Introduction
The familiarity of humankind with plant species producing food, medicine, essential oil etc. dates back to beginning of civilization. This dependency of man on the plants around him made him to acquire the knowledge of economic and medicinal properties of many plants by trial and error. Consequently he gained the knowledge of many useful as well as harmful plants, accumulated and enriched through generations and passed on from one generation to another without any written documentation. There was no need of any special documentation of this art and knowledge about healing herbs as it was the part of the culture of the society. But with the changing time, there came the new systems of medicine in which there is no role to the wild herbs. As this synthesized drug based medical system became popular, automatically the herbal therapy was ignored and its practice was reduced to minimum. Thus, there came the necessity of proper documentation and preservation of knowledge about healing herbal art. This necessity lead to new branch of biology called ‘Ethno botany’ which is an anthropocentric approach to botany and is essentially concerned with gathering information on plants and their uses (Rao, 1996). Scientific documentation and exploration of traditional plant knowledge is popularly called ethnobotany. This term was first coined by Harshberger (1896) of USA. His publication ‘The purposes of ethnobotany’ is the first of its kind and is generally considered as starting point for the ethnobotanical discipline. The broad concept of ethnobotany was emerged with the explanation of Robbins et. al.(1916) to the term as “Study and evaluation of
the knowledge of the phases of plant life amongst primitive societies and of the effect of the vegetal environment upon the life". Further, Schultes (1960), Jones (1941), Castetter (1944) and Faulks (1958) defined the term ethnobotany more clearly and gave enlarged scope and coverage to it. In recent days, this discipline has grown into a field of diverse research activities and developed into an interdisciplinary science.

**Ethnobotany in India:**

In India, Kirtikar and Basu used the term ethnobotany for the first time in 1933. But the knowledge about the plant therapeutics and ethnomedicobotany has its roots in pre-historic era. Written records of the use of plants for curing human or animal diseases in India can be traced back to the earliest (4500 B.C.) scripture of the Hindus, the Rigveda. Ayurveda- the Indian indigenous system of medicine dating back to vedic ages (1500-800 B.C.) has been the integral part of Indian culture (Weiss, 1987). This system is based on the monumental ancient treatise on the subject like Charak Samhita (1000-800 B.C.), Sushrut Samhita (800-700 B.C) and Vagbhata’s Astanga Hridaya.

It can be said that history of ethnobotanical studies in India began much before the coining of the term itself with the publication of Colloquies on the samples and drugs of India by Garcia da Orta in 1563 (Rao, 1996). But the organized study of ethnobotany in India was initiated by Dr. E K Janaki Ammal with her publication on Subsistence economy of India (Janaki Ammal, 1956). From 1960, Dr S K Jain started intensive field
studies among tribes of coastal India (Jain, 1963, a-e). The publications from his group in early sixties triggered ethnobotanical activities in many other centers. By 1995 as many as 420 research papers and 14 books on ethnobotany had been published from India covering ethnomedicobotanical investigations of about 250 ethnic groups (Rao, 1996). Traditional uses of approximately 9000 species of plants have been documented so far, of which 7500 are medicinal (Anonymous, 1994).


**Ethnobotany in southern India:**

Even though southern India have a rich ethnobotanical diversity from ancient times, its proper study and documentation is started very recently. The available ethnobotanical literature can be viewed by grouping them in state wise manner.

