Review of Literature

Marine microorganisms have become an important point of study in search for novel antibiotics. This is consequent to the decrease in discoveries from terrestrial microbial sources, as well as, the emergence of antibiotic resistant clinical pathogens such as *Mycobacterium tuberculosis*, *Enterococcus*, *Pseudomonas* sp., *Streptococcus pneumoniae*, and *Staphylococcus aureus* led to constant need to find new sources of effective antibiotics, Donia Hosni Sheir, *et al.*, (2011).

Alaa E Din M. S. Hosny (2011) has reported the Production of Antimicrobial Agent from Marine Bacteria Isolated from Mediterranean.

Rani Juneius CE (2012) has reported the Process optimization for the production of antimicrobial compounds from marine sponge associated bacteria *Rhodopseudomonas palustris* MSB 55 and they conclude that Process optimization revealed that, the optimum incubation period for the production of bioactive compounds using sponge associated bacteria *R. palustris* MSB 55 was, incubation period 72 hours, pH 8.5 and temperature 25ºC. Aeration also played a significant role in terms of product formation. Agitation speed of 150rpm showed maximum yield. Secondary metabolites had showed broad-spectrum activity against bacteria as well as fungi. Hence, the new strain associated with sponge, *R. palustris* MSB 55 can serve as a source of antimicrobials.

Diversity of actinomycetes isolates was high, perhaps due to the nutritive status of the soil. The first report on marine actinomycetes was made by Nadson (1903) from the salt molds of *St. Pedenburg*. Other reports on the isolation of actinomycetes from marine soil were by Dhanasekaran *et al.*, (2005).
*Streptoverticillium album* having antibacterial activity reported by Ting *et al.*, (2004) to isolation and characterization of actinobacteria with antibacterial activity from soil and rhizosphere soil.

Gayathri A (2011) has reported the establishment of antibacterial activity of actinomycetes isolated from salt pan region. Totally 20 actinomycetes was isolated and determined the antibacterial activity against the three human pathogens. *Streptoverticillium album* showed the high antibacterial activity against the *S. aureus*. To conclude, results from this study has shown that there is potential in sourcing for inhibitory compounds produced from actinomycetes and to identify the antibacterial components for further use.

Wilson *et al.*, (2009) has reported that the sponge associated bacteria has the potent antimicrobial activity against several human pathogens as well as fish pathogen.

Various studies have been confirmed the predominance of Gram-negative producers in the marine environment (Fenical, 1993). In a study on antibiotic production in marine bacteria, reported that 36% of the strains were Gram-negative rods. Gram-positive as well as Gram-negative bacteria were more or less equally presented in the producers encountered.

R. Saravanakumar *et al.*, (2011) has reported the most active Gram-positive *Bacillus* sp (SAR11) was found against all the target strains followed Gram-negative bacterium SAR17. The producer strains were molecular and biochemically characterized so that this information will help in future for the optimization of media and physical factors to achieve maximum antibiotic production.
In the marine environment the genus *Vibrio* has been reported from biofilms attached to surfaces, as pelagic bacteria and as invertebrate associated bacteria (West and Colwell, 1984). Reported *Vibrio* in their study on phylogenetic identification of antibiotic producing bacteria from Mediterranean sponges, Thiel and Imhoff (2003).

Dobler *et al.*, (2002) reported that 12 bioactive compounds were reported from marine Bacillus sp. The same result was also observed in the study of *Bacillus* sp. (SAR11) had higher activity against all the target strains. The diversity of antibiotic producing marine bacteria isolated in the present study suggests that sponges are rich sources of novel bacteria, R. Saravanakumar, *et al.*, (2011)

Sivasubramanian K *et al.*, (2011) reported that the *P. tunicata* has potential antimicrobial activity. It also revealed that marine microbes are also being useful in development of drugs against human pathogens.

