2. Review of Literature

Abubakar (2009) The herb *Euphorbia hirta* can be used as source of oral drugs to fight infections caused by susceptible bacteria.

Alagesaboopathi (2009) The current research deals with the ethnomedicinal plants of Kumaragiri Hills of Salem district, Tamilnadu. The scientific name, vernacular name, family, part used and traditional practice of 80 species, 65 genera and families are discussed here for the treatment of various ailments. The dicotyledons are represented by 73 species of 58 genera and 37 families while monocotyledons are represented by 7 species of 7 genera and 4 families. 91.25% dicotyledons and 8.75% monocotyledons were encountered.

Barlow *et al.* (2012) The existing databases that catalogue information on traditional Chinese medicines are reviewed in terms of their content and utility for *in-silico* research on Chinese herbal medicines, as well are the various protein database resources and the software available use for such studies. The software available for bioinformatics and 'omics studies of Chinese herbal medicines are summarised, and a critical evaluation given of the various *in-silico* methods useful in screening Chinese herbal medicines, including, neural networks, support vector machines, classification trees, docking and inverse docking algorithms. Recommendations are made regarding any future *in-silico* studies of Chinese herbal medicines.

Bharatham *et al.* (2007) The Pharmacophore models for lymphocyte specific protein tyrosine kinase (P56 LCK) were developed using CATALYST HypoGen with training set comprising of 25 different P56 LCK inhibitors. The compounds with good estimated activity and docking scores were evaluated for physiological properties based on Lipinski's rules. Finally 68 compounds satisfied all the properties required to a successful inhibitor candidate.

Boobis *et al.* (2002) The computational move toward is one of the newest and fastest developing techniques in pharmacokinetics, drug discovery and toxicity, ADME (absorption, distribution, metabolism, excretion) evaluation.

Though, to date, the software packages faithful to ADME prediction, particularly of metabolism, have not yet been adequately validated and still require improvements to be effective. Most are 'open' systems, under constant evolution and able to incorporate rapidly and new information from user or developer databases. Quantitative *in silico* predictions are probable for several pharmacokinetic (PK) parameters, particularly absorption and distribution. The promising consensus is that the predictions are no worse than those made using *in vitro* tests, with the decisive advantage that much less investment in technology, resources and time is required. In addition it is possible to screen virtual compounds. Some packages are capable to handle thousands of molecules in a few hours. Though, common experience shows that, in part at least for essentially unreasonable reasons, there is currently a lack of confidence in these approaches. An effort should be made by the software producers towards more transparency, in order to improve the assurance of their customers. It seems highly probable that *in silico* approaches will evolve rapidly, as did *in vitro* methods during the last decade. Past experience with the latter should be helpful in avoiding repetition of similar errors and in taking the necessary steps to ensure effective implementation. A general concern is the lack of access to the large amounts of data on compounds no longer in development, but still kept secret by the pharmaceutical industry. Controlled access to these data could be particularly helpful in validating new *in silico* approaches.

Cowan (1999) This review challenge to summarize the current status of botanical screening efforts, as well as *in vivo* studies of their effectiveness and toxicity. The structure and antimicrobial properties of phytochemicals are also addressed. Because many of these compounds are currently available as unregulated botanical preparations and their use by the public is increasing rapidly, clinicians need to consider the consequences of patients self-medicating with these preparations.

Dabur *et al.* (2007) The antimicrobial potential of 77 extracts from 24 plants was screened against 8 bacteria and 4 pathogenic fungi, using microbroth dilution assay. Lowest concentration of the extract, which inhibits any visual

microbial growth after treatment with p-iodonitrotetrazolium violet, was considered to be minimum inhibitory concentration (MIC). Water extracts of *Justicia zelanica, Acacia nilotica, Lantana camara* and *Saraca asoca* exhibited good activity against all the bacteria tested and the MIC was recorded in range of 9.375-37.5 μg/ml and 75.0-300.0 μg/ml against the bacterial and fungal pathogens, respectively. The other extracts of *Phyllanthus urinaria, Saraca asoca, Thevetia nerifolia, Acacia nilotica, Jatropha gossypifolia, Chlorophytum borivilianum, Tamarindus indica, Aegle marmelos, Mangifera indica, Woodfordia fruticosa and Phyllanthus emblica* showed antimicrobial activity in a range of 75-1200 μg/ml.

Deore and Khadabadi (2010) The roots of *C. borivilianum* contain three important common sterol, fatty acids, stigmasterol and 1 furostanol saponins.

Dhanalekshmi *et al.* (2010) This research is to explore the wound healing and antimicrobial effects of crude ethanolic extract of whole plant of *E. alsinoides* L., (*Convolvulaceae*).

