Chapter 2

Review of Literature

Traditional medicine includes folk medicine, a purely empirical oral tradition and ‘codified’ traditional medical systems with strong theoretical foundation and a body of published texts, having history of several thousand years (Shankar, 1996). Among India’s codified medical traditions, Ayurveda is the oldest, with its origin in the Vedic ages (3500 – 800 BC). The Rigveda (1200 – 900 BC) and Atharvaveda contain numerous references to the healing properties of plants. References to 67 medicinal herbs in Rigveda, 82 in Yajurveda, 288 in Atharva, 129 in Brahmanas, 31 in Upanishads, 517 in Kalpasutra, 152 in Panini, 109 in Patanjala Mahabhashya have been traced out (Sharma, 1993). Epics like Ramayana (10th century BC) elude many plants with wound healing properties with popular examples like Mritasanjeevani and Vishalyakarani. Ayurveda’s earliest works are believed to have been composed between the 10th and 4th century BC. Of these, Materia Medica of Charaka, Shushruta and Vagbhata are the best known. The ancient authors, Charaka, Shushruta and Vagbhata mentioned about 700 medicinal plants in their Pharmacopoeia. A total of about 1900 Sanskrit names of plants appeared in these, with 670 common to all and 240, 370 and 240 exclusive to Charaka Samhita, Shushruta Samhita and Ashtangahridaya Samhita out of 1100, 1270 and 1150 Sanskrit names respectively. (Mooss, 1983). Later texts of importance include Madhavakara’s Rugvinishchaya (14th century) and Bhavamishra’s Bhavaprakasha (16th century). Second major traditional medical system is the alchemical and magical system of Tamil speaking area, Siddha with its origin dating back with the Ayurveda. Unani medicine, with its traces to Hippocrates (460 – 377 BC) and later modified by Roman physician Galen (AD 131 – 200) got established throughout the world through Muslim rulers. Modern medical science has its roots in the Islamic civilization of the middle ages.

In Western countries use of plants for medicinal purpose dates back to 1500 BC Egyptian Papyrus. Assyrian and Babylonian pharmacy developed around 650 BC. Hippocrates (460 BC), father of medicine described about 400 plants as
medicines, while Theophrastus (370 – 267 BC) listed 500 plants as medicine. In 78 AD Dioscorides wrote “De Materia Medica” one of the most authentic compilations of Greek medicine with description of about 1000 medicinal plants (Rout et al., 2009; Tantry, 2009). It was Harshberger (1885) who first coined the term ‘Ethno botany’. Robbins et al. (1916) and Schultes (1963) defined the subject and highlighted the scope.

European studies of India’s medicinal flora can be traced to Garcia da Orta’s 1563 “Coloquios dos simples e drogas he cousas medicinais da India” with 57 drug details (Markham, 1913) and van Rheede’s 12 volume “Hortus Malabaricus” (1678 – 1703). During 1783 to 1794 Sir William Jones translated a number of important Sanskrit works on science and medicine, leading to a brief revival of European interest in Indian medicine. Efforts to document traditional knowledge of India during the past two centuries added much to our knowledge of the uses and efficacy of plants. Apart from the translations of classical medical texts, late 19th century works of Watt (1889 – 1896) and Dymock et al. (1890) have set the stage for a revival of interest in Indian medicine. During the past century, a number of standard reference works have been published which include Kirtikar & Basu’s ‘Indian Medicinal Plants’ (1918), Nadkarni’s ‘Indian Materia Medica’ (1954), Chopra’s ‘Indigenous Drugs of India’ (1933), recent CCRAS compendium (Sharma et al., 1998) and Jain’s (1991) ‘Dictionary of Indian folk medicine and Ethno botany’. In recent decades, there has been a vigorous effort within India and abroad to conserve, document and promote knowledge of plant drugs.

In the early days of Ethno botanical research, researchers concentrated their works on large geographical areas such as entire state or whole district. Later it got transformed into studies limited to particular tribal group or village study. This continued up to 1990. During these period attempts were also made to record the plants used for certain disorders or having a characteristic therapeutic efficacy. After 1990, research interest got transformed towards Pharmacognosy of particular species or group. During the last decade it got evolved again and at present majority of the work is either review of the therapeutics of a species or Phytochemistry, in vitro
studies and biotechnological applications to conserve or to produce drugs from a single species.

