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A REVIEW ON ANTICANCER NATURAL HERBS IN INDIA

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ABSTRACT

An integrated approach is needed to manage cancer using the growing body of knowledge gained through scientific developments. Thousands of herbal and traditional compounds are being screened worldwide to validate their use as anti-cancerous drugs . The science of ayurveda is supposed to add a step on to the curative aspects of cancer that have resemblance with clinical entities of arbuda and granthi mentioned with Sushrutha samhita .This article has been made to review some medicinal plants used for the anticancer activity. The Plant sources of India are likely to provide effective anticancer agents. In recent years owing to the fear of side effects people prefer to use of natural plant products for cancer treatment. This review also helps to summarize the diverse methodologies and various ways to evaluate the potential natural compounds having anticancer activity.

KEYWORDS : Medicinal plants, Anticancer agents, Ayurveda, Herbal

Cancer is one of the most dreaded diseases of the 20th century and spreading further with continuance and increasing incidence in 21th century. Cancer is a leading cause of mortality, and it strikes more than one third of the world's population and it's the cause of more than 20% of all deaths. The principles underlying herbal medicines are relatively simple although they are quite distinct from conventional medicine and herbal medicine. Among the cause for cancer are tobacco, viral, infection, chemicals, radiation, environmental factors and dietary factors. (L. Lemkebthomas et al .2008) plants has been used as an old remedy of cancer history of use in the treatment of cancer. These plants may promote host resistance against infection by re-stabilizing body equilibrium and conditioning the body tissues. Several repots describes that the anticancer activity of medicinal plants is due to the presence of antioxidants present in them. In fact, the medicinal plants are easily available, cheaper and possess no toxicity as compared to the modern (allopathic) drugs (R. Prema et al.2011).

Anticancer Plants

Garlic (*Allium sativum* L.) has a long history of being as a food having a unique taste and odor along with some medicinal qualities. Modern scientific research has revealed that the wide variety of dietary and medicinal functions of garlic can be attributed to the sulfur compounds present in or generated from garlic. Although garlic produces more than 20 kinds of sulfide compounds from a few sulfur containing amino acids, their functions are different from one another; e.g., allicin, methyl allyl trisulfide, and diallyl trisulfide have antibacterial, antithrombotic, and anticancer activities, respectively(T. Ariga and T. Seki 2006).

Garlic [*Allium sativum*] is among the oldest of all cultivated plants. It has been used as a medicinal agent for thousands of years. It is a remarkable plant, which has multiple beneficial effects such as antimicrobial, antithrombotic, hypolipidemic, antiarthritic, hypoglycemic and antitumor activity. A number of studies have demonstrated the chemopreventive activity of garlic by using different garlic preparations including fresh garlic extract, aged garlic, garlic oil and a number of organosulfur compounds derived from garlic. The chemopreventive activity has been attributed to the presence of organosulfur compounds in garlic. However it not understood, but several mode of action this is achieved is not fully understood, but several mode of action have been proposed. These include its effect on drugs metabolizing enzymes, antioxidants properties and tumor growth inhibition. Most of these studies were carried out in the animal models. Also, recent research has been focused on the antimutagenic activity of garlic. Recently, it has been observed that aged garlic extract, exhibited free radical scavenging activity. The two major compounds in aged garlic, S-allylcysteine and S-allymercapto-L-cysteine, which has had the highest radical scavenging activity. In addition, some organosulfur compounds derived from garlic, include S-allylcysteine, have been found to retard the growth of chemically induced and transplantable tumors in several animal models. Therefore, the consumption of garlic may provide some

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kind of protection from cancer development (Thomson and Ali 2003).

Catharanthus roseus produces low levels of two dimeric terpenoid indole alkaloids, vinblastine and vincristine, which are widely used in cancer chemotherapy. The dimerization reaction leading to 2-3',4'-anhydrovinblastine is a key regulatory step for the production of the anticancer alkaloids in plant has an potential application in the industrial production of two semi synthetic derivatives also used as anticancer drugs. The cloning, characterization, and subcellular localization of an enzymes with anhydrovinblastine synthase activity identified as the major class III peroxidase present in *C. roseus* leaves and was named an CrPrxl. The deduced amino acid sequence corresponds to a plypeptide of 363 amino acids including an N-terminal signal peptide showing the secretory nature of CrPrxl. CrPrxl has a two-intron structure and is present as a single gene copy. Phylogenetic analysis indicates that CrPrxl belongs to an evolutionary branch of vacuolar class III peroxidases whose member seems to have been recruited for different functions during evolution. Expression of a green fluorescent protein CrPrxl fusion confirmed the vacuolar localization of this peroxidase the exact sabcellular localization of the alkaloid monomeric precursors and dimeric products. Expression data further supports the role of CrPrxl in -3', 4'-anhydovinvlastine biosynthesis indicating the potential CrPrxl as a target to increases alkaloid levels in the plant (Maria et al., 2008).