Ocky Karna Radjasa *et al.*, (2004) reported that the three genera *Pseudoalteromonas*, *Vibrio* and *Brachybacterium* were found to show antibacterial activities in the present study. The members of *Alteromonadales* and *Vibrionales* of the *proteobacteria*, such as *Pseudoalteromonas* and *Vibrio* have been known as the dominant antibiotics producers (Long and Azam, 2001; Grossart *et al.*, 2004). Futhermore, Radjasa *et al.*, (2007a) isolated a coral-associated bacterium TAB4. 2 which showed 98% identity to *Pseudoalteromonas luteoviolacea*, an antibiotic-producing bacterium (McCarthy *et al.*, 1994) and exhibited growth inhibition against both coral bacteria and pathogenic bacteria. Species of *Pseudoalteromonas* have also been isolated from tunicates (Holmstrom, 1999) and sponges.
Matthias Wietz et al., (2011) isolated compound andrimid and holomycin from isolated from marine Vibrionaceae. In their study they have also concluded that the Vibrionaceae shows potent antimicrobial activity against several pathogenic organisms.

M. Shnit-Orland et al., (2008) reported that the 20% of cultivable bacteria obtained from the mucus layer of the coral Acropora palmata demonstrated antimicrobial activity against indicator bacteria. Soft coral extracts were found to be more active than hard coral extracts. In their study they have also suggested that there are different mechanisms of antimicrobial activity against pathogens involved in scleractinian corals. This also may suggest that production and secretion of antimicrobial compounds by mucus-associated bacteria is part of the scleractinian coral’s defense strategy against pathogens (Rohwer et al., 2007; Reshef et al., 2006).

Luis J. Villarreal-Gómez et al., (2010) reported that the organisms, collected from the same sea, show similar antibacterial activity against Proteus mirabilis. This bacterium is detrimental to human health causing wound infections, septicemia, pneumonia, and kidney stones, as well as other diseases. Despite the fact that P. mirabilis is susceptible to many antibiotics such as tetracycline, 10% to 20% of the strains are resistant to ampicillin and first-generation cephalosporins, which is an interesting finding for ecology and bioactive chemical compounds.

Alejandra Cetina et al., (2010) in their report, the seven isolates pigmented were bioactive compounds producer strains. In accordance with this, it is a recognized fact that a likely association exists between pigments and toxic activity in several marine pigmented hetero-trophic bacteria; for example, a number of biosynthetic enzymes involved in synthesis of inhibitors compounds were identified for pigment
synthesis in *Pseudoalteromonas tunicate*. However, when we tested yellow pigment of strain (MS-3/48) against target pathogen bacteria, no antimicrobial activity was observed indicating that pigment was not the antimicrobial compound against target bacteria.

Some marine bacteria can also produce compounds as exopolymers to provide a means by which bacteria can adhere to surfaces and grow in biofilm (Holström & Kjelleberg 1999). A rod-shaped bacterium (strain MS-3/48) which was also produces exopolymer. This study also suggest that isolated MS-3/48 is biofilm-forming bacterium and its extracellular polymeric compound helps the cell to avoid nutrient-depleted environments, which could enhance the chances for other marine organisms to survive in specific marine habitats as it was described for marine bacteria genus *Pseudoalteromonas* by Bowman (2007).

The crude extracts from biomass showed antibiotic activities against *S. aureus* and *P. aeruginosa* but non in pigment extracted from the cells or in the spent broth free of cells suggested that biological compounds with antimicrobial capacity were into the cells or it may be adhered to extracellular polymeric matrix close to the cells as describe in a marine Chromobacterium by Andersen *et al.* (1974).

In the recent years, there are many studies about the biological activities of the secondary metabolites isolated from the marine microorganisms, and these studies mainly focus on the antibacterial, cytotoxic, antioxidation, and antiviral, immunosuppressant activities. In the screening program for bioactive principles from marine microorganisms, it is essential to study the biological activities of the marine microorganisms producing the bioactive secondary metabolites. Xiaoling Lu *et al.*, (2011)
Xiaoling Lu et al., (2011) have reported that the screening program for bioactive principles from marine microorganisms, diketopiperazine and macrolide are the two important bioactive secondary metabolites. Diketopiperazines (DKPs), the smallest cyclic peptides, have been isolated from marine microorganisms (bacteria, fungi, and actinomycete) or the microorganisms associated with sponge. As cyclic peptide derivatives, DKPs have been considered as cell-cell signalling compounds. Some L, L-diketopiperazines have recently been known as quorum-sensing bacterial sensors, which are used by Gram-negative bacteria for cell-cell communication and regulating gene expression in response to population density. For example, cyclo (L-Pro-L-Phe) and cyclo (L-Pro-L-Leu) are capable of activating or antagonizing LuxR-mediated quorum-sensing system of bacteria. Therefore, the diketopiperazines, which were produced by many species of the microorganisms, suggest a probable role of these compounds in bacterial-bacterial interaction.

