Chapter II

Review of Literature
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Ethnobotany

Medicinal plants have long been the subject of human curiosity and need. Plant derived products are present in 14 of 15 therapeutic categories of pharmaceutical preparations which are currently recommended by medicinal practitioners and they form important part of health care system in the Western world (Phillipson and Anderson, 1989). The Science of medicine is said to have its origin in the quest of early man to discover plants useful to cure.

Man, even desirous of knowledge, has already exported many things, but more and greater still remain concealed, perhaps reserved for far distant generation who shall prosecute the examinations of their creator's work in remote countries and make many discoveries for the pleasure and convenience of life.

A thorough review of the literature on ethnobotanical studies revealed that the Adivasi tribes and their habitats received maximum importance for deciphering valuable folklore information for scientific validation. The term Ethno botany, on inter disciplinary subject took birth before century, however the subject must date back as early as commencement of very mankind itself. Ethno botany deals with study of total natural and traditional inter relationship between man and
plants and man's domesticated animals. Gathering jungle fruits or tubers or hunting animals for food by the earliest man was the beginning of the Ethnobotany and Ethnozoology (Jain, 2001).

Abroad


India

Almost the entire world has now recognised the value and importance of traditional medicinal plants that are employed in Ayurvedic and Unani systems of Medicine in India. Even the ethnomedicinals have been found to be efficacious in controlling and curing a wide variety of ailments. This has provided an ignition to the activity of documenting traditional knowledge relating to plants claimed to be of great medicinal value.
Ethnobotany, as an organised discipline of the study in India, is rather young, just about five decades old. The first bibliography of an ethnobotany in India was published in the early eighties (Jain, et al., 1984).

Indian medicine is known as the richest, the first and the foremost among other branches of medical knowledge available elsewhere on the globe.

Harsberger (1896) first used the term Ethnobotany, without offering a definition referred to a study of "all form of the vegetative world, which the aborigines used for medicine, food, textile, fabrics, ornaments etc., The history of the use of plants in medicine can be traced back to the ancient civilizations or pre-rigvedic times. The earliest written record of the preparation and use of medicine from plants is the Rigveda, the earliest script of Hindus (4500 - 1600 BC). The Indo-Aryans acquired knowledge of the medicinal properties and use of plants while searching for the therapeutical uses of the soma whose juice is mentioned as "Oshadi". Atharvanaveda documented more details on medicinal herbs and their varied utility. This was followed by monumental contributions like Charaka Samhita (1000-1300 BC), Sushruta Samhita (1800-700 BC) and Vaghbatta's "Astanga Hridya (1970).

Compilation of Indian medicinal plants started in the early nineteenth century. The earliest contributions like Sir Willamjone's 'Catalogue of Medicinal Plants (1810) and Royles' An essay on the antiquity of Hindu medicine (1837) dealt mainly with plants and drugs of established indigenous systems of Indian medicine.

The Sidha system of medicine is considered as a branch of Ayurveda with advanced specialties in respect of a few selected medicinal plants and was evolved
by Sadhus (sage or sanyasis) in South India. The Unani system of medicine is supposed to be a contemporary of Sidha type of medicinal system developed by Muslim physicians during the Mohamadan rule. The Allopathic medicine originated in Europe became dominant in India with the establishment of British rule.

The systematic study and research in Ethno botany with emphasis on tribal systems of medicine and culture are of recent origin. Ethno botanical explorations with special reference to tribal / folklore medicine were carried out by a number of investigations allover the world.

Most of the publications in the three decades of the fifties, sixties, and seventies of the last century were small inventories. This was natural, as the subject was just getting known, attracting more and more young field botanists and other to 'extend' their simple plant collection and floristic or ethnographic work to closer enquiries and record of indigenous uses of plants. Since the eighties, however, emphasis has been laid on more specific work on particular classes of indigenous uses like plants in food, medicine, other material culture, and even faith or tradition related to conservation of bio resources, and on particular diseases or ethnic groups.

