There are in fact two things, science and opinion; the former begets knowledge, the latter ignorance.

— Hippocrates
1.1. Importance of Medicinal Plants

Since time immemorial, man has used various parts of plants in the treatment and prevention of many ailments (Chah et al., 2006). According to the World Health Organization (WHO, 1977), a medicinal plant is any plant which contains substances that can be used for the therapeutic purposes in one or more of its organ or substances which are precursors for the synthesis of useful drugs. Medicinal plants are further defined as plants that have at least one of their parts (leaves, stem, barks or roots) used for therapeutic purposes (Bruneton, 1993). A plant becomes a medicinal plant only when its biological activity has been ethnobotanically reported or scientifically established (Elujoba, 1997). Plants provide a source of medicine, which are useful in treatment of various categories of human ailments and conditions. The World Health Organization (WHO) has estimated that up to 80% of the world’s population rely on plants for their primary health care (BCGI, 1995), while in Nigeria, a WHO survey estimated that up to 75% of the population patronize traditional medicine (Omoseyindemi, 2003). More importantly, plants have been the main source of medicine for man before the advancement of Science and Technology (Schmelzer and Omino, 2003). Plants are significant sources of medicines that are used in the treatment of various categories of human diseases. Historically all medicinal preparations were derived from plants, whether in the simple form of plant parts or in the more complex form of crude extracts, mixtures, etc. Today a substantial number of drugs are developed from plants which are active against a number of diseases. The majority of these
involve the isolation of the active ingredient (chemical compound) found in a particular medicinal plant and its subsequent modification.

Traditional systems of medicine continue to be widely practised on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicine for a wide variety of human ailments. Global estimates indicate that 80% of about 4 billion population cannot afford the products of the Western Pharmaceutical Industry and have to rely upon the use of traditional medicines which are mainly derived from plant material. This fact is well documented in the inventory of medicinal plants, listing over 20,000 species. In spite of the overwhelming influences and our dependence on modern medicine and tremendous advances in synthetic drugs, a large segment of the world population still likes drugs from plants. In many of the developing countries the use of plant drugs is increasing because modern life saving drugs are beyond the reach of three quarters of the third world’s population although many such countries spend 40-50% of their total wealth on drugs and health care. As a part of the strategy to reduce the financial burden on developing countries, it is obvious that an increased use of plant drugs will be followed in the future. Among ancient civilisations, India has been known to be rich repository of medicinal plants. The forests in India are the principal repository of large number of medicinal and aromatic plants, which are largely collected as raw
materials for manufacture of drugs and perfumery products. About 8,000 herbal remedies have been codified in Ayurveda. The *Rigveda* (5000 BC) has recorded 67 medicinal plants, *Yajurveda* 81 species, *Atharvaveda* (4500-2500 BC) 290 species, *Charak Samhita* (700 BC) and *Sushrut Samhita* (200 BC) had described properties and uses of 1100 and 1270 species respectively, in compounding of drugs and these are still used in the classical formulations, in the Ayurvedic system of medicine. Unfortunately, much of the ancient knowledge and many valuable plants are being lost at an alarming rate. With the rapid depletion of forests, impairing the availability of raw drugs, Ayurveda, like other systems of herbal medicines has reached a very critical phase. About 50% of the tropical forests, the treasure house of plant and animal diversity have already been destroyed. In India, forest cover is disappearing at an annual rate 1.5mha/yr. What is left at present is only 8% as against a mandatory 33% of the geographical area. Many valuable medicinal plants are under the verge of extinction. *The Red Data Book of India* has 427 entries of endangered species of which 28 are considered extinct, 124 endangered, 81 vulnerable, 100 rare and 34 insufficiently known species (Thomas, 1997).

Green plants synthesise and preserve a variety of biochemical products, many of which are extractable and used as chemical feed stocks or as raw material for various scientific investigations. Many secondary metabolites of plant are commercially important and find use in a number of pharmaceutical compounds. However, a sustained supply of the source material often becomes difficult due to the factors like environmental changes, cultural practices,
diverse geographical distribution, labour cost, and selection of the superior plant stock and over exploitation by pharmaceutical industry.

