

THERAPEUTIC APPLICATIONS OF MEDICINAL PLANTS FOUND IN ODISHA, USED FOR THE TREATMENT OF CANCER

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ABSTRACTS

Medicinal herbs and their derivative phytoconstituents are being increasingly recognized as useful complementary treatments for cancer. Data was obtained from survey and it was found that some medicinal herbs like *Catharanthus roseus*, *Withania somnifera*, *Bacopa monnieri*, *Ocimum sanctum*, *Curcuma longa*, *Zingiber officinale*, *Allium sativum*, *Brassica oleracea* var. *botrytis*, *Brassica oleracea* var. *capitata*, *Daucus carota* are found in Odisha which were used for the treatment of cancer. *C. roseus* is an evergreen herbaceous plant which contains alkaloids such as vinblastine, vincristine, vinorelbine, vinflunine inhibit spread of breast, ovary and lung cancer and also induce apoptosis. *W. somnifera* contains active

components like withaferin, withanolide, withanoside and withanone. Particularly withaferin found in this plant, inhibit breast cancer. Compounds such as bacopaside E and bacopaside VII extracted from *B. monnieri* have effects on cancer cells in malignant glioma and breast cancer. The main active compound of *C. longa* is curcumin which inhibit regrowth of cancer stem cells and shows best effects on breast and stomach cancer. *O. sanctum* has a range of beneficial compounds such as eugenol, rosmarinic acid, carnosic acid and apigenin inhibits the development of new tumors and induces cell death. *Z. officinale* contains a pungent compound such as 6-shogaol, zingerone and paradols provide chemopreventive activity which prevents and slows the progression of tumor growth. Arginine, oligosaccharides, flavonoids and selenium are extracted from *A. sativum* reduce risk of stomach, colon and breast cancer. *B. oleracea* var. *botrytis* contains fiber, vitamin B and C, carotenoids, glucosinolates, isothiocyanates promote the death of cancer cells while sparing

healthy cells. *B.oleraceae var. capitata* contain antioxidants like vitamin A and C and phytonutrients such as thiocyanate, lutein, zeaxanthin, isothiocyanates, sulforaphane protect against breast, colon and prostate cancer. *D.carota* is a rich source of photochemicals and antioxidants like carotenoids, flavonoids, falcarinol prevents the cells from cancer. The above cheap medicinal herbs and their secondary metabolites are used effectively for the treatment of various types of cancer.

KEYWORDS: Arginine, Cancer, Medicinal, Phytoconstituents, Withaferin.

INTRODUCTION

Natural products especially plants have been used for the treatment of various diseases promisingly by the knowledge of Ayurveda.^[1] Medicinal plants are the source of new discoveries leads towards various health care issues and synthesis of new formulations.^[1] Every biological change can be seen when a normal cell progresses to cancerous one^[1] which is one of the most life threatening diseases and poses many health hazards, characterized by irregular proliferation of cells^[1], which can colonize and spread to distant sites of the body.^[2] In males, the most common prevalent types of cancers are lungs, prostate, colorectal, stomach and liver cancers whereas, breast, colorectal, lungs, uterine cervix and stomach cancers are most prevalent in women's.^[2] The medicinal plants have been contributed many novel therapeutic compounds are used for preventive and curative various types of cancer.^[1] The survey of anti cancerous medicinal plants was carried out in Kanas, Odisha, India. Data was obtained from this survey and it was found that some medicinal herbs like *Catharanthus roseus*, *Withania somnifera*, *Bacopa monnieri*, *Ocimum sanctum*, *Curcuma longa*, *Zingiber officinale*, *Allium sativum*, *Brassica oleracea var. botrytis*, *Brassica oleracea var. capitata* and *Daucus carota* are found in the region of Kanas, Odisha, which were used by the local people for the treatment of various types of cancer. Therapeutic applications of these medicinal plants possess antimutagenic and anticancer properties that inhibit or kill carcinogenic cells and also inhibit growth and initiate apoptosis of cancerous cells and also have the ability to prevent the spread or risk of developing various forms of cancer.^[1] These medicinal plants are good and cheap valuable sources of natural therapeutic agents and are used for the prevention and treatment of various types of cancer.^[3]

MATERIAL AND METHODS

During the survey therapeutic applications of medicinal plants used for the treatment of Cancer were collected from the region of Kanas, Odisha and botanically authenticated by

specialists. Information of the medicinal plants are used for the treatment of various types of cancer was collected personal with local herbal practitioners and the patients suffering from cancer in the village of Kanas of Puri districts of Odisha. Therapeutic applications of medicinal plants were noted such as *Catharanthus roseus*, *Withania somnifera*, *Bacopa monnieri*, *Ocimum sanctum*, *Curcuma longa*, *Zingiber officinale*, *Allium sativum*, *Brassica oleracea var. botrytis*, *var. capitata* and *Daucus carota* are used for the treatment of various types of cancer. Other information viz. major phytochemicals isolated and the bioactivities were assayed through the literature search and data about anticancerous medicinal plants derived from historical ethnopharmacological information as well as invitro and invivo results and clinical findings extracted from different literature databases including (PubMed, Scopus, Web of Science, and Google Scholar).

