CHAPTER 7

Introduction
India is one of the largest populated countries of the world. The uncontrolled growth in the population during the last century has created a heavy demand of additional food and medicine. The unprecedented increase in the population and heavy industrialization have jeopardized the natural wealth and eco-balance. This ever-increasing demand for food and medicine has forced one to look up alternative ways for rapid multiplication of food yielding, and medicinal plants. The major health problem of India has multiplied in the form of diseases like tuberculosis, malaria and nutritional disorders which have been eradicated in the developed countries, are still responsible for major morbidity and mortality. At the same time the frequent occurrence of diseases of modern civilization like, cardiovascular disease, cancer, diabetes, coronary heart disease, hypertension, leukaemia, AIDS and viral diseases are increasing rapidly in India. Fatty liver, alcoholic hepatitis and cirrhosis are the main disorders of alcoholic liver diseases (Ahmad et al., 1987). The cardiovascular problems have also reached at alarming stage. Cancer is the most dreaded and prevalent disease in the modern time. Diabetes is a metabolic disorder of common occurrence and is of great concern for every Indian. Anemia is also a common problem in the child population of this country.

India is one of the pioneers in the development and practice of well documented indigenous systems of medicine, particularly Ayurveda. The Indian population is dependent mostly on plant based crude drugs for the treatment of a variety of ailments. The herbal medicines are being used in areas of primary health care programmes in several developing countries including India (Chopra et al., 1996).

**Indigenous system of medicine:**

Systematic investigation of drugs used in indigenous medicine in India on modern scientific lines was started more than 50 years ago. A number of important medicinal plants prescribed by Vaidś and Hakims
have been investigated. The constituents have been examined, pharmacological action of the active principles worked out by animal's experimentation and preparations made from the plant drugs have been tested clinically (Watt, 1889).

Historical background:

The history of medicine in India can be traced to the remote past. Turning back the pages of the history of civilization one would encounter two main enemies of mankind in all ages, namely, hunger and disease. In fact, even the prehistoric man would have been fighting against these for the better part of his life; although, we are not left with any records to confirm this belief. The interest of the primitive man in the plants and animals around him would be natural. Thus, by trial and error, and later through folklore, the useful plants were differentiated from others including the poisonous ones.

Gradually, as society evolved the concept of division of labour, the importance of the "medicine-man" grew enormously as he claimed unto himself supernatural and divine powers and became respected also as the possessor of all knowledge - religious, philosophical, medical and otherwise. The experience of generation of the common man, however, sustained him in his fight against day to day afflictions and thus developed a wealth of information about plants of medicinal value. It is not surprising to note that description and properties of medicinal plants are found in the most ancient records and in India, date back to more than 20 centuries. Our vast sub-continent, with its wealth and variety of medicinal plants, has accumulated, through the ages, a great mass of popular medicines, many of which are even today in common use throughout the country, though much of the folk medicine is steadily being eroded by the advancing tide of synthetic drugs. About two thousand plants are mentioned in the Ayurvedic and Unani systems of medicine and three-fourth of these are recognized as official in Eastern and Western Pharmacopoeias. It may be added that many of the
remaining indigenous plants could be a good substitute for those, which are imported from other countries.

Traditional system of medicine, which has served man through the ages to alleviate suffering and disease in various parts of the world, have been recognized by WHO as an essential building block for primary health care.

Ayurveda and Unani Tibb (Greek origin), the two forms of traditional medicine most commonly used in India. As a rough estimate the percentage of the population of India using traditional medicine is 60-70 (Das and Laltish, 1980).

Plants have always been a common source of medicament either of traditional preparations or as pure active principles. In a survey done by WHO it has been estimated that 80% or more than 4,000 million inhabitants of the world rely chiefly on traditional medicine for their primary health care needs and it can safely be presumed that a major part of traditional therapy involves the use of plant extracts or their active principles (Farnsworth et al., 1979). In the developed countries too, plant derived drugs are important. In USA, for example, 25% of all prescriptions dispensed from community pharmacies, contain plant extracts or active principles prepared from the plants (Farnsworth and Bingel, 1977).

