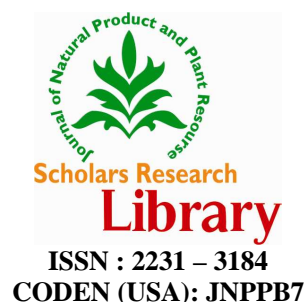




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Anticancer plants: A Review

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ABSTRACT

Cancer is major health problem 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. Because of high death rate associated with cancer and because of serious side effects of chemotherapy and radiation therapy, many cancer patients seek alternative complementary methods of treatment. Plants have been used for treating diseases since time immemorial. More than 50% of modern drugs in clinical use are of natural products. In the present review, an attempt has been made to study the plants that have been used in the treatment of cancer.

Keywords: Herbal medicine, Chemopreventive, Traditional medicine, Complementary methods.

INTRODUCTION

Natural products especially plants have been used for the treatment of various diseases for thousand of years. Terrestrial plants have been used as medicines in Egypt, China, India and Greece from ancient times and an impressive number of modern drugs have been developed from them. The first written records on the medicinal uses of plants appeared in about 2600 BC from the Sumerians and Akkaidians. [1] The Ebers Papyrus, the best known Egyptian pharmaceutical record which documented over 700 drugs, represents the history of Egyptian medicine dated from 1500 BC. The Chinese Materia Medica, which describes more than 600 medicinal plants, have been well documented with the first record dating from about 1100 BC. [2] Documentation of the Ayurvedic system recorded in Susruta and Charaka dates from about

1000 BC. [3] The Greeks also contributed substantially to the rational development of the herbal drugs. Dioscorides, the Greek physician (100 AD), described in his work, *De Materia Medica* more than 600 medicinal plants. [4]

Over the past decade, herbal medicine has become a topic of global importance, making an impact on both world health and international trade. Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. [5] This is particularly true in developing countries, where herbal medicine has a long and uninterrupted history of use. Continuous usage of herbal medicine by a large proportion of the population in the developing countries is largely due to the high cost of Western Pharmaceuticals and Healthcare. In addition, herbal medicines are more acceptable in these countries from their cultural and spiritual points of view.[6] Among the human diseases treated with medicinal plants is cancer, which is probably the most important genetic disease. Every year, millions of people are diagnosed with cancer, leading to death in a majority of the cases. [7]

CANCER is the abnormal growth of cells in our bodies that can lead to death. 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. Billions of dollars have been spent on cancer research and yet we do not understand exactly what cancer is. [8] Every year, millions of people are diagnosed with cancer, leading to death. According to the American Cancer Society [9], deaths arising from cancer constitute 2–3% of the annual deaths recorded worldwide. Thus cancer kills about 3500 million people annually all over the world. Several chemopreventive agents are used to treat cancer, but they cause toxicity that prevents their usage. [10]

Cancer is the second leading cause of death in America. The major causes of cancer are smoking, dietary imbalances, hormones and chronic infections leading to chronic inflammation. [11] Because of high death rate associated with cancer and because of the serious side effects of chemotherapy and radiation therapy, many cancer patients seek alternative and/or complementary methods of treatment. The important preventive methods for most of the cancers include dietary changes, stopping the use of tobacco products, treating inflammatory diseases effectively, and taking nutritional supplements that aid immune functions. [12]

Chemotherapy, being a major treatment modality used for the control of advanced stages of malignancies and as a prophylactic against possible metastasis, exhibits severe toxicity on normal tissues. [13, 14] Plants have been used for treating various diseases of human beings and animals since time immemorial. They maintain the health and vitality of individuals, and also cure diseases, including cancer without causing toxicity. More than 50% of all modern drugs in clinical use are of natural products, many of which have the ability to control cancer cells. [15] According to the estimates of the WHO, more than 80% of people in developing countries depend on traditional medicine for their primary health needs. A recent survey shows that more than 60% of cancer patients use vitamins or herbs as therapy. [16, 17] Over the past decade, herbal medicines have been accepted universally, and they have an impact on both world health and international trade. Hence, medicinal plants continue to play an important role in the healthcare system of a large number of the world's population. Traditional medicine is widely used in India.

