2.1. EVOLUTION OF AYURVEDA:

Over the past decade the utilization of alternative medical therapy has increased. Historically, plants have provided a source of motivation for new drug compounds, as plant derived medicines have made large contribution to human health and well being, on the other hand, there is an increment use of herbal products all over the world. Many studies indicates that in same plants there are numerous substances such as peptides, unsaturated long chain aldehyde, alkaloid constituents, some essential oils, phenols, and water, ethanol, chloroform, methanol and butanol, soluble compounds, these plants then emerged as compounds, these plants then emerged as compounds with, potentially significant therapeutic function against human pathogens, including bacteria, fungi, or virus. Therefore, in the present work plan all the extracts were performed for bioactivity guided fractionation and were reaching to pure bioactives with antibiotic potentials.

Natural world has been a source of healing agents since times immemorial. The importance of herbs in the management of human ailments cannot be over emphasized. It is clear that the plant kingdom harbors an unlimited source of active ingredients precious...
in the management of many intractable diseases. Furthermore, the active components of herbal remedies have the advantage of being combined with many other substances that appear to be inactive. However, these complementary components give the plant as a whole a protection and efficiency much superior to that of its isolated and pure active components (Shariff et al., 2001).

Antibiotic resistance has become a global anxiety (Westh et al., 2004). There has been an increasing frequency of multiple resistances in human pathogenic microorganisms in recent years, largely due to randomly use of commercial antimicrobial drugs commonly engaged in the healing of infectious diseases. This has forced scientist to search for new antimicrobial substances from various sources like the medicinal plants. Search for new antibacterial agents should be continued by screening many plant families. Recent work revealed the potential of several herbs as sources of drugs (Iwu et al., 2002). The screening of plant extracts and plant products for antimicrobial activity has shown that higher plants represent a potential source of fresh antibiotic prototypes (Afolayan et al., 2003).

Various studies have recognized compounds within herbal plants that are effective antibiotics. Conventional therapeutic systems around the world that use herbal remedies are an important source for the detection of new antibiotics. Some traditional remedies have already produced compounds that are effective against antibiotic resistant strains of bacteria (Kone et al., 2004). The results of this indicate the requirement for further research into traditional health system. It also facilitates pharmacological studies leading to synthesis of a more effective drug with reduced toxicity. The need of the current science is to monitor a number many efforts have been made to discover new antimicrobial compounds from various kinds of sources such as micro-organisms, animals, and plants. One of such resources is folk medicines. Systematic screening of them may result in the discovery of new effective compounds (Tomoko et al. 2002). Medicinal plants have been used by mankind for its therapeutic value since the starting of human civilization. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources.
Many of these isolations were based on the uses of the agents in traditional medicine. The plant-based, traditional medicine systems continue to play an essential role in health care, with about 80% of the world’s inhabitants relying mainly on traditional medicines for their primary health care (Owolabi et al., 2007).

India has numerous medical systems, such as Ayurveda and Unani, which has survived through more than 3000 years, mainly using plant-based drugs. The *Material Medica* of these systems contains a rich legacy of native herbal practices that have helped to maintain the health of most rural people of India. The ancient texts like Rig Veda (4500-1600 BC) and Ayurveda mention the use of several plants as medicine.

According to the books of ayurvedic medicine such as *Charaka Samhita* and *Susruta Samhita* refer to the use of more than 700 herbs (Jain, 1968). According to the World Health Organization (WHO, 1977) the definition of medicinal plant is the medicinal plant is any plant, whose one or more of its organ contains substances that can be used for the therapeutic purposes or there precursors are used for the synthesis of useful drugs.

### 2.2. IMPORTANCE OF MEDICINAL PLANTS:

The definition of medicinal plants distinguishes those plants whose therapeutic properties and constituents have been established scientifically and flora that are regarded as curative but which have not yet been subjected to thorough investigation. The word herbal drug explains the parts of a plant (leaves, flowers, seeds, roots, barks, stems, etc). That is used for preparing medicines (Anonymous, 2007).

Furthermore, WHO (2001) defines medicinal plant as herbal preparations produced by subjecting plant materials to extraction, fractionation, purification, concentration or other physical or biological processes which may be produced for immediate consumption or as a basis for herbal products.

Medicinal plants are possessing natural active ingredients which are used to treat disease or reduce pain (Okigbo et al., 2008). The use of conventional medicines and medicinal plants in most developing countries as therapeutic agents for the maintenance of fine health has been widely observed (UNESCO, 1996).
Modern pharmacopoeia still contains at least 25% drugs derived from plants and many others, which are synthetic analogues, built on prototype compounds isolated from plants. Interest in medicinal plants as a re-emerging health assist has been fuelled by the rising costs of prescription drugs in the maintenance of personal health and well being and the bio prospecting of new plant-derived drugs (Lucy and Edgar, 1999). The constant growing detection of medicinal plants is due to several reasons, including rising assurance in herbal medicine (Kala et.al; 2005).