Ekins *et al.* (2007) The *in silico* pharmacology model is ongoing and presents a rich array of opportunities that will assist in expediating the discovery of new targets, and ultimately lead to compounds with predicted biological activity for these novel targets.

Faparusi *et al.* (2012) *B. patula* is a medicinal plant used for different ailments in Africa. antibacterial potential and Phytochemical constituents of the plant were investigated. The ethanolic extracts were active against all the 5 pathogenic bacteria while the methanolic extract inhibited all the test bacteria but *S. aureus***.** The methanolic and ethanolic extracts of *B. patula* contained a good number of bioactive chemical constituents including alkaloids, , terpenoids, glycosidessteroids, tannins, flavonoids, and saponins. The extraction solvents played significant role in the phytochemical constituents of the extracts. The number of phytochemicals identified in the extracts, methanol was a better solvent. Ethanolic extract was more active against all the test organisms. Leaf extract of *B. patula* could be a novel source of antibacterial agents that might have broad spectrum activity.

Golbabaei *et al.* (2013) *Boswellia carterii have* been used in traditional medicine for several years for management different gastrointestinal disorders. In this study, we wish to report urease inhibitory activity of four isolated compound of boswellic acid derivative. The inhibition potency is probably due to the formation of appropriate hydrogen bonds and hydrophobic interactions between the investigated compounds and urease enzyme active site and confirms its traditional usage.

Goud *et al.* (2008) Antibacterial activity and phytochemical tests of 8 whole plant methanol extracts belong to family *Euphorbiaceae* were evaluated. In agar well diffusion assay the diameter of inhibition zones ranged from 3–13 mm. *P. emblica* showed maximum activity. The MIC and MBC observed were *P. piscatorum* and *P. emblica* showed the lowest MIC, *P. emblica* the lowest MBC and thus an effective inhibitor of the tested bacteria. Alkaloids, tannins and saponins were detected in 7 out of 8 tested plants.

Haque *et al.* (2011) The common use of *C. borivilianum* as a rasayana drug. The efficiency of methanolic extract of *C. borivilianum* in treating pain is observed. *Chlorophytum tuberosum* Baker usually referred as Musli has been widely used as a potent Rasayana drug in Ayurveda as a rejuvenator and tonic. An plumpness control agent with healthrestorative and health-promotional benefits to humans comprising the extract of *Chlorophytum* species, more particularly, *C. arundinacceum*, is disclosed. The efficacy of *C. borivilianum* root (powder) in modulating the hyperlipaemic/hypercholesteraemic conditions in male albino rats. The whole root powder of *Chlorophytum borivilianum* was administered in two dose i.e. 0.75 and 1.5 g root powder/rat per day for 4 weeks to hypercholesteraemic rats.

Hryniewicz *et al.* (2001) There is increasing resistance among urinary tract pathogens to predictable drugs. The aim of this study was to obtain data on susceptibility patterns of pathogens guilty for urinary tract infections in Poland to currently used antimicrobial agents. The most common aetiological agent was *E. coli* (73.0%), followed by *Proteus* spp. (8.9%) and other species of *Enterobacteriaceae* (9.6%). Few community infections were caused by Gram-positive bacteria (2.2%). Gram-positive cocci were isolated more

normally from a hospital setting (14.1%) and the most common were *Enterococcus* spp. (8.5%). *P. aeruginosa* was found only among hospital isolates and was responsible for 10.7% of infections. *E. coli* isolates from both community and hospital infections were highly susceptible to many antimicrobial agents with the exception of those isolates producing extendedspectrum lactamases (ESBLs). All of Enterobacteriaceae tested, 38 strains (6.9%) were capable of producing ESBLs.

Jaryal *et al.* (2012) Aqueous leaf extracts of *E. hirta, E. suaveolens* and methanolic leaf extract of *Thevetia peruviana* showed antibacterial activity against extended spectrum beta lactamase (ESBL) producing bacteria *E. coli, Pseudomonas, Klebsiella, MRSA (methicillin- resistant staphylococcus aureus), Salmonella, and Proteus.* Methanolic leaf extract of *Thevetia peruviana* showed highest antibacterial activity against *Klebsiella, E. coli* (15mm, 14mm) respectively and significant against other. While *E. hirta, E. suaveolens* showed least antibacterial activity against all these bacteria. The main purpose of the study is to eliminate the urinary tract infection problem across the world by using medicinal plants.

Kandalkar *et al.* (2009) *E. hirta* linn.(Euphorbiaceae), a pantropic herbaceous wild plant which has been used in some countries as an antidiarrhoeal, antidiuretic, also as a treatment of expectorant and also remedy for asthama, bronchitis, intestinal ailments of children and for various skin diseases.