List of Anticancer plants:

Sr.No:	Plant Name/Family	Habitat	Active constituent	Class
1.	<i>Agapanthus africanus</i> Agapanthaceae	S.Africa	Isoliquiritigenin	Chalcone [7]
2.	<i>Aglaila sylvestre</i> Meliaceae	India	Silvesterol	-----
3.	<i>Ailanthus Altissima</i> Simaraubaceae	China	Ailnthon, Ailantenol	Quassinoids [18]
4.	<i>Apium graveolens</i> Umbelliferae	N.America	Apigenin	Flavonoid [19]
5.	<i>Bleckeria vitensis</i> Apocynaceae	France	Ellipticine	Alkaloid [20]
6.	<i>Brucea antidysenterica</i> Simaraubaceae	Africa	Bruceantin	Quassinoid [20]
7.	<i>Bursera microphylla</i> Burseraceae	Mexico	Burseran	Lignan
8.	<i>Camptotheca acuminata</i> Nyssaceae	China	Camptothecin	Alkaloid [20]
9.	<i>Catharanthus roseus</i> Apocynaceae	India,Africa	Vincristine, Vinblastine	Alkaloid [20]
10.	<i>Centaurea montata</i> Asteraceae	Europe	Montamine	Alkaloid
11.	<i>Centaurea schischkinii</i> Asteraceae	-----	Schischkinnin	Alkaloid
12.	<i>Cephalotaxus harringtonia</i> Cephalotaxaceae	Japan	Homoharringtonine	Alkaloid [20]
13.	<i>Cleistanthus collinus</i> Euphorbiaceae	India	Cleistanthin, Collinusin	Lignan
14.	<i>Combretum caffrum</i> Combretaceae	S.Africa	Combrestatins	Stilbenes
15.	<i>Croton lechleri</i> Euphorbiaceae	S.America	Taspine	Alkaloid [21]
16.	<i>Daphne mezereum</i> Thymelaeaceae	Asia, Europe	Mezerein	-----
17.	<i>Diphylleia grayi</i> Berberidaceae	Japan	Diphyllin	Lignan [20]
18.	<i>Dysoxylum binectariferum</i> Meliaceae	India	Rohitukine	Alkaloid [20]
19.	<i>Erythroxylum pervillei</i> Erythroxylaceae	Madagascar	Pervilleine	Alkaloid
20.	<i>Euphorbia semiperfoliata</i> Euphorbiaceae	Europe	Jatrophone	Terpenoid [20]
21.	<i>Fritillaria thunbergii</i> Liliaceae	China,Japan	Zhebeinone	Alkaloid
22.	<i>Gunnera perpensa</i> Gunneraceae	Brazil	2-methyl-6(3-methyl 2-butenyl) benzo 1-4 quinone	Quinone
23.	<i>Hypericum perforatum</i> Clusiaceae	Europe	Hypericin	Anthraquinone
24.	<i>Hypoxis colchicifolia</i> Hypoxidaceae	S.Africa	Hypoxoside, Rooperol	Glycoside

25.	<i>Indigofera tinctoria</i> Leguminosae	Asia	Indirubins	Indigoids [20]
26.	<i>Justicia procumbens</i> Acanthaceae	India	Justicidin A,B	Lignan
27.	<i>Lantana camara</i> Verbenaceae	America	Verbascoside	Glucoside
28.	<i>Larrea tridentate</i> Zygophyllaceae	Mexico	Terameprocol	Lignan [22]
29.	<i>Linium album</i> Linaceae	-----	Podophyllotoxin	Lignan
30.	<i>Lonicera japonica</i> Caprifoliaceae	Japan	Luteolin	Flavanoid [23]
31.	<i>Paris polyphilla</i> Trilliaceae	China	Polyphyllin	[24]
32.	<i>Pestemon deustus</i> Serophulariaceae	U.S.A	Liriodendrin	Lignan
33.	<i>Phaleria macrocarpa</i> Thymelaeaceae	Indonesia	Pinoresinol, Laricinesinol	Lignan
34.	<i>Podophyllum emodii</i> Berberidaceae	India	Epipodophyllotoxin	Alkaloid
35.	<i>Polygonum cuspidatum</i> Polygonaceae	Japan,China	Resveratrol	Flavanoid
36.	<i>Pteris multifida</i> Pteridaceae	Japan	Pterokaurane	Terpenoid [25]
37.	<i>Pygeum africanum</i> Rosaceae	Africa	Amygdalin	Glycoside
51.	<i>Vitex rotundifolia</i> Verbenaceae	India, Korea	Casticin	Flavanoid [31]
52.	<i>Wikstroemia viridi</i> Thymelaeaceae	China	Wikstromol	Caumarin

There are several medicinal plants all over the world, including India, which are being used traditionally for the prevention and treatment of cancer. However, only few medicinal plants have attracted the interest of scientists to investigate the remedy for neoplasm (tumour or cancer). Hence, an attempt has been made to review some medicinal plants used for the prevention and treatment of cancer in foreign countries.

CONCLUSION

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. In this review some anti cancer plants have been presented. These plants possess good immunomodulatory and antioxidant properties leading to anticancer activity. In conclusion this article provides the knowledge about anticancer medicinal plants of foreign origin, which are used by people all over the world. Also it is of significance to exploit novel anticancer drugs from medicinal plants.

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