Even though the usage of plants and plant products in Andhra Pradesh were reported by Roxburgh (1832), Elliot (1859) and Sayeed-Ud-Din (1935), the report of food plants used by tribals of Andhra Pradesh by
Banarjee (1977) is considered as the base work of ethnobotany in the state. Jain et al. (1973) made an intensive investigations on 32 medicinal plants used by adibasis in the state. Harasreeramulu (1980) reported the medicinal importance of 40 plants used by Girijans of Srikakulan district. Other noteworthy ethnomedicobotanical works of that decade are that of Nisteswar and Kumar (1980), Reddy (1980), Sudhakar (1980), Hemadri (1981), Ellis (1982), Hemadri and Rao (1983 a and b), Rao and Harashreeramulu (1985). East Godavari district of the state was found to be rich in its ethnic diversity and as many as 250 wild medicinal plants were reported from this area (Sudhakar and Rolla 1985; Arunee Kumar et. al., 1990). Similar ethnomedicobotanical explorations were undertaken in the districts of Rayal seema (Nagaraju and Rao, 1989 and 1990; Vedavathy et. al., 1991), Chittor (Reddy et. al., 1989; Rao et. al., 1996), Karim Nagar (Hemadri, 1990), Warangal (Hemadri, 1990, Reddy et. al., 1998), Srikakulam (Hemadri, 1991), Prakasam (Vijay Kumar and Pullaiah, 1998), Mehaboob Nagar (Kumar et. al., 1999), Nalagonda (Reddy and Raju, 2000) and Khammam (Upadhyay and Chauhan, 2000).

Plants in the veterinary medicine have also been reported by many workers in the state (Reddy and Sudarshanam, 1987; Sudarshanam et.al., 1995; Goud and Pullaiah 1996; Reddy and Venkata Raju 1999; Reddy et. al., 1997). Apart from studies on the plants in the treatments of fevers (Reddy et. al., 1997), dental care (Rao et. al., 1996) and for family planning (Vedavathy et. al., 1991), studies pertaining to different tribes and communities were also undertaken in the state (Ramarao and Henry, 1996).
The report of medicinal plants from the hilly regions of Pune and Satara districts by Vartak (1959) was the first ethnomedicobotanical report from Maharastra. In 1963, Janardhanan reported the usage of 165 species of medicinal plants from Khed Taluka and in 1973, Malhotra and Moorthy recorded 126 useful as well as medicinal plants from Chandrapur district. In next few years such attempts were made from Dahanu forest division (Shah et al., 1983), Kolhapur district (Upadhye et al., 1986), Khandala (Vedaprakash and Mehrothra, 1987), Nasik district (Sharma and Laxminarasinma, 1986), Pune (Deokule and Magadum, 1992), Koyna and Thane (Kothari and Rao, 1999) and Amaravati districts (Kothari and Londhe, 1999).

Apart from this, traditional knowledge of Mahadeokoli tribe of Western Maharastra has been thoroughly investigated (Kulkarni and Kumbhojkar, 1992a, 1992b, 1993, 1996). The ethnobotany of other tribes of the state like Korkus (Kamble and Pradhan, 1980), Bonds (Bandhe et al., 1997) has also been carried out. Similar studies on traditional medicines and healthcare system of tribals of Satpuda region (Yadav and Patil, 2001) have been undertaken recently.

Even though, Kerala is considered as land of herbal healing, the ethnobotanical history of the state is comparatively of recent origin. Moos (1976, 1978) is considered as the founder of ethnomedicobotanical studies in the state. Later, similar studies were made in North Kerala area
(Prasad and Abraham, 1984), Trivendrum forest division (John, 1984) and Attappady region (Goplakrishnan and Prasad, 1992). Plants used as single drugs by various tribes of Kerala has been reported by Radhakrishnan et. al. (1996), while plant formulations in the treatment of snake bites have been reported by Rajashekharan et. al. (1989). In addition to this, studies were also concentrated on the ethnomedicine knowledge possessed by several tribes like Cholanaikkens (Pushpangadan and Atal, 1984), Malayans (Mini raj and Nybe, 1998) and other hill tribes of Shola forests of high ranges (Kumar et. al., 1999) by different workers.