Kandalkar *et al.* (2010) The Extract from the leaves of *E. hirta* was investigated for antioxidant activity. *E. hirta* Linn. Showed *In-vitro* and *In-vivo* potent antioxidant activity may be responsible for its wide and popular traditional use.

Kapetanovic *et al.* (2008) Generally drug discovery and development are very time and resources consuming processes. There is an ever growing effort to apply computational power to the combined chemical and biological space in order to streamline drug discovery, design, development and optimization.

It is predictable that the power of CADDD will grow as the technology continues to evolve.

Kensav (2011) The antibacterial activity of leaves, stems and roots extracts of *L. camara* L. were evaluated using Soxhelt extraction method. Methanol, Petroleum ether, water and Chloroform were used as solvents in arrange to get the plant extract. The antibacterial activity was done by using disc diffusion. Technique against pathogenic bacterial species of *E. coli, P. aeruginosa, S. aureus and S. saprophiticus.* The diameter of inhibition zone was measured in millimeters. Leaves were showed strong inhibition compared to stem and root extracts on all tested bacteria. Phytochemical screening revealed that leaf, stem and root of *L. camara* contained saponin, tannin, steroids, catachin, alkaloids, anthroquinone, phenol, protein and reducing sugar.

Khond *et al.* (2009) Antimicrobial activities of fifty five plant extracts were evaluated against 12 microbial strains using macrobroth dilution assay. 21 extracts exhibited antimicrobial activity against the tested microorganisms in range of 0.20 to 6.25 mg/ml. Extracts from *M. longifolia, P. biglandulosa, P. acerifolium* showed highest antimicrobial potential among the tested plants (MIC 0.20-12.5 mg/ml). Bio-assays showed presence of multiple specifically active compounds at different R_f values in various plant extracts. Acetone and ethanol extract of *M. longifolia, P. biglandulosa, P. acerifolium* shows greater antibacterial activity as compared to their water extracts and could be the potential source to develop new antimicrobial agents.

Kumar *et al.* (2010) Thus, our study shows that oral administration of *E. hirta* flower extracts in alloxan diabetic mice showed antidiabetic effects. The extracts also exhibit *in vitro* antioxidative effect. Phytochemical and pharmacological investigations are needed to isolate and identify the active constituents responsible for the activity.

Kunwar *et al.* (2010) Even if traditional herbal medicine is only a primary means of health care in far-west Nepal, the medicine has been follow indigenously with complementing pharmacology and the Ayurveda. So,

further pharmacological evaluation of traditional herbal medicine deserves more attention.

Mahalingam *et al.* (2011) The bacteria organisms were isolated from drinking water (*Bacillus, Borchothrix, Clavibacter sp, Anguslobacter sp, and Brevi bacterium*). Selected Indian medicinal plants *Strychnos nuxvomica* and cassia angustifolia were selected for antibacterial studies. The solvents used for the extraction of plant roots were n-butanol, ethyl acetate and distilled water. The *in vitro* antibacterial activity was performed by agar well diffusion method. The most susceptible Gram-Postive bacteria was *Bacillus sp, Brevibacterium sp,* and the most susceptible Gram-negative bacteria was *Borchothrix sp, Clavibacter sp,* and *Ancylobacter sp.* The extracts of plant *Strychnos nuxvomica* and *Cassia angustifolia* inhibited the growth of the bacterial strains investigated. The most active extracts were compared with the standard antibiotics, pencillin, Streptomycin and Ampicillin 100mg/disc). The results obtained in the present study suggest that *Strychnos nuxvomica* and *Cassia angustifolia* could be used in treating diseases caused by the test organisms. The results are discussed in detail.

Morales *et al.* (2008) The antimicrobial activities of aqueous, ethanol and chloroform extracts of 3 *Baccharis* species currently used in Northern Chile folk medicine for the treatment of several infectious and inflammatory disorders were tested against Gram +ve and -ve bacterial and fungal spp. using the agar-disc diffusion assay. The results specify that the activity was more pronounced against Gram+ve than against Gram-ve bacteria and yeast. No significant differences on the antibacterial activity were observed in the aqueous, ethanol versus chloroform extracts. None of the plant extracts evaluated exhibited any activity against ten fungi tested.

Ogueke *et al.* (2007) Leaves of *Euphorbia hirta* used in traditional medicine for the treatment of wounds, boils and control of diarrhoea and dysentery was extracted by maceration in ethanol.

Okimoto *et al.* (2009) The molecular dynamics simulations to virtual screening for lead discovery is both effective and practical. Though, further

optimization of the computational protocols is required for screening various target proteins.

