

# CHAPTER-1

## GENERAL INTRODUCTION

*“Om Namō HariKeshbhya. Vananam Pataya Namah  
Vrikshanam Pataye Namah. Aushadhinam Pataye Namah”.*  
**-Yajurved**

“Destroying vegetational wealth invites destruction of health”. Plants play a promoting and protecting role in health. Since, the time of creation of the planet “Earth”, the plant kingdom has fed the entire world and cured several ills and is still doing so. The chances of survival of human race could have become bleak if he had not reconciled with nature especially the plant kingdom. Man the most intelligent creature in the evolutionary ladder has utilized his wanderer-gatherer aptitude and had collected many different plant species due to their food, medicinal or other economical usage. Since he became interested in certain species of the ecosystem and scientific quest had begun and various aspects of plants were unfolding very critically. There is no single aspect of life of human being where plants do not play a significant role.

Man absolutely depends on the plants for almost all the activities and requirements of life. Explosion in human population together with modernisation and industrialization of society created much more demand for energy, food, fibre, shelter, medicine, cloth and ornament etc. Plants were thought to be the best weapon for combating ailments and as a preventive cure against diseases. Plants still form a major part of ingredient in almost all systems of therapeutics. All over the world man

has attempted to utilize the flora of his respective region for the relief of ailments. The welfare of mankind is served by the species, that share the earth along with them. They are also regarded as abodes of spiritual solace.

According to evolutionary theories and other ancient scripts, it is proved that plants have originated before human beings. The idea that plant could be used for treating diseases and healing wounds probably arose in the mind of early man and they used plant parts and their crude extract to help them in need, sorrows and sickness without the scientific knowledge of their composition. India has a great and ancient cultural heritage. Medical treatment flourished here centuries ago when people in other parts of the world were not so advanced. The use of plants for curing various human ailments figured in ancient manuscripts as the Rigveda, the Bible, the Illiad and the Odyssey etc. In the early ages, man used raw drugs isolated or obtained from the plants lead one to infer about the inter-relationship between primitive men and medicinal plants. From a very long time, plants have been used traditionally as medicine by aboriginal people. In 19th century a good number of workers compiled literature regarding the traditional uses of plants by primitive human societies.

Our-knowledge of intimate relationship between early man and plant has come to us mainly through generation to generation from ancestors or through tribal people i.e., by surviving tradition. This attempt was baptised by John William Harshberger in the year 1896 as "Ethnobotany" to indicate interrelationship between plants and aboriginals. So, the relationship between man and his ambient vegetation is called Ethnobotany. This subject gained importance during the past few decades under

many respective interdisciplines, out of which ethnomedicinal knowledge is very ancient in India. From ancient times to, todate, people healed themselves with traditional herbal medicines, which in several cases is by trial and error, proved efficacious. In every ethno group there exists a traditional health care system which is culturally patterned. In tribal communities the traditional health care seems to be the first and fore most line of defence. The World Health Organization has also recognised the contribution of traditional health care in tribal communities. Ethnomedicine is an area of research that deals with medicine derived from plants used by rural and tribal people against various ailments. The term ethnomedicine has been used lately to defined the medicinal uses of plants in relation to human being. All indigenous remedies whether traditional or modern have been originated directly or indirectly from superstitions rituals and folklore etc. Rich traditional skills and oral folk-lore knowledge are fast disappearing and are likely to be lost for ever. Hence, this problem must be taken as a challenge by researchers and scientists to conserve the valuable knowledge and wisdom of the tribals for the posterity and human welfare. So, in the present day, investigations have been necessitated due to rapid depletion of natural resources on one hand and the dwindling traditional ethnic culture on the other hand.