During and since the last few decades of recent past, over 30 books have been published with the word ethnobotany or tribal medicine in the title. The books represent almost all regions of India from North (Good et al., 2001) to South (Ramarao and Henry 1996) from West (Singh and Panday 1998) and some other books on Northern (Maheswari et al., 1981) Central (Varghese and Hembrom 2000) and Peninsular India (Vedavathy et al., 1997). The two most
commonly studied utility groups have been the plants used for medicine and food. Among books on indigenous medicine, mention may be made of Jain and Filipps (1991), Jain et al., (1991) Hembrom (1995), Dahanukar and Hajra (1995), Varghese (1996), Pal and Jain (1998) Chanhan (1999). Folk medicines have been studied not only for human but also for animals and in addition to the consolidated Dictionary (Jain and Srivastava 1999) about 30 papers have been published on ethnoveterinary plants (Jain and Srivastava 2001).

Most of the research in the field of medicinal plants has been accumulated in India during 20th century (Bose 1932; Chakraverthy 1923; Chopra 1932, 1933, 1939; Chopra et al., 1956; Kirtikar 1935; Nadkarni 1937; Dastur 1970. Kirtikar and Basu (1935) and Chopra et al., (1956) published books on Indian medicinal plants. Janaki Ammal (1954) stressed scope and need for seeking the help of oboriginies in tribal regions of Assam, the Himalayas, Andaman and Nicobar islands and the Western Ghats, for ethnobotanical findings. Jain (1965) reported 101 medicinal plants used by tribes of Bastar. Considerable organised field work and other studies in this subject were started in the Botanical Survey of India (1960). Jain et al., (1973) studied the medicinal and food plants of Chenchu, Reddy, Valmiki and Goud triber in Andhra Pradesh and Saora and Kondha tribes in Orissa. The traditional uses of 138 species belonging to 119 genera and 52 families by Irulas of Tamilnadu were reported by Ramachandran and Nair (1981). Kombot and Dhawan (1982) reported antifertility herbal drugs used by primitive societies of India. Ethnobotanical studies on the tribes of Andaman and Nicobar islands described and discussed by Bhargava (1983) Hemadri and Rao (1984) described 17 plants exclusively used in the treatment of jaundice by the tribals of Dandakaranya. The basic data on 210 species belonging to 191 genera and 79

Considerable work has been done on ethnomedicinal plants which are used for various ailments from tribals of Rajasthan by Katewa and Arora (1997).


Ethnobotany of Rajbanshin of Assam was studied by Barva et al., (1999) by Girac et al., (1999) and they reported 38 medicinal plants for skin diseases from Bhadrak district of Orissa. Jeevan Ram et al., (1999) conducted medicobotanical studies on crude drugs from Eastern Ghats and reported 53 important medicinal plants for various skin ailments.

A recent detailed bibliographic work on Indian ethnobotany (Jain 2002) has brought out certain facts and trends in research. Varghese and Hembrom (2000) from Central India, worked on ethnomedico botanical survey. Kotaki and Das (2000) studied some tribal medicine from Kamrup district of Assam. Ethnomedicobotanical knowledge of the tribal of Western Himalayas was investigated by Singh and Kumar (2000). Some less known medicinal plants and their uses described by Sharma and Singh (2000) from Dadra and Nagar Haveli by Dam et al., (2000) reported ethnemedicinal practices in the thar desert. A specific case study on the use of Plumbago zeylanica on the birth control was given by Dal et al., (2000), among Jani tribals of Orissa. Ethno-botany of bark of certain plants given was by Islam (2000) from North-West India. An ethno botanic study and folk medicine from Satlorderm village of Goa were by Kamat (2000). Kotaki and Das (2000) studied some tribal medicine of Kamrup district of Assam. Singh and
Kumar (2000) reported ethno botanical knowledge of Gaddi tribe of Western Himalayas.

