many age-related problems like, memory loss, chronic illness, atherosclerosis, cancer and many more for which modern medicine has no answer.

d) World population is increasing at an alarming rate.

1.5 Need for study

Traditional knowledge of plants is at risk of being lost, making its documentation imperative. The traditional knowledge system in India is fast eroding. There is an urgent need to inventories and record all ethnobiological information among the diverse ethnic communities before the traditional cultures are completely lost (Rao, 1996). The disappearance of several plant species is affecting the quality of the day-to-day life of man in different ways, and perhaps his very survival. To compete with the growing pharmaceutical market, there is an urgency to utilize and scientifically validate more medicinally useful herbal products (Atmakuri & Dathi, 2010). The orally transmitted traditional knowledge is exposed or prone to exploitation. In the absence of any written record, unscrupulous persons may access knowledge in a clandestine manner and may file patent (Pushpangadan & George, 2009).

Each geographical area is blessed with many such plants and natural materials which are needed for the living beings of that area. Locally available drugs are the best suited for treating the diseases of that area and native people. To conserve biodiversity a complete understanding of the bioresources of the nation and their commercial potential is a sine qua non. Tulunadu, the ancient heritage site is also not an exception. This area is rich both in biodiversity and traditional health care systems. Even from time immemorial the people of this area have given much importance to the plants which is evident in their socio-cultural life, folk beliefs and
rich vocabulary. They have given sacred status to a number of plants in order to conserve them for the posterity. The folk, through trial and error developed their own method for identification of local plants through ethno linguistic approach and doctrine of signature. Even many places and surnames were named after the plants (Appendix 5). In this context, documentation of traditional knowledge of the local people, which is transferred orally from generation to generation, is an urgent need as the major languages, *Tulu*, *Konkani* and *Byary* languages are scriptless.

### 1.6 Objectives

Present study was undertaken with the goal to introduce the floristic wealth of *Tulunadu* and its traditional use in health care. The major objectives of the study are:

a) Study of folklore and traditional knowledge regarding the plants and their uses.

b) Elucidation of socio-economic aspects and therapeutic profile of traditional healers.

c) Ethnolinguistic approach in classification of plants.

d) Etymology and doctrine of signature.

e) Medicinal plant distribution, status, availability and endemism.

f) Exotic, naturalized plants and weeds as medicine.

g) Possible substitutes in absence of effective drugs.

h) Threats for medicinal plants.

i) Suggestions for sustainable utilization and conservation of medicinal plant germplasm.