The field of Ethno botany began to take its shape in India when the British botanists came and surveyed indigenous plants for their botanical studies and recorded economic values. Roxburgh (1832) described the use, vernacular names and botanical identity of many plants. In 1873, Sir George Watt studied the economic plants of Manipur and Burma. Further during 1889 – 1896, he published his monumental work, ‘Dictionary of the economic products of India’ with an index of 3000 vernacular names and uses from different parts of the country. Ethno botany was uplifted to the status of genuine academic and research field in the second half of 20th century. Dr. S. K. Jain (1986) made pioneer investigations and affectionately known as father of Indian Ethno botany.

In recent years an impressive number of research centers have been established to study the taxonomy, distribution, ethno botany, cultivation, genetic improvement and the chemical as well as pharmacological aspects of plants used in traditional medicine. Numerous books and nearly 200 journals reporting on indigenous medicinal plants are published in India each year.

It is not possible to cover all ethno botanical and medicinal plant studies carried out by researchers throughout the world. So some of the important studies throughout the world are:

2.1 Journals and research reports

2.1.1 Worldwide


2.1.2 India

A bird’s eye view of ethno botanical studies of India in state wise manner is depicted below.
Jammu and Kashmir


Haryana

An account of medicinal plants of the state of Haryana has been provided by Yadav et al. (2006) and Panghal et al. (2010), while two decades ago Lal & Yadav (1983) enumerated medicinal plants of Kurukshetra.

Himachal Pradesh


Uttarakhand

There are few important recent studies on medicines of Uttarakhand. Ethno botanical profile of the Gujjars was presented by Singh (2010). Tiwari & Pande (2010) studied ethno veterinary medicines with enumeration on therapeutic dose. Medicinal plant resources of Kedarnath valley were explored by Semwal et al. (2010). Other prominent contributors are: Rawat & Chandhok (2009), Ahamed et al. (2010), Semwal et al. (2010), Singh et al. (2010). In 2008, Snehlata et al. reviewed 248 ethno botanical papers published from the state during the period 1957 – 2007.
**Jharkhand**

Vidyarthi & Gupta (2004), Tripathi et al. (2008) and Singh et al. (2009) are the major contributors to the knowledge on the medicinal plants from the state of Jharkhand.

**Punjab**

Paul & Virk (2009) studied and recorded the important medicinal plants of Punjab.

**Himalayas**


**Uttar Pradesh**

Uttaranchal


Chhattisgarh


Rajasthan

In 1984 Sebastian & Bhandari explored phyto medicines from Mount Abu. Exploration in and around Udaipur to record medicinal uses of plants were carried out in 1997 by Katewa & Arora. Tripathi et al. (1996a&b), Jain et al. (2005, 2008), Sharma & Kumar (2007), Jain & Chauhan (2010), Meena & Yadav (2010), Verma et al. (2010) studied medicinal plants from different parts of the state. Veterinary medicinal plants of various districts were highlighted through the works of Kumar et al. (2004), Takhar & Chaudhary (2004), Galav et al. (2010) and Upadhyay et al. (2011). Plants utilized in the treatment of snake bite were recorded by Joshi (1993) while that for birth control by Jain et al. (2005). Iyer et al. (1995) were credited much for their contribution to the knowledge on skin care through plants. Bohra (2009) listed out the non timber forest products of the state.

Gujarat


**Madhya Pradesh**


**Bihar**


**West Bengal**

Phytotherapy in Midnapur district (Pal & Jain, 1989; Mallick & Behera, 2009), Bankura (Namhata & Mukherjee, 1989), Purulia (Das & Chattopadhyay, 2003), Darjeeling (Saini, 2000), Indo-Nepal border (Kala, 2003) were brought to light. Plants used in the treatment of gastro intestinal disorders in northern parts were studied by Mitra & Mukherjee (2010) while that for treating pets (Bandyopadhyay

**North East**


Borthakur in 1976 explored the herbal diversity of Mikir hills. It was Goswami & Dutta (1982) who carried out exploration of cardiac medicines. Plants used in post natal care were brought to light through the work of Borthakur (1996). In 1996 he further studied the ethno botanical profile of the Nepalese of Assam. Tamuli & Saikia (2004), Nath *et al.* (2006), Sajem & Gosai (2006), Bhattacharjya & Borah (2008), Das *et al.* (2008) are the other prominent contributors from Assam.