Raghunathan (1976) started the ethnobotanical studies in Tamilnadu, by working on flora of medicinal plants of different tribal pockets in Nilgiris. Folklore medicinal claims of other tribes from the state, like Todas, Kotas and Irulars (Abraham, 1981), Malayalis (Viswanathan, 1989), Gounder Malayali and Veduvar (Dwarakan and Ansari, 1992), Kavis (Chelladharai and Apparananthan, 1983) and Yanadis (Sudarshanam and Shivaprasad, 1995) have also been reported. The ethnobotany of Kadars, Malasars and Muthuvans of the Annamalais in Coimbatore district studied by Hosagoudar and Henry (1996a), while tribal ethnomedicobotany of Nilgiri district (Mandal and Basu, 1996), North Arkot district (Anandan and Veluchamy, 1986), Coimbatore district (Ramachandran and Marian, 1991) Kanyakumari district (Rosakutty et. al., 1999 and Rajan et. al., 2000) have also been worked out.
The ethnobotanical studies in Goa are of very recent origin as that of state itself. Venugopal (1998) reported the immunomodulating plants in folk medicines of Goa and the folk medicines of Satlordem village of Goa has been reported by Kamat (2000). Thus much work in the field of ethnomedicobotany has been expected from the state in coming years.

Karantaka:

Even though the state has very short list of contributions to the field of ethnobotany earlier, quite a good progress can be observed in recent years. In early seventies, Rao (1977) has recorded plants in folklore medicines of Mysore district. Subsequently the ethnomedicobotany of Tumkur (Yoganarasimhan et. al., 1982), Bangalore (Pushapalata et. al., 1990), Chikmagalore (Gopalkumar et.al., 1991), Coorg and Mysore (Kshirsagar and Singh, 2000a and 2001) and Raichur (Kattimani et. al., 2001) has also been reported by different workers.

The Western Ghats belt of the state is rich in its biodiversity as well as tribal diversity. Ethnobotanical studies of tribes have been made about Soligas (Hosagoudar and Henry, 1993; 1996a), Siddis (Bhandary et.al., 1995), Gowlies (Bhandary et. al., 1996), Jenukurubas (Kshirasagar and Singh, 2000b) and Kunbis (Harsha et. al., 2002). Along with these, reports are also made about the plants used in the treatment of veterinary treatments (Bhandary and Chandrashekar, 2003), jaundice (Shantamma et.al., 1986), snake bites (Bhandary and Chandrashekar, 2001) and skin diseases (Maruthi et. al., 2000; Harsha et. al., 2003).
The ethnomedicobotanical studies by Bhandary et. al. (1995) reveals the usage of 70 sps of plants by the people of Siddi tribe, living in Western Ghats of Uttara Kannada. The Gowlies, another tribe of the same region use about 40 species of plants in their ethnomedical practice (Bhandary et. al., 1996). Further, during the ethnomedicobotanical survey of the area, Harsha et. al., (2002) have reported 45 species used by the people of Kunabi tribe. The usage of about 31 plants by the people of different communities living in Uttara Kannada to treat different skin diseases has been listed out by Harsha et. al., (2003). The report ascribes the high curative abilities of herbal medicines with 17 hitherto new claims to different skin diseases. Apart from this, Bhandary and Chandrashekar (2002) in their exhaustive work, reported about 169 formulations for 17 different ailments from coastal Karnataka. They have also listed out the plants with reported antimicrobial properties from the area.

As the acceptability of most of the plants claimed as effective remedies is quite high among the local population, there is a need of fresh efforts involving more scientific approaches to study their safety and efficacy. The screening for antimicrobial activities is one of those pharmacological studies, which has contributed greatly in the development of new herbal drugs. The theory of antimicrobial property has its roots to prehistoric era, as many of the plants and their extracts have found to be used in treatment of wounds, skin diseases and as antiseptic agents. But the terminology ‘antimicrobial’ was introduced only after the invention of antibiotic, Penicillin, by Alexander Fleming in 1928. Since then man has
learned to isolate many of such compounds and has studied their properties. The methodology, to study the antimicrobial efficacy, has been studied greatly by different workers (Morley, 1945; Bondi et. al., 1947; Turek et. al., 1963). But the method for antibiotic susceptibility test, given by Bauer et. al. (1966), is considered as standard method and is followed even today.