Ute Hentschel et al., (2011) has reported that the 238 bacterial isolates retrieved from the sponge A. aerophoba were tested for their antimicrobial activity. Twenty-seven isolates showed a positive response in an inhibition zone assay against bacteria but not against the eukaryotic fungus C. albicans. Comparative 16S rDNA sequence analysis of the 27 candidates demonstrated that they could be assigned to eight phylogenetically different clusters. The high recovery rate suggests that sponges are a rich source of novel micro-organisms with potentially pharmacologically relevant bioactivity.

The identification of novel targets and the development of more specific chemotherapeutic agents are the most important goals of research in cancer therapy. Several bacterial pathogens have been identified as mediators of apoptosis in vitro and
during pathogenesis. A family of natural red pigments called prodigiosins is synthesized from different bacteria including *Actinomycetes, Streptomyces* and *Serratia marcescens*, it has more therapeutic values. R. Kavitha *et al.*, (2010)

R. Kavitha *et al.*, (2010) reported that the *Prodigiosin* had a potent apoptosis activity against human cervix carcinoma cells. The assessment of the cell viability was based on the data from two different assays, MTT and NRU assay.

Marine source are rich source of natural products and many compounds are derived from these sources. The anti-cancer drugs that been isolated from marine organism such as bacteria, *actinobacteria, cyanobacteria, Fungi, Microalgea, Seadweeds*, Mangroves and other halophytes etc. have been shown to possess cytotoxic activity against various tumors. B Dhorajiya *et al.*, (2011)

Luis J. Villarreal-Gómez *et al.*, (2010) reported that the strain Sm6, showing anticancer activity was with an IC50 value of 5.5 μg ml⁻¹ and a sequence similarity of 99.87% to Bacillus. Although this type of bacterium can be found in almost any substrate, it can be suggested that because of its association with *Sargassum muticum*, it seems to have acquired the ability to synthesize a compound able to inhibit colon cancer cells (HCT-116). *Sargassum muticum* has been found to show low antibacterial activity against some species of marine algae.

YE *et al.*, (2009) reported that the *S. griseorubens* WBF9 isolates from the sea demonstrated that it has higher anti-tumor properties and a great potential source of anti-tumor compounds.

Archana N. Thakur *et al.*, (2005) reported that the bacterial isolates from the sponge (*S. domuncula*) surface and from the primmorphs possess bioactive properties.
Among all the isolates, PB2 displayed potential antiangiogenic, antimicrobial, hemolytic, and cyto-resource for the discovery of novel bioactive molecules.

Plants are important source of potentially useful structures for the development of new chemotherapeutic agents. The first step towards this goal is the in vitro antibacterial activity assay. Many reports are available on the antiviral, antibacterial, antifungal, anthelmintic, antimolluscal and anti-inflammatory properties of plants. Thomson, W. A. R., (1978)

Charaka (1000-800 B.C.) mentioned the therapeutic applications of large number of medicinal plants, in his treatise “Charaka Samhita”. Sushruta (1000-800 B.C.) also recorded number of plants having medicinal use in the book “Sushruta Samhita”.

Jain S. K (1994) mentioned the curative properties of the herbs and uses of plants as medicines in India. Suja has reported the importance of medicinal plants of Western ghats.

Herbal medicines are often combinations of botanical extracts that are assumed to have additive or synergistic effects. The investigation on comparative effect of individual botanical extracts with combinations of other extracts on prostate cell viability was studied by Lynn S. Adams (2006)

Jeong et al., (2009) have isolated compounds form the methanolic extract of the heartwood of Callistemon lanceolatus, Sappanchalcone and 4-0-methuepisappanol, togther with methoxychalcone and three aromatic compunds, 4-0 methysappanol, cisalpine-J and pulchoic.
The chloroform extract of the leaves of Plantago L yielded the new bioflavonoida was studied by Beara et al., (2009).

Fu et al., (2008) have isolated 3-Deoxy-4-0methylpisappanol, a new 3-benzylchroman derivative, together with thirteen known chemical compounds identified as portosappanin-a. Sappanchalcone, Sappanone-B, Palmatic acid.