Potentially, every plant occurring on this planet has one or more medicinal properties. An increasing number of investigations have been developing attention to the vast stored knowledge about the properties and uses of plants, still existing in nature cultures in several parts of the country. But without paying attentions on

traditional and ecological aspects between man and his surrounding plants, it is not possible to conserve these plants forever along with their medicinal properties. Exploitation can be sustained through the ecological studies of all species along with their rational uses. Through the conservation of plants, ethnoecology, man can preserve several species as botanical curiosities, useful to him and thus ensure their survival. Like other organisms plants or plant communities, germinate, grow, become mature and ultimately die. Majority of life processes i.e., reproduction, growth & yield of plants are governed by various habitat factors such as; climate, physiography and biotic influences etc. India presents extreme variety in its climatic conditions. Environment affects general growth condition of the plants as well as formulation of active principles in them. Vegetation plays a major key role in the structural configuration of nature and it can be managed either for physical and recreational benefits, they confer; or for productive purposes. Plants exercise a moderating influence on air, water, temperature and other various factors. Besides altering the physical and chemical properties of soil, they play an important role in checking flood, drought, erosion and vagaries of nature. Several factors such as soil rainfall, altitude, light and method of cultivation etc. play a major key role for economical success of large scale cultivation of plants. Numerous activities of man influence the growth and production of plants.

Anonymous (1948) gave report on the promotion of wasteland through ecological studies of important weeds. Joshi (1987) supported conservation and cultivation of medicinal herb plants. According to Arora (1989) ethnobotany and

plants domestication is necessary for global prospective and security through plants conservation. However large scale cultivation of these medicinal plants for profit depends on the active principle constituents and not on their luxuriant growth. Cultivation is essential in case of drugs because supplies of the wild plant species are insufficient to meet the ever growing demand. For success in cultivation it is necessary to study the conditions under which the plant flourished in wild state. Small changes in ecological conditions can affect the growth of any plant. Soils, which may have direct control on plant distribution and plant growth performance, demand more detailed consideration. According to Jain and Mitra (1990) the impact of ethnobotany in conservation of natural resources is very direct. American Pharmaceutical industries depend on natural resources to the extent of 30%. Even today the message of conservation can be induced to many primitive societies through faith and tradition rather than in terms of ordinances.

The purpose of the study is to point out the potentials of medicinal plants and to explore the possibility of finding and improving new uses of plants of the area. It is worth while to tap traditional knowledge, while the elderly medicinal men, who are familiar with curative values of plants and are still alive. Ethnobotanist brings out suggestions as to which plant material may be tapped and they get clues from rural or tribal men. This field has received considerable attention in India as well as abroad. Observation and inferences, accidents and institutions, philosophy and traditions, medication and sliding into deep prolonged thought all seems to have contributed in the birth and growth of Indian system of medicine. Hence, ethnobotanical studies

would be more meaningful if the data so obtained are subjected to vigorous experimental evaluation.

Indian medicinal plants have drawn the attention of scientists all over the world. Our various drugs have come accidentally through the work of travellers, explorers and missionaries etc. The further evaluation of these drugs are made by botanists, chemists and ethnobotanists engaged in their own research to find out new drugs. Pharmacological action of the herbs have been described in the Ayurvedic system of medicine according to the properties and action in terms of Ras, Guna, Veerya, Vipaka and Prabhava and their effect on Dosha, Dhatu, Mala, Agni, Ama, Ojas etc. However it is not understood by scientists to elucidate the mode of action of these terms on scientific parameters (Tripathi et.al. 1980). The role of natural products in the development of drug is necessity of further research in folklore use of single plant or their formulation in medicine. Chemistry has a vital role in improving the material life of people at large. The role of phytochemistry in medicine is a fascinating application of scientific knowledge in the well-being of mankind. Screening of medicinal herbs has become a potential source of biodynamic compounds of therapeutic values in phytochemical researches. Besides drawing the attention of ethnobotanists, plant-biochemists, microbiologists and pharmacologists for various analytical studies these attempts are also likely to yield more valuable natural drugs.

From literature, it is found that the medicinal value and industrial stimulus has been provided by natural active constituents isolated from plant material used in

oriental folk medicine. It is likely that still other substances with more significant and valuable pharmacological properties could be isolated from plants and that incidentally clues to some of these may be found in the folk medicine of primitive man. There is ample proof for the application of crude plant extracts and decoction in their preparation by world over as well as in India. But the aboroginals rationalisation of the science of therapeutics as we know is comparatively of recent origin. Chemical investigation alongwith pharmacological examination of the chemical constituents from plants of medicinal values have gained much importance in the therapeutic world.

