Chapter-I

INTRODUCTION

Medicinal plants, the world’s oldest known health care products, play a key role in traditional medicine. But these plants are not only used for primary health care; many widely used pharmaceuticals are derived from plants and other natural sources. Traditional medicine is used the world over but is particularly relied on in developing countries. In the South, some 80% of people endeavor to protect or restore health using methods that have been handed down from generation to generation. Following the advent of modern medicine, herbal medicine suffered a setback, but during last two or three decades advances in phytochemistry and in identification of plant compounds effective against certain diseases have renewed the interest in herbal medicines.

Plants have always been the source of food, medicine and other necessities of life since the origin of human being. Plants containing medicinal properties have been known and used in some form or other, even by primitive people (Jain and Sakalani, 1991). The World Health Organization (WHO) also appreciated the importance of medicinal plants for public health care in developing nations and evolved guidelines to support the member states in their efforts to formulate national polices on traditional medicine and to study their potential usefulness including evolution, safety and efficacy. In India, the oldest record of the use of plants as medicine is given in the Regveda (4500 -1600 BC), in which curative properties of some plants are described. Then appeared the two important Indian
system of medicine *viz.*, the Charaka Samhita (1000 – 800 BC) and Susruta Samhita (800 – 700 BC).

India is a varietal emporium of medicinal plants and is one of the richest countries in the world in regard to genetic resources of medicinal plants, topography and climate. It is one of the mega diversity countries of the world with a rich diversity of biotic resources (Bapat *et al*., 2008). Out of 34 hotspots recognized, India has two major hotspots - the Eastern Himalayas and the Western Ghats due to the existence of high degree of endemism and is well known for its ancient heritage for medicinal plants as well as plant drugs since the time of Rigveda. India harbours about 47,000 species of plants of which 17,000 are angiosperms (Bapat *et al*., 2008). A total of 560 plant species of India have been included in the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened species, out of which 247 species are in the threatened category. On a global basis, the IUCN has estimated that about 12.5% of the world’s vascular plants, totaling about 34,000 species are under varying degrees of threat were noticed (Phartyal *et al*., 2002).

Several traditional medical systems existing in India such as Ayurveda, Siddha, Unani, Tibetan, Homeopathy and modern System and among them Ayurveda has been extensively practiced. It is also backed by rich ancient literature. It is originated from Vedas, Adharva Veda in particular contains 114 hymns are formulations for the treatment of diseases. It is established as early as 700 BC (Takshila) and 500 BC (Nalanda). Other System such as Unani, Folk medicine, are informal and passed usually from generation to generation (Sahai,
Siddha system is the oldest system of medicine exists in South India particularly in Tamil Nadu and it comprises Alchemy, Philosophy Yoga mantra, Astrology (Pillai, 1979; Hausmen, 1996). Siddha is effective in treating chronic cases of liver, skin diseases, rheumatic problems anaemia, prostate enlargement, piles, and peptic ulcer. It has been proven that traditional medicines are effective in treating several venereal disease and aids (Haddad et al., 1998). In many countries, including India and China, thousands of tribal communities still use folklore medicinal plants for the cure of various diseases. It has been confirmed by WHO, that traditional medicines, based largely on different species of plants, animals and serve the health needs of large number of people; especially for millions of people in the vast rural areas of developing countries (Kong et al., 2003).

There are 20,000 plant species have been recorded recently but more than 500 traditional communities’ uses about 800 plant species for curing different diseases (Kamboj, 2000). The world Health organization estimates that herbal medicine is still the main stay of about 75-80% of the world population mainly in the developing countries for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. The use of natural substance particularly plants, to control diseases is centuries old practice that has lead to the discovery of more than half of all modern pharmaceuticals. In the last century, roughly 121 pharmaceutical products were formulated based on the traditional knowledge obtained from various sources (Verma and Singh, 2008). It is estimated that about 25-30% of all modern
medicines are directly or indirectly derived from higher plants (Kumari et al., 2011).

Different surveys conducted in various parts of India revealed that majority of the people are suffering from one microbial diseases or the other ranging from dreadful diseases like tuberculosis, leprosy to fever. The researchers found that tendency of self-medication, drug resistance, ignorance, poor health and hygiene are some of the factors responsible for such widespread occurrence of such diseases (Mazumder et al., 2003). Considerable progress has been made from the past two centuries when the chemists and biologists accepted the challenge of combating these dreadful diseases by synthesizing a wide plethora of organic compounds having capacity to combat various pathogens. However, indiscriminate uses of the synthetic drugs have resulted in mutation of the strains making them insensitive to these chemical agents leading to the global hazard of drug resistance. The scientists of the 21st century are generally reviving our traditional knowledge and are screening various parts of plants scientifically used in the folklore medicine in search of newer lead compounds having antibacterial efficacy.

In modern medicine also plants occupy a very significant place as raw material for some important drugs. Although synthetic drugs as antibiotics brought about a revolution in controlling different diseases which were thought to be fatal in past centuries. But these synthetic drugs are out of reach to majority of the world population. The tribal and rural people who live in remote places, dense forests, and small villages or Dhanis mostly depend on traditional healers whom
they know and trust. Judicious, accurate, and timely use of medicinal plants can even cure fatal or deadly, and incurable diseases that have long defined synthetic drugs. The goals of using plants as sources of therapeutic agents are

a) to isolate bioactive compounds for direct use as drug, e.g., atropine, scopolamine, digoxin, digitoxin, morphine, reserpine, taxol, vinblastine, vincristine;

b) to produce bioactive compounds from novel or known structures, using them as lead compounds for (semi)synthesis of novel patentable entities with better activity and/or lower toxicity;

c) to use natural products as pharmacological tools, e.g. lysergic acid diethylamide, mescaline, strychnine, yohimbine; and

d) to use the whole plant or part of it as a herbal remedy, e.g. cranberry, Echinacea, fever, garlic, Ginkgo biloba, St. John’s wort and saw palmetto.

Information regarding the identification and utilization of medicinal plants are available in plenty. But the efforts to collect and propagate such information are to be strengthened. The plant kingdom is a very rich resource for discovering new antimicrobial compounds for human medicine as well as many other applications such as food preservation, disease management in agriculture, veterinary disease control and the coatings of household products. The goal of this work was to screen plants for (novel) antimicrobial compounds and particularly to find antimicrobial and anti-inflammatory compounds from selected medicinal plants.