



## A review on natural herbs as anticancer drugs

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### Abstract

This project has been made to review some medicinal plants used as anticancer drugs. Herbal drugs having vital role in treatment of cancer. Many of the classes of phytochemicals in herbal medicines are finding therapeutic use. Individual herbal medicine shows antipyruvatic, analgesic, anti-inflammatory and anticancer effect.

Now a day's medicinal plants have become the best source of drug discovery. India is the largest producer of medicinal plants and is rightly called as the botanical garden of the world. The herbal drugs are easily available, cheaper and posses no toxicity as compared to other drugs. The current focus is on what are Cancer and Herbal Anticancer drugs which means the plants used in the treatment of the cancer.

In the past few years, there has been no exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effect. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter. This review will discuss the herbal anticancer drugs with pharmacognostic account.

**Keywords:** Natural herbs, medicines, herbal anticancer

### Introduction

According to World Health Organization, 80% of people living in rural areas depending on medicinal herbs as primary health care system. <sup>[1]</sup> Herbal drugs plays vital role in prevention or in treatment of various disease. Herbal drugs are easily available and comparatively economical. Hence, scientist all over the world are concentrating on herbal drugs.

In this study, we are selected few medicinal plants which shows high potency towards cancer cell. This selected herbal drugs/ medicinal plants shows anticancer activity. Synthetic anticancer remedies are beyond the rich of common men because of cost factor. Medicinal plants are considered as repository of numerous type of bioactive compounds possessing varied therapeutic properties.

Herbal remedies are in practices in thousands of years and are a part of culture in counties like India, China, even in Nepal also. This article has been made to review some medicinal plants used for prevention and treatment of cancer. Terrestrial plants have been used as medicines in India, China, Egypt and Greece from ancient time. Lot of modern drugs are derived from medicinal plants.

More than 30% of cancers are caused by modifiable behavioural and environmental risk factors, including tobacco and alcohol use, dietary factors, insufficient regular consumption of fruit and vegetable, overweight and obesity, physical inactivity, chronic infections from Helicobacter pylori, hepatitis B virus (HBV), hepatitis C virus (HCV) and some types of human papilloma virus (HPV), environmental and occupational risks including exposure to ionizing and nonionizing radiation.

Conventional treatment of cancer includes interventions such as psychosocial support, surgery, radiotherapy and chemotherapy. Currently, the most commonly used cancer chemotherapy includes mainly alkylating agents, antimetabolites, antitumor antibiotics, platinum analogs and

natural anticancer agents. However, due to the increasing rate of mortality associated with cancer and adverse or toxic side effects of cancer chemotherapy and radiation therapy, discovery of new anticancer agents derived from nature, especially plants, is currently under investigation. Screening of medicinal plants as a source of anticancer agents was started in the 1950s, with the discovery and development of vinca alkaloids, vinblastine and vincristine and the isolation of the cytotoxic podophyllotoxins. The cool temperate climate of North America supports the growth of an enormous number of plant species which are important sources of unique phytochemicals having anticancer properties.

### Types of cancer <sup>[6]</sup>

There are a hundreds of different types of cancer. But most common type of cancer are breast cancer, prostate cancer, lung cancer, cancer of colon or rectum, blood cancer, bladder cancer, ovarian cancer, brain cancer.

Types of cancer

#### 1. Cancers of Blood and Lymphatic Systems

a. Hodgkin's disease, b. Leukaemia, c. Lymphomas, d. Multiple myeloma, e. Waldenstrom's disease

#### 2. Skin Cancers

a. Malignant Melanoma

#### 3. Cancers of Digestive Systems

a. Oesophageal cancer, b. Stomach cancer, c. Cancer of pancreas, d. Liver cancer, e. Colon and Rectal cancer, f. Anal cancer

#### 4. Cancers of Urinary system

a. Kidney cancer, b. Bladder cancer, c. Testis cancer, d. Prostate cancer

## 5. Cancers in women

a. Breast cancer, b. Ovarian cancer, c. Gynaecological cancer, d. Choriocarcinoma