The up-date and to present a comprehensive analysis of traditional and folklore uses, pharmacological reports and phyto-constituents isolated from the orchids family has been studied by Rosa Martha Pérez Gutiérrez, (2009).

Isoflavens are isolated and characterized as 5-hydraoxy-67-dimethoxy-3,4-methylendioxyisofavone by chemical and spectral studies, along with mitiducarpin, β- sitosterol and oleanolic acid has been studied by Charles et al., (2006).

Nawal Merghoub et al., (2009) have reported Cytotoxic effect of some Moroccan medicinal plant extracts on human cervical cell lines, tested for their potential cytotoxic cancer cell lines SiHa and HeLa, harbouring HPV16 and HPV 18 respectively. MTT (Tetrazolium blue) colorimetric assay was used to evaluate the viability of cell cultures in the presence of the extracts.

Phytochemical constituents and bioactive compounds of the extracts of Cassia nigricans Vahl, was isolated and it is arich sources of polyphenols, anthraquinone derivatives, flavonoids and polysaccharides from the plant has been studied by R. G. Ayo., (2010).

B. Mahesh et al., (2008) has reported that the methanol leaf extracts of Acacia nilotica shows potent antimicrobial activity against several pathogenic organisms such as E. coli, P. aeuroginosa etc.
Dagmar Janovska et al., (2003) have concluded that the plants C. majus, S. officinalis, and T. farfara possessed the highest antimicrobial activity. All these species are perennial herbs widely used as medicines and described in the Chinese Materia Medica

A. John De Britto et al., (2011) Antibacterial activity of aqueous extracts of all the six plants are Acalypha indica L., Aerva lanata L., Juss. Schult, Phyllanthus amarus L., Phyllanthus emblica L., Cassia auriculata L., Caesalpinia pulcherrima (L) Sw. Highly significant antibacterial activity was observed in P. amarus followed by A. lanata and A. indica, respectively against two tested pathogens. Among the two pathogens A. hydrophila was highly susceptible.

Suwanna T., (2006) has demonstrated the effects of these Thai medicinal plants for their antibacterial activities by using the macrodilution assay. Based on the present study, the water methanol fraction (fraction 2) of Balanophora abbreviate Bl, showed the antibacterial activity at the MIC level of 250g/ml but the activity was bacteriostatic in its effects. Therefore, the use of these medicinal plants in controlling fever and infectious diseases appears to be justified and further investigations may be required to obtain more information.

Numerous herbs and plants have been reported to be the potential sources of antimicrobial agents but not many have been studied with respect to levels and range of activities. Because of this, it is essential to use herbal medicine cautiously. However, the results obtained in the present report exhibited the correlation between scientific observations and the recommendations of traditional medicine. Suwanna T., (2006)
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 produced 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. Maher Obeidat, (2011).

The strongest antibacterial activities among all plant species were obtained by the aqueous extract of *A. indica* with inhibition zone of 18 mm against *A. hydrophila*. *S. torvum* demonstrated moderate (11 mm) and *C. longa* marked weak (8 mm) inhibiting activity against *A. hydrophila*. Abdul Kader Mydeen KP *et al.*, (2011).

Priscila Ikeda Ushimaru, *et al.*, (2007) concluded that ethanolic extracts of garlic did not have anti-*E. coli* or anti-*Shigella* action. Using another methodology, Vuddhakul *et al.* observed that garlic extracts inhibited the growth of *V. parahaemolyticus*, *E. coli* and *S. aureus*; however, lemongrass and ginger extracts
did not show any antimicrobial activity. Such behavior of the antibacterial action was also verified by Adonizio et al., (2006) who used lemongrass extracts and did not observe antibacterial effects.

The presence of cytotoxic acetogenins and styryl-lactones in the genus *Goniothalamus* has been studied on only 22 species in the genus *Goniothalamus*, out of 160 species (13.7%) which are so far been investigated. In an effort to promote further research on the genus *Goniothalamus* which could represent a source of drugs for the treatment of cancers and bacterial infections, this work offers a broad analysis of current knowledge on *Goniothalamus* species (Christophe Wiart., 2007).