Furthermore, an increasing dependence on the use of medicinal plants in the modern societies has been screened to the extraction and development of drugs and chemotherapeutics from these plants as well as from traditionally used herbal remedies (UNESCO, 1998). The medicinal properties of plants could be based on the antioxidant, antimicrobial antipyretic effects of the photochemical in them (Cowman, 1999; Adesokan et al., 2008).

According to World Health Organization, medicinal plants would be the greatest source to acquire a range of drugs. Therefore, such plants should be investigated to better understand their properties, safety and efficacy (Nascimento et al., 2000).

Bioactive compounds produced by Medicinal plants used mainly for therapeutic purposes. These compounds either act on different systems of animals including man, and/or act through interfering in the metabolism of microbes infecting them. The microbes may be pathogenic or symbiotic. The bioactive compounds from medicinal plants play a decisive role in adapting host-microbe interface in errand of the host.

So the detection of bioactive compound in plants, their isolation, purification and characterization of active ingredients in crude extracts by a range of analytical methods is significant. The medicinal properties of plants could be based on the antioxidant, antimicrobial, antipyretic effects of the photochemical in them (Cowman et.al., 1999; Adesokan et al., 2008).

The instant rising requirement of plant-based drugs is unluckily creating heavy pressure on some selected high-value medicinal plant populations in the wild due to over-harvesting. Several of these medicinal plant species have slow growth rates, low population densities, and narrow geographic ranges (Nautiyal et al., 2002),
Therefore, they are more level to devastation (Jablonski et.al., 2004). Conversely, because information on the use of plant species for therapeutic purpose has been approved from one generation to the next through oral practice, this knowledge of therapeutic plants has in progress to turn down and become obsolete through the lack of recognition by younger generations as a result of a shift in attitude and ongoing socioeconomic changes (Kala et.al., 2000).

In addition, the native knowledge on the use of lesser-known medicinal plants is also quickly warning. Continuous attrition in the traditional knowledge of many valuable plants for medicine in the past and the renewal interest currently, the need existed to appraisal the valuable knowledge with the principle of mounting the medicinal plants zone (Kala et al., 2006).

In India, the ayurvedic system has described a large number of such medicines based on plants or plant product and the purpose of their morphological and pharmacological or pharmacognostical characters can provide a better understanding of their active principles and mode of action. However a large number of tropical plants have not been studied in detail for their chemical constituents, pharmacological properties of the extracts, and their pharmacognostical characterization including DNA sequencing etc.

2.3. ANTIMICROBIAL ACTIVITY OF MEDICINAL PLANTS:

Mahesh et.al., (2008) reported the antimicrobial action of five medicinal plants Acacia nilotica plant, Sida cordifolia plant, Tinospora cordifolia plant, Withania somnifer plant and Ziziphus mauritiana plant. The activity was screened against Bacillus subtilis, Escherichia coli, Pseudomonas fluorescens, Staphylococcus aureus and Xanthomonas axonopodis pv. malvacearum and antifungal activity against Aspergillus flavus, Dreschlera turcica and Fusarium verticillioides. When compare to root/bark extracts. A. nilotica and S. cordifolia leaf extract showed highest antibacterial activity against B. subtilis. And Z. mauritiana leaf extract showed significant activity against X. a. PV. Malvacearum. Root and leaf extract of S. cordifolia plant also show the activity against all the test bacteria. A. nilotica plant bark and leaf extract showed significant antifungal activity against A. flavus. Ziziphus mauritiana and Tinospora cordifolia plant
recorded effective antifungal activity against *D. turcica* plant. The methanol extract of *Sida cordifolia* plant show significant antifungal activity against *F. verticillioides*.

Karou *et al.*, (2005) screened the Polyphenols from four medicinal plants of Burkina Faso, the plants are *Combretum micranthum*, plant *Khaya senegalensis* plant, *Pterocarpus erinaceus* plant and *Sida acuta* plant, for their antioxidant and antimicrobial activities against pathogenic bacteria. These medicinal plants showed different polyphenols contents and antioxidant activities.

The bark of *P. erinaceus* plant had the highest antioxidant activity compare to another plants. Some microorganisms were susceptible to polyphenol extracts with minimal bactericidal concentration values between 20 and 2000 mg/ml. while other microorganisms appeared to be resistant to the extracts. Microbicide and micro biostatic activities of these plant extracts were dependent on the type of strains. Results suggest that these plants are not only interesting sources for antimicrobial activities but also potential sources of phenolic antioxidants.

Samy *et al.*, (2008) suggested the key bioactive compounds and the role of medicinal plants in Ayurvedic systems of medicine in India. There has been an increase in demand for the Phyto pharmaceutical products of Ayurveda in Western countries, for the reason that of the allopathic drugs have more side effects.