It is mainly during the last 100 years that some of the active ingredients present in herbal products have been isolated and introduced into "modern" medicine. It had also pointed out in the review articles that there are at least 119 distinct chemical substances derived from plants that can be considered as an important drug current in use. Thus the drugs derived from plants still occupy an important position. In traditional system of medicine the plant parts i.e. stem, bark, leaves, flowers, fruits, seed, root and other plant parts i.e. gum, oil, resin and exudation have some specific uses. Most of the herbal drugs used by different traditional practitioners are varied in number and characters.
Few active constituents have been isolated from the crude drugs which are used now in allopathic system of medicine. The following active principles are given below:

I. Digitoxin - *Digitalis purpurea* Linn.

II. Ephedrine - *Ephedra gerardiana* Wall.

III. Reserpine - *Rauwolfia serpentina* (L.) Benth.

IV. Taxol - *Taxus baccata* Linn.

V. Vincristine & vinblastine - *Vinca rosea* Linn.

Ayurvedic system of medicine is now widely practised in India, where it originated, and to varying degrees in Myanmar, Nepal, Srilanka and Thailand (Kurup, 1983; Sharma, 1971). The earliest mention of the medicinal use of plants is found in the Rigveda mentioning 67 herbal drugs, perhaps the oldest repository of human knowledge. *Susruta Samhita* and *Charaka Samhita* are the first recorded treatises of Ayurveda. "Chakara Samhita" is the earliest treatise on "Ayurveda" which lists a total of 341 plants and plant products for use in health management. "Susruta Samhita" also dealt with plant related medicines. Ancient Ayurvedic records include the medicinal properties of herbs, their distribution and characters, body functions, surgery, psychology of Vedic Science. So it is a system of health care, which treats each person in holistic fashion. This system believes in the concept of "Tridosha" (Sivarajan and Balachandran, 1983).

Unani (Greco-Arab) medicine in India: Greco-Arab system of medicine can be traced to ancient time (131-200 A.D.). The Unani or Greco-Arab medicine historically owes its origin to Greek philosopher-physicians. It was through a chain of developments till perfected during the ascendency of Muslim civilization in the Asia and Africa. However, the Muslims continued to call it Unani (Ionion) medicine, thereby gratefully acknowledging its Greek origin. The European historians, on the other hand, call it Arab medicine. It is connected with great names in
medicine like Hippocrates, Galen, Rhazes and Avicenna who have predominantly mentioned vegetable drugs in their books. Unani medicine has an almost inexhaustible store of empirical knowledge handed down through centuries and modern physicians, can still find striking new insights in old tomes of its empiricism. Unani medicine came to Indian sub-continent in 12th century A.D. and since then has been adopted here as a vastly popular system. It is a duly recognized medical system in India, Pakistan and Bangladesh where official agencies through legislative enactment's control the manufacture and sale of Unani medicine, colleges and institutions for its teaching and research (Ahmad, 1983). In the Unani system, temperament (mizaj) has an important place and forms the basis of pathology, diagnosis and treatment. The Galenic concept of temperament being sanguine, phlegmatic, choleric or melancholic, finds expression in the Unani system that considers each individual as unique (Said, 1983). A perusal of the texts of Galen (130-200 A.D.), Rhazes (850-927 A.D.), Al-Baruni (973-1048 A.D.), Avicenna (980-1037 A.D.) and Ibnal-Baitar (d. 1248 A.D.) is not surprising to note where much information is compiled on the description and properties of medicinal plants which was based on a strong foundation of scientific methodology using the tools available at that time (Fathima, 1994).

The Siddha system of medicine is one of the ancient and traditional systems of India. The origin of which is Tamil Nadu, is essentially a Tamil medicine. This system of medicine was founded by Agastya-a Saint of Tamil Nadu. Siddha system as it exists has much in common with the ancient medicine, and its pharmacopoea contains vegetable, metal, animal and mineral products etc. Siddhars have written medical works on four subjects viz:

1. Alchemy (Chemistry)
2. Medicine
3. Yoga
4. Wisdom (Philosophy)

**Screening of herbal drugs:**

The standardization work on Indian medicinal plants has been carried out in various universities and research institutes, and is being continued to the present day with results reported in professional journals. Two serial book publications (Chatterjee and Pakrashi, 1991; 1992; 1994; 1997; Rastogi and Mehrotra, 1990; 1991; 1993; 1995; 1998a; 1998b) attempt to cover recent and earlier findings. As a result of this research and other investigations carried out elsewhere in the world, there is now enough accumulated data from which one can conclude that in a significant number of cases there is corroboration of the main claims of these plants as per traditional usage.

