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REVIEW ARTICLE

A Review on medicinal plants with Anticancer activity

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ABSTRACT

Cancer is a major public health burden in both developed and developing countries. Cancer after cardiovascular disease is the second leading cause of death. Cancer is the abnormal growth of cells in our bodies that can lead to death. India is a peninsula of herbal hub, in which Ayurvedics system of medicine has flourished as an enlightment in the field of Medicine. Currently medicinal plants have become the paramount source of drug discovery in research for treating diverse form of diseases including Cancer. With the current decline in the number of new molecular entities from the Pharmaceutical industry, novel anticancer agents are being sought from traditional medicines. This article reveals a detailed review of ethno medicinally important plants in cancer from medicinal plants which will be useful to treat various types of cancer.

Keywords: Medicinal plants, WHO, Phytoconstituents, anticancer activity.

INTRODUCTION

Cancer cells usually invade and destroy normal cells. These cells are born due to imbalance in the body and by correcting this imbalance, the cancer may be treated. Ayurveda, a traditional Indian medical practice using plant drugs has been successful from very early times in using these natural drugs and preventing or suppressing various tumours with different lines of treatment.[1] In India, people of different ethnic groups inhabiting various terrains, possess their own distinct culture, religious rites, food habit and a rich knowledge of traditional medicine.[2] Plants keep on serving as could be allowed hotspots for new medications what's more, chemicals got from different parts of plants.[3] What's more, herbs have given us a portion of the essential life sparing medications utilized as a part of the armamentarium of cutting edge medicine.[4] According to World Health Organization, 80 % of the people living in rural areas depend on medicinal herbs as primary healthcare system. The synthetic anticancer remedies are beyond the reach of common man because of cost factor. Herbal medicines have a vital role in the prevention and treatment of cancer and medicinal herbs are commonly available and comparatively economical.

MEDICINAL PLANTS WITH ANTICANCER ACTIVITY

***Allium Sativum* (Allicin):** *Allium sativum* (Garlic, Lasun) is used to treat a wide variety of diseases in India. Allicin is a major component of raw garlic and ajoene is a product of the rearrangement of allicin. Its cytotoxic effect has been tested using human primary fibroblasts, a permanent, nontumorgenic cell line derived from baby hamster kidney cells and a tumorgenic lymphoid cell line derived from a Burkitt lymphoma. The cytotoxic action was in the range 2-50 µg/ml.Some organo-sulfur compounds from garlic, like S-allylcysteine, are reported to retard the growth of chemically induced and transplantable tumors in several animal models.[5] Administration of garlic (250 mg/kg, p.o., thrice a week) in male wistar rats, has been significantly suppressed 4-nitro quinoline-1-oxide induced tongue carcinogenesis as revealed by the absence by the carcinomas in the initiation phase and their reduced incidence in the post initiation phase.[6]

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Thus the consumption of garlic may beneficial providing some kind of protection from cancer.

Annona muricata: Graviola is known by its scientific name, *Annona muricata*. The important class of medicinal components found in graviola is acetogenins. Acetogenins was found in the fruit, seeds, leaves, and bark of the graviola plant. Preliminary research showed that acetogenins block production of adenosine triphosphate, which inhibits the pump that removes cancer drugs from the cell, allowing chemotherapy to be more effective. Furthermore, research suggested that acetogenin may have chemotherapeutic potential, especially against cancer that resistant to multiple drugs.[7] Parkinson like symptoms can occur on oral ingestion of graviola.[8] Some specific acetogenins have been reportedly identified to be toxic for various cancer cell lines like lung solid human-breast cancer, tumor carcinoma, pancreatic carcinoma, prostatic adenocarcinoma, colonic adenocarcinoma, human lymphoma, liver cancer, and multiple-drug resistant human-breast adenocarcinoma.