Many pharmaceutical companies are now focused on industrialized of Ayurvedic Phyto pharmaceutical products. Ayurveda is the Indian traditional system of medicine, which also deals about pharmaceutical science.

Different type of plant parts used for the Ayurvedic formulation overall out line of those herbal situation and its future prospects for the scientific evaluation of medicinal plants used by traditional healers are also discussed. In India most of them, where Ayurvedic treatment is regularly used, for their ailments and provides instructions to local people how to prepare medicine from the herbs. As much as possible importance is also given for the taxonomic literature.

Adomi *et al.*, (2006) reported the medicinal properties of two Nigerian medicinal plants, in the experiment water and ethanol extracts of the stem bark of *Alstonia boonei* plant and *Morinda lucida*, plant used conventionally in treating several diseases were
tested on clinical isolates of two Gram-positive and five Gram-negative bacteria. When antimicrobial activity of Ethanol extract of *A. boonei* plant was seen against selected bacteria. There was not any action against any of the bacterial tested while the aqueous stem barks extracts of *A. boonei* plant and *M. lucida* plant were active. The Ethanol stem bark extracts of *M. lucida* showed the most excellent activity against selected bacteria’s. The stage of the hang-up of bacteria was related to concentration of the plant extract, the solvent used for extraction and the organism tested. The minimum concentration of the active extract different with the organism. Activities of the crude plant extracts were equivalent to the standard antibiotics.

Sharma *et al.*, (2011) investigated the therapeutic potentials of crude ethanolic extracts from five plants viz., *Artemisia scoparia* plant, *Allium sativum* plant, *Glycinemax* plant, *Solanum dulcamara* plant and *Venidium decurrens* plant. These ethanolic plant extracts were evaluated against some pathogenic bacterial strains (gram positive and gram negative) using agar disc diffusion method. The ethanolic extracts of all the plants were found to be more or less active against almost all tested pathogenic strains. The inhibition zone and activity index varied in gram positive (IZ= 8mm- 30mm and AI= 0.57-2.5mm) and gram negative bacterial strains (IZ= 7mm- 20mm and AI= 0.46-1.36mm). *A. sativum* plant has the highest zone of clearing on *S. faecalis* (IZ= 30mm and AI= 2.5mm). The most excellent activity was seen against *G. max* plant and *V. decurens* plant. These plants extract were showed more or less similar activity against all the pathogens tested. The present investigations suggest that the plants studied could be useful for preparation of neutraceuticals as strong antibacterial agent to treat various human diseases and its complications.

Thakare *et al.*, (2004) investigated the antibacterial and feed additive potential of seven medicinal plants. In this conduct test Ethanol extracts of different medicinal plants including *Curcuma longa* plant (Turmeric), *Zingiber officinale* plant (Ginger), *Piper nigrum* plant (Black Pepper), *Cinnamomum cassia* plant (Cinnamon), *Thymus vulgaris* plant (Thyme), *Laurus nobilis* plant (Bay leaf), and *Syzygium aromaticum* plant (Clove) were tested. In this exploration they employ the disc diffusion method for their antimicrobial activity against the common poultry pathogens *E. coli*, *S. typhimurium*, *E.*
Review of Literature

faecium, and E. faecalis. The ethanol extract of Cinnamon extract (CE), at 130 mg/disc, exhibited antibacterial activity against E. coli, S. typhimurium, and E. faecalis. Thyme extract (TE), at 30 mg/disk, exhibited antibacterial activity against E. coli, E. faecium, and E. faecalis. While the remaining medicinal plant extracts showed no activity against selected microorganisms. The minimum inhibitory concentration (MIC) of the cinnamon and thyme was determined by the dilution method. The range of MIC value from 31.25 to 250 mg/ml. From this in vitro antibacterial study, cinnamon and thyme were selected for a 21-d feeding trial in broilers to study their influence on feed consumption, body weight gain, and feed conversion. These results suggested that cinnamon and thyme overcome antibacterial activity in vitro, and thyme has an activity that reduces body weight. Since cinnamon caused no significant change in body weight gain compared to positive or negative controls, it warrants further study as a substitute for antibiotics in the diet.

Jain et.al., (2010) carried out sequential extracts of some medicinally important arid zone plants of Rajasthan, viz. Lepidagathis trinervis Nees., Polycarpea corymbosa Lam. and Sericostoma pauciflorum Stocks. ex Wight. These arid zone plants were tested against six bacterial (Gram +ve and Gram –ve) and five fungal strains using agar well diffusion method. The Ethyl acetate extract of L. Trinervis showed maximum activity against Bacillus subtilis, Enterobactor aerogenes, Pseudomonas aeruginosa, Aspergillus flavus and Trichophyton rubrum (inhibition zone 16.00±0.81, 13.33±0.66, 14.33±1.85, 14.30±0.34 and 23.00±0.00 mm) at varied minimum inhibitory concentrations of 82, 20, 41, 41 and 20 μg/ml, respectively.