Anticancer activity of the rhizomes of turmeric (*Curcuma longa*) was evaluated by italies in vitro using tissue culture methods and in vivo in mice using Dalton's lymphoma cells grown as ascites form. Turmeric extract inhibited the cell growth in Chinese Hamster Ovary (CHO) cells at a concentration of 0.4 mg/ml and was cytotoxic to lymphocytes and Dolton's lymphoma cells at the same concentration. Cytotoxic effects was found within 30 min at room temp. (30°C). The active cytotoxicity was found to be curcumin which showed cytotoxicity to lymphocytes and Dalton's lymphoma cells at a concentration of 4 mhg/ml. Initial experiments indicated that turmeric extract and curcumin reduced the development of animal tumours (Kuttan et al. 1985).

Curcuma zedoaria belonging to the family Zingiberaceae has been used in the traditional system of medicine in India and Southwest Asia in treating of many human ailments and is found to possess many biological activities. The rationale of the present study was to isolate, identify, and characterize antitumour principles from the rhizomes of *Curcuma zedoaria*, to assess its cytotoxic effects of human and murine cancer cells, and to evaluate its tumour reducing properties in in vivo mice models. Isocurcumenol was characterized as the activity compound by spectroscopy and was found to inhibit the proliferation of cancer cells without inducing significant toxicity to the normal cells. Fluorescents staining exhibited the morphological features of apoptosis in the compound-treated cancer cells. In vivo tumour reductions studies revealed that a dose of 35.7 mh/kg body weight significantly reduced the ascetic tumour in DLA-challenged mice and increased the lifespan with respect to untreated control mice (Lakshmi et al. 2011).

Licochalcone (LA) is a novel estrogenic flavonoid isolated from PC-SPES composition herb licorice root (*Glycyrrhiza Glabra*) which show significant antitumor activity in various malignant human cell lines. To better understand its anti-Cancer activities investigation were carried out in LA-elicited growth control and induction of apoptosis using androgen-independent p53-null PC-3 prostate cancer cells. LA induced modest level of apoptosis but had more pronounced effect on cells cycle progression arresting cells in G2/M, accompanied by suppression of cyclin B1 and cdc2. It also inhibited phosphorylation of Rb, specifically phosphorylation of S780 with no change of phosphorylation status of T821, decreased expression of transcription factor E2F concurrent with reduction of cyclin D1, down-regulation of CDKs 4 and 6, but increased cyclin expression. These finding provide mechanistic explanation for LA activity and suggest that it may be considered as a chemopreventive agent and its anticancer properties should be further explored (Fu. Yue et al., 2004).

Barley and Wheat

Lunasin, a unique 43 amino acid, 4.8 kDa cancer-chemopreventive peptide initially in soyabean and found in barley and wheat , has been shown to be cancer-chemopreventive in mammalian aells and in a skin cancer

