# CHAPTER 1

**Chapter-1 Introduction**

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CHAPTER 1

INTRODUCTION

1.1. Introduction to Natural Products

Natural medicines occupy a broad collection of biological therapy with the aim of curing the health system. For thousands of year’s natural products encompass an extremely significant role in health care and prevention of ailments. The ancient civilizations of the Chinese, Indians and North Africans make available on paper evidence for the use of natural sources for curing various ailments. The earliest recognized written documents were nearly 4000 years old Sumerian terracotta tablet that proceedings remedies for a multiplicity of illness.

According to current studies made by the World Health Organization (WHO), about 80% of the world’s populations relies on traditional medicine. Herb used in conventional medicine is injurious to the patient, this may cause harmful effects than to cure a disease. The ineffective treatment may lead to the death of the patient. Presently the 20% of the world have been supplied by the natural products. Hence the natural medicine plays an effective role in the treatment of many ailments. It was estimated that nearly 41% i.e., 6% natural products, 26% semi synthetic and 9% natural product based synthesis of new drugs permitted from natural products as their source of modern medicine as shown in (Fig. 1).
Fig. 1: Role of natural product in the modern Medicine

This 41% fraction is the exclusive fraction of antioxidant and anthelmintic drugs. The antioxidant and anthelmintic origin from the natural products have become more increasingly up to 60% (Fig. 2).

Fig. 2: Natural products with antioxidant and anthelmintic drugs.

During 1981-2006, nearly about 25-30 anticancer drugs have been developed which is a mirror image of the drug obtained from the
natural products. Thus, natural products make a very significant contribution to the health care system, particularly for mankind.

1.2. Types of Natural Products

The list of natural drugs about their analogues obtained for the natural products have been listed down with a four major classification in Fig.3:

![Diagram of natural product sources]

**Fig.3: Sources of natural product**
1.3. Origin of ethnobiology

The origin of ethnobiology can be traced to the many ecological hot spot which plays an important role in the existence of life. The significance of herbal drug to human healthiness have lately recognized which have strained concentration to the irrational use of therapeutic plants.

The study of the association between man and his ambient plant life is called ethnobotany. Power [1] used the term ‘aboriginal botany’ which meant the study of plants used by aboriginals for medicine, food, textiles, etc., Robbins et al.,[2] gave a broad definition of ethnobotany.

Since then ethnobotany has been denied and interpreted by many scholars like Jones [3], Schultes [4], Maneswari [5], Bye [6], Martin [7], Cotton [8] etc. has greatly enlarged the scope of making it as an interdisciplinary science for a holistic approach to man-plant relationships. Puspangadan [9] treated ethnobotany as a study of the knowledge system pertaining to three multidimensional perspectives of life, culture, traditions as well as interaction of traditional or less advanced communities like tribes with their local flora and fauna.

The main object of ethnobotany is to document the aboriginal acquaintance for the consumption of plant resources for medicinal resources, by different tribal communities had come through generations and use the particulars for the benefit of the society. Its importance has
been realized; it brings to light numerous less known or unknown uses of plants specifically for health purpose. Some of which have potential wider usage like anthelmintic, antifungal, anti fertility etc.

Historically, plants employed in traditional medicine by the indigenous population across the world have produced some of the most useful modern day pharmaceuticals. It is, therefore, of great significance that studies in Ethnobotany and Ethnopharmacology assist us in knowing about the significance of traditional medicine. The field approach of the study of the Ethnobotony plays a vital role, because of the direct contact that can establish with the authentic information on the uses of plants both wild and cultivated.

The science of Ethnobotony has recently received much attention in the underdeveloped countries, where small or large portions of populations still depend on natural resources in particular indigenous condition and the impact of the modern system of medicine has not reached them was clearly revealed by Jain S.K.[10]. The importance of ethnobotany has been increasing considerably and even an international organization like the World Wide Fund for Nature (WWF) program has considered this to be an essential part of the program.