Omogbai *et al.* (2011) The *in vitro* antibacterial activity of ethanolic and aqueous extract of the whole plant of *E. alsinoides* was investigated on gram +ve and gram-ve bacteria by agar well diffusion technique. The results indicate that alkaloids, glycosides, tannins, saponins, flavonoids and volatile oil were better extracted in ethanol than water.

Panghal *et al.* (2011) Treated oral cancer patients were neutropenic and prone to secondary infection of microbes. The medicinal plant can confirm as effective antimicrobial agent to check the secondary infections in treated cancer patients.

Patel and Patel (2012) *A. indica* Linn. as an random use of antimicrobial drugs in the treatment of infectious diseases, microorganisms have developed resistance to many antibiotics. There is require to develop alternative antibiotic drugs from plants. One approach is to screen local medicinal plants, which represent rich source of novel antimicrobial agents. In work an effort has been carried out to evaluate anti-HIV, anti-cancer, anti-malarial and anti-TB action of such species. Medicinal plants containing natural and its synthesize chemical compound fit in to two research targets (Mitogen-activated protein kinase for cancer and Thymidine monophosphate kinase for TB) and two successful targets (HIV protease for HIV and Enoyl-ACP reductase for malaria). Beside that ligand library compounds were also examined for drug likeness. Molecular docking studies were carried out with docking programmed. The result indicates ligand CID_5281601 and CID_79730 and as best from library for further study. The synthesize chemical compound having best score comparison to the natural chemical compound present in the *Anisomeles indica* Linn. wild medicinal plant.

Patel and Patel (2012) *Euphorbia hirta* L. it is wild ethnomedicinal plant is used by the tribes and local people of North Gujarat area as local medicine and proven pre-clinically for anti-inflammation, asthma, wound healing and diarrhea. It has antioxidant activity also. In present work an attempt has been

carried out to evaluate anti- HIV, anti-malarial, anti-cancer and anti-TB action of such species. Medicinal plants containing natural and its synthesize chemical compound belonging to two research targets (Mitogen-activated protein kinase for cancer and Thymidine monophosphate kinase for TB) and two successful targets (HIV protease for HIV and Enoyl-ACP reductase for malaria). Beside that ligand library compounds were also examined for druglikeness. Molecular docking studies were carried out with docking programmed. The result indicates ligand CID_7057976 as best from library for further study. The synthesize chemical compound having best score comparison to the natural chemical compound present in the *Euphorbia hirta* L. wild medicinal plant.

Pathak *et al.* (2010) The solvents used for the extraction of plants were aqueous and methanol. The *in vitro* antibacterial activity was done by agar cup method. The most susceptible Gram +ve bacteria was *B. subtalis* and *S.aureus* while the most susceptible Gram-negative bacteria was *K. pneumoniae* and *P. vulgaris*. The significant antibacterial activity of active extracts was compared with the standard antibiotic streptomycin (100 ppm). The results obtained in the study suggest that *A. muricata* can be used in treating diseases caused by the test organisms.

Patil *et al.* (2009) *Euphorbia hirta* has been reported as increase in urine output, antidiarrheal, antispasmodic, anti-inflammatory etc.

Perumal *et al.* (2012) *Euphorbia hirta* has been used widely in traditional Malay medicine as a treatment against infectious pathogens. Based on the broad spectrum antimicrobial activities exhibited by this plant, we believe this report validates the safe use of this plant in ethnomedicine for treating various infectious diseases.

Pitchai *et al.* (2010) Drug discovery from plants involves a multidisciplinary advance combining ethnobotanical, phytochemical and biological techniques to provide us new chemical compounds (lead molecules) for the development of drugs against various pharmacological targets, including cancer, diabetes and its secondary complications.

Polani *et al.* (2013) The medical plants are widely used by the traditional medicinal practitioners for curing various diseases. The present study aims at evaluate the phytochemical properties and antioxidant sensing activity of the fruit H*elicteres Isora*. For this the fruit parts of the plant were chosen and extracts were prepared using methanol and ethanol. Phytochemical qualitative screening revealed the presence of compounds such as alkaloids, glycosides, carbohydrates, amino acids, saponins, proteins, and flavonoids. The antioxidant activity of the plant extracts were performed by DPPH method. The free radical scavenging activity was measured spectrophotometrically as maximum fading power of DPPH at 517nm. All extracts showed different level of antioxidant activity. Molecular docking studies was also done to study the mechanism of action of the active compounds present in the fruit.