**Andhra Pradesh**

Andhra Pradesh state received little attention in ethnobotanical studies particularly on folklore survey. Roxburgh initiated the ethnobotanical investigations in the state and reported on therapeutic uses of plants and plant products used by the local tribes.


The thorough review of literature on the ethno medico botanical studies in Andhra Pradesh, came to conclusion that a very little attention was made ethno-medico-botany of Anantapur district, that too it is restricted to some parts. While Nigidi forest range is not surveyed extensively which possess diversified vegetation of tropical and scrub elements and made the topic of present investigation possess good medicinal properties.

Phytochemical Studies:

The drug yielding plants were screened for the analysis of secondary metabolites like alkaloids, saponins, flavonoids etc. (Amarasingham et al., 1964; Kapoor et al., 1969; Das and Bhattacharjee, 1970; O' debiyi & Sofowora, 1978; Tripathi and Rastogi, 1981). The Tanzanian Medicinal plants were screened or different secondary metabolites by Chhabra et al., (1984). Harborne (1984) expressed the significance of phytochemical analysis and its importance for the establishment of alternative medicine.

Bheemsankara Rao et al., (1985) examined 3 new terpene components from Premna integrifolia and Premna latifolia var. mollissima root barks. Murthy (1985 a & b) isolated two new biflavonoids viz., Jeediflavanone and Galluflavanone from the alcoholic extracts of Semecarpus anacardium nut shells. Certain important crude drugs used in Ayurveda were chemically analysed and the
constituents were reported (Anonymous, 1986). Nagaraju (1986) reported some important secondary metabolites from the medicinal plants of Apocynaceae and Asclepiadaceae. A new triterpene, cyclocuphordenol and a macrocyclic diterpene ester were isolated from the latex of *Euphorbia tirucalli* by Khan et al., (1988) and Khan and Malik (1990) respectively. Phytochemical screening of the plants of Gandhamerdan hills of Orissa was carried out by Brahman & Saxena (1989) for tannins, saponins, flavonoids and alkaloids. Gupta and Singh (1989) reported P-hydroxyacetophenone derivatives from the tubers of *Dioscorea bulbifera*. The chemical constituents of medicinal plants of Coorg district of Karnataka state were studied by Kesavamurthy & Yoganarasimhan (1990).