Numerous wild and cultivated plants play a very vital role. Among different ethnic cultures and this interrelationship has evolved over generations of experience and practices. In earlier days, tribal people always used plants for treating a wide spectrum of aliments and
preserved this information as a family secret. Now advances in science, notably in the field of chemistry, helped in the isolation of many of the active ingredients from the medicinal plants. These extracts are helping a lot in the manufacture of many useful drugs, mostly employed in the control of a variety of diseases both in human beings and cattle.

Tribal medicine is traditionally acquired local medicine among the different ethnic groups for their well being and to create disease free atmosphere among the tribal medicine and traditional medicine are together collectively called ‘Folk Medicine’ or Ethno-Medicine. Ethno-Medico botany deals with the relationship between medicinal plants and human beings.

Nearly half of the medicines we utilize at present are herbal within source and a section contains plant extracts or vigorous chemicals in use directly from plants. Lots of supplementary is still to be discovered, recorded and researched. Across the globe, the hunt is against unearth species that could outline the base for new medicines and food.

Ethnological study has offered enormous range and opportunity of augmentation of innovative drugs. Countless drugs were developed through myths and conventional system of medicine. However, out of 16,000 medicinal plants, only 10% have so far been exploited for the development of new biological sources for drugs was explained by Mehrotra and Mehrotra[11].
1.4. Evolution of natural medicine

Thousands of years previously, the prehistoric Egyptians exposed simple traditions to pick up and use the lively ingredients inside plants. Egyptian papyrus manuscripts from 2000 BC record the use of perfumes and fine oils and gums as an essential part of the embalming process.

In ancient Greece in the 5th and 4th centuries BC, Hippocrates known as the father of medicine was previously recommending Asparagus and garlic for their diuretic traits, pappy as a line of attack of inducing sleep and willow leaves to reduce pain and fever. During the 1st century AD, another Greek doctor, Dioscorudes, established the first collection of medicinal plants and wrote a book ‘De Materia Medica’. Dioscorudes described about 600 curative plants with their analgacic activity. Exposition on the theme was translated into Arabic and Persian. Centuries later, his tool was also used by the Muslim scholars who prejudiced large universities of the time, particularly at Montpellier, Europe’s nearly all eminent centers for the learning of botany was mentioned in Nature’s Medicine chert[12].

The early ethnobotanical studies of several scholars paved the way for expansion of the scope of the subject of enormously covering ethnomedicine, Ethnotaxonomy and Ethnoecology as well as anthropology and Botany. Later the science of Ethnobotany has evolved as a discipline primarily concerned with enlisting beneficial plants to a multidisciplinary endeavor focused on understanding the relationships
between plants and people in a holistic context. Although much of the expansion and diversification of ethnobotanical studies have occurred in the last 25 years, recently there has been an increasing awareness of this traditional knowledge among all sorts of people for various purposes.

One benefit of such awareness of ethnobotanical studies is that it helps in solving conservation and developmental issues and even provides a significant framework for devising new drugs which can combat not only common ailments but also certain dreadful diseases like AIDS, Cancer etc. In the context of present day environment crisis, the integration of ethnobotanical knowledge with conservation studies holds immense significance and it helped in the origin of a new discipline called ‘Ethnoecology’.

The relevance of quantitative studies in ethnobotanical research has been emphasized by various authors Prance et al.,[13], Martin[14], Cotton[15]. Quantitative ethnobotanical studies reveal the abundance, distribution and importance of individual species in a given plant community. The values described the plant species would be of diverse indices for the plant communities to study their medicinal value and constructional aspects.

The importance of conventional awareness is now being increasingly realized the world over and the pharmaceutical production long-established communities was given by Posey and Dutfield [16]. Ethnobotanical study in particular, offers immense scope and
opportunities for those engaged in bio-prospecting particularly in drugs/chemicals and gene prospecting.

It is estimated nearly about 120 bio active natural products forms an 75 % ethnobotanical uses was indetail explained by Farnsworth et al.,[17]. There is an enormous scientific researche focused on the natural products.

Unfortunately a large amount of this wealth of acquaintance being lost, due to the disappearing of traditional systems. This fading knowledge is to be preserved and placed at the disposal of the local communities.