Some *Ayurvedic/Unani* medicinal plants that have received pharmacological/clinical support for their therapeutic claims are given below:

<table>
<thead>
<tr>
<th>Botanical names</th>
<th>Active components</th>
<th>Pharmacological actions</th>
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<tbody>
<tr>
<td>1 <em>Adhatoda zeylanica</em> Medic.</td>
<td>Vasicine</td>
<td>Bronchodilator</td>
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<tr>
<td>2 <em>Asparagus racemosus</em> Willd.</td>
<td>Shatavarin-l</td>
<td>Anti-abortifacient</td>
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<td>3 <em>Bacopa monnieri</em> (L.) Pennell.</td>
<td>Baccosides</td>
<td>Improves memory</td>
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<td>4 <em>Boswellia serrata</em> Roxb. Ex Coleby.</td>
<td>Boswellic acids</td>
<td>Anti-arthritic</td>
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<tr>
<td>5 <em>Centella asiatica</em> (L.) Urban</td>
<td>Asiaticosides</td>
<td>Skin diseases</td>
</tr>
<tr>
<td>6 <em>Commiphora wightii</em> Bhandari com. nov.</td>
<td>Guggulsterones</td>
<td>Hypolipidemic</td>
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<tr>
<td>7 <em>Curcuma longa</em> Koenig non L.</td>
<td>Curcumin</td>
<td>Anti-inflammatory</td>
</tr>
<tr>
<td>8 <em>Pierorrhiza kurroa</em> Royle ex Bent.</td>
<td>Picroside, kutcoside</td>
<td>Hepato-protector</td>
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<tr>
<td>9 <em>Rauwolfia serpentina</em> (L) Benth. Ex Kurz</td>
<td>Reserpine</td>
<td>Tranquilizer</td>
</tr>
<tr>
<td>10 <em>Swertia chirayita</em> (Roxb Ex Flem) Karst</td>
<td>Chiratin, ophelic acid</td>
<td>Hepatoprotector</td>
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**Purity of raw material:**

One of the major problems in the study of Indian medicinal plants is to establish their correct identity based on the classical text and other references. The probable second cause for low efficacy is that the collection of the raw materials is not being made generally by expert
hands. The collectors and labourers are generally uneducated persons and they do not know the importance of the time of collection, the exact place of collection and the exact parts of the plants to be collected. They also collect the drugs with the unwanted materials and handle them so casually and even roughly that the drugs lose much of their effectiveness. For purposes of research and international communication, the botanical identity of the plants used in medicine has also to be established accurately (Bhattacharjee, 1998).

**Need to study the herbal drugs:**

The ever increasing demand for medicinal and aromatic plants or commercial exploitation of medicinal plants is consistently increasing throughout India to cater the needs of pharmaceutical and allied industries. Adulteration and controversy regarding the names of crude drugs are two main lacunae of our indigenous system of medicine and because of lack of detailed description, it is practically impossible to decide the identity of medicinal plants. Hence, an urgent need of proper standardization of crude drug samples is being felt necessary to encourage and to make effective the indigenous system of medicine. This requires an intensive survey of literature, a detailed botanical knowledge (morphological/anatomical) and phytochemical studies of the concerning root and leafy drugs so that some definite pharmacognostic delimitations may be generalized for their perfect standardization and utilization (Farnsworth et al., 1966; Farnsworth and Bingel, 1977; Von Reis, 1973; Ahmad et al., 1983; Balandran et al., 1985; Duke, 1985; Narargo, 1995).

Keeping these points in mind, the present detailed study was conducted on six, hitherto neglected, Indian medicinal plants whose importance is discussed elsewhere (Chapter III). Of these, six, namely:

1. "Safed kiker" *Acacia leucophloea* (Roxb.) Willd.
4. "Vilaitibaval" *Leucaena leucocephala* (Lamk.) Wit.
5. "Biskhapra or Santh" *Trianthema portulacastrum* Linn.

6. "Kamala" *Mallotus philippensis* Muell. Arg. were studied for their morphological and anatomical features. Phytochemical characters of the plant materials including extraction, isolation, purification and characterization form the main part of the thesis.