The Propolis is a sticky dark-colored material showing a very complex chemical composition that honeybees collect from plants. It has been used in folk medicine since ancient times, due to several biological properties, such as antimicrobial, anti-inflammatory, antioxidant and immunomodulatory activities. Its antitumour action *in vivo* and *in vitro* has also been reported, using propolis extracts or its isolated compounds (Michelle C. Bu´falo et al., 2009).

You-Cheng Hseu et al., (2009) studied the effectiveness of the ethanol (70%) extracts of *A. pricei rhizome* (AP extracts) in terms of tumour regression as determined by using both in vitro cell culture and *in vivo* athymic nude mice models of KB cells. They found that the AP extract (25–200 mg/ml) treatment decreased the proliferation of KB cells by arresting progression through the G2/M phase of the cell cycle.

The traditional Japanese medicine prepared by using the leaves of *Kumaizasa bamboo* extract from hot water at 100°C, by a new, ‘vigorous’ extraction method involving steps at 100, 121 and 196°C. This procedure not only yielded greater
amounts of extract but also with significant increase in immunostimulating activity, which induces activation of human natural killer (NK) cells, macrophages and potent induction of IL-2, IL-12 and IFN-g in tumour bearing mice (Takahiro Seki et al., 2008).

Compilation of data on promising phytochemicals from folk medicinal plants for anticancer activity that have been tested in various disease models using modern scientific methodologies was studied by G. Venkateshwar Rao et al., (2011).

Pathikrit Banerjee et al., (2008) have reported if microdoses of ultra-high diluted arsenictrioxide (a potentized homeopathic remedy Arsenicum Album 20C, diluted 10 times) have hepatoprotective potentials in mice subjected to repeated injections of arsenic trioxide. Ooi Kheng Leong et al., (2009) studied on the Physalis minima L. which is reputed for having anticancer property. The chloroform extract of this plant exhibited remarkable cytotoxic activities on NCI-H23 (human lung adenocarcinoma) cell line at dose- and time-dependent manners (after 24, 48 and 72 h of incubation). Analysis of cell-death mechanism demonstrated that the extract exerted apoptotic programmed cell death in NCI-H23 cells with typical DNA fragmentation, which is a biochemical hallmark of apoptosis.

Mutasim M. Khalafalla et al., (2010) conduct an experiment to test different extracts from the leaves of Moringa or drumstick tree (Moringa oleifera) for activity against leukemia and hepatocarcinoma cells in vitro has shown anticancer activity.

Nazl N. Ilgar and Gül Özcan Arican (2010) investigated the anti-proliferative and apoptotic effects of paclitaxel, which is itself an antichemotherapeutic agent, to FM3A cell line originated from Mouse mammary carcinoma at 7 different doses.
Masaki Kawamura and Hirotake Kasai (2007) have examined the effects of hemicellulase-treated *Agaricus blazei* (AB fraction H, ABH) on growth of several tumor cell lines. ABH inhibited the proliferation of some cell lines without cytotoxic effects. It has markedly prolonged the S phase of the cell cycle. ABH also induced mitochondria-mediated apoptosis in different cell lines.

Cancer is a leading cause of mortality worldwide and therefore a major focus of research has been made on the chemoprevention of cancer. This approach is a mean of cancer control where the induction of this disease can be totally prevented or the rate of development slowed or reversed partially or substantially by the administration of one or more naturally occurring agents (Singh and Lippman, 1998).

Siddig Ibrahim Abdelwahab *et al.*, (2009) studied antibacterial, antioxidant, anticancer properties and chemical compositions of *Goniothalamus umbrosus* (GU) hexane extract following disc diffusion method, DPPH assay, MTT cytotoxicity test (MCF-7 breast cancer cell line, HT-29 colon cancer cell line and CEMss leukemia cellline) and GC-MS, respectively.

The anticancer activity of the curcumin ethanolic extract was done *in vivo* on mice and *in vitro* on cell line. The extract showed a considerable anticancer activity against the cell line of human hepato cellular liver carcinoma (Jasim Hilo Naama *et al.*, 2009).