Table 1 : Some Anticancer Natural Products

Sl. No.	Name	Biological Source	Chemical Constituent	Uses
1.	*Allium Sativum* (Garlic)	Bulb of plant know as allium sativum, liliaceae	Chorbohydrate, Protein (albumin), Fat, Mucilage	Charminative, Aphrodisiac, Expectorant Stimulant disinfectant
2.	*Artemisia*	Unexpended flower head of *Artemisia cina*, *Artemisi buvifolia* wall, *Artemisia maritime*, compositae	Essential oil, santonin, artemisin	Anthelminitic
3.	*Camellia sinensis*	Prepared leaves and leaf buds of *Thea sinensis*, Theaceae	Caffeine, theobromine, theophylline, gallatonic acid	CNS stimulant, Diuretic
4.	*Catharanthus roseus*	Dried whole plant of *Catharanthus roseus,* appocunaceae	Vincristine, Vinblastine, ajmalicine	Antineoplastic, acute, leukemia, hodgkin's disease
5.	*Curcuma longa*	Dried as well as fresh rhizome of the plant known as *Curcuma longa,* zingiberaceae	Curcuminoids, curcumin, volatile oil, starch	Anti inflammatory, anti arthritic, cervical cancer
6.	*Glycyrrhiza glabra*	Dried peeled or unpeeled root and stolon of *Glycyrrhiza glabra*, laguminosae	Glycurrhizin, glycyrrhizinic acid which on hydrolysis yield glycyrrhetinic acid	Ecpectorant, demulcent, antigastric effect
7.	*Taxus brevifolia*	Dried leaves, bark and root of various species of *taxus*, taxaceae	Taxane, cephalomannine, 10 deacetyl baccatin, taxol	Lung carcinoma, gastric and cervical cancer and also carcinomas of head , neck, prostate and colon
8.	*Zingiber*	Rhizomes of *Zingiberofficinale* roscoe, zingiberaceae	Volatile oil, starch, fat, fiber, inorganic material, residual moisture, acrid, resinous matter.	Stomachic, aromatic, carminative, stimulant, flavoring agent.

mouse model against oncogenes and chemical carcinogens. To identify bioactive components in traditional herbal medicines and in search for new source of lunasin from *Solanum nigrum* L. (SNL), a plant indigenous to northeast Asia. Lunasin was screened in the crude extract of five varieties of the medicinal plants of solanaceae origin and seven other major herbal plants. An in vitro digestion stability assay for measuring bioavailability was carried out on SNL crude protein and autoclaved SNL using pepsin and pancreatin. A nonradioactive histone acetyltransferase (HAT) assay and HAT activity colorimetric assay were used to measure the inhibition of core hisone acetylation . The inhibitory effect of lunasin on the phosphorylation of retinoblastoma protein (Rb) was determined by immunoblotting against phospho-Rb. Lunasin isolated from autoclaved SNL inhibited core histone H3 and H4 acetylation, the activities of HATs, and the phosphorylation of the Rb protein. Lunasin in the crude protein was very stable to pepsin and pancreatin in vitro digestion. While the synthetic pure lunasin was digested at 2 min after the reaction. It was conclude that lunasin is a bioactive and bioavailable component in SNL and that the consumption of SNL may play an important role in cancer prevention.

Solanum nigrum L. (SNL) has been traditionally used as a herbal plant, whose fruit is believed to have anti-tumor properties, although the mechanism for the activity remain to be elucidated. An ethanol extract from ripe fruits of SNL was prepared and investigated the mechanism involved in its growth-inhibitory eggecton MCF-7 human breast cancer cells. Results from proliferation assay using tritium uptake showed that the proliferative capacity of MCF-7 cells was strongly suppressed in the presence of SNL ethanol extract. This was further confirmed through MTT assay and trypan blue exclusion experiments, which showed a very closed correlation between the SNL extract-concentration and the surviving cell numbers the SNL extract. mediated suppression of cell growth was verified to be apoptotic, based on the appreance of DNA laddering, increase in DNA fragmentation, and low fluorescence intensity in DNA in nuclei after propidium iodide staining of the cells. Furthermore, the SNL extract was revealed to be a potential scavenger of hydroxyl radicals and DPPH radicals rather than superoxide anions. Collectively, findings suggest that SNL fruit extract could be used as an anti-oxidant and cancer chemo-preventive material.

Phyllanthus niruri/amarus An aqueous extract the life span of the tumous bearing rates and normalizes y-glutamyl transpeptidase activity. It play a major role in description of HBs Ag mRNA transcription and post transcription which could be beneficial against viral carcinogenesis (NV Rajesh Kumar and R. Kuttan 2009).

Anticancer Activity

Some medicinal plants which are used in the treatment of various types of is listed in the table 1 and few medicinal plants have been presented above possess good imnunomodulatory and antioxidant properties leading to anticancer activities (Jeong et al., 2007; Son et al., 2003).

CONCLUSION

Medicinal plants have contributed a rich health to human beings. Plant extract and their bioactive compound present in them which are responsible for anticancer activity have to be screened for their valuable information. This review had given some of the plants possessing anticancer activity for various types of cancer. This review can help other to explore herbs to further extract and its use in various other disease and toxicity studies along which clinical trials.

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