Plants produce diverse biologically active molecules making them a rich source of different types of medicines in the maintenance of human health since ancient times (Farombi, 2003). Over 50% of all modern clinical drugs are of natural product origin (Stuffness and Douros, 1982). Herbal medicine play important role in drug development programmes in the pharmaceutical industry (Baker et al., 1995). There are a few reports on the use of plants in traditional healing by either tribal people or indigenous community (Traditional Ecological Knowledge) (Sandhy et al., 2006; Ayyanar and Ignacimuthu, 2005; Rajan et al., 2002; Natarajan et al., 1999 and Ignacimuthu et al., 1998). Presently in the developing countries, synthetic drugs are expensive, resistant and inadequate for the treatment of diseases but are also often with adulterations and side effects (Shariff, 2001). Therefore there is a need to search for new plants of medicinal value. In the last few decades, there has been an exponential growth in the field of herbal medicine or phytochemistry due to failure of modern medicine in providing effective treatment for chronic diseases and emergence of multidrug resistant microorganisms. Various traditional medicinal plant extracts with folklore reputation have been examined (Avdha, Sinha; 2001, 2009, 2007) to identify the source of therapeutic drugs, but there is still an urgent need to screen novel substances that are active towards pathogens with high resistance (Cragg, 1997). Extraction of bioactive compounds from medicinal plants permits the
demonstration of their physiological activity. It also facilitates pharmacological studies leading to the discovery of potent new drugs (Ebana et al., 1991; Williams, 1996; Pamplona and Roger, 1999; Manna and Abalaka, 2000). Furthermore, the active components of plant extracts have greater advantage of being combined with many other substances that may be biologically inactive. However, these complementary components give the plant as a whole a safety and efficiency much superior to that of its isolated and pure active components (Shariff, 2001). Approximately 60–80% of the world’s population still relies on traditional plant medicines for the treatment of common illnesses (WHO, 2002, Zhang, 2004). Plant secondary metabolites have been used for centuries in traditional medicines and therefore represent a source of potentially active compound (Sami, 1998, Hamil, 2003; Motesi, 2003; Bougrad, 2001; Rios, 2005). Demand for traditional plant medicines is increasing because of the scarcity and high costs of orthodox medicine (Tagboto and Townson, 2001; Hudaib et al., 2008). Many plants contain a variety of bioactive compounds which have found very important applications in the field of medicine. Natural products play a vital role in the development of novel drug leads for the treatment and prevention of various diseases (Newman et al., 2003; Gilani and Rahman, 2005). It is very important to know widespread uses of plants, but also because they have the potentials to cause toxic reactions or interact with other drugs. For example, senna (Cassia acutifolia) and germander (Teucrium polium) having hepatotoxic activity (Lynch and Berry, 2007; Sawalha et al., 2008). In traditional medicine Cassia species have been well known for their
laxative and purgative properties and for the treatment of skin diseases (Dalziel, 1956), scientific evidences showing plants possess many beneficial properties. Different plant parts like root, leaves, stems, seeds or even whole plants may have therapeutic properties (Prakash, 2005). More than 100 medicinal plant species are involved in 25% of all prescribed drugs in advanced countries (Comer, 1996)

We know that plant based drugs offer potential sources of pharmaceutical agents such as new antibiotics, anticancer agents, and anti-HIV agents. In an effort to discover new lead compounds, many research groups screen plant extracts to detect secondary metabolites with relevant biological activities. At the same time urgent attention is needed to conserve medicinal plants because of rapid deforestation and the concurrent loss of biodiversity throughout the world.

1.2. Use of plants against microbial infection.

The antimicrobial activities have been screened because of their potential medicinal relevance. In the recent years infections have increased to a great extent and resistant against antibiotics has become an ever increasing therapeutic problem (Austin et al., 1999). Bioactive components of medicinal plants may give a new source of antimicrobial compounds. There are many research groups that are now engaged in medicinal plants research for the discovery of new drugs (Samy et al., 1998; Hamil et al., 2003; Motsei et al., 2003). Silver and Bostian (1993) have documented the use of natural products as new antibacterial drugs. There is an urgent need to identify novel substances
active towards highly resistant pathogens (Recio, 1989; Cragg et al., 1997). In an effort to discover new bioactive molecule, many research groups screen plant extracts to detect active secondary metabolites. With this aim, several simple bioassays have been developed for screening purposes (Hostettmann, 1991). Even though, these traditional practices are empirical in nature, over 200 million people in India with limited access to primary healthcare centres, depend on traditional system of medicine to cater to their healthcare needs (Elderc, 2004).

