CHAPTER 2: REVIEW OF LITERATURE

Man has been using plants for various purposes from the time of his emergence on this planet. He gained the knowledge of useful and harmful plants. This knowledge becomes an integral part of his culture. Studies in archaeology, paleobotany, and ethnography revealed the close relationship between plants and man. Evidences are available regarding the use of plants in Vedic period (4500-1500 B.C.) to cure human ailments in India.

2.1 Review of Ethnobotanical Literature

Ethnobotany is a rapidly expanding science. In last three decades, it has been considerably expanded, both in its concepts and scope. The literature on the subject is piling up at a very rapid rate not only in India but also in other parts of the world. Hence, an attempt has been made to include review of literature under the following three headings.

2.1.1 Ethnobotanical work at International level

Significant contribution in the field of Ethnobotany was done by several workers in the world. Richard Evan Schultes (1938, 1954, 1962 & 1963) has conducted ethnobotanical explorations in Oklahoma, Oaxaca, Mexico, Amazon and other regions. Duke (1970) wrote ethnobotanical information of Choco Indians. Berlin et al. (1974) have collected and documented hundreds of folk medicinal plants from the high lands of Chiapas, a state of Southern Mexico. Anderson (1986) has investigated ethnobotany of Akha tribes and reported 121 medicinal plant species from Thailand. Dennis (1988) has studied the herbal medicine among the Miskito of Eastern Nicaragua. Ethnobotanical information on 86 plant species from Makawanpur district of Nepal was reported by Bhattari (1990). Joshi and Edington (1990) have reported medicinal plants of Central region of Nepal. Similarly, Johns et al. (1990)
have reported 330 medicinal plant species from the Siaya district of Kenya. Bhat et al. (1990) have reported 52 plant species collected during ethnobotanical survey of Kwara state Nigeria.

Dangol and Gurung (1991) have reported 71 medicinal plant species from Tharu tribe of Chitwan district of Nepal. Manandhar (1991) has made ethnobotanical study of Tamang tribe in Nepal. Mahunnah (1991) has reported 44 medicinal plants belonging to 39 genera and 21 families used by the Hene and Safawa tribes inhabiting the southern high lands of Tanzania. Abbas et al. (1992) have reported 52 folk medicinal plants used in traditional medicine of Bahrain. Yang et al. (1992) have compiled ethnobotanical information on 157 plant species of Cucurbits in China. Cunningham (1993) has studied African medicinal plants with emphasis on conservation and primary health care. Fabiyi (1993) has reported the important plants used in the treatment of Guinea worm at Bauchi state of Nigeria. George (1995) has studied pharmacopoeia of 108 medicinal plants from 52 families used for the treatment of different ailments. Gogai and Borthakur (1996) have classified ethnic plants of Tai communities. Gurib-Fakim et al. (1997) have surveyed in Mauritius Island for ethnobotanical reports and collected about 461 commonly used medicinal plants. Islam (1999) has studied the ethno-botany of Majuli, the great freshwater river island. Ong and Nordiana (1999) have surveyed in rural areas of Machang district of Malaysia. Lentini (2000) has investigated the traditional use of plants of the Sicilian flora. Yunheng Ji et al. (2000) have studied the traditional utilization of Chinese ‘Chellera’ (Stellera chamaejasme) in North West Yunnan China. Huyin et al. (2000) have compared the ethno-botany of Lahu people of China and Thailand.

Salma et al. (2001) have reported 35 plant species used in the treatment of urinary system problems by the inhabitants of the North-Western Mediterranean