Premanath and Devi (2011) *Andrographis paniculata* Nees. is an important medicinal plant in India which is used in traditional medicine. So, in this study we evaluate the antibacterial, antifungal and antioxidant activities of *A. paniculata* leaves in different solvent extracts. *A. paniculata* leaves were extracted with chloroform, hexane, methanol, ethanol and water separately and phenol and flavonoid contents were estimated in these extracts. The antibacterial and antifungal activity studies were carried out by using disc diffusion method and mycelial dry weight method respectively. Ferrous reducing antioxidant power assay, 1, 1-diphenyl-2-picryl hydrazyl (DPPH) scavenging activity, lipid peroxidation inhibitory activity and superoxide scavenging activity were used for *in vitro* antioxidant activity studies. *A. panicualta* ethanol leaf extract showed the highest phenol and flavonoid contents of 64.82 mg/g and 0.87 mg/g respectively. The highest antibacterial activity was recorded in the ethanol extract with Minimum Inhibitory Concentration (MIC) values of 0.75 mg/ml for *Pseudomonas aeruginosa* and 1.0 mg/ml for *Staphylococcus aureus.* MIC values of 1.75 mg/ml and 3.0 mg/ml were recorded for *Epidermophyton floccosum* and *Trichophyton rubrum* in ethanol extract. Antioxidant activity was more in ethanol extract, which showed Inhibitory Concentration (IC50) values of 0.5 mg/ml, 0.1 mg/ml and 0.9 mg/ml for DPPH scavenging activity, lipid peroxidation inhibitory activity and superoxide scavenging activity respectively. The result

indicates that ethanolic leaf extract of *A. paniculata* shows potent antibacterial, antifungal and antioxidant activities.

Priyavardhini *et al.* (2012) Qualitative and quantitative phytochemical analysis and antibacterial activity of hexane, petroleum ether, chloroform, acetone and methanol extracts of *C. epigaeus* leaf, stem and tuber against various pathogens such as *S. aureus, E. coli, K. pneumoniae, S. marcescens* and *P. aeruginosa* by disc diffusion method were analyzed in the present study. Phytochemical analysis recorded positive results for alkaloids, flavonoids, phenols, tannins, steroids, saponins, glycosides and terpenoids. Among the various extracts, methanol extracts of the investigated plant parts of *C. epigaeus* were found to more effective against all the tested pathogens. The results of the study covered most valuable information and also support the continued sustainable use of these plants in traditional systems of medicine.

Prusti *et al.* (2008) The extracts were screening of *in vitro* antibacterial activity against selected UTI causing pathogens viz. *S. aureus, P. aeruginosa*, *P. mirabilis*, *E. faecalis* and *E. coli* at the concentrations of 500 and 250 µg/ml by disc diffusion assay method. The results of antibacterial activity revealed that all the extract showed good inhibitory activity against all the tested pathogens and the ES extract showed comparative by better activity than the other extracts. The activity of the extract were compared with standard antibiotics.

Raja *et al.* (2011) The present study explain the antimicrobial activities of boswellic acid molecules against oral cavity pathogens. Acetyl-11-keto-β-boswellic acid (AKBA) can be valuable compound for the development of antibacterial agent against oral pathogens and it has great potential for use in mouthwash for preventing and treating oral infections.

Ramesh *et al.* (2010) The present study revealed the immunomodulating potential of an Indian medicinal plant *Euphorbia hirta*. This plant's immunomodulatory potential has not been reported thus far to our knowledge. However, antibacterial activity of this plant has been reported.

Rao *et al.* (2012) The antibacterial activity of *Anisomeles indica* extract and its isolated constituents against *Helicobacter pylori* growth were examined. Along with tested, ethanol extract, pure constituents ovatodiolide (OVT) followed by acteoside, isoacteoside, and terniflorin showed potent antimicrobial activity. OVT demonstrated bactericide activity against *H. pylori* reference, as well as multidrug-resistant strains. On the other side, *in vitro H. pylori* infection model revealed that OVT inhibited the *H. pylori* bacteria adhesion and invasion to human gastric epithelial (AGS) cells. In adding up, OVT inhibited the *H. pylori* induced inflammatory response by the reduced nuclear factor (NF)-kB activation and interleukin (IL)-8 expressions in *H. pylori* infected AGS cells. Moreover, OVT attenuated the cytotoxin-associated gene A (CagA) functions by reduced CagA translocation, phosphorylation, and caused hummingbird phenotype of AGS cells. These results specify that OVT might be useful as food supplement or drug development for *H. pylori* complications.