Bidens pilosa: *Bidens pilosa* is a folk medicine reported with the presence of polyacetylenes, flavonoids, terpenoids, phenylpropanoids and others. An extensive research work on different extracts of *Bidens pilosa* and further fractionation led to the isolation and characterization of potential marker compound phenyl-1, 3, 5-heptatriyne. This marker compounds revealed the toxicity profile on normal blood cells in erythrocyte osmotic fragility experiments along with other extracts. Hexane, chloroform and methanol extracts of *Bidens pilosa* and their fractions were tested on various cancer cell lines. Results exhibited the antitumor activity of extracts among which hexane extract pronounced the most remarkable activity. [9]

Cannabis sativa: *In vitro* studies of components of marijuana *(Cannabis sativa)* indicate a potential to inhibit human breast cancer cells and to produce tumor eradications. In experiments introducing marijuana to malignant brain tumors, it was found that survival of animals was increased significantly. The active components of *Cannabis sativa* are cannabinoids. Cannabinoids and their derivatives exert palliative effects in cancer patients by preventing nausea, vomiting and pain and also stimulated the appetite. These compounds have also been shown anti-tumor activity in cell culture and animal models by modulating key cell-signalling pathways.[10]

Daphne mezereum: Daphne mezereum is a plant widely used as afolklore remedy for treating cancer like symptoms. A hydro alcohol extract of *Daphne mezereumhas* exhibited a potent antileukemic activity against lymphocytic leukemia in mice. Further fractionation studies on the extract resulted in the isolation and characterization of mezerein as a potent antileukemic compound. [11]

Gossypium hirsutum: *Gossypium hirustum* or *Gossypium herbaceumalso* called as Gossypol or cottonseed oil and used as a male contraceptive, in the treatment of metastatic carcinoma of endometrium or ovary and also used in HIV. Some *in vivo* and *in vitro* studies revealed the antitumor properties of gossypol on many cytosolic and mitochondrial enzyme systems that is fundamental for tumor cell growth, including melanoma, endometrial, colon, lung, prostate, breast, brain, and adrenocortical cancer. However no typical dose is yet suggested for the treatment of cancer and self-medication with gossypol is not safe because of its potential toxicity. [12]

Andrographis paniculata: Phytochemical investigation of the ethanol extract of the aerial parts of *Andographis paniculata* reported the isolation of 14 compounds; a majority of them are flavonoids and labdane diterpenoids. The cytotoxic activities of these compounds have been evaluated against various cell lines and found that these isolates have a potent tumour inhibitory activity against all investigated cell lines[13]. The methanol extract of *Andrographis paniculata* was fractionated, dichloromethane fraction reported to possess three active constituents which were further tested and exhibited cytotoxic activity and also potent immunostimulating activity[14]. However, there were also its adverse side effects were also reported which may include gastric upset, headache, bitter taste and fatigue. High doses of *Andographis paniculata* may have affect the normal functions of liver. [15]

***Salvia miltiorrhiza*:** Tanshinone-I was isolated from traditional herb Salvia miltiorrhizae, was investigated on the expression of intercellular adhesion molecule. The study revealed a potential anticancer effect of tanshinone-I on breast cancer cells, suggesting that tanshinone-I may serve as an effective drug for the treatment of breast cancer[16]. Tanshinone II-A, isolated from *Salvia miltiorrhiza,* induced apoptosis which was linked

to proteolytic cleavage of a major component in apoptotic cell death mechanism. [17]