The lost resources can be preserved by the help of ethanobotanist, they preserve various knowledge of the plants and are helpful in maintaining a book full of scientific datas on various species and to maintain the herbarium of the locally available plants. In view of the harmful developments, the United Nations declared the year 1993 as the “international year of the indigenous people” based on recommendations of Rio de Janeiro Earth Summit.

The precautionary approach of health is vigor of the Indian system of Medicine (ISM). ISM comprises of 8,000 medicinal and aromatic plant species. In our country nearly 4 million practitioners of (ISM) use just about many important plants. An average of forty percentage of 16,000 flowering plants have ethnomedicinal use, where as 12% of therapeutic
Plants can prove as a prospective source of novel drugs was given by Pushpangadan et al.,[18].

Plants and natural products increased culture from ancient time. About 750 plant species from the ingredients of 14000 published recipes for Ayurveda, Siddha and Unani, medicines. The therapeutic value of 98 plant species forms of medicinal and aromatic plants was listed by chauhan [19]. Only 100 plant species are used to a different system of medicine was explained by Brahus Varchas[20].

The futuristic diversity in the Indian subcontinent is spread in natural habitats in different vegetation or forest types and interestingly, it is in such areas that native comminutes dominate and use native plant wealth and practice traditional agriculture and medicine. There are greater than 550 native or tribal communities under 227 ethnic groups spread over 5000 villages in India were listed in Anonymous[21].

The indigenous people of South India relied for centuries on natural products for health care. It believes that 7.56 million people belonging to about 20 different communities of South India still use traditional remedies derived from plant based origin were listed in Red listed medicinal plants of South India were Ravikumar and Ved worked on it[22].

Much interest in ethnobotanical studies has been generated at that national level under the all India coordinated research project on
Ethnobiology since the last decade by the Department of Environment and Forests. Realizing the significance of Ethnobotany so many organizations and institutes such as Botanical Survey of India [BSI] Kolkata, CDRI, CIMAP have been involved seriously in studying and documentation of the National Folklore. Many research Scholars from different universities are also involved in gathering information on medicinal plants from the local inhabitants and tribals.

Vast ethnobotanical knowledge exists in India from times immemorial. The Indian system of medicine such as Ayurveda, Unani, Siddha is probably the world’s oldest and richest traditions. These systems of medicine are accessible to millions of Indian households because they rely upon locally available herbs and drugs that are deeply embedded in local culture. In rural communities, traditional birth attendants, bonesetters, herbal healers and wandering monks heavily depend on Ayurveda, Sidda and Unani.

Apart from these specialized folk carries, there are millions of women and elders who have habitual knowledge of herbal home remedies and of food and nutrition. The medicinal plants continue to benefit from attention of scientists from chemical, pharmacological and clinical angles in India and abroad. There is a need to chemically and pharmacologically analysis for known biosynthetic species and see their physiological effectiveness.
A few may yield drugs for modern medicine to treat some ailments for which they are used traditionally and may lead to the discovery of different chemical compounds. Now it has been realized that unstudied flora of our country represents a vast emporium of unknown chemical compounds awaiting for discovery was given by Alam[23].

Plant extracts and other forms of treatments is enjoying great attractiveness in the late 1990s was studied by Cowan[24]. Examination of plants used in conventional and current medicine in China hand out source of encouragement was studied by Patwardhan et al.,[25]. The commencement of current curative plant research was explained by Hamburger & Hostettmann[26].

‘Chekka Mandu’ and ‘Talli mandu’ - a medicine used to protect mother from all the diseases associated with child birth Hemadri[27].

Thus, there is no death of tribal medicine to deal with primary health, particularly in rural areas. In the present work quite a good number of plant extracts used by tribal people and Natuvydyas for prevention and cure of various diseases and manifestations which generally trouble the mother, child and youth, have been given together with mode of preparation and administration with prescribed doses.