**Orissa**

Murthy *et al.* (1986) reported different medicinal plants used for snake bite. Das & Mishra (1987, 1988) explored Koraput district in search of healing herbs. Herbs used to treat diarrhoea were recorded by Mohanty *et al.* (1996) and Dash & Padhy

**Maharashtra**


Sharma & Singh (2001) reported veterinary medicines from Dadar & Nagar Haveli.

**Andaman & Nicobar Islands**

Nicobar. It was Gupta et al. (2004) who studied medicines from Car Nicobar. Dagar in 1989 contributed to the science by exploring medicines of Nicobar.

**Andhra Pradesh**


**Tamil Nadu**

Rajan & Sethuraman (1991a&b), Suresh et al. (1994), Viswanathan (1995), Rajan et al. (1997, 2003), Balasubramanian et al. (2000), Paulsamy et al. (2005), Rajasekaran et al. (2005), Murugesan et al. (2005), Manikandan (2005, 2008), Manikandan et al. (2006) recorded medicinal plant resources of Nilgiris. Herbal medicines used by the tribal communities: Palliyar (Arinathan et al., 2003a; Muthukumarasamy et al., 2003, 2004; Shanmugam et al., 2008), Valaiyans (Subramanian et al., 2003), Malayalis (Viswanathan, 1997; Ravikumar & Sankar,
2003), Poliyars (Sivakumar et al., 2003), Kani (Prakash et al., 2008), Kanikkars (Prasad et al., 1987, 2009; Pandarasivan et al., 2008; Lalitharani et al., 2009), Irulas (Ramachandran & Nair, 1981; Balasubramanian et al., 1997a&b), Malasar (Pandikumar et al., 2007), Chellipale (Udayan et al., 2005b) were also reported. Reserved forests and wild life sanctuaries like Pachamalai (Rajadurai et al., 2009; Rani, 2010a&b), Mundanthurai (Sutha et al., 2010), Siruvani (Karthikeyani & Janardhanan, 2003), Agasthiamalai (Britto & Mahesh, 2007; Prakash et al., 2008), Kodiakkarai (Ragupathy & Newmaster, 2009), Velliangiri (Balasubramanian & Murugesan, 2004; Ragupathy et al., 2008), Piranmalai (Rajasekaran & Prasad, 2005; Sandhya et al., 2006), Mudumalai (Udayan et al., 2007) were studied in detail in order to explore the phytotherapeutics.


Antibacterial profile of medicinal plants were enumerated by Sumathi & Parvathi (2010), Sudharameshwari & Radhika (2007) while anti venomous plants (Venugopal & Ramaswamy, 2008; Meenatchisundaram et al., 2008), medicinal pteridophytes (Benjamin & Manickam, 2007), medicinal plants of sacred groves (Ganesan et al., 2009), anti diabetics (Jeyachandran & Mahesh, 2007), CNS depressants (Tamizhmani et al., 2003), exotic medicinal plants (Paulsamy & Suresh, 2007), medicinal orchids (Rajendran et al., 1997), veterinary medicines (Ponnusamy et al., 2009), abortifacients (Kumari & Narasimhan, 2003). Balasubramanian (1992), Sekharan & Jagadeesan (1997), Rajendran et al. (2000a&b), Ganesan & Kesavan (2003), Brinda & Parvathy (2003), Kadamban et al. (2004), Duraipandiyan et al. (2006), Ganesan et al. (2009) are the other prominent workers.

