Chapter I

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There has been a tremendous progress made towards development of modern medicine. However, plants continued to be a major source for formulation of drugs throughout the world. India being a country where wide variations exists in climatic, soil, altitude and latitude sustain the availability of diverse types of plants which grow wild in different parts of the country. It is well known that the knowledge of medicinal plants has been inherited traditionally. Use of the plant and plant parts for curing various ailments can be attributed to the chemical compounds synthesized during various metabolic pathways in the life-cycle of plants. Thus, rich botanical wealth is available that needs to be identified, analyzed and utilized for drug industry. Plants are still used in crude form by the people who live in remote areas. There are instances where medicinal herbs can be judiciously used for curing chronic diseases that are defied by the synthetic drugs.

The continuous research is going on to obtain a raw material for feeding the pharmaceutical industry.

Medicinal plants, as a group, comprise approximately 8000 species and account for about 50% of all the higher flowering plant species in India. A large number of the country’s rural population depend on medicinal plants for treating various illnesses. About 1.5 million practitioners of the Indian systems of medicine and homeopathy (ISM & H) use medicinal plants for preventive, promotive and curative applications. Furthermore, there are 7843 registered Indian system of medicine (ISM) pharmacies and 851 of homeopathy as well as a number of unlicensed small-scale units. Besides meeting national demands, India caters to 12%
of the global herbal trade. In recent years, trade in herbal-based products has quantum
leaped, particularly in the volume of plant material traded within and outside the
country. (Satyabrata 2006)

India is blessed with two mega centres of biodiversity: the Hindustan centre of
origin and the Central Asia centre of origin. This biodiversity is mainly distributed in
western ghat, North Eastern India and Himalayan region. Floristically rich, India has
about 141 families of higher plants. Among the different endemic species, 2532
species are distributed in Himalayas, 1788 species in the peninsular region and 185
species in the Andaman and Nicobar islands. About 43000 plant species are said to
exist in India, of which 7500 plant species are referred to in Indian folklore but only
about 1700 plant species have actually been documented in old literature (Satyabrata
2006). The vast degree of diversity present in this country is directly related to the
highly divergent ecosystem and altitudinal variations. The agro-biodiversity in India
is distributed in eight very diverse phytogeographical and 15 agroecological regions.
The range of distribution of these plants varies from the wet evergreen forests in the
Western Ghats to the Alpine scrub of the Himalayas; from the arid deserts of
Rajasthan to the mangroves along the east coast; from the vast deciduous forest of the
Deccan to the shoals of the high ranges; from the swamps of the Ganges to the moss
laden tree trunks of the silent valley. The indigenous diversity of plant species of
medicinal and aromatic value in the region is also unique. This is reflected from the
Arogyopachar (Trichopus zeylanicus) of the Agastiar hills to the Saalam Panja of the
Himalayas; from the tiny Drosera of the sholas to the huge Dipterocarps of the
Western Ghats; from the xerophytic Aloes to the morshy land Brahmis; from the wild
turmeric to the cultivated peppers. Over 7000 species belonging mainly to the families
Fabaceae, Euphorbiaceae, Asteraceae, Poaceae, Rubiaceae, Cucurbitaceae, Apiaceae,
Convolvulaceae, Malvaceae and Solanaceae have been used from ancient times by various indigenous people in the country. This number corresponds to more than 25% of the world’s known medicinal plants, estimated to be at around 30,000 species. Analyses of these plants show that they include all the major life forms (i.e., trees, shrubs, climbers, and herbs), with the proportion of ferns and lichens being much smaller as compared to flowering plants.

Medicinal plants played a significant role in various ancient traditional systems of medication such as Ayurvedic and Unani in India, Chinese traditional medicine and their derivatives. Today, medicinal plants still play an important role in developing countries in Asia, both in preventive and curative treatments, despite advances in modern western medicine. People of many Asian countries earn a living from selling collected materials from the forest, or from cultivation on their lands.

The development of modern medicine with the introduction of modern drugs produced by pharmaceutical companies, has dealt harshly with traditional medicine which was accused of being inefficient, laborious in preparation and unavailable due to scarcity of raw material. This is exacerbated by the lack of traditional doctors who cannot earn a living without basic material (medicinal plants) and demand.