Kosanić et.al., (2012) investigated antioxidant, antimicrobial, and anticancer activity of the acetone extracts of the lichens Umbilicaria crustulosa, U. cylindrica, and U. polyphylla. Antioxidant activity was evaluated by five separate free radical scavenging, superoxide anion radical scavenging, reducing power, determination of total phenolic compounds, and determination of total flavonoid content. Of the lichens tested, U. polyphylla had major free radical scavenging activity (72.79% inhibition at a concentration of 1 mg/mL), which was similar as standard antioxidants in the same concentration. Moreover, the tested extracts had valuable reducing power and superoxide
anion radical scavenging. Total content of phenol and flavonoid in extracts was determined as pyrocatechol equivalent, and as rutin equivalent, respectively. The strong associations between total phenolic and flavonoid contents and the antioxidant effect of tested extracts were observed. The antimicrobial activity was estimated by determination of the minimal inhibitory concentration by the broth micro dilution method. The most active was extract of *U. polyphylla* with minimum inhibitory concentration values ranging from 1.56 to 12.5 mg/mL.

Anticancer activity was tested against FemX (human melanoma) and LS174 (human colon carcinoma) cell lines using MTT method. All extracts were create strong anticancer activity in the direction of both cell lines with IC (50) values ranging from 28.45 to 97.82 μg/mL. The present study shows that tested lichen extracts established a strong antioxidant, antimicrobial, and anticancer effects. That suggests that lichens may be used as probable natural antioxidant, antimicrobial, and anticancer agents.

Branco *et.al.*, (2012) examined that many commonly used medicinal plants may lead to the discovery of new drugs has encouraged the study of local knowledge of these resources. An ethno botanical survey of species traditionally used for the treatment of infectious diseases was undertaken in two areas of northeastern Brazil one in the Caatinga (dry forest) and another in the Atlantic Forest (humid forest). Initially, diffusion tests using paper disks and subsequently, for extracts presenting significant results (inhibition halos above 15 mm), minimum inhibitory concentrations were determined. The activity was evaluated as a percentage for each species, comparing the diameters of the inhibition halos and the number of positive results against the seven microorganisms studied. Extracts were classified into three categories: strong activity-species with halos exceeding 16mm, moderate activity-species with halos between 13mm and 15mm and low activity-species with halos below 12 mm.

Branco *et.al.*, (2012) Selected total thirty four species, twenty plants were selected from the Caatinga and fourteen plants were selected from the Atlantic Forest. In the
Atlantic Forest, 28.5% of the fourteen plants extract studied showed strong activity, with 14.5% having moderate activity and 28.5% having low activity. The microorganism that was most susceptible to the extracts from the Caatinga was *Mycobacterium smegmatis*; 85% of the species tested were able to inhibit its growth. The organism that was susceptible to the highest number of plant species (71%) from the Atlantic Forest was *Staphylococcus aureus*.

Madureira et al., (2011) reported that plants are known to play a crucial role in African traditional medicine for the treatment of infection diseases. Eighty-three polar and non-polar extracts from twenty two medicinal plants were screened for their antibacterial activity. These plants were selected against Gram-positive (*Staphylococcus aureus* and *Enterococcus faecalis*) and Gram-negative bacteria (*Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae*) and *Mycobacterium smegmatis* using the broth micro dilution method. The highest activity was obtained with the methanol extracts of the aerial parts of *Acacia karroo* Hayne (Fabaceae) and *Anacardium occidentale* L. (Anacardiaceae) and the roots of *Bridelia cathartica* G. Bertol (Euphorbiaceae), against *S. aureus* (minimum inhibitory concentration (MIC)=7.5 µg/mL). The same MIC values were exhibited against *E. faecalis* by the methanol extract of *A. occidentale*, the dichloromethane and methanol extracts of *B. cathartica* and the ethyl acetate extract of *Momordica balsamina* (Cucurbitaceae) leaves. In the results Gram-negative bacteria were less sensitive; the growth of *P. aeruginosa* was significantly inhibited (MIC=31 µg/mL) by the n-hexane and methanol extracts of *Gomphocarpus fruticosus* (l.) Ait. (Asclepiadaceae) fruits and by the dichloromethane extract of *Trichilia emetica* Vahl (Meliaceae) seeds. Most of the active extracts were rich in phenols/flavonoids.

Gautam et al., (2007) estimated that one-third of the world's population is infected with *tubercle bacillus* and the problem of tuberculosis (TB) has been intensified due to HIV pandemic providing a large reservoir of highly susceptible individuals. Since no anti-TB drugs have been introduced in past 30 years, there is an urgent need to search for
and develop new, effective and affordable anti-TB drugs. Interestingly, most of the plant species have shown strong positive ethno pharmacological association with the conventional knowledge. In addition, the recent in vitro screening methods for anti mycobacterial activity are also come into experimentation ,therefore in present work, highlight the promising plant species for further investigation as leads for drug development.