Gidey Yirga (2010) has conducted ethnobotanical study of medicinal plants in and around Alamata, Southern Tigray of Northern Ethiopia. Musa S. Musa et al.
(2011) have made ethnobotanical study of medicinal plants used in the Blue Nile State of South-eastern Sudan. Similarly, medicinal plants used by Kalangua tribe of Philippines were recorded by Teodora Balangcod and Ashlyn Kim Balangcod (2011). Ethnobotanical study of medicinal plants of Tigray region of Ethiopia was carried out by Abraha Teklay et al. (2013). Shehla Shinwari et al. (2011) have worked on the medicinal plants of Kohat pass of Pakistan. Anely Nedelcheva (2013) has made ethnobotanical study of wild edible plants in Bulgaria. Anita Rani Chowdhury and Mohammed Rahmatullah (2012) have conducted ethnobotanical study in several districts in Bangladesh. Elufioye et al. (2012) have made ethnomedicinal study in Sagamu region of Nigeria. Anant Gopal Singh et al. (2012) have surveyed the ethnomedicinal plants used in Terai forest of western Nepal. Kalayu Mesfin et al. (2013) have reported traditional medicinal plants used by indigenous people of Gemad district of Northern Ethiopia. Arifa Zereen et al. (2013) have made ethnobotanical studies of wild herbs of central Punjab of Pakistan. Mohammad Sadegh Amiri and Mohammad Reza Joharchi (2013) have investigated the traditional medicinal plants commercialized in the markets of Mashhad in Iran. Masoko Peter (2013) has made ethnobotanical study of some selected medicinal plants used by traditional healers in Limpopo Province of South Africa. Gurdal and Kultur (2013) have made an ethnobotanical study of medicinal plants in Mugla region of Turkey. Ohemu et al. (2014) have surveyed the medicinal plants used in the traditional treatment of viral infections in Plateau state of Nigeria.

2.1.2 Ethnobotanical work in India

Several workers have contributed in the development and progress of ethnobotanical research in India. Vartak (1959) reported the medicinal plants from the hilly regions of Pune and Satara districts of Maharashtra. Jain (1963a, 1963b, 1963c,
1963d & 1965) made an intensive ethnobotanical work in North India especially from the tribal areas of Madhya Pradesh. His research work unfolds new vistas of Traditional Medicine in India. He compiled nearly 100 indigenous medicinal plants with authentic information on their distribution, parts used and the medicinal and other uses. Jain and Tarafdar (1970) have worked on the medicinal plants in folklore of the Santhals. Malhotra and Moorthy (1973) have recorded 126 useful as well as medicinal plants of Chandrapur district in Maharashtra. Bhatnagar et al. (1973) have conducted medico-botanical studies on the flora of Ghatigaon forests of Gwalior. Raghunathan (1976) has worked on the flora of medicinal plants of different tribal pockets in Nilgiris hills in Tamil Nadu. Jain and Dam (1979) have made ethnobotanical work in north eastern India. Tiwari et al. (1979) have reported the medicinal folklore from Assam and Arunachal Pradesh. Kritikar and Basu (1935) had written a book on Indian medicinal plants in 4 volumes which were reprinted in 1980.

Tiwari et al. (1979) have investigated the folklore medicine of Assam and Arunachal Pradesh. Role of beliefs and folklore on sacred groves along the Western Ghats of Maharashtra and Goa was studied by Vartak and Gadgil (1981). Singh and Pandey (1982) have described the religious use of plants in Rajasthan. Dixit and Pandey (1984) have studied the plants used in Jhansi and Lalitpur of Bundelkhand in Uttar Pradesh. Sahu (1982, 1983) has studied the ethnomedicine of Madhya Pradesh. Pushpangandan and Atal (1984) have worked on ethnomedico botanical investigations in Kerala. Saxena (1986) and Tarafdar (1986) have conducted ethnobotanical works in Madhya Pradesh and Bihar respectively. Ghosh (1986) has conducted the ethnobotanical survey of Cooch Bihar district in West Bengal. Sharma and Singh (1988) have made ethnobotanical studies of some common plants of Kangar Range in Madhya Pradesh. Jain et al. (1989) have investigated the medicinal plants known among several tribes of India. Mukherjee and Namhata (1990) have studied medicinal plant lore of Sundargarh in Orissa. Nayar and Sastry (1987-1990) have published 3 Volumes of Red data book of Indian medicinal plants for Botanical Survey of India.