Karnataka

Yoganarasimhan et al. (1981, 1982, 1985a&b, 1987) contributed a lot to the medicinal plant profile of the state by describing the medicinal plant resources of both folk and Ayurvedic medicine; importance of trees in folk medicines of Tumkur district. Primitive tribal groups like Soligas (Hosagoudar & Henry, 1996; Gopal & Chandra, 2003; Kshirsagar & Singh, 2003), Gawlis (Bhandary et al., 1996), Siddis (Bhandary et al., 1995), Kuruba (Udayan et al., 2004) were exploited for the collection of ethno medicinal details. Pushpalata et al. (1990) elucidated the herbal medicines of rural Bangalore while that of Chickmagalur (Gopakumar et al., 1991; Prakash et al., 2010), Dharwad (Hebbar et al., 2003, 2004), Mysore and Coorg (Ksirsagar, 2000; Ksirsagar & Singh, 2001), Shimoga (Mahishi et al., 2005; Rajakumar & Shivanna, 2010), Uttara Kannada (Harsha et al., 2003a&b, 2005; Ramana et al., 2003a&b; Rajasab & Isaq, 2004; Prakash & Krishnappa, 2006; Shiddamallayya et al., 2010a&b), Bhadra wild life sanctuary (Parinitha et al., 2004), Bidar (Prashantkumar & Vidyasagar, 2006), Bhadravati (Shivanna & Rajakumar, 2010), Chitradurga (Hiremath & Taranath, 2009) were also carried out. Udayan et
al. (2003) discussed the use of plants from medicinal plant conservation areas and Jog (2009) from Sahyadris.

Kerala

of Kozhikode, Binu (2008) pteridophytes as medicine, Rajith et al. (2010) mother care plants and Binu (2009) for jaundice. Medicinal use of palms scripted in *Hortus Malabaricus* was described in detail by Renuka et al. (2003). In 2003, Sasidharan & Muraleedharan gave a detailed report on the consumption of raw drugs by the pharmaceutical industry of North Kerala. Maya et al. (2003) enumerated the importance of traditional sacred tanks in the conservation of medicinal plant germ plasm. Other important ethno botanical works are that of Radhakrishnan et al. (1996), Rajasekharan et al. (1996) and Joy et al. (1998).

**Tulunadu**

Literature survey support that only limited works were carried out regarding ethno botanical aspects of *Tulunadu*. It was Arora in 1965, 1966a&b, 1967 and along with Aggarwal (1965) who gave a clear picture regarding the forest types and vegetation characteristics of South Kanara and coastal Karnataka. Rao & Suresh (1990) and Chandrashehar & Kaveriappa (1991) studied the mangrove floristics of Karnataka. Coastal vegetation of this area were recorded by Rao & Sastry (1974) while back water flora by Mudaliar & Kamath (1954). Bhat (2003, 1993) published the flora of Udupi taluk and that of Pilarkin reserve forest. Floristic account of Kasaragod were recorded by Ansari (1985) and that of deltas of Chandragiri river by Prasad & Raveendran (2009).


### 2.1.3 Pharmacognosy

Medicinal plant studies aimed at their pharmacognosy gained momentum during the last decade of 20th century. At present majority of the research are based on this aspect. Khosla (1995) studied the pharmacognosy of *Ocimum tenuiflorum*. Later,

2.1.4 Therapeutics

There are a number of publications depicting the different therapeutic potential of herbs. Some important works are:
Antimicrobial activity


Wound healer

Wound healing property of plants were made study subject and reported by Jaiswal et al. (2004) and Habbu (2007). Oladejo et al. (2003) elucidated wound healing property of Ageratum conyzoides.

Anti-inflammatory

Shah et al. (2011) pointed out the role of different plants as source of valuable anti-inflammatory drugs. Rao et al. (1997) reported the anti-inflammatory activity of Delonix elata.

Anti-mutagen

Bhattacharya (2011) listed out the plants having anti-mutagenic activity.

Immunomodulators

Sagrawat & Khan (2007) and Sharma & Khosa (2007) studied the role of plants as immunomodulators. Saraswathy (1994) reported plants used for AIDS, Aqil et al. (2006), Shivhare et al. (2009) and Pakutharivu & Suriyavadhana (2010) on antioxidants from plants were also published.