Mmushi et.al.,(2009) find out fifteen plant species and these plant species were collected from the Nelspruit Botanical Garden based on a list of plants provided by Phyto medicine Programme at the University of Pretoria and their ethno pharmacological information. For the screening of anti mycobacterial activity of Hexane, dichloromethane (DCM), acetone and methanolic extracts were used for anti mycobacterial activity against *Mycobacterium smegmatis*. In the results the acetone extract of *Milletia stuhlmannii* plant was the most active, showing activity against *Mycobacterium smegmatis* with minimum inhibitory concentration (MIC) value of 0.13 mg/ml. Acetone extracts for all plants had lower MIC values ranging between 0.11-1.25 mg/ml against *M. smegmatis* plant. *Milletia stuhlmannii* plant, *Albizia gummifera* plant, *Xanthocercis zambesiaca* plant and *Barringtonia racemosa* plant have shown great potential as anti-tuberculosis agents. They were active against *M. smegmatis* plant with average MIC values of acetone extracts of 0.13 mg/ml.

Newton et.al.,( 2000) found that tuberculosis is a chronic infectious disease caused by several species of mycobacteria. Due to multi-drug resistant strains of mycobacterium and to a high prevalence of tuberculosis in patients who have acquired human immunodeficiency syndrome (AIDS), the number of patients infected with the disease is increasing worldwide. Thus there is an urgent need for new efficient anti mycobacterial and antimicrobial agents to replace those currently in use. In this instance, the plant kingdom is undoubtedly a valuable source for new anti-tuberculosis agents. The present review based on findings from an extensive literature search of all plants that have been assessed for antimicrobial activity over the past years.
Hafidh et al. (2011) reported the continuous acceleration of resistant bacteria against a wide range of antibiotics necessitates discovering novel unconventional sources of antibiotics. B. oleracea L (red cabbage) is health-promoting food with proven anticancer and anti-inflammatory activities. However, it has not been researched satisfactorily for its antimicrobial activity on potential resistant pathogens. The methanol crude extracts of B. oleracea L plant was investigated for a possible anti-microbial activity. The screening method was conducted using disc diffusion assay against twenty two pathogenic bacteria and fungi. It was followed by evaluation of the minimum inhibitory concentration (MIC). Moreover, the antibacterial and the antifungal activities were confirmed using the minimum bactericidal concentration (MBC) and the minimum fungicidal concentration (MFC), respectively. Remarkable, antibacterial activity was evident particularly against highly infectious microorganisms such as Methicillin-resistant Staphylococcus aureus, Escherichia coli O157:H7, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus, and Salmonella enterica serovar Typhimurium as well as against human fungal pathogens, Trichophyton rubrum and Aspergillus terreus.

Red cabbage is a rich source of phenolic compounds, anthocyanins being the most abundant class, which might explain its potent antimicrobial action. This extract is potentially novel for future antimicrobials, inexpensive, and readily available at a large scale for pharmaceutical companies for further investigation and processing.

Obeidat et al. (2011) reported that new antimicrobial agents against multidrug resistant pathogens for the treatment of skin infections is of increasing interest. Therefore, the aqueous and ethanolic extracts from different parts of five medicinal plants used locally in folk medicine were evaluated for antimicrobial activity against the most frequent skin pathogens. It was found that most plant extracts studied had antibacterial and antifungal activities. The antibacterial activities with the best minimum inhibitory concentration (MIC) values were significantly produced by the aqueous extracts of Eminium spiculatum stems and Lupinus varius, seeds against Pseudomonas aeruginosa and by the ethanolic extracts of Mandragora autumnalis, fruits against Escherichia coli,
and Methicillin-resistant *Staphylococcus aureus* (MRSA). Whereas, the highest significant antifungal activity with the best MIC value was created by aqueous extracts of *L. varius* seeds against *Candida albicans*. However, leaf extracts of the tested plants were appeared to produce the least antimicrobial activity. It was concluded that the antimicrobial activity is associated with the used part of plant in addition to the type of solvent used for extraction. The antimicrobial effects of some plant extracts, in particular aqueous seed extracts of *L. varius* and ethanolic fruit extracts of *M. autumnalis*, may be used for the topical treatment of skin infections.

### 2.4. CHEMICAL CONSTITUENTS OF MEDICINAL PLANTS

Schultes *et al.*, (1978) suggested that a few herbs and spices used by human to season food give up valuable medicinal compounds.

Verkerk *et al.*, (1993) searched that *Azadirachta indica* Juss plant which is the member of Meliaceae family and the vernacular name of this plant is Neem. It is distributed wide spread in the world. The chemical constituents of Neem contains many biological active compounds that can be extracted from neem including alkaloids, flavonoides, triterpenoides, phenolic compounds cartenoides, steroids, and ketone. The azadirachitin compound is in point of fact a mixture of seven isomeric compounds labeled as azadirachtin A-G and Azadirachitin E is more effective, other compounds than azadirachtin that have a biological action are salammin, volatile oils, melantrial and nimbin.