## 6. Miscellaneous cancers

a. Brain cancer, b. Bone cancer, c. Carcinoid cancer, d. Nasopharyngeal cancer, e. Retroperitoneal sarcomas f) Soft tissue cancer, g) Thyroid cancer

### Classification of cancer<sup>[7]</sup>

Cancer can be classified according to the following categories

#### ▪ Carcinoma

A cancer that arises from the epithelial cells (the lining of cells that helps protect or enclose organs). Carcinomas may invade the surrounding tissues and organs and metastasis to the lymph nodes and other areas of the body. The most common forms of cancer in this group are breast, prostate, lung and colon cancer.

#### ▪ Sarcoma

A type of malignant tumour of the bone or soft tissue (fat, muscle, blood vessels, nerves and other connective tissues that support and surround organs). The most common forms of sarcoma are leiomyosarcoma, lip sarcoma and osteosarcoma.

#### ▪ Lymphoma

Lymphoma is a cancer of the lymphatic system, which runs all through the body, and can therefore occur anywhere. The two main forms are non-Hodgkin's which begins with uncontrolled growth of the - white blood cells (lymphocytes) of the immune system and Hodgkin's lymphoma in which cells of the lymph nodes become cancerous.

#### ▪ Leukaemia

Leukaemia is a cancer of the white blood cells and bone marrow, the tissue that forms blood cells. There are several subtypes; common are lymphocytic leukaemia and chronic lymphocytic leukaemia.

### Herbal drugs

Medicinal plant plays important role in the development of potent therapeutic agents. Now days near about 80% of peoples of developing countries still relays on traditional medicine based on species of plants. A great deal of pharmaceutical research done in technologically advanced countries like U.S.A., Germany, France, Japan and China has considerably improved quality of the herbal medicines used in the treatment of cancer. From the earliest times, herbs have been prized for their pain-relieving and healing abilities and today we still rely largely on the curative properties of plants.

Medicinal plants are considered a repository of numerous types of bioactive compounds possessing varied therapeutic properties. The therapeutic potential of plants has been well explored over a very long time period. The vast array of therapeutic effects associated with medicinal plants includes anti-inflammatory, antiviral, antitumor, anti malarial, and analgesic.<sup>[8]</sup>

Herbal medicine has been widely used for treatment of different diseases in China for hundreds of years. Herbal

medicines usually are prepared in a traditional formulation that contains a variety of constituents such as triterpenoids, flavonoids, a saponin-like glycoside, flavonoid glycosides such as liquiritin and rhamnoliquirtin, coumarin derivatives including herniarin.<sup>[9]</sup> Different formulations have spasmolytic properties and beneficial influences on the healing process of ulcers. Other therapeutic properties of herbal medicines include anti-inflammatory, antiallergic, antiarthritic, antiestrogenic, antihepatotoxic, antiviral and anticholinergic actions. However, herbal medicine is hampered by its quality and often its authenticity. In addition, our limited understanding of their biological activities and the slow action in the healing process has slowed down the development of herbal medicine for pharmacological applications. Nevertheless, recent development of herbal medicine for prevention or treatment of cancer has aroused a lot of interest and research in this area.

### Herbal anticancer drugs

#### Definition

Some plant extract, phytochemical constituents or bioactive compounds which shows anticancer activity.

OR

Some herbal extract, phytochemical constituents or bioactive compounds derived from part of plants which shows anticancer activity are known as anticancer drugs.

This types of plant posses a good immunomodulatory or antioxidant activity against cancerous cells.