1.5. Reasons for under taking the present study

The conventional knowledge is eroding owing to a stable end regrets in human expertise not capable of recognize various medicinal
plants. Hamilton explained the wealth of knowledge is disappearing because it is mostly oral[28]. Other reasons for the gradual loss of this traditional knowledge are adaptation of global products by the younger people, extinction of species, urbanization and destruction of habitat, breakdown in traditional structure and certain natural causes like famine, flood, wars, etc. therefore, required documentation and computerization is very necessary is explained by Mehrotra & Mehrotra[11].

There is an increasing demand for Ayurvedic medicine and tribal medicine of a large section of people because of no side effects when compared with synthetic drugs. The efficiency of these systems of medicine has been realized for certain ailments for which conventional medicine was not so much applicable. In recent years as well as the continuing efforts of pharmaceutical industry in search of natural source of new drugs from all plants of the globe furnish evidence for the increasing significance being attached to medicines from the plant kingdom. In India, despite of rich traditional knowledge and large biodiversity, marketable drugs are very few. The reason for this is, that there are constraints in developing them into successful drugs to test their efficacy and safety through pharmacological and toxicological evaluation.

The area is under present study viz., forests in Anantapur district are fast dwindling due to biotic interference and scanty rainfall. The
major factors like indiscriminate cutting of the forest area for agriculture purposes, industrialization, over grazing, forest fires etc. are responsible for the loss of some rare medicinal plants in this area. In future, degradation of the area will hasten up owing to steep increases in human population and live stock along with man’s avaricious activities.

As most of the tribal people are migrating to urban areas, their precious knowledge of the medicinal plants may not be available the future generations. In view of the present circumstances, the urgent need of the hour is to collect, document and preserve some valuable information on certain medicinal plants from this area before they are lost permanently. The conservation of this plant wealth has to be made available for the benefit of future generations and also for the benefit of researchers in the field of botany, Chemistry and Pharmacology etc.,

A thorough perusal of botanical literature reveals that less attention has been paid to the present area of study with regard to ethnobotanical, phytochemical and antimicrobial studies by the earlier researchers. In the light of the above observations, the present investigation is taken up for ethnobotanical survey and phytochemical screening and secrecy of therapeutic properties. The tribe inhabiting in and around some forests of Anantapur is widely using the medicinal plants for healing different ailments of human beings and cattle. In addition to documentation of medicinal properties of certain plants used by tribals, herbal heelers etc.
The crude drugs were subjected to phytochemical analysis to understand the distribution of various classes of secondary metabolites. The crude drug extracts were further tested for their bioassay on selected human pathogenic microorganisms in order to know their biosynthetic activity.

1.5.1. Ecology system in Ananthapuramu

1.5.1.1. Physiography

Andhra Pradesh is the fifth largest and fourth most populated state in India. It occupies the eastern side of the peninsula and southeastern part of India. (Fig-4). The state is situated between latitudes of 12° 40’ and 19° 54’ N and longitudes of 76° 50’ and 84° 54’E, and displays a considerable amount of diversity in paleography, socio-economic condition.
1.5.1.2. Topography of the explored Area

Anantapur district was shaped during the year 1882 has been divided from Bellary district. It is part of the southern most districts of Rayalaseema of Andhra Pradesh. The district extends over an area of 19.130 sq. Km (or) 19.13 lakh hectors. Geometrically the district is located between 13° 14’ and 15° 14’ north latitudes and 76° 47’ and 78° 26’ East longitudes (Fig-4). Rocks belonging to the literate formation cover the area of Tadipatri taluk and the eastern parts of Gooty, Singanamala and Kadiri taluks. The remaining parts of the district are composed of the older archaean group of rocks.
The hill ranges run from north to south but are not yet known by any particular name. 1) The Muchukota lies between Tadipatri, Gooty and Singanamala in the taluks of Hardwickia binata type and scrub jungle type. 2) Nagasamudram hills is limit of Gooty taluk, Anantapur and Dharmavaram with separate vegetation can only boast of some scrub jungles. 3) In the eastern part of the Penukonda taluk range starts from the south at Kalyandurg and runs through the taluks of Penukonda, Satyasai and Hindupur finally entering Karnataka with very poor vegetation and 5) The Madakasira range of hills which divides Madakasira taluk into two, has a slightly thick vegetation, with deciduous elements. The Erramalai hills which occupy the western part of the kurnool district enter Anantapur district in Tadipatri taluk near Kona-Uppalapadu. Bugga and Alur. The height of these hills ranges between 100-200 m are Thalaricheruvu and Ooruchiatala. There are a few beautiful valleys with narrow streams in these Erramalai hills. These valleys are popularly known as “konas” which are met with near Kona-uppalapadu, Alur Kona. Gurugundukona and MobbuKona was studied by Pullaiah & Yesoda[29].