Sahoo *et al.* (2012) The phytochemical and antimicrobial activity of crude methanol and chloroform extract of two different plant species such as *Morinda tinctoria* Roxb. and *Morinda citrifolia* L. belonging to the genus Morinda were analysed. In phytochemical analysis, the methanol extract of leaf and stem was found to contain all the phytoconstituents such as alkaloid, glycoside, steroid, triterpenoid, tannin, carbohydrate, protein and flavonoids etc. Whereas in antimicrobial study, *Morinda citrifolia* L. was found to be active against most of the test pathogens such as *Klebsiella pneumoniae, Proteus mirabilis, Escherichia coli, Salmonella typhii, Staphylococcus aureus, Salmonella paratyphii, Pseudomonas aeruginosa, Chromobacterium violecum, Micrococcus leuteus, Pseudomonas aquatum, Aspergellus niger, Aspergillus fumigatus, Candida albicans, Rhizopus oryzae, Sclerotium* sp., *Helminthosporium* sp., and *Curvulari*a sp. Maximum antibacterial activity was found against *K. pneumoniae* (20mm), in the leaf extract of *M. citrifolia* whereas maximum antifungal activity was found against *R. oryza*e (18mm) in both plant parts. The MIC values are less than 5-6mg/ml for each extract against pathogens. The result highlights that the studied plants are potential

sources of phytochemical constituents and antimicrobial agents which needs further pharmacological screening for drug development programme.

Sanghani *et al.* (2012) Cyclin dependent kinases are critical molecules that control cell cycle progression from one phase to the other. However, mutational changes in these molecules lead to the purturbed cell cycle leading to uncontrolled cellular proliferation or cell death. In humans, mutations in cyclin dependent kinase 2 (1GII) is responsible for nearly 50% of cancers. In this paper preliminary in-silico screening were performed of natural polytriterpene phytochemical that are thought to have potential to inhibit mutated 1GII. Out of the two triterpenes boswellic acid and ursolic acid, boswellic acid shows inhibition activity with 1GII. From this study we propose that boswellic acid is promising towards oral cancer than ursolic acid.

Sankaranarayanan *et al.* (2010) The study of ethnobotanical was carried out along with the ethnic groups in the South Western Ghats of India. The conventional ethno medicinal plants were mostly used for dysentery, fever, poison bites, skin diseases, piles, wounds and rheumatism. The medicinal plants used by traditional users of Villupuram district are arranged alphabetically followed by botanical name, family name, local name and major chemical constituents, parts used, mode of preparation and medicinal uses.

Saraf *et al.* (2011) Butanolic extracts of 2 different *Cinnamon* species (*C. zeylanicum*; Commercial variety and *C. flexuous*; Wild variety), were investigated for their *in vitro* antibacterial activity. Maximum inhibition was shown by *C. zeylanicum* against gram +ve bacterium *S. aureus. C. flexuous* extract also showed inhibition but was inactive against *K. pneumoniae*. *C. flexuous* extract was more active than *C. flexuous* as indicated by the results. The lowest value was obtained for *S. aureus* thus this bacteria is most inhibited by the extract, whereas *B. subtilis*.

Sethiya *et al.* (2010) Shankhpushpi is a well-known and extensively used plant in Ayurveda with therapeutic potential as memory enhancer. There is

still need to evaluate each plants for their comparative chemical markers based identification and their comparative biological potency.

Sharma *et al.* (2009) The antibacterial activity of fifteen medicinal plants used by tribals against UTI causing isolates. The antibacterial activity of water, ethanol and acetone extracts of *C. sativum, A. indicum, B. diffusa andrographis paniculata, P. ovata, B. monnieri, B. variegata, F. ramontchi, E. tfgerium, E. ligularia, Z. officinale, T. chebula, A. indica, O. sanctum* and *C. cassia* was determined against thirty three UTI isolates i.e. *P. mirabilis* (10), *E. coli* (6), *P. vulgaris* (6), *K. pneumoniae* (5), *E. cloacae* (2), *P. pseudomallei* (2), *P. aeruginosa* (1) and *K. oxytoca* (1) by disc diffusion method. Our studies concluded that crude extracts of the selected plants especially the acetone and ethanol extracts exhibited significant activity against UTI pathogens. It can be done that these plants can be used to discover natural products that may serve as lead for the development of new pharmaceuticals addressing the major therapeutic needs.

Sharma *et al.* (2011) Preliminary phytochemical screening indicates that the extract contain large amount of polysaccharides (30-35%). The facts obtained in the current study implies that the aqueous extract of *B. Serrata* have persuasive anti-oxidant activity in conflict to free radicals in a concentration dependent approach.

Singh and Jain (2011) The alcoholic and aqueous extracts of five medicinal plants (*Cassia fistula, Albizia lebbeck, Cassia occidentalis , Sphaeranthus indicus* and *Vitex nigundo*) collected from Uttarakhand, North India; were assess for antibacterial activity by Agar diffusion method against medically important bacteria viz. *B. subtilis, Enterobacter aerogenes, E. coli, K. pneumonia, Pseudomonas aeruginosa, S. auresus, P. mirabilis* .The alcoholic extracts showed some degree of antibacterial activity as compare to aqueous extracts. Kanamycin was used as standard drug for antibacterial activity. Out of five plant extracts, alcoholic extract of *Sphaeranthus indicus* showed the best antibacterial activity.