Aphrodisiacs

Singh & Mukherjee (1998) clearly indicated the role of plant based drugs in increasing sexual stamina and fertility.
Gynecology


Asthma

Aulakh & Mahadevan (1989), Prasad et al. (2009) and Ismail (2010) gave an account of anti asthmatic drugs.

Skin and hair care


Ulcer

Sen et al. (2009) and Vyawahare et al. (2009) reported the plants used in the treatment of ulcers. Ezike et al. (2009) highlighted anti ulcer property of Carica papaya.

Diabetes


Fungal diseases

Ramana (2006), Rawat et al. (2008) and Patil et al. (2009) described the plants having fungicidal properties.
Brain care


Allergy

Chaudhary et al. (2008) recorded the plants with anti histaminic properties.

Kidney stone

Prasad et al. (2007) and Prachi et al. (2009) mainly focused on plants useful for treating urolithiasis.

Digestive tract

Sidhu et al. (2007) plants used for digestive disorders, Kosalge & Fursule (2009) plants as anthelmintics, Mohanty & Padhy (1996), Mohanty et al. (1998) and Venugopal et al. (2003) for diarrhoea were listed out.

Antipyretic

Sharma et al. (2010) studied and compiled the Indian plants used for the treatment of fever.

Veterinary


Cancer

Chavan & Shankar (2009) discussed the plants utilized in the treatment of different types of cancer.
**Hypertension**

Srimal & Shukla (1986) listed out different herbs used in rural areas to bring down the high blood pressure.

**Liver**


**Dental**

Punjani (1998) was credited for his work on plants used in dental hygiene and health.

**Tumors**

Anti tumor properties of plants were discussed in detail by Sharma & Govind (2009).

**Poisonous bites**


**Arthritis**


**Eye diseases**

Meena *et al.* (2010) studied the plants used to treat cataract.

**Rickets**

2.1.5 Phytochemistry


2.1.6 In vitro studies

Nyman et al. (1998) and Vadlapudi & Naidu (2010a&b) are the researchers who mainly concentrated on this aspect.