1.5.1.3. Soil and Climate

Soil

Soils of Anantapur District are typically red except Gooty, Uravakonda, Guntakal, Yadiki, Pamidi, Bommanahal, Kanekal, Vidapanakal, Vajrakarur, Peddavadugar, Tadipatri, Yellanur,
Peddapappur and Puttur. In these areas, black and red soils come about almost in the same proportions. Thus 76% red soils, 24% are black soils.

**Climate and Rainfall**

The district of Anantapur has a quite exceptional altitude which provides the district with endurable climate throughout the year. It has a steady fall from the South North towards the valley of the pennar in peddavadugur, Peddapappur and Tadapatri Mandals. There is a usual rise in Parigi, Chilamathur, Rolla, Hindupur, Madakasira, Lepakshi, Agali areas in the south to link the Karnataka plateau where the normal increase is about 2000 feet to the ocean level.

Anantapur is the driest district of the state with regular famines because of very poor rainfall. Agriculture circumstances are more often precarious. Monsoons also evade this part because of its adverse locality. Being remote from the East coast, it does not gain from the complete profit of North East monsoons is been cutoff by the elevated western Ghats, the South west monsoons are also prohibited from attacking the dryness of the arid soils.

The standard rainfall of the district is 553.0mm which is the slightest rainfall when compared to Rayalaseema and additional parts of the South West Monsoon period is 338.0mm which regards 61.2% of the entire rainfall for the year. Rainfall intended for North East monsoon
time is 156.0 mm only, which forms 28.3% mm of the entire rainfall during October to November.

The extra months are roughly dry. March, April and May are humid months when the regular day after day maximum temperature ranges between 29.1°C to 43.1°C, Rolla, Parigi, Agali, Hindupur, Chilamathur, and Lepakshi, Mandals individual at High Elevation are further cooler than the respite of the Mandals in the District.

**Rivers**

The important rivers in the district are penna, Chitravathi, Jayamangala, Hagari river.

**1.5.1.4. Phytochemistry and Biological Activity**

The anti microbial, secondary metabolites produced by most of the plants develop against pathogen attack was explained by John [30]. The possibility that these compounds may protect against infectious diseases which intrigued botanists during the 20th century. An antifungal compounds like eudesmin were isolated from Asteraceae, Myristicaceae, Magnoliaceae, and from Apiaceae. Yangambin has been isolated from Piperaceae and Myoporaceae, Kobusin of Scophulariaceae, Magnoliaceae, Lauraceae. John et al., [30] examined about the herbal remedies of Luo of Siaya district. Murthy [31] isolated two new biflavinoid viz., Jeediflavanone and Galluflavanone from the alcoholic extracts of semecarpus anacardium nut shells. A new triterpene, cycloeuphordenol
and marocyclic diterpene ester was isolated from the latex of Euphorbia tirucalli by Khan et al., [32] and Khan and Malik[33] respectively. Essential oils of bupleurum tenue analysed through column chromatography coupled with GLC yielded santene, ρ-cymene, β- phyllodendrene, camphene, limonene, granyl acetate, citronellyl acetate and bornel. Thiarubine-A, a dithiacyclohexadiene polyines from the roots of chaenactis douglaii, a related dithiacyclohexadiene polypine from the roots of chaenactis douglaii, a related dithiacyclohexadiene polylene from Rudbeckia hirta exhibited strong light dependent anti bacterial and antifungal activity.

The information thus gathered from the tribals, herbal healers etc., would give a comprehensive database of wild plant resources, which can be of great use for further scientific investigation for identifying alternative or additional food resources.