Infectious diseases are the leading cause of death worldwide (Prakash, 2005). A number of antimicrobial agents already exist for many purposes but the search for new antimicrobial agents is in progress because microorganisms often evolve into new genetic variants which subsequently become resistant to the existing drugs. Many higher plant species are known to produce antimicrobial compounds (Sakuma and Tomiyana, 1967), and indeed extracts of plants from different parts of the world have been shown to possess potent antimicrobial activity (Malcom and Sofowora, 1969; Bhakuni and Bittner, 1974; Boakye, 1977). Man is using traditional plant medicines to treat common infectious diseases, and some of the herbal medicines are still part of the habitual treatment for various diseases (Sathy, 2008). Natural products, either as pure compounds or as standardized plant extracts, provide unlimited opportunities for new drugs (Prakash, 2005). Scientific interest in medicinal plants has burgeoned in recent times due to increased efficiency of new plant derived drugs and rising concerns about the side effects of modern medicine,
and hence the need to look for new bioactive compounds from the plant kingdom (Sathya, 2008; Nair, 2005).

1.3. Use of plants against free radical damage

Free radicals such as $\cdot$O$_2$ (superoxide anion), H$_2$O$_2$ (hydrogen peroxide), and $\cdot$OH (hydroxyl radical) are highly reactive and unstable molecules produced in the body during normal metabolic functions. Human bodies are protected from oxidative damage of free radicals through some complex defence systems which are called antioxidants. Antioxidant works to maintain the oxidant at optimum level and to reduce free radicals, stopping it from forming before it can disrupt living cells in our body. However, excessive oxidants or free radicals can cause cell disruption and lead to chronic diseases includes atherosclerosis, diabetes mellitus, cancer, Parkinson's disease and immune dysfunction and is involved in aging (Haliwell, 2000; Metadivioe et al, 2000; Young, 2009). Research investigation shows that diets high in antioxidants or antioxidant supplements reduce cancer death rates, cold and flu infections and protect against atherosclerosis, heart disease and cataracts (Zino, 1997). Various antioxidants have been identified such as ascorbic acid, $\beta$-carotene and $\alpha$-tocophenol (Morell, 1993). Naturally-occurring antioxidants are Vitamin E, Vitamin C and $\beta$-carotene. More researchers have begun to formally study the health benefits of herbs and spices. In general, fresh herbs and spices are healthier and contain higher antioxidant levels compared to their processed counterparts (Zino, 1997). Antioxidants, both exogenous and endogenous, whether synthetic or natural, can be effective in prevention of the
free radical formation by scavenging or promoting their decomposition and suppression (Haliwell, 2000; Maxwell, 1995). There is an increasing interest towards natural antioxidants from plants (Larson, 1998; Gazani, 1998; Velioglu, 1998). For several years, many researchers have been searching for powerful but non-toxic antioxidants from natural sources, especially edible or medicinal plants. Such natural antioxidants could prevent the formation of the above reactive oxygen species (Branen, 1975). Recently there has been an upsurge of interest in the therapeutic potential of medicinal plants as antioxidants in reducing free radical-induced tissue injury (Pourmorad et al., 2006). This has attracted a great deal of research interest in natural antioxidants. Subsequently, a worldwide trend towards the use of natural phytochemicals present in berry crops, tea, herbs, oilseeds, beans, fruits, and vegetables has increased (Deiana, 1999; Lee and Shibamoto, 2000; Wang, 2000). Antioxidants interfere with the production of free radicals and also play a key role to inactivate them (Dusinska et al., 1999). Phytochemicals like carotenoids, tocopherols, ascorbates and phenols present in plants are strong natural antioxidant and have an important role in health care system.

1.4. The use of plants against mycobacterial infection

Tuberculosis (TB) is a disease that has affected mankind from very ancient times. It is caused by Mycobacterium tuberculosis. India accounts for nearly one-third of the global burden of tuberculosis and the disease is one of India’s most significant public health problems. In India approximately 2 million people acquire TB every year (Young et al. 2009). Indian medicinal
plants are used in different Ayurvedic formulations to treat Tuberculosis (Kirtikar and Basu 1935). It is estimated that there are currently 2 million deaths from tuberculosis annually (Deng et al., 2008). Moreover, up to 50 million people are infected with drug-resistant forms of Tuberculosis with about 500,000 cases of Multi Drug Resistant tuberculosis a year worldwide (WHO, 2007). The recent increase in the widespread existence of extensively drug-resistant tuberculosis (XDR-TB) especially in the developing countries emphasized the need for the development of new drugs to treat this infection. New anti-tubercular agents from medicinal plants should have novel modes of action and full activity on the pathogen- Mycobacterium tuberculosis.