Antimicrobial compounds in higher plants are produced for self defense and are called as secondary metabolites. This is a special feature of higher plants, as they produce large number of compounds with high structural diversity. Over last 20 years, a large number of higher plants have been evaluated for their antimicrobial active compounds in India and abroad. Still the search for new antimicrobial plant sources are on all over the world (Fabry et. al., 1998; Grierson and Afolayan, 1999; Portillo et. al., 2001; Jayasinghe et. al., 2002; Goun et. al., 2003; Roias et. al., 2003; Garcia et. al., 2003).

In India, Dhar et. al. (1968) have screened some Indian medicinal plants for their antimicrobial properties. Since then similar screening for the biological activities of different plants has been carried out by different workers (Aswal et.al., 1984; Abraham et. al., 1986; Valsraj et. al., 1997; Ahamad et. al., 1998; Perumal Samy et. al., 1998). The plants used in local ethnomedicine have been screened by Gond and Shankhapal (1998) and Perumal Samy et.al. (1999). Recently, Srinivasan et.al. (2001) have reported antimicrobial properties of 50 medicinal plants belonging to 26 families, while Perumal Samy and Ignacimuthu (2000) have screened out 30 folklore medicinal plants used by tribals of Western Ghats in India.
Antimicrobial activity of nine common plants in Kerala was screened by Sasidharan et al. (1998), while Bhandary and Chandrashekar (2002) listed out 55 plants with biological activities from coastal Karnataka.

According to Ved Prakash (1998), among 3000 flowering plants, which are used for medicine in India, only 700 are investigated pharmacologically and clinically. However, recently Kameshwara Rao (2000) has listed out 752 plants showing antibacterial, antifungal and antimicrobial activities. Thus, it is necessary to screen the remaining plant wealth to prove their efficacy. In this context, antimicrobial nature of *Vitex trifolia* (Hossain et al., 2001), *Cassia alata* (Khan et al., 2001), *Syzygium cumini* (Shafi et al., 2002), *Syzygium travancorium* (Shafi et al., 2002), *Michelia champaca* (Khan et al., 2002), *Aerva lanata* (Chowdhury et al., 2002), *Mappia foetida* (Kumar et al., 2002), *Dodonia viscosa* (Getie et al., 2003), *Vernonia cinerea* (Guptha et al., 2003), *Ixora coccinea* (Annapurna et al., 2003) and *Gymnema sylvestre* (Satdive et al., 2003) has been screened out recently. Along with these, the members of the families like Bignoniaceae (Bandopadhyay et al., 1997), Annonaceae (Khan et al., 1998) and Zingiberaceae (Habsah et al., 2000) have been screened pharmacologically.

Generally the term 'antimicrobial' includes both antibacterial and antifungal. There are few such works, which give only antibacterial or antifungal nature of the plants. In such efforts, antibacterial properties of few selected medicinal plants have been reported by Rajendran (1998), while that of *Momordica charentia* by Khan and Omoslo (1998). Sheela and
Kannan (2003) screened three Indian medicinal plants against 6 bacterial strains. Similarly, antifungal activities of *Ficus racemosa* (Deraniyagala *et al.*, 1998), Water melon (Nidiry, 1998) and *Ailanthes exelsa* (Joshi *et al.*, 2003) have been reported recently by different workers.

The different parts in higher plants may or may not possess the same extent of antimicrobial nature. This is because of the varied combinations and concentrations of secondary metabolites production and storage. Thus the different parts of the plants viz. roots (Perumal Samy, 1999), bark (Iqbal *et al.*, 1995), leaves (Satdive *et al.*, 2003; Annapurna *et al.*, 2003), seeds (Saeed and Ford, 1998; Nidiry, 1998) and floral petals (Darokar *et al.*, 1998) of different plant species have been screened for their biological activity. In addition to this, the plant extracts like essential oil (Battinelli *et al.*, 1998; Tajo and Thoppil, 1999) and fruit juice (Meera *et al.*, 1999) of few plants have been also screened by different workers.