The rhizomes of *Curculigo orchiodes* were screened and certain new compounds viz., methyl esters of carbamic acid (Madhu Porwal et al., 1988) and alipathic compound like 25-hydroxy-33-methylpentatricontan-6-one (Mehta et al., 1990) were reported. Jun-ping Xu et al., (1992) isolated several cycloartane glycosides and triterpenoid sapogenin, called curculigenin from the rhizomes of *Curculigo orchiodes*. Bhakuni et al., (1992) isolated 2', 4', 5'-trihydroxy - 5,7-dimethoxy flavone and triacontanyl dotriacontanoate from *Pedalium murex* fruits. Akhtar & Malik (1992) isolated proceragenin, an antibacterial glycoside from *Calotropis procera*. Tanaka et al., (1992) isolated 18 flavonoid compounds from the root bark of *Pongamia pinnata*. Kundu and Mahato (1993) isolated two new triterpenoid glycosides viz., Chebuloside 1 and 2 from stem bark and a pentacyclic triterpene (Singh, 1990) from *Terminalia chebula*. Mulla and George (1993) conducted preliminary phytochemical screening of alcohol extracts of 18 monocotyledonous plants, while Vijayalakshmi (1993) conducted on traditional antidotes used by Chenchus in Ahohilam hills of Kurnool district. Siddiqui et al.,
(1995) isolated seven pentacyclic triterpenoids from the aerial parts of *Lantana camera* Reddy (1995) conducted preliminary phytochemical studies on medicinal plant resources of Cuddapah district. The gum resin of *Boswellia serrata* was examined and characterised by two new terpenoids and boswellic acids by Mahajan *et al.*, (1995). Venkataraju (1996) conducted preliminary phytochemical studies on medicinal plant resources of Cuddapah district. The gum resin of *Boswellia serrata* was examined and characterised by two new terpenoids and boswellic acids by Mahajan *et al.*, (1995). Venkataraju (1996) conducted preliminary phytochemical studies on traditional folk medicines of Chenchu tribals of Andhra Pradesh. Norihiko Terahara (1998) isolated eight new antocyanins from the flowers of *Clitoria ternatea*. Sexena and Sharma (1999) isolated a new 7, 5-dihydroxy-6, 4-dimethoxy isoflavone 7-O - D-galactopyranoside from the roots of *Abras precatorium*. Islam and Tahara (2000) examined the stem bark of *Lannea coromandelica* and isolated dihydroflavonols. Elena *et al.*, (2000) examined the aerial parts of *Acanthospermum hispidum* and isolated 26 sesquiterpene lactones and two guaianolides. The novel isoflavone compound such as glycoside 5, 4'-dimethoxy - 3' - prenylbiochanin 7-O-D-galactoside (Yadav and Kumar, 1999) and three new eudesmanoids (1) 11, 13-dihydro-3, 7-dihydroxy-4, 5-epoxy-6, 7-eudesmanolide, (2) 11, 13-dihydro-7-acetoxy-3-hydroxy-6, 7-eudesm-4-enolide and (3) 3-keto-eudesmol were isolated from *Sphaeranthus indicus* (Prasad *et al.*, 2000). Deepa Chauhan *et al.*, (2001) isolated two new anthraquinone glycosides from the leaves of *Cassia occidentalis*.

The plants of tropical region would possess diversified phytochemicals which can be responsible for curative properties. The plant material of Nigidi forest range is also experiencing stress conditions as they are growing under the
above average temperature, poor rain fall zone might show diversified phytochemicals. The different phytochemicals are analysed based on the potentiality and distribution.

**Antimicrobial Studies**

In India herbal medicines have been the basis of treatment and cure for various diseases in traditional methods practiced such as Ayurveda, Unani and Siddha. Although reports of antibacterial activity of indigenous plants have been published from many regions (Nadakarni, 1908; Dhar et al., 1968) they have not been systematically conducted, except in a few cases, there by resulting to confusion in drawing meaningful conclusions (Padmaja et al., 1993; Vijaya et al., 1995). In recent years, antifungal properties of medicinal plants have been reported from different parts of the world (Qamar & Chaudhary, 1991; Desta, 1993a). However, such reports are available only on a few Indian medicinal plants (Dayal & Purohit, 1971; Ahmed et al., 1995; Suresh et al., 1995; Mehmood et al., 1999).

Some of the notable works on antimicrobial screening of wild medicinal plants are as follows:

Dhār et al., (1968 & 1974) and Bhakuni et al., (1969) assayed certain potential crude drugs based on bioassay studies. Antifungal activity of some selected plants from West Bengal was carried out by Gupta & Banerjee (1972). Ikram & Inamul (1980) conducted preliminary screening of some medicinal plants for antimicrobial activity. Antibacterial and antifungal activity of South American plants was carried out by Gutkind et al., (1981), while Verpoorte et al., (1982) and Farouk et al., (1983) studied on wild plants of Surinam and Sudan respectively.
The crude drug extracts were bio-assayed using pathological strains in order to evaluate the potential properties against the organisms (Atal, 1982; Mossa et al., 1983). Gary and Kasera (1983) carried out the antibacterial activity of the essential oils of *Sphaeranthus indicus*. The comprehensive data on antimicrobial properties of Hungarian flora and Sudanese plants were reported by Kulscar & Jenossy (1983) and Almagboul *et al.*, (1985) respectively. Saxena and Vyas (1986) conducted antimicrobial screening of seeds of some ethnomedicinal plants. Antimicrobial activity of flavonoids extracted from certain medicinal plants was reported by Barnabas and Nagarajan (1988). The bioactive compounds functioning antimicrobial principle like bicyclic sesquiterpene lactone and dihydrodioscorine were extracted from petroleum ether extracts of *Sphaeranthus indicus* (Sinha *et al.*, 1988) and *Dioscorea bulbifera* (Adeleye and Ikonm, 1989) respectively. 176 crude plant extracts and 42 purified principles were reported from 64 Indian medicinal plants by Naqvi *et al.*, (1991) for antibacterial, antifungal and anthelmintic effects. The antimicrobial activity of *plumbago zeylanica* was carried out by Desta (1993a), while Caceres *et al.*, (1993) reported antidermatophytic properties of seven American plants.