Alghazali *et al.*, (1998) investigated that petroleum ether, methanol and aqueous extracts of the seeds of *Helianthus anuus* plant (Asteraceae), leaves of *Azadirachta indica* plant (Meliceae), bulbs of *allium cepa* plant (Liliaceae) and seeds of *Portulaca oleracea* plant (Portulacaceae) were screened for their anti microbial activity. It was screened using the plate agar diffusion method.

Yagoub *et al.*, (2001) suggested that these were tested against six bacteria: two Gram Positive bacteria (*Bacillus subtilis* and *Staphylococcus aureus*) and four Gram–negative bacteria (*E.coli, Proteus vulgaris, pseudomonas aeroginosa and Salmonella typhi*) and against two fungi (*Aspergillus niger and Candida albicans*). The vulnerability
of micro organism to the extracts of these plants was compared with each other and with selected antibiotics. The anti microbial activities of these plants were discussed according to their photochemical components.

Appleton et al., (2000) found out that the volatile oils of blackpepper, clove, merr & perry, geranium, nutmeg, oregano and thyme were assessed for antibacterial activity against twenty five different genera of bacteria. These include animal and plant pathogens food poisoning and spoilage bacteria. The volatile oils exhibited considerable inhibitory effects against all the organisms under test while their major components demonstrated various degree of growth inhibition.

Taguchi et al., (2005) investigated the consequence of clove (*Syzygium aromaticum*) administered by two different routes on *Candida albicans* growth using a murine oral candidiasis model. When the clove preparation was administered into the oral cavity of Candida –infected mice, their oral symptoms were improved and the number of viable Candida cells in the cavity was reduced. When the clove preparation was administered intra-gastrically, oral symptoms were not enhanced but viable cell numbers of *Candida* in the stomach and feces were decreased. These finding reveal that oral ingestion of an herbal food, clove, and may curb the overgrowth of *C. albicans* in the alimentary tract including the oral cavity. (Protection of oral or intestinal candidacies in mice by oral or intragastric administration of herbal food, clove (*Syzygium aromaticum*).

Arora et al., (2007) examined the antimicrobial activity of Aqueous extracts of six medicinal plants *Achillea tomentosa, Anthemis nobilis, Artemisia arboresceus, Convolvulus siculus, Savia triloba, Salvia indica* alongside some position strain of human pathogenic bacteria *Anethum graveolens, Elettaria cardamomum, Foeniculum vulgare, Trachyspermum ammi* and *Viola odorata* were establish to be improved efficient compared to standard antibiotics. The methanol leaf extracts of *Acacia nilotica* plant, *Sida cordifolia* plant, *Tinospora cordifolia* plant, *Withania somniferous* plant and *Ziziphus mauritiana* plant showed significant antibacterial activity against *Bacillus subtilis, E.coli, Pseudomonas fluorescens, Staphylococcus aureus, and Xanthomonas axonopodis PV, Malvacearum* and antifungal activity against *Aspergillus*
flavus, Dreschlera turcica and Fusarium verticillioides when compare to root/bark extracts. *A. nilotica* plant and *S. cordifolia* plant leaf extract showed maximum antibacterial activity against *B. subtilis* and *Z. mauritiana*.

Chopra *et al.*, (2000) searched that Morbidity and Mortality due to diarrhea carry on to be a chief trouble in many developing countries including, India, Bangladesh, espacilly amongst children illness due to a variety of bacterial etiologic agents such as pathogenic *E. coli, Vibrio, Areomonas Shigella, Salmonella, Pseudomonas* are most common. However antibiotic resistance is a major clinical problem in treating infection caused by these micro organisms.

Raoks *et al.*, (2000) find out that many voluntarily accessible plants in India are used in folklore medicine for the treatment of gastrointestinal disorders, such as cholera, diarrhea and dysentery. These plants are used by the indigenous people in different parts of India for the treatment of infectious disease such as cholera, diarrhea, dysentery and other gastrointestinal disorders.

Acharyya *et al.*, (2009) evaluated the methanol extracts of plants which are conventionally used in different parts of India were screened for antibacterial activity against eleven strains of enter pathogenic bacteria. Including multi drug resistant *vibrio cholera*, (serotypes 01, 0139, non01, non-0139, using broth micro dilution method, Ampicillin was used as a positive reference standard to determine the sensitivity of the strains. Phyto chemical screening was carried out for phenolics and flavonoids.

Degroot *et al.*, (1998) find out that extensive use of antibiotics against acne is obsolete because of exacerbated antibiotic resistance. Twelve medicinal plants, which have been traditionally used as antimicrobial and anti-inflammatory agents were examined for antimicrobial activities against microorganisms frequently involved in acne inflammation, *Propionibacterium acnes* and *Staphylococcus epidermidis*.