A country can also earn a good amount of foreign exchange by exporting this natural wealth to other countries.

The high cost of modern medicine (mostly imported), their unavailability in remote areas and, most importantly, the serious side effects of certain drugs, have resulted in a significant return to traditional and indigenous herbal medicine. The subject of the World Health Organization (WHO) campaign in the 70s for all its member countries to preserve their national heritage of ethno-medicine and ethno-pharmacology and to re-include the use of known and tested medicinal plants and
derivatives into their primary health care system in rural areas and as an alternative when modern medicine is not readily available. Since large portions of pharmaceutical drugs are derived from medicinal plants, the demand for these raw materials is steadily rising.

Ethnomedicine is the study of the belief and practices concerning illness in different human populations (Genest 1978). It observes and describes hygienic, preventive and healing practices prevalent among these populations also taking into account temporal and spatial references (Guerci 1995).

The study of ethnomedicinal plants mainly comprises following major phases.

A. The first phase is the exploration, collection, identification and documentation of ethnomedicinal plants from specific locations.
   - Preparation of laboratory specimens, herbarium sheets, voucher specimens.
   - Work out the ethnomedicinal significance by repeated visits to the field, establishing rapport with local practitioners.
   - Authenticate the information provided by herbal practitioners by carrying out detailed investigation and chemical analysis.

B. The study is significant to provide measures for conservation of ethnomedicinal germplasm by bringing these plants under cultivation practices, among the tribes and also conserve the plants ex-situ in Botanic Gardens, further it is also helpful in developing nursery of these ethnomedicinally important plants.
C. The ethnomedicinal plants are usually concerned with the socio-cultural practices, among the tribes, with a view to understand cultural and biological diversity.

In the recent two decades, scientists from pharmaceutical, medicinal, agricultural, industrial and from organic chemistry are interested in herbal medicines due to their efficiency of curing almost all diseases in human beings. These drugs possess less side effects. Even the plant and plant parts administered is crude form are being widely used by tribal populations for their day-to-day ailments. The survey of tribal villages and information from the local practitioners brought forth that ample of taxa are being utilised as folk medicines. These herbal plants also finds an application in the production of secondary metabolites. It is the cumulative effect of these phytochemical compounds that act against the specific ailment. However, the local practitioners are not aware of this particular information. Foreign scientists are now taking patents of herbal medicines. These wild plant taxa offer a good material for studying the phytochemical compounds responsible for curative properties. During the preliminary screening of some of the taxa; many such chemical compounds are found to be present in the various plant parts. So it was thought interesting to carry out the work on phytochemical compounds present in the plant *Tacca leontopetaloides* (L) O Kize., *Tectaria macrodonta* (Fee) C. Chr., *Dioscorea pentaphylla* L., *Leea macrophylla* Roxb., *Clerodendron infortunatum* L., that would provide a significant information to correlate the therapeutic properties and also it will be helpful for its inclusion in pharmaceutical, medicinal, agricultural and industrial fields.
Hence, with above aims and objectives the present research work has been undertaken and the thesis is an account of these investigations. The present investigation deals with the phyto-chemical analysis of selected ethno-medicinally significant plants, specially the plant parts such as roots, tubers, rhizomes, leaves, which are used by tribals and other medical practitioners. The study aims at investigation of structural properties and their correlation with existing drugs which are used for treatment of particular diseases.

Present work:

The literature survey reveals that in the recent year there has been a revival of interest in herbal medicines and it has come up as an alternative medicine, which are forming an important component of healthcare system. Phytochemical and ethnobotanical study attracted the attention of foreign scientists, medical practitioners and travelers; they are exploring the medicinal values of the plant and taking patents of Indian plants. But we Indians are not aware of this. Due to extensive applications of allopathic medicines, it proved that there are many side effects; hence USA and European countries are now realizing the usefulness of the nature's green gift and they are working on phytochemistry. As the plant *Tacca leontopetaloides* (L) O Ktze., *Tectaria macrodonta* (Fee) C. Chr., *Dioscorea pentaphylla* L., *Leea macrophylla* Roxb., *Clerodendron infortunatum* L. have medicinal and traditional uses so it has created sufficient interest to the author to investigate the phytochemical component of above mentioned plants.