N. H. Faujan *et al.*, (2010) have reported the cytotoxic effect of betulinic acid (BA), isolated from *Melaleuca cajuput* a Malaysian plant and its four synthetic derivatives were tested for their cytotoxicity in various cell line or peripheral blood mononuclear cells (PBMC) by 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide (MTT) assay result indicates cytotoxic effect of plant extract.
Xiang-Min Tong et al., (2011) have studied the anti-leukemic activity of Sinomenine with or without aclarubicin (Acla) on leukemia cells and its molecular mechanism. HL-60 cells after treating with Sinomenine (5 to 20 ng/ml) with or without Acla (0.05 to 0.25 μg/ml).

The mechanism underlying the apoptosis of HL-60 cells after treatment with triperine of different dosages and durations were determined using flow cytometry and transmission electron microscopy studied by Sheng Quan et al., (2010).

Z.A. Zakaria et al., (2011) have investigated the in vitro cytotoxic and antioxidant properties of the aqueous, chloroform and methanol extracts of the Dicranopteris linearis leaves. The cytotoxic effect was determined against the normal (3T3) and cancer cell lines (MCF-7, HeLa, HT-29, HL-60, K-562 and MDA-MB-231) by using the 3,(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay, while the antioxidant activity was assessed using the DPPH radical and superoxide.

Baiyi Lu et al., (2010) studied the anti-tumour activities of a triterpenoid-rich extract of bamboo shavings (EBS) and its main component, friedelin was evaluated for anticancer activity.

Shailah Abdullah et al., (2009) have conducted experiment to determine the mechanism of antitumor effects of ginger extract for evaluating apoptosis rate and cell cycle progression status in colon cancer cell lines HCT 116 and p53 defective HT 29.

Currently, many of the chemotherapeutic agents are of plant products, like the six dimeric indole alkaloids showing two of these vincleukoblastine (vinblastine) and leurocristine (vincristine) are form Catharanthus roseus (De Vita, 2005). The latest
entry for cancer treatment is taxol isolated from the stem bark of pacific Yew *Taxus brevifolia* Nutt, Camptothecin form *Camptotheca acuminata*. (Sukh Dev, 2010).

Ratankaran Satay Teja and Bibhu kalyan prasade Nayak (2011) have studied on the anticancer drugs from medicinal plants including vinblastine, vincristine, the camptothecin and irinocetan which are derived from the plants.

Yibin Feng *et al.*, (2011) reported the use of herbal medicines in the treatment of cancer as complementary and alternative therapy which is accepted increasingly with growing scientific evidences of biomedical research and clinical trials. Anticancer drugs discovered from herbal medicines have a long history and some of them have been used in clinical setting as the conventional anticancer drugs.

Magdalena C. Kowalczyk *et al.*, (2009) have studied on the potential cancer preventive properties of several phytochemicals, i. e. grape seed extract (GSE), resveratrol (RES) and next determined their effects on a 4 week inflammatory hyperplasia assay using 7,12-dimethylbenz[a]anthracene- induced murine skin carcinogenesis model.

Bo-Rim Seo *et al.*, (2005) have investigated the effect of saucernetin-7, which is a dineolignan isolated from *Saururus chinensis*, on the proliferation, cell cycle-regulation and differentiation of HL-60 human promyelocyticleukemia cells.

Solanum Nigrum methanolic extract has significant cytotoxicity effect on HeLa Cell Line in concentration range between 10 mg/ml to 0. 0196 mg/ml by using SRB assay and study also showed that inhibitory action on HeLa cell line in concentration range between 10 mg/ml to 0. 0196 mg/ml by using MTT assay. From the performed assay, methanolic extract of these drug shows greater activity on HeLa cell line and little activity on Vero cell line and that mean Solanum Nigrum can be used as anticancer activity. Sanjay Patel, *et al.*, (2009)
Priyanka Sharma, et al., (2009) has reported that very small aspect of the modulation of the carcinogenesis process yet it can be concluded that *P. niruri* acts as a modulator of two stage skin carcinogenesis in Swiss albino mice since it prolongs the formation of tumors in skin, decrease the tumor multiplicity and yield, elicited by DMBA/croton oil. The anti-carcinogenic function of *P. niruri* might be attributed to a combination of its cytoprotective effect on normal cells and cytotoxic effect on pre-neoplastic and/or neoplastic cells. Since *P. niruri* is a complicated phytochemically rich plant, it can be suggested that the cumulative/synergistic effects of phytochemicals present in this plant including antioxidants, flavonoids and tannins etc. may be the underlying principle behind the protective potential of *P. niruri*. The present work demands further investigation for its possible use as chemopreventive agent against other types of tumors also.