Today in modern medicine, about 60% of the drugs used are products produced from plants, algae or fungi (Lonergan, 1998). This clearly indicates the revitalization of herbal drugs in modern medical system. Thus, even though, several plant species have been reported for their antimicrobial activities, still the search for the antimicrobial compounds from new plant sources to control common diseases continues on an increasing scale. But there is a large difference between the demand and production of many of the healing herbs. Raw herbal drugs, generally, are collected from wild, often in a destructive manner. This may lead to extinction of many plant species with potential benefits to mankind even...
before they are studied completely. Thus in recent days, apart from other conservational measures, major efforts have been directed towards callus and cell suspension cultures for the production of secondary metabolites of pharmacological and pharmaceutical interests. The accumulation of phytochemicals in plant cell cultures has been studied for more than 30 years and the generated knowledge has helped in realization of using cell and callus cultures for production of desired phytochemicals. The utility of plant tissue culture in the production of secondary metabolites was visualized in early 1940s, however it was demonstrated by Kaul and Staba (1967) by producing visnagin by callus cultures of *Ammi visnaga*. In this perspective, similar works like production of sterols from *Datura* callus culture (Nag, 1976), effect of plant growth regulators on secondary metabolite production (Nag, 1997) and production of different secondary metabolites from *Daucus carota* L. callus (Khanna *et al.*, 1977) have been carried out by different Indian workers.

Even though much work has been carried out on the production of secondary metabolites by single cell culture, suspension culture and hairy root cultures, very few attempts have been made to compare the antimicrobial abilities of these accumulated compounds to that of original plant parts. In 1986, Evans *et al.* reported the production of some antimicrobial compounds in plant cell culture studies. Subsequently, the variation in the biological activity of calli supplemented with different media and growth regulators was studied in five marine halophytes by Kathiresan and Ravikumar (1997). Furmanowa *et al.* (1998), in their
studies, reported the antimicrobial activities of hairy roots produced in vitro in *Withania somnifera* (L.) Dun., while the antimicrobial activity in the callus of *Heterostemma tanjorense* W&Am. has also been reported (Lakshmi *et. al.*, 1999). Apart from antimicrobial nature, hepatoprotective and cardiac inhibitory activities have been compared in leaf and leaf callus of *Eclipta alba* (L.) Hassk. (Sagar and Zafar, 2000). The comparative account of antimicrobial activity of crude extracts from the plant parts and their corresponding calli of medicinal plant *Bixa orellana* L. has been worked out by Castello *et. al.* (2002). Thus the production and assessment of secondary metabolites in higher plants, especially antimicrobial compounds, from non-conventional sources has got much more opportunities to work on.

Thus, from the review of the work done and ongoing research in the field of ethnobotany and antimicrobial screening of plants and their calli, it is evident that, there is much to do in these branches. It is also evident that there are only very few reports on utilization of plants in local health tradition, while no reports on antimicrobial efficacy of the plants used in medicine from Uttara Kannada district. This is inspite of the fact that the present study area is situated in the hearts of Western Ghats belt, with rich repository of floral richness coupled with ethnic diversity, which can enable both intensive and extensive studies in ethnomedical and pharmacological research.

A study aimed at documentation of indigenous plant knowledge of Uttara Kannada district in Karnataka and antimicrobial
screening of selected medicinal plants along with their calli was, therefore, undertaken with the following specific objectives:

- Documentation of the herbal medical practices of the indigenous tribal and non-tribal communities of Uttara Kannada district in Karnataka, India.

- Screening the antimicrobial potentiality of the selected medicinal plants from the area to facilitate the development of new herbal drugs along with providing scientific base to the local herbal tradition.

- Standardization of the protocol for *in vitro* callus production to the plants showing better antimicrobial properties, which also will be helpful in further re-generation studies.

- Comparing the antimicrobial efficacies of the plant parts to their corresponding calli to enhance the thrust on production of secondary metabolites from callus cell lines, which in other way helps in the conservation of natural plant resources.