Singh (2008) *E. alsinoides* L. (*Convolvulaceae*) is used as nootropic or brain-tonic in traditional systems of medicine like Ayurveda and Unani. The review summarizes ethno medicinal uses and pharmacological investigations carried on the medicinal plant.

Singh *et al.* (2012) *Chlorophytum borivilianum* family Liliaceae is a traditional rare Indian medicinal herb broadly used in the treatment of many clinical conditions in India. It is an important drug commonly known as 'Safed Musli'. It has many therapeutic applications in Ayurvedic, Unani, Homeopathic and Allopathic system of medicine. The Ayurvedic literature, Safed Musli is celebrated as a Divya Aushad with unparalleled medicinal properties. It is a chief ingredient in the preparation of over a hundred Ayurvedic formulations. *Chlorophytum borivilianum* is widely cultivated throughout India. Major phytochemical components reported from the roots of *C. borivilianum* include mainly steroidal saponins, fructoligosaccharides, fructans and acetylated mannans, phenolic compounds and proteins. In this review paper, an attempt has been made to discover various dimensions of the drug including phytochemical and pharmacological studies carried out on this drug.

Sukirtha and Growther (2012) Plants have potent components of phytomedicine. Plant based natural components can be derived from part of the plant like bark, flowers, leaves, roots, fruits, seeds etc., The therapeutic use of medicinal plant is becoming popular because of its inability to cause side effects and combat antibiotic resistant microorganisms. Medicinal plants such as *Punica granatum, Psidium guajava, Aegle marmelos* and *Prosopsi juliflora* are important sources of antibacterial, antifungal and antioxidant compounds. These plants contain secondary metabolites such as alkaloids, terpenes, flavonoids, phenolics, steroids, volatile oils etc., These are important for radical scavenging effects as well as their potential antibacterial, estrogenic and anti- cancer activities. This research is to conclude the antibacterial, antifungal and phytochemical analyses of the four medicinal plants. *Punica granatum* was more effective followed by *Psidium guajava, Prosopis juliflora,* and *Aegle marmelos*.

Sundaram *et al.* (2011) Antibacterial properties of different extracts of *C. borivilianum* was studied. These results explain that the extract has a wide range of antibacterial property than the other extracts.

Suresh *et al.* (2008) *Cynodon dactylon* (L.) Pers, *Carica papaya* L., *Melia azedarach* L., *Euphorbia hirta* L., *Psidium guajava* L. belong to 5 different families, viz., Caricaceae, Gramineae (Poaceae), Euphorbiaceae, Meliaceae and Myrtaceae. The plants aqueous leaf extracts showed pronounced inhibition than chloroform leaf extracts. Leaf extracts showed more inhibitory action on *Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli* and *Klebsiella pneumoniae*.

Tamilarasi and Ananthi (2012) Ethanolic extracts of *Mimosa pudica* leaves were screened for phytochemical component and antimicrobial activity towards pathogens. The activity was tested against *Klebsiella pneumonia, Bacillus subtilis, Pseudomonas aeruginosa, Aspergillus flavus* and *Trycophyton rubrum* at different concentrations of 25, 50, 75 and 100 µl/disc and the results have been illustrated. Phytochemical analysis of the extract revealed that the antimicrobial activity of the plant materials is due to the presence of active constituents like alkaloids or tannins. The susceptibility of different microbial agents to different concentrations of *Mimosa pudica* indicates that plant is the potential source for antimicrobial compound. So, further work on the profile in order to determine the nature of bioactive principles present in the plant and their mode of action.

Thakur *et al.* (2007) *C. borivilianum* Santapau & Fernandes (Liliaceae) is a very popular herb in traditional Indian medicine and constitute a group of herbs used as 'Rasayan' or adaptogen. An increase in delayed-type hypersensitivity response, % neutrophil adhesion and *in vivo* phagocytosis by carbon clearance method was observed after treatment with extracts. Immunostimulant activity of ethanolic extract was more pronounced as compared to sapogenins. The results, thus justifies the traditional use of *C. borivilianum* as a rasayana drug.

Ushir *et al.* (2010) The essential oil from the aerial part and roots of *A. indica* Linn. from the Toranmal forest, Maharashtra (India), was obtained by hydrodistillation after drying and grounding of the herbal material. Limonene, pinene, isobornyl acetate and eugenol can be considered as the main antimicrobial constituents in the essential oils of plants.