#### List of herbal anticancer drugs

1. Astragals
2. Podophyllumpeltanum
3. Curcumin
4. Echinacea
5. Aconite
6. Allium satvium
7. Artemisia
8. Camellia sinensis
9. Comptotheaacuminata
10. Catharanthusroseus

#### Detailed study of common anticancer drug<sup>[18]</sup>

##### 1. Catharanthus roseus



Fig 1: Catharanthus roseus

**Synonyms**

Vincarosea (basionym), Ammocallisrosea, Lochnerarosea

**Biological source**

It is the dried whole plant of catheranthusroseus belonging to family apocynaceae

**Geographical source**

It is probably indigenous to Madagascar. It is cultivated in South Africa India USA Europe Australia and Caribbean islands as an ornamental plant as well as for its medicinal properties.

**Chemical constituents**

Rosinidin is an anthocyanidin pigment found in the flowers of *C. roseus*. Vincristine and vinblastine, chemotherapy medications used to treat a number of types of cancers, are also found in the plant.

**Uses**

In the treatment of acute leukaemia of childrens in adults hodgkins diseases reticulum cell sarcoma, lymphosarcoma and myosarcoma Vinblastine sulfate (sold as Velban) is also employed in therapy for lymph sarcoma, choriocarcinoma, neuroblastoma, and carcinoma of the breasts, lungs and other organs in acute and chronic leukemia. Vincristine sulfate (sold as Oncovin) is known to arrest mitosis

**2. Curcumin**

**Fig 2:** Curcumin

**Synonyms**

Indian saffron, curcuma, Turmeric, Haldi, Halad, Haridra, Aushadhi, Gouri, and Kanchani

**Biological source**

It is dried as well as fresh rhizomes of plant curcuma longa linn. Belongs to family zinziberaceae

**Geographical source**

In India Tamilnadu, Andhra Pradesh, kerala, south east asia china thialand Italy malacia archipelago and north Australia.

**Chemical constituents**

Turmeric has hundreds of molecular constituents, each with a variety of biological activities. For instance, there are at least 20 molecules that are anti-biotic, 14 that are known cancer preventatives, 12 that are anti-tumour, 12 are anti-inflammatory and there are at least 10 different anti-oxidants. Three gold-colored alkaloidal Curcuminoids: Curcumin, Demethoxy-curcumin,

**Uses**

It is used as condiment or spice and colouring agent. For the detection of boric acid. Used as anticeptic and anti inflamettary and it is powerfull antioxidant. It is used as antineoplastic. In the treatment of skin cancer. [12]

**3. Allium sativum**

**Fig 3:** Allium sativum

**Synonyms**

Garlic, Allium

**Biological source**

This consist of bulbs of the plant known as allium sativum linn. Family liliaceae. It contains not less than 0.2 percent of alliin on dried basis

**Geographical source**

Garlic is culticated in central Asia, southern Asia, southern Europe, USA and India. In India it is found in almost all the states and cultivated as a spice or condiment crop.

**Chemical constituents**

Garlic contains 29% of carbohydrates, about 56% of proteins (albumin) 0.1% of fat, mucilage, and 0.6 to 0.1 % of volatile oil. It also contains phosphorus iron and copper. Volatile oil of drug is the chief active constituent, and contains allyl propyl disulphide, diallyl disulphide, allin and allacin. Allin by action of enzyme allinyase is converted into allacin. Garlic oil is yellow in colour and has specific gravity of 1.046. it is optically inactive.

**Uses**

Garlic is used as carminative aphrodisiac expectorant stimulant and disinfectant in the treatment of pulmonary condition. It is largely used in the condiments. Oil of garlic is used as anthelmintic and

**4. Zingiber**

**Fig 4:** Zingiber

**Synonyms**

Zingiber, zingiberis, Sunthi

**Biological source**

(Zingiber officinale) is a flowering plant whose rhizome, ginger root or simply ginger, belongs to family Zingiberaceae

**Geographical source**

It is native to south East Asia but cultivated in Caribbean island also Africa Australia india tiaban Jamaica and Mauritius

**Chemical constituents**

Starch, fat, fibre, monoterpin hydrocarbons sesquiterpene hydrocarbons, oxygenated mono and sesquiterpens and phenyl propanoids.