This idea has largely been responsible to take up the phytochemical investigations carried out during the course of present study. The medicinal importance of the plants depend upon the presence of active principles. The isolation of active principles which possess the physiological and pharmacological activity from the medicinal plants and their successful utilization to alleviate human suffering have encouraged researchers to continue the investigation for finding out the new drugs from natural resources. Phytochemistry has not only enriched modern medicine but has also provided valuable lead for drug designing. Pharmacologists and chemists have made various analytical attempts also to yield more valuable natural drugs including various chemotherapeutic agents. The chemical substances used for the treatment of infectious diseases or diseases caused by the proliferations or malignant cells are commonly termed as chemotherapeutents.



Drug research which is an important dimension of research in Ayurveda is necessary for maintenance and reinforcement of drugs and their standardisation. Without drug research proper and reliable standardisation and cross experiment of the ability of various drugs will be hard to accomplish, it may not only help in the identification of traditional or time tested herbs but also help in the discovery and application of new species and formulation of new compounds. Anatomical and pharmacognostical information also give authenticity of any drug from its adulterants i.e. leaves of *Acalypha indica* are used as anthelmintic, emetic, laxative, congestive and expectorant etc. It is repeated in various systems of medicine for curing rheumatic pains, chronic bronchitis, asthma, headache, constipation, earache, snake-bite, scabies and other skin diseases. These leaves have been reported to contain cyanogenetic glycosides, acalypin, triacetamine and unknown poisonous substances. Naturally occurring substances are distinguishable from synthetic compounds. The screening of higher plants for their antibiotic activity has been carried out by number of workers (George and Pandalai 1947; Joshi and Magar 1952; Bhatnagar *et al.*, 1961; Dhar *et al.* 1968 etc.).

During these days, chemists have synthesized very important remedies against various ailments such as arsenicals and antimalarial compounds, which have proved effective in the treatment of protozoal diseases. Antibiotics have revolutionized the treatment of bacterial and rickettsial diseases and even some viral diseases are said to be controlled by certain antibiotics. In modern medicine, much attention is given to the phenomenon of incompatibility of drugs. When two drugs are administered

simultaneously may have some interaction and form a third compounds, which may be either having a desired action, adverse effect, synergetic effect or no effect at all. Thus, if the interaction of drug is known it can be manipulated to our advantage. In Ayurvedic methodology, the formulation is generally a very complex mixture of plant material, containing different chemical constituents. Such complex formulations having beneficial effect have been administered by ancient 'rishis'. There is no dearth of evidences to prove these statements as is evident through Vedas, Puranas and subsequent Indian scripts.

At present moment when all pharmaceutical companies of the world are involving in making synthetic drugs, then it is very necessary that attention should be turned to the possible remedies that may be found among indigenous plants of the world. On account of increasing realization about the adverse side effects of many modern drugs on human health the attention is now again being focussed on traditional remedies. Diseases which were considered incurable few years back are now curable by herbal therapies. This necessitates research on the ethnobotanical aspects of indigenous drugs. Herbal drugs are gaining renewed importance and therefore various aspects of ethnomedicinal plants has become the subject of very active interest during the past few decades. The natural sources are a common heritage, which we shared with the past generation and our future generation will be inheriting these resources from us. The conception, gestation, birth, growth, death, maturity, disease and decay are the secrets and inexorable law of nature. The plantkingdom has always, been man's principle source to meet his necessities and amenities of life.

Sagar district of Madhya Pradesh, is one of those region in India where the tribal and rural population forms a considerable part of population and having very rich flora from medicinal point of view. But only a few preliminary reports on ethnobotanical aspects of this region are available. (Saxena and Vyas, 1981; Sahu et al., 1983; Bhalla et al., 1982 and Sahu 1982; Dixit 1993; Dixit, 1994; Mishra 1996 etc.)

In view of the above mentioned back ground the present work entitled "Ecophysiological, Ethnobotanical and phytochemical studies of Genus *Calotropis*" (Linn.) R.Br. was under taken. The attention has been focussed mainly on following aspects.

- (1) Ecophysiological observations including phenological behaviour, seed collection and seed germination studies etc.
- (2) Ethnobotanical survey of various selected localities of Sagar district.
- (3) Phytochemical analysis of different plant parts.