Badi *et al.*, (2008) evaluated that the Borage (*Borago Officinalis L.*) which is an annual herbaceous plant. Which is well suited for crop growing is certain countries of the world. Borage seeds and other parts of this plant have valuable fatty acid predominantly Gamma linolenic acid. This compound has probable to stop cardiovascular disease,
cancer and infectious disease. So it was subjected that borage could be a Power Food of the future. It is one of valuable medicinal plant.

2.5. ANTIOXIDANT ACTIVITY OF MEDICINAL PLANTS:

Sayanovo et al., (2008) investigated that free radicals are concerned in many disease. The free radicals are assault the unsaturated fatty acids in the bio membrane resulting in membrane lipid per oxidation which is powerfully connected to aging, carcinogenesis and atherosclerosis.

Floyd et al., (1900) analyzed that the free radicals also attack on DNA and cause mutation leading to cancer. In the processing and storage of food Lipid per oxidation is an important deterioration reaction. From the plant Caryopteris incano isolated the potent radical scavenging Philinoside A and four other Phenylpropenoid glycosides, and additional fractionation of radical scavenger has led to the isolation of four other active glycosides. These were recognized as three new phenylethanoid glycosides, incanoside C Incanoside D and Incanoside E and one known compound, B-D fructo furanosyl etc.

Yang. et al., (1993) find out that Green and black or fermented tea acquire a variety of natural pharmacological and anti cancer effects and these are addicted worldwide. The indigenous Aspalathus linearis that forms part of the vegetation in southwestern regions of the Western cape of Africa is cultivated for production of rooibos. Rooibos is herbal tea that is commonly consumed in South Africa and also attracts interest from consumer elsewhere.

Rabe et al., (1994) searched that use of rooibos tea extracts reduces the number of chromosome aberrations in chiense Hamster ovary (CHO) cells treated with benzo pyrene.

Yang.et al., (1993) searched that in green and black tea flavonol compounds epigallo and epicatechins components are accountable for the biological effect. The poly phenolic constituents of rooibos is aspalathin represent one of the major compound in unfermented rooibos (Joubert 1996) differ from green and black tea.
Gadow et.al.,(1994) told that the *Aspalathin* show evidence of potent antioxidant activity in various test system not together from the antioxidant effects very little is known about other anticancer properties including the anti mutagenic and anti proliferative activities of tea.

Aqil et.al.,(2006) searched that a large number of medicinal plant and their constituents shown the precious restorative potentials. Various herbs and spices have been reported to demonstrate antioxidant activity including *Ocimum sanctum. Piper cubeba Allium satiyum Linn. Terminalia bellerica. Camellia sinensis Linn. Zingiber officinale roscoe* and several Indian and Chinese plants. The greater part of the antioxidant activity is due to flavones, isoflavona, flavonoids, anthocyanin, coumarin lignans, catechins, and isocatechins. Piper species were assessed for their antioxidant potential these are commonly used in diet and traditional medicine. Catalase activity predominated in *Piper longum Linn. Pipr cubeba linn. green pepper, Piper brachystachyum Linn. and Piper nigrum Linn.*

Rani et.al., (2003) reported that Black pepper was richest in glutathione peroxidase, and glucose -6 phosphate dehydrogenase, green pepper was richest in peroxidase and vitamin C. The antioxidant and radical scavenging activities of black pepper (piper nigrum Linn.) seeds have been well reported. (Gulcin et.al.,2005) both water extract and ethanol extract of black pepper exhibited strong anti oxidant activity.

Aqil et.al.,(2006) evaluated that the cloves (*piper cubeba Linn.*) are usually used in family unit spice, it posses the antioxidant ,superoxide, dismutase and Catalase activities. The Cardamom spice consists of whole or ground dried fruit of *Elettaria Cordarmomum* Linn. Maton, an herbaceous perennial of the ginger family (zingiberaceae) contains essential oils. It has been conventionally used to treat skin condition and dyspepsia. Cardamom oil is also used in decorative because of its cooling properties and spices and herbs are recognized as sources of natural anti oxidants and this play an important role in the chemoprevention of disease and aging. Free radical scavenging activity was evaluated in vitro using 1-1-diphenyl 2-picryl –hydroxyl (DPPH) free radicals.
Yeum et al., (2003) searched that the Consumption of fruits and vegetables is revealed to lesser the hazard for chronic disease, such as cancer, cardiovascular disease and stroke. The positive health effects may be due to high content of certain Phenolic compounds in plant derived foods. Their effects on human health have been intensively studied. A search for antioxidants, hypoglycemic agents and anticancer agents in vegetables, fruit, teas, spices and medicinal herbs has involved immense consideration.

Warrier et al., (1996) find out that the Syzygium cumini骷髅 has been documented in the Indian folklore medicine system to have several medicinal properties. The bark of the plant is caustic, sweet, refrigerant, carminative, diuretic, digestive, antihelmenthic, febrifuge, constipating, Stomachic and antibacterial. The fruits and seeds of Syzygium cumini are used to treat diabetes, pharyngitis, spleenpathy, urethrorrhea and ringworm infection. The leaves have been broadly used to treat diabetes, constipation.