2.1.7 Plant groups


### 2.1.8 Single plant

Chelladurai & Apparanantham (1983) listed out the uses of *Thottea siliquosa*. Later a number of publications narrated the review of medicinal properties of a single plant or drug. Some of them are: Ethno botany and medicinal use review of *Costus speciosus* (Ammal & Prasad, 1984), *Rauvolfia serpentina* (Gupta, 1997), *Schleichera oleosa* (Upadhye & Kumbhojkar, 1998), *Azadirachta indica* (Amirthalingam, 2001; Biswal et al., 2002; Ogbuewu et al., 2011), *Terminalia chebula* (Chattopadhyay & Bhattacharyya, 2007; Gavli et al., 2009), *Zingiber officinale* (Jain, 1995), *Ampelocissus* spp. (Patil & Karkamkar, 2009), *Andrographis paniculata* (Balu & Alagesaboopathi, 1995; Alagesaboopathi et al., 1999, 2000; Mishra et al., 2007), *Cassia auriculata* (Manogaran & Sulochana, 2004), *Moringa pterygosperma* (Fahey, 2005; Anbazhakan et al., 2007), *Drynaria quercifolia* (Rajendra & Rajan, 1996; Das et al., 2009), *Trianthema portulacastrum* (Balamurugan & Muthusamy, 2009), *Ensete superbum* (Sarojkumar et al., 2010), *Evolvulus alsinoides* (Singh, 2008), *Nelumbo nucifera* (Mukherjee et al., 1996), *Prosopis cineraria* (Ukani et al., 2000), *Tribulus terrestris* (Ukani et al., 1997), *Rubia cordifolia* (Mitra & Kannan, 2007; Deshkar et al., 2008; Meena et al., 2010), *Trichosanthes tricuspidata* (Bhandari et al., 2008), *Curcuma longa* (Pandeya, 2005; Jain et al., 2007), *Psidium guajava* (Kamath et al., 2008), *Bacopa monnieri* (Shikha et al., 2009; Gohil & Patel, 2010), *Eclipta prostrata* (Khan & Khan, 2010), *Semecarpus anacardium* (Raut et al., 2007; Majumdar et al., 2008; Semalty et al., 2010), *Phyllanthus* spp. (Sen & Dubey, 2009), *Premna serratifolia* (Ghosh et al., 2009), mustard (Manohar et al., 2009), *Streblus asper* (Madhavan et al., 2009), *Allium sativum* (Mahady, 2001; Gupta, 2008; Verma et al., 2008; Petrovska & Cekovska, 2010), *Saccharum officinarum* (Karthikeyan & Samipillai, 2010),
Sesamum orientale (Chakraborty et al., 2008), Ipomoea aquatica (Prasad et al., 2008), Areca catechu (Jaiswal et al., 2011), Lagenaria spp. (Shah et al., 2010), Terminalia cuneata (Paarakh, 2010), Ailanthus excelsa (Lavhale & Mishra, 2007; Kumar et al., 2010), Pergularia daemia (Karthishwaran & Mirunalini, 2010), Stereospermum suaveolens (Meena et al., 2010), Terminalia catappa (Mohale et al., 2009), Euphorbia hirta (Patil et al., 2009), Dodonaea viscosa (Rani et al., 2009), Terminalia bellirica (Singh et al., 2009), Carissa congesta (Devmurai et al., 2009), Kalanchoe pinnata (Kamboj & Saluja, 2009), Pterocarpus marsupium (Devgun et al., 2009), Ageratum conyzoides (Tripathi & Srivastava, 2008), Withania somnifera (Srivastava, 2009), Flacourtia jangomas (Srivastava et al., 2009), Coriandrum sativum (Shivanand, 2010), Cissus quadrangularis (Meher et al., 2010), Oxalis corniculata (Kathiriya et al., 2010), Salvadora persica (Sher et al., 2010), Oroxylum indicum (Dev et al., 2010), Leucas aspera (Prajapati et al., 2010), Psoralea corylifolia (Khushboo et al., 2010), Mangifera indica (Shah et al., 2010), Artocarpus heterophyllus (Prakash et al., 2009), Foeniculum vulgare (Garg et al., 2009), Solanum nigrum (Saleem et al., 2009), Ziziphus jujuba (Mahajan & Chopda, 2009), Dalbergia spp. (Vasudeva et al., 2009), Tectona grandis (Goswami et al., 2009), Allium cepa (Bora & Sharma, 2009), Toddalia asiatica (Rajkumar et al., 2008), Berberis aristata (Rashmi et al., 2008), Dendrophthoe falcata (Pattanayak et al., 2008), Nothapodytes nimmoniana (Namdeo et al., 2008), Protasparagus racemosus (Velavan et al., 2007), Gymnema sylvestre (Gurav et al., 2007), Butea monosperma (Burli & Khade, 2007; Jadhav, 2008), Cestrum spp. (Begum & Goyal, 2007), Bauhinia variegata (Mali et al., 2007), Euphorbia thymifolia (Gupta et al., 2007), Albizia lebbeck (Kumar et al., 2007), Achyranthes aspera (Goyal et al., 2007), Ocimum tenuiflorum (Pattanayak et al., 2010), Crocus sativus (Moghaddasi, 2010), Sapium insigne (Rawat & Kharwat, 2010), Oryza sativa (Rahman et al., 2006), Triumfetta rhomboidea (Devmurai et al., 2010), Boerhavia diffusa (Saini & Batra, 2008; Goyal et al., 2010), Lawsonia inermis (Chaudhary et al., 2010), Mimosa pudica (Kumar et al., 2009), Calotropis spp. (Misra et al., 1993), Justicia adhatoda (Ahmad et al., 2009), Ficus racemosa (Paarakh, 2009), Bombax ceiba (Jain et al., 2009), Acacia spp. (Saini et al., 2008), Morus alba (Kumar & Chauhan,

2.2 Books

A vast number of published books both in India and abroad dealing with different aspects of medicinal plants are also there. Some of them are as follows:

2.2.1 World wide

2.2.2 India

Hindi


English


Malayalam

Majority of the works in Malayalam were focused on single drug remedies. Some important ones include those of Nair (1995a&b), Leeladevi (2000), Paul & Kesari (2004) and Namboodiri (2008). Folk medicines constitute another important

**Kannada**


**Tulunadu**