Cynodon dactylon: *Cynodon dactylon* belongs to the family of *Poaceae* and is said to have many medicinal properties including anti-helmintic, anti–diuretic, anti-inflammatory, hepatoprotective activity as well as treatment of urinary tract infection, Prostatitis and Dysentery. Traditionally it is used in diabetes, jaundice, kidney problem, urinay diseases, gastro intestinal disorder, constipation and abdominal pain. The whole plant is used for diuretics, dropsy, syphilis, wound infection and piles. *Cynodon dactylon* is used as antihaemorrhagic in dysentery and nasal bleeding. The juice of plant is astringent and is applied externally to fresh cuts and wounds. It is used in treatment of catarrhal ophthalmia hysteria, epilepsy, insanity and chronic diarrhea. The plant is folk remedy for anasarca, calculus, carbuncles, cough, hypertension, snake bites, gout, and rheumatic affections. The nontoxic dose of the petroleum ether of *Cynodon dactylon* on normal vero cell line showed that with regard to viability of cell was found to be 97 % at a concentration of 0.007 mg/ml which decreased with increase in concentration. The extract showed a potent cytotoxic activity against Hep-2 laryngeal cancer cell line. Cyclophosphamide served as pc-control and 96.2 % cancer inhibition was observed. The concentration of petroleum ether extract of *Cynodon dactylon* at 10 mg/ ml showed inhibition percent with regard to cytotoxicity of 93.5 % that was comparable to the positive control. [18]

Drosera indica: Drosera is a cosmopolitan genus of insectivorous plants and consists of approximately 170 species. In India *Drosera indica* L. Family - Droseraceae, *Drosera burmannii* Vahl and *Drosera peltata* J.E. Sm.ex. Wild have been reported to be present at different location. These species are used as vital components in the Ayurvedic preparation Swarnabhasma (Golden ash). Swarnbhasma (golden ash) is used in several clinical manifestations including the loss of memory, defective eyesight, infertility, overall body weakness and incidence of early aging. It is also used for the treatment of diseases like bronchial asthma, rheumatoid arthritis, diabetes mellitus and nervous disorder. The ethanolic and aqueous extract of *D. indica* L Possess significant anti-oxidant and anticancer activities when tested against different *in vitro* models. The antioxidant ability could be attributed action. Thus *D. indica* L extracts as promising natural source of antioxidant and anticancer agent can be used in nutritional or pharmaceutical field for the prevention fields for the prevention of free radical mediated disease.[19]

Salacia fruticosa: *Salacia fruticosa* Heyne ex Lawson belongs to the family Hippocrateaceae / Celastraceae, commonly known as Ponkorandi in Malayalam, Korandi in Tamil. It is a woody climbing shrub, which is native to India (Karnataka, Tamilnadu & Kerala) and Srilanka. In Tamilnadu, it is mostly seen in Dindugul & Kanniyakumari. The hydroalcoholic extract of *Salacia fruticosa*-root was found to be potent antioxidant & anticancer agent. [20]

***Vitex pinnata* Linn.:** *Vitex pinnata* is the tree with trifoliate leaves, gray to brown bark. The leaves are potential as antioxidant; because of flavonoids, alkaloids & terpenoids content. In Traditional medicine, the plant is used to expel intestinal worms, as analgesic, anti-inflammatory, antipyretic, wound healing, anti-oxidant, antibacterial and stomach ache. The present study deals with the *in vitro* anticancer activity of various fractions of hydroalcoholic extract of *Vitex pinnata* Linn., against L6 and EAC cell lines. MTT assay was used to assess the *in vitro* anticancer activity. the ethanolic fraction of *Vitex pinnata* reported to more potent anticancer activity than the all other fractions. [21].

CONCLUSION

In conclusion this article provides the knowledge about anticancer medicinal plants which are used by people all over the world. Medicinal plants maintain the health and vitality of individual and also cure various diseases including cancer without causing toxicity. Natural products discovered from medicinal plants have played an important role in treatment of cancer.Also it is of significance to exploit novel anticancer drugs from medicinal plants. The Cost effective herbal drug treatment may highly be recommended to the rural and poor people to treat effectively the cancers of various type is an ideal choice. Based on that the Siddha medicines are coming up in combination with metals and other essential supplements to improve the immune status of the cancer patients in India. The available literature finds to be very impressive which may give an indication for the therapeutic usefulness. Only few of the plants listed here and there are hundreds of plants unexplored need much detailed survey. The isolation, identification of active principles and pharmacological studies of the active

phytoconstituents may be considered and studied elaborately to treat effectively for various types of cancer. Medicinal plants have contributed a rich health to human beings. Plant extracts and their bioactive compounds 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.

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