RESULTS AND DISCUSSION

The present study revealed that the anticancerous medicinal plants are found in the region of Kanas, Odisha for treatment of various types of cancer. The data was obtained from this survey regarding the most commonly used medicinal plants such as *Catharanthus roseus*, *Withania somnifera*, *Bacopa monnieri*, *Ocimum sanctum*, *Curcuma longa*, *Zingiber officinale*, *Allium sativum*, *Brassica oleracea var. botrytis*, *Brassica oleracea var. capitata* and *Daucus carota* are used for the treatment of various types of cancer illustrating their importance as natural anticancer agents. From this study following results were obtained i.e., *C. roseus* is an evergreen herbaceous plant contain alkaloids such as vinblastine, vincristine, vinorelbine, vinflunine which are arrested cancer cell proliferation by binding to tubulin in the mitotic spindle and induce apoptosis and also inhibit spread of various types of cancer like breast, Ovary, lungs, colon, testis. *W. somnifera* is an antioxidant herb with cancer fighting potential act as a radio sensitizer and chemotherapeutic agent that reduces tumor cell proliferation. Active components like withaferin, withanolide, withanoside and withanone present in this herb have been found effective against different kinds of cancer such as brain, prostate, skin, renal and breast. Withaferin A, in particularly inhibit breast cancer. Compounds such as bacopaside E and bacopaside VII extracted from *B. monnieri* have effects on cancer cells in malignant glioma and breast cancer. This plant is the full of antioxidants that help in removing free radicals that can further mutate into cancer cells. The main active compound of *C. longa* is curcumin also shows anticancer effects on cancer cells that helps in prevention of several forms of cancer including breast, lungs, stomach, liver and colon because of its anti inflammatory and antioxidant properties. It inhibits the action of

COX-2, an enzyme that causes negative inflammation, which leads to cancer and prevent regrowth of cancer stem cells and also have the ability to kill cancer cells leaving healthy cells unharmed.

O. sanctum is a potent herb with an wide range of beneficial compounds such as eugenol, rosmarinic acid, carnosic acid and apigenin that help in fighting cancerous cells. It increases antioxidant activity and also inhibits the development of new tumors and induces cell death. It is effective in inhibiting the growth and progression of breast cancer by blocking the cell proliferation. *Z. officinale* contains a pungent component known as 6-shogaol is superior to conventional chemotherapy in targeting the root cause of breast cancer malignancy and also inhibits breast cancer cells and stem cell-like spheroids by modulation of notch signaling pathway through Y-secretase inhibition. This plant also contains other compounds such as zingerone and paradols that provide chemopreventive activity which prevents and slows the progression of tumor growth. Arginine, oligosaccharides, flavonoids and selenium are extracted from *A. sativum* reduced risk of certain cancers including cancer of the stomach, colon, esophagus, pancreas and breast and also have the ability to block the formation of cancer causing substnecs, halt the activation of cancer causing substances. It contains sulfur compounds that stimulate the immune system,s natural defense against cancer and have the potential to reduce tumor growth. *B. oleraceae var. botrytis* contains fiber, vitamin B and C, and high concentration of carotenoids, i.e., antioxidants, glucosinolates, isothiocyanates have anticancer effects which inhibit cancer growth and promote the death of cancer cells while sparing healthy cells. *B. oleraceae var. capitata* has high concentrations of anti-inflammatory, antioxidants compounds and contains fibers, vitamin A and C and phytonutrients such as thiocyanate, lutein, zeaxanthin, isothiocyanates, sulforaphane to protect against breast, colon and prostate cancer. *D.carota* is a rich source of photochemicals and antioxidants like carotenoids, flavonoids,falcarinol prevents the cells from cancer and falcarinol is a powerful antioxidant that guards the cells against damage from free radicals.The above cheap medicinal herbs and their secondary metabolites are used effectively for the treatment of various types of cancer.

Some medicinal plants are used for the treatment of various types of cancer are described by several review papers in which some review papers were taken to consideration for discussion. According to the review on anticancer potential of plants and natural products revealed that *C. roseus*, *A. sativum*, *W. somnifera*, *Z. officinale* have anticancerous properties

Another review paper revealed about the anticancer activity of medicinal plants like *C.roseus*, *A. sativum*, *Z. officinale*.^[4] A brief review on medicinal plants revealed that the anticancerous medicinal plants such as *A. sativum*, *O. sanctum* are used effectively for the treatment of various types of cancer.^[5]

CONCLUSION

Medicinal plants keep 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 the treatment of cancer. From this study, it is concluded that some anti-cancer medicinal plants such as *Catharanthus roseus*, *Withania somnifera*, *Bacopa monnieri*, *Ocimum sanctum*, *Curcuma longa*, *Zingiber officinale*, *Allium sativum*, *Brassica oleracea var. botrytis*, *Brassica oleracea var. capitata*, *Daucus carota* are found in the region of Kanas, Odisha are used for the treatment of various types of cancer. These plants possess good immunomodulatory and antioxidant properties leading to anticancer activity. These medicinal plants are good and cheap valuable sources of natural therapeutic agents are used for the prevention and treatment of various types of cancer.

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