**Uses**

Used as stomachic, an aromatic, carminative, stimulant, and flavouring agent

Zingiber officinalis (ginger) rhizomes offer a rich package of gingerols-phenolic antioxidants that possess pronounced anti-inflammatory activity-that inhibit various cancers. Ginger also contains

**5. Whithania somnifera**

Fig 5: Whithania Somnifera

**Synonyms**

Whithania root asgandh, winter cherry

**Biological source**

Dried roots and stem bases of withania somnifera belonging to family solanaceae

**Geographical source**

This plant wildely grows in all dry parts of subtropical india in madhyapradesh, utterpradesh, Punjab plains and north western parts of india like gujrat and rajasthan it is also found in congo south affrica Egypt morocco jorden Pakistan and afganistan

**Chemical constituents**

Alkaloids and steroidal lactones are main constituents withanin somniferin somnine somniferinintropin choline. Include saponins containing an additional acyl group (sitoindoside VII and VIII), and withanolides with a glucose at carbon (Kikuzaki and Nakatani,1993). Apart from these contents plant also contain chemical constituents like

withaniol, acylsteryl glucosides, starch, reducing sugar, hantreacotane and ducitol.

**Uses**

As sedative and hypnotic hypotensive respiratory stimulant actions belongwith bradycardia. Traditionally in treatment of rheumatism gout hypertension and other skin diseases. In the treatment of Breast, lung, colon & CNS cancer<sup>[13]</sup>

**6. Azadirachta Indica**

Fig 6: Azadirecta Indica

**Synonyms**

Margosa, Neem

**Biological source**

It consist of all aerial parts of plant known as azadirecta Indica belongs to family meliaceae

**Geographical source**

It found in, India, Pakistan, Bangladesh shrilanka, Thialand, Malaysia, Fiji, South Africa, East Africa

**Chemical constituents**

Diterpenes, triterpenes, flavonides glycosides nimaton quercetin myrecetinka empferol, neem leaves contains not less than 1.0 % w/w of rutin

**Uses**

Insect repellent, insecticide, antifeedent, nematicide, and antimicrobial properties.

Azadirachtin A, Nimbolide, Nimbidin etc., possess convincing anticancer properties. Molecular mechanisms of their action have been investigated. Due to these reasons, it is imperative that suitable clinical trials should be conducted to pave the way to bring these products into the market as certified anticancer drugs.<sup>[20]</sup>

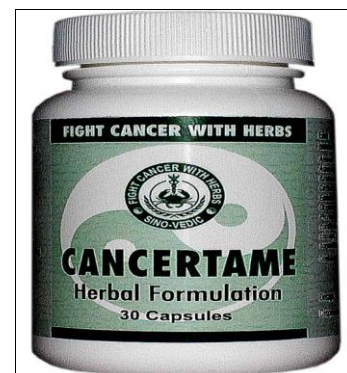
**Herbal anticancer formulations available in market**

Fig 6: Rbal Formulation

**Advantages of herbal drugs** <sup>[19]</sup>

Advantages of herbal drugs over other drugs are as

1. low/minimum cost
2. Complete accessibility
3. Enhanced tolerance
4. More protection
5. Fewer side effect
6. Potency and efficiency is very high

**Disadvantages of herbal drugs**

1. Not able to cure rapid sickness and accidents
2. Risk with self dosing
3. Complexity in standardization.

**Conclusion**

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 for various types of cancer. This review can help others to explore herbs to further extent and its use in various other disease and toxicity studies along with clinical trials. The literature evidences quoted in various Ayurvedic texts and recent pharmacological studies on medicinal plants, inferred that medicinal plants represent a good source of pharmacologically active agents treating various type of malignancies. Also, since many herbs play chemo protective action, a combination of Ayurvedic medicine and conventional therapy could also be recommended to inhibit the growth of cancer cells and to reduce the side effects of radiation and chemotherapy. 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 for various types of cancer. This review can help others to explore herbs to further extent and its use in various other disease and toxicity studies along with clinical trials.

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