The antimicrobial properties of certain Indian medicinal plants were reported based on folklore information (Hook & Thomas 1995; Reddy 1995) and specific inhibitory activity against certain pathogenic bacteria and fungi was reported (Taylor *et al.*, 1995; Geeta *et al.*, 1996). Verma *et al.*, (1997) isolated a flavone glycoside, a potential bioactive compound from the leaves of *Lantana camara*, which inhibited a wide range of gram-positive and gram-negative bacteria. Fabry *et al.*, (1998) conducted an ethnopharmacological survey on the solvent extracts of six East African medicinal plants against 105 strains of bacteria.

The broad spectrum antimicrobial activity of Rhynchosia beddomei, a rare and endemic species was studied by Bakshu and Venkataraju (2000). Antimicrobial activity of the essential oil of Lantana camara was carried out by Deena and Thoppil (2000). Antimicrobial activity of different solvent extracts of Acalypha indica leaves was conducted by Gopalakrishnan et al, (2000) while, Perumal Samy and Ignacimuthu (2000) and Srinivasan et al, (2001) reported on
certain crude drugs from Western Ghats. Mosaddik et al., (2000) conducted antibacterial activity of methanol extracts of *Alangium salvifolium* flowers against both gram positive and gram-negative bacteria. The extracts of Dichloromethane and methanol of 13 species of *Alpinia*, *Costus* and *Zingiber* (Zingiberaceae) genera were screened for antimicrobial and antioxidant activities by Habsah et al., (2000). Sai Ram et al., (2000) reported the antimicrobial activity of NIM-76, a spermicidal fraction from neen oil. Vaijayanthimala et al., (2000) studied anticandidal activity of ethanol and aqueous extracts of 20 household South Indian medicinal plants against 30 different *Candida albicans* isolates obtained from vaginal candidiasis patients. Ahmed and Beg (2001) conducted phytochemical and antimicrobial screening of ethanolic extracts of 45 Indian medicinal plants, while, Bakshu et al., (2001) reported the activity of *Securinega leucopyrus* against different pathogenic bacteria and fungi. The antimicrobial activity of methanol extracts of *Urena lobata* roots was studied by Mazumder et al., (2001), while Nagalakshmi (2001) reported on traditional plants of Rayalaseema of Andhra Pradesh. Enzo et al., (2001) conducted antimicrobial activity of 56 ethanol extracts of Australian medicinal plants against four gram positive and four gram negative bacteria. Gupta et al., (2002) and Chowdhury et al., (2002) reported the antimicrobial activity of methanol extract of *Terminalia pallida* (dried fruit powder) and *Aerva lanata* respectively. The present investigation also focussed on the screening of plants for their biological activity using Antimicrobial studies. The plants were selected for screening for antimicrobial activity was based on the information secured from the adivasi and the survey of literature.
The present investigation focused on the ethno medico botanical inventory, preliminary phytochemical studies and antimicrobial assay of certain potential crude drugs. Three plants were selected for further processing of phytochemicals, which possess essential oils. The essential oil was isolated and characterized by standard procedures explained in subsequent chapters.