Bhandary et al., (1995) find out that in plant Acetyl Oleanolic acid, triterpenoids, ellagic acid, isoquercitin, quercetin, kaempferol and Myricetin set up in various concentration (Rastogi et al., 1990). Most of these compounds have been reported to own antioxidant and free radical scavenging activities.

Tanaka et al., (1998) considered the chemical composition and antioxidant activity of S. cumini fruits. (Benherlal et al. 2007; Banerjee et al., 2005).

2.6. ANTI TUMOR ACTIVITY OF MEDICINAL PLANTS

Balasubramanian et al., (1994) screened the anti cancer activity of two bioflavonoid e.g. luteolin and quercetin. They found that luteolin and quercetin have the domination to diminish the explosion of cells in human carcinoma of larynx and sarcoma-180 cell lines. (Rao et al., 1997). The Phenanthroindolizidine alkaloids pergusonanine and tylophorinidine which were isolated from Pergularia pallida (Roxb.) Wight & Arn. (Asclepiadaceae) repressed the growth of Lactobacillus leichmannii cells by binding to thymidylate synthetase Withanolides, In roots and leaves of Withania somnifera Dunal (Solanaceae) the active constituents of are present in group of pharmacologically active compounds. The withanolides are basically steroidal lactones. Withanolides are similar to ginsenosides in structure and activity. They are invented to be
immunomodulatory, which most almost certainly accounts for anticancer activity. Withaferin-A is best studied withanolide (Ali et al., 1997).

Badami et al., (2003) investigated the free radical scavenging, anti-tumor and anti-carcinogenic activity of gossypin. Antitumor activity of total alkaloid fraction of Solanum pseudocapsicum L. (Solanaceae) leaves has been reported.

Devi et al., (1999) find out that Plumbago rosea contains plumbagin, and napthoquinone has shown anti tumor activity in animal. The antitumor and radimodifying properties of plumbagin were experienced on mouse Ehrlich ascites carcinoma. Plumbagin produced inhibition of exponentially growing tumors. When radiation was communal with plumbagin, mouse survival was increased by 120 days. However mode of action of anti cancer activity of plumbagin remains unclear.

Schwartsmann et.al., (2001) suggested that Anticancer agents may be imitative from nature (through isolation of active lead compounds). There are examples of successful drugs obtained from plant sources which had a profound impact in the field of cancer. Indeed, the medical armamentarium is rich in examples of important agents that were isolated from plants and which continue to be used in current, routine clinical practice.

Daniel et.al.,(2005) searched that Ochnaceae is a large family of tropical plants. It has been identified in South America. The plant Ouratea and Luxemburgia genera shows occurrence of biflavonoids (Werle et.al.,2000). Biflavonoids from Ouratea have been found to possess cytotoxic and antitumor activities. (Carvalho et.al.,2000) as well as the capacity to inhibit DNA topoisomerases. (Grynberg et. al.,2005; Lee et.al., 1999). Flavonoids involve an important group of naturally going on, bioactive polyphenolics, ubiquitous in plants of higher generation. Recent interests on flavonoids have largely focused on two different aspects. The first concerns their various biological activities, (Ren et.al.,2003) the second relates to their anti carcinogenic properties (Siess et.al.,2000).
Dhanukar et al. (2000) find out that species of Caltrops are generally recognized as the Swallow Wort, or milk weed and Caltrops belong to the family Asclepiadeace. Calotropis is observe as useful medicinal plant and used in folk medicine. The latex of Caltrops procera has been extensively studied and shows the cytotoxic, procoagulant, anti-inflammatory, abortifacient activities.

Mhaskar et al. (2000) investigated that the root bark of C. procera contains akundarol, isovalerate, mundarol isovalerate and quercetin-3-rutinoside. The roots contain compounds called oxypregnaneoligoglycosides or steroidal lactones.

Ali et al. (1996) explained that these compounds are in a group called as Caltropsides and roots contain calotroposides C, D, E, F, and G. (Smith et al., 1995) searched that the Alcoholic extract of root has been investigated for anti cancer activity against a board of human and mouse cell lines.

Stevia Rebaudiana is the members of Asteraceae family commonly known as Honey leaf, Candy leaf, and sweet leaf. It is affluent in terpenes and flavonoids. The austroinullin, B carotene, dulcoside, nilacin rebaudi oxides, riboflavin, steviol, tannins, Phytochemicals are present in Stevia rebaudiana. These Phytochemicals play a vital responsibility in put off colorectal cancer and other cancer. Stevia has important industrial uses in beverages, energizers as well as medicinal uses such as low uric acid treatment, vasodilator, cardiotonic, anesthetic and anti inflammatory.