Dubey and Gayetri (2001) have conducted ethnobotanical study on Gond tribe of Madhya Pradesh. Similar works have been done by Chaudhary and Hutke (2002) on Melghat tribes of Maharashtra and Singh (2003) on Santhal parghanas tribe of Jharkhand. Dam et al. (2001) have studied the ethnobotany of Thar Desert in North Western India. Jain et al. (2003) have conducted ethno-medico-botanical survey of Raipur district in Chhattisgarh. Ayyanar and Ignacimuthu (2005) have studied the medicinal plants used for treating snake bite and skin diseases in Tamil Nadu. Rajan et al. (2001) have described the folk practices of Paniyas in Nilgiri district of Tamilnadu. Shukla et al. (2001) have worked on herbal folk medicine of Chhuri Hills, Bilaspur district in Madhya Pradesh. Bhagwati and Vandana (2005) have recorded a total of 113 medicinal plant species used for various ailments by rural women of Garhwal Himalaya in Uttaranchal. Praveen Kumar Sharma et al. (2005) have documented about 35 medicinal plant species used by the Malani ethnic community of Kullu district in Himachal Pradesh. Ashalata Devi et al. (2005) have made ethnobotanical study of Manipur state. Sanjay Kr Uniyal et al. (2006) have documented
medicinal plants used by the tribal communities of Chhota Bhangal in Western Himalaya.

Subramanyam Ragupathy et al. (2008) have studied traditional aboriginal knowledge of medicinal plants in the Velliangiri holy hills of Tamil Nadu. Venkataswamy et al. (2010) have made ethnobotanical study of medicinal plants used by Malasar tribals in Coimbatore district of Tamil Nadu. Dash et al. (2008) have worked on medicinally useful orchids of Niyamgiri Hill ranges in Orissa. Rakhi Gupta et al. (2010) have surveyed ethnomedicinal plants used by Gond tribe of Bhandara district in Maharashtra. Sahu et al. (2011) have studied medicinal plants of the coastal districts of Orissa. Vijay Wagh et al. (2011) have documented ethnomedicinal plants used for curing dysentery and diarrhea by tribals of Jhabua district in Madhya Pradesh. Anima Panda and Malaya Misra (2011) have conducted ethnobotanical survey of medicinal plants used by local herbal healers in South Orissa. Koushalya Nandan Singh (2012) has made a detailed study on ethnobotanical uses of plant biodiversity from the Indian western Himalaya. Elavarasi and Saravanan (2012) have documented the medicinal plants used in the treatment of diabetes by tribal people of Kolli Hills in Namakkal district of Tamil Nadu. Khan et al (2012) have made ethnobotanical study of Poonch valley in Aazad Kashmir. Sathiyaraj et al. (2012) have documented antifertility medicinal plants used by the local people of Vellore district in Tamil Nadu. Prayaga Murty Pragada et al. (2012) have documented ethnomedicinal plants used in the treatment of dysentery in North Coastal Andhra Pradesh. Jitin Rahul (2013) has made ethnobotanical survey of medicinal plants used in Bundelkhand region of Uttar Pradesh. Kumar Rajesh et al. (2013) have made ethnobotanical study of Dudhwa National Park in Uttar Pradesh. Rajeswar Pegu et al. (2013) have conducted ethnobotanical study of wild edible plants in Poba reserved
forest of Assam. Bilal Ahmad Baig et al. (2013) have worked on distribution pattern and current conservation status of threatened medicinal plants of Menwarsar Pahalgam in Kashmir Himalayas. Rana et al. (2013) have documented the ethnobotanical knowledge of Nanda Devi Biosphere reserve in Uttarakhand.

2.1.3 Ethnobotanical work in Karnataka

In Karnataka, a very few people have contributed to the field of ethnobotanical research in the earlier period. But now, a considerable amount of good progress has been made in many districts of the state. Rao (1977) has recorded the plants of folklore medicine in Mysore district. Pushpalata (1990) has studied folk medicine from rural area of Bangalore district. Ethnobotanical works were carried out in various districts of Karnataka state such as, South Kanara (Iyengar et al., 1986), Tumkur (Yoganarsihman et al., 1982), Chikmagalur (Gopakumar et al., 1991), Kodagu (Kalyanasundaram Indira, 1995) and Uttar Kannada (Harsha et al., 2003). Similar works have also been carried out in Shimoga (Parinitha et al., 2004; Rajkumar and Shivanna, 2010), Bidar (Prashantkumar and Vidyasagar, 2008), Chitradurga (Hiremath and Taranath, 2010) and Gulbarga district (Ghatapanadi et al., 2011).