In the past 5 years many research reports and review articles appeared in the literature about anti-mycobacterium activity of medicinal plants and natural products. (Okunade et al., 2004; Copp, 2003; Newton et al., 2002; Cantrell et al., 2001). About 350 natural products, mainly from medicinal plant species have been screened for their anti-mycobacterial activities (Newton et al., 2002). A number have demonstrated significant in vitro anti-mycobacterial activity and active plant-derived compounds belonging to various chemical classes have been isolated (Newton et al., 2002). In recent years, a notable number of natural products-derived from medicinal plants have been discovered by employing screening approaches involving cellular or biochemical targets in their assay design (Shu, 1998).
India is one of the top 12 megadiversity country in the world (Singh and Chowdhery, 2002) with 10 biogeographic regions (Rodgers and Panwar, 1990). In addition it has over 40 sites which are known for their high endemism and genetic diversity (Nayar, 1996). In the updated list of world’s biodiversity hotspots, two are from India. The climatic and altitudinal variations, coupled with varied ecological habitats of this country, have contributed to the development of immensely rich vegetation with a unique diversity in medicinal plants which provides an important source of raw materials for traditional medicine systems as well as for pharmaceutical industries in the country and abroad (Myers et al., 2000). Plant diversity of India possesses about 20,000 species of higher plants and one third of it being endemic and 500 species are categorized to have medicinal value (Mandal, 1999; Arora, 1988). The Southern Western Ghats is one of the major repositories of endemic medicinal plants. It harbours around 4,000 species of higher plants of which 450 species belonging to 150 natural orders are endangered. The Legumes or pulses belong to the family leguminosae. The legumes are next in importance to cereals as source of human food. They contain more protein materials than any other vegetable product in the world. The pulses form an important item in India where the majority of the population consists of vegetarian carbohydrates and fats are also present in the legumes. The proteins occur as aleurone grains in the same cells with the starch grains. The use of traditional medicine and
medicinal plants in most developing countries, as a normative basis for the maintenance of good health, has been widely observed (UNESCO, 1996).

Occurrence of forage legumes of around 400 species belonging to 35 genera has been recorded in India. Some of the cultivated leguminous crops in India for dietary purposes are *Arachis hypogaea* (peanut), *Cajanus cajan* (pigeon pea), *Cicer arietinum* (chickpea), *Cyanopsis tetragonoloba* (cluster bean), *Glycine max* (soybean), *Lablab purpureus* (dolichos bean) *Lathyrus sativus* (grass pea), *Lens culinaris* (lentil), *Macrotyloma uniflorum* (horse gram), *Phaseolus lunatus* (lima bean), *Phaseolus vulgaris* (French bean), *Pisum sativum* (peas), *Tamarindus indica* (tamarind), *Trigonella foenumgraecum* (fenugreek), *Vicia faba* (broad bean), *Vigna aconitifolia* (dew gram), *Vigna mungo* (black gram), *Vigna radiata* (green gram) etc. (Arora and Chandel, 1972). Legumes are also being used by tribal communities in India as local healthcare traditions. More than 50 species of underutilised legumes belonging to 38 genera are known to be used by tribal communities in local health traditions. Medical practices of local and indigenous people have remained unmodified over long periods of time. Due to increasing industrialization and modernization, the local health traditions knowledge base has begun to erode. *Acacia catechu, A. concinna, Cassia auriculata, C.fistula, C. javanica, C. senna, Ceratonia siliqua, glycyrrhiza glabra, Mucuna pruriens,, Psoralea corylifolia, Pueraria tuberosa* are some of the medicinal legumes available from India. Legumes used for treating various ailments of the body, Ear, nose and throat and eyes (ophthalmic, odontalgic, sternutatory),
Chest and lungs (antiasthmatic, demulcent, expectorant), Heart and blood (cardiac, blood purifier, vasodilator), Liver and kidneys (hepatic, antbilious), Stomach (emetic, stomachic, digestive), Bowles and bladder (purgative, laxative, carminative), Nerves and muscles (antispasmodic, nervine), Bones (anti-inflammatory, anti-rheumatic), Skin, hands and feet (acrid, skin applications), Sex and reproduction (abortifacient, aphrodisiac, galactogogue), Wounds and bruises (antiseptic, poultice, vulnerary), Fever (febrifuge); Infectious diseases (antiperiodic, VD), Bites and stings (antidote, stings), Cancer (cancer), (Varaprasad, 2006). Numerous Indian legume species (62%) contribute to the food and health security of tribal communities. Lesser known legume such as *Pisum sativum, Psophocarpus tetragonolobus, Mucuna pruriens, Canavalia ensiformis, C. gladiata, Parkia roxburghii, Vicia faba, Vigna umbellata, Vigna unguiculata, Vigna unguiculata var. sesquipedalis* are becoming popular because of their nutritional and pharmaceutical importance.