Vishnu priya P, et al., (2011) The effect of anti-cancer activity of Tridax procumbens flower crude extract in aqueous and acetone on prostate epithelial cancerous cells PC 3 was determined by measuring cell viability by MTT assay. The experiment consists of cleavage of the soluble yellow coloured tetrazolium salt MTT [3-(4, 5-dimethyl–thiazole-2-yl)-2, 5-diphenyl tetrazolium bromide] to a blue coloured formazan by the mitochondrial succinate dehydrogenase. The flower extract of acetone showed 82.28% cancer cell death within 24hrs and aqueous extract exhibited a very weak anti-cancer activity.

Sathishkumar Jayaraman, et al., (2008) has concluded that the medicinal plant *Stevia rebaudiana* has potent antimicrobial and antitumor activities.

Resveratrol (3,5,40-trihydroxystilbene) (Res) derivatives, which were isolated from stem bark of *Vatica rassak* (Dipterocarpaceae), were evaluated for in vitro
cytotoxicity against a panel of human tumor cell lines. Vaticanol C (Vat C) is a major component induced a considerable cytotoxicity in all tested cell lines and exhibited growth suppression in colon cancer cell lines even at low dose reported by Tetsuro Ito et al., (2004).

Rana P. Singh et al., (2006) was carried out an experiment to assess the anticancer efficacy of linarin (LN), linarin acetate (LA) and acacetin (AC), the flavonoid compounds with the same flavone ring structure but different substitution, against human prostate cancer (PCA), LNCaP and DU145 cells. LN was isolated and purified from Chrysanthemum zawadskii; LA was chemically synthesized from LN, and AC obtained commercially.

Sun Kyu Park et al., (2009) have studied the inhibitory effect of kalopanaxsaponin A (KPS-A) on cell invasion and MMP-9 activation in phorbol 12-myristate 13-acetate (PMA)-treated MCF-7 human breast cancer cells. The invitro effects of acteoside on the proliferation, cell cycle regulation and differentiation of HL-60 human promyelocytic leukemia cells. Acteoside inhibited the proliferation of HL-60 cells in a concentration- and time-dependent manner with an IC$_{50}$ (Kyung-Won Lee et al., 2007).

Two medicinal herbs Linum persicum and Euphorbia cheiradenia that are native to Iran were tested for their possible anticancer effect and apoptosis induction property on human tumor cell lines including leukemia cell lines was studeid by Zahra Amirghofran et al., (2007).

Zahra Tayarani-Najaran et al., (2009) have reported the cytotoxic properties of total methanol extract of S. litwinowii and its fractions after investing on different cancer cell lines including AGS, HeLa, MCF-7, PC12 and NIH 3T3. Meanwhile, the role of apoptosis in toxicity was also explored. The cells were cultured in DMEM
medium and incubated with different concentrations of herb plant extracts of *S. litwinowii*. Cell viability was quantitated by MTT assay.

Plant derived compounds have played an important role in the development of several clinically useful anticancer agents. These include vinblastine, vincristine, the camptothecin derivatives, topotecan and irinotecan, etoposide, derived from epipodophyllotoxin and paclitaxel. Several promising new agents are in clinical development based on selective activity against cancer related molecular targets including flavopiridol and combretastin A4 phosphate (Cragg and Newman. 2006).

Recently various classes of compounds that possess potent antitumour activity are discovered. These compounds were obtained after knowing bioactivity and mechanism of action directed isolation and characterization, Coupled with rational drug design based modification and analog synthesis. Research highlights include GL331, which is currently in anticancer clinical trials (Dholwani et al., 2008).

Anticancer agents may be derived from nature through isolation of active lead compounds (da Rocha et al., 2001 & Schwartsmann et al., 2002). There are examples of successful drugs obtained from plant sources which have had a profound impact in the field of cancer. 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. Worldwide efforts are on to discover new anticancer agents from plants (Mans et al., 2000 & Newman et al., 2000).

Ajoene, a constituent of garlic, may have an application in the treatment of acute myeloid leukemia (AML). This compound was shown to inhibit proliferation and induce apoptosis of several human leukemia CD- 34 negative cells including HL-60, U937, HEL and OCIM-1(Hassan, 2004).