Ethnobotanical studies of Soligas tribe have been made by Hosagoudar and Henry (1996). Bhandari et al. (1995) have conducted ethnobotanical study on Siddis of Uttar Kannada district. Harsha et al. (2002) have reported 45 plant species used by the Kunabi tribe of Uttar kannada. Harish Kumara et al. (2009) have made a case study on traditional knowledge system (medicine) in Arakalgud taluk of Hassan district and recorded 82 plant species belonging to 44 families. Nagabhushan Harihar and Kotresha (2010) have worked on wild medicinal plants of Kappat Hills in Gadag district and documented 43 species belonging to 39 genera and 31 families. Prakasha et al. (2010) have documented the indigenous medicinal plants used by the people of
NR Pura taluk in Chikmagalur district. Guruprasad (2011) has conducted survey of ethnomedicinal plants from Chamundi hills of Mysore. Shivakumar and Vidyasagar (2013) have documented ethnomedicinal plants used in the treatment of skin diseases in Hyderabad-Karnataka region. Recently, Yogesh Kumar et al. (2014) have reported the ethnomedicinal plants used by the traditional herbal healers of Tarikere taluk in Chikmagalur district.

2.2 Review of Pharmacological Literature

The available literature study revealed that an evaluation of the antibacterial and antifungal activity of leaf extracts of *Momordica charantia* L. (bitter melon) against *Candida albicans*, *Staphylococcus aureus* and *Escherichia coli* was carried out by Jagessar and Mohamed (2008). Fruit skin and pulp of *M. charantia* were screened for antibacterial activities against 56 isolates belonging to 11 different species of Gram-negative bacilli: *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Salmonella paratyphi A*, *Salmonella paratyphi B*, *Proteus mirabilis*, *Proteus vulgaris*, *Enterobacter aerogenes*, *Shigella dysenteriae*, and *Yersinia enterocolitica* (Sabahat Saeed and Perween Tariq, 2005). *Staphylococcus aureus* was found to be the most sensitive microorganism against the antibacterial potential of *M. charantia* (Alessandra Braca and Tiziana Siciliano, 2008).

Pharmacological study on tested microorganisms indicated that fruit extracts showed higher antimicrobial activity than leaf extract of *M. charantia* (Mwambete, 2009). Sathish Kumar et al. (2010) have revealed the medicinal potency of *M. charantia* on various human ailments. Subhashchandra Patel et al. (2010) have isolated, purified and characterized the chemical constituent ‘charantin’ from *M. charantia* fruit. The isolated charantin was further tested for its antimicrobial efficacy. Leelaprakash et al. (2011) have investigated the *in vitro* antimicrobial and
antioxidant activity of aqueous and methanolic extracts of *M. charantia* leaves. The phytochemical prospection of the fresh and dried leaves extracts showed the presence of different classes of secondary metabolites such as flavonoids, alkaloids and tannins that have demonstrated antimicrobial action. Fresh and dried leaves presented significantly antimicrobial activity against all bacterial strains tested especially *Escherichia coli* and *Bacillus cereus* (Jose Galberto Costa, *et al.*, 2011). The *in vitro* study of hexane: petroleum ether fruit extract of *M. charantia* has shown its potency as a promising antimicrobial agent towards a broad range of pathogenic microorganisms tested (Yin Yin Chia and Wai Sum Yap, 2011).

Abalaka *et al.* (2011) have reported antioxidant capabilities and antimicrobial activities of chromatographic fractions of *M. charantia*. Supraja and Usha (2013) have claimed that *M. charantia* is effective against bacterial infections that cause a variety of skin conditions like psoriasis, acne, wounds etc. It also possesses antidiabetic and antitoxic effects (Kumar *et al.*, 2013). The antimicrobial activity of *M. charantia* was evaluated for *Bacillus subtilis, Streptococcus mutans, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* and *Klebsiella pneumonia*, by using well diffusion methods. The studies have also shown its efficacy in various cancers such as lymphoid leukemia, lymphoma, choriocarcinoma, melanoma, breast cancer, skin tumor, prostatic cancer, squamous carcinoma of tongue and larynx, human bladder carcinomas and Hodgkin's disease (Komathi and Rajalakshmi, 2013). Bashir Ahmad and Abid Ali Khan (2013) have carried out antibacterial, antifungal and phytotoxic activities of *M. charantia* using crude methanolic fruit extract. While, Mada *et al.* (2013) used aqueous and ethanolic leaf extracts of *M. charantia* for phytochemical screening and antimicrobial activity.