Vaidya and Devasagayam (2007) Indian medicinal plants also provide a wealthy source for antioxidants that are known to prevent/delay different diseased states. The antioxidant protection is observed at different levels. The medicinal plants also include other beneficial compounds like ingredients for functional foods. Hence, the global knowledge about Ayurveda and Indian herbals will hopefully be enhanced by information on the evidence-base of these plants. This will yield rich dividends in the coming years.

Vijaya and Padmavathi (2010) The present study revealed the immunomodulating potential of an Indian medicinal plant *Euphorbia hirta*. The antibacterial activity is attributed in part to the flavanoids present in the plant. Flavanoids have also been reported to responsible for producing antiinflammatory and humoral antibody responses. In the present study, inflorescence part of the plant was used since a previous study from this laboratory has revealed the presence of flavanoids as a major fraction in the inflorescence.

Villoutreix *et al.* (2008) Protein-protein interactions have a pivotal role in many biological processes suggesting that targeting macromolecular complexes will open new avenues for the design of the next generation of therapeutics. PPI modulators through the combination of *in silico* and *in vitro* screening experiments.

Vishnu Priya *et al.* (2010) *Garcinia mangostana* Linn is used as a phytomedicine in South East Asia for the treatment of trauma, diahorrea and skin infections. In the present study anti microbial activity of *Garcinia mangostana* extract powder was carried out. Antimicrobial activity was examined by determining the minimal inhibitory concentration (MIC) using macro dilution broth technique. *Garcinia mangostana* extract powder at

different concentrations were tested against *Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus.* The extract from mangosteen pericarp was effective against *Staphylococcus aureus, Staphylococcus albus, Micrococcus lutus.* The strong anti bacterial activity of the extract suggests that it is a good drug of choice for which might be helpful in preventing the progress of various diseases and it can be used in alternative system of medicine.

Wendakoon *et al.* (2012) The antibacterial activity of the extracts (50, 70, and 90% ethanol) was evaluated using a standard well assay and microbroth dilution method. Minimum bactericidal concentrations (MBCs) were also determined for each extract. Plant extracts showed strong antibacterial action against Gram-positive bacteria, *Staphylococcus aureus, Staphylococcus epidermidis,* methicillin resistant *Staphylococcus aureus* (MRSA), and *Streptococcus pyogenes*, while negligible to no inhibitory activity against Gram-negative bacteria; *Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae* and *Salmonella enteritidis* was observed. Among the plant extracts, the hops, boldo, licorice and yerba mansa exhibited a strong antibacterial action at all three ethanol concentrations. Of these four, hops showed the strongest activity at 90% ethanol. *E. angustifolia* extracts did not show any considerable antibacterial activity, while usnea showed strong activity only at 90% against *S. epidermis.* Except *Echinacea angustifolia* and usnea, the plant extracts were strongly inhibitory towards the MRSA strain. Buchu, yerba mansa and Oregon grape showed higher activity at 50% or 70% on MRSA. MBCs varied from 1/4 to >1/256 dilution levels and were in agreement with well assay results. The results suggest that the extracts of boldo, hops, licorice and yerba mansa could be considered as potentially effective antibacterial agents against Gram-positive bacteria including MRSA. For hops, buchu, Oregon grape and usnea, the activity is dependent on the concentration of ethanol used in the extraction procedure. The ratio of ethanol/water mixture used for extraction of medicinal plants is an important factor to obtain optimum antibacterial activity.

Yadava and Barsainya (1998) The percentage composition and antimicrobial activity of the essential oil obtained from the flowers of *Anisomeles indica* (L). The essential oil was found to be more active against: *Bacillus anthracis, salmonella Stanley, streptococcus agalacties, staphylococcus aureus, aspergillus niger, aspergillus fumigatus, fusarium Oxysporum*. Therefore this oil may prove therapeutically useful against diseases caused by these microbes.

Zaidan *et al.* (2005) Medicinal plants have many traditional claims including the treatment of ailments of infectious origin. The antibacterial activities were charged by the presence or absence of inhibition zones and MIC values. *P. sarmentosum, M. citrifolia,* and *C. asiatica* methanol extract and *A. paniculata* (water extract) have potential antibacterial activities to both gram +ve *S. aureus* and Methicillin Resistant *S. aureus*. None of the five plant extracts tested showed antibacterial activities to gram negative *E. coli* and *K. pneumoniae,* except for *A. paniculata* and *P. sarmentosum* which showed activity towards *P. aeruginosa. A. paniculata* being the most potent at MIC. This finding forms a basis for further studies on screening of local medicinal plant extracts for antibacteria properties.