



## ANTICANCER ACTIVITY OF MEDICINAL PLANTS: A REVIEW

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### ABSTRACT

Cancer, a major threat and health burden to the existing world. Globally, it severely affects the human population and it is the leading cause of death. Apart from the chemically synthesized drugs, we need to find more drugs from medicinal plants where they are more effective and efficient. Many treatments are being found and tried for the cure of cancer which are mostly tried chemically, instead which we need to discover from medicinal plant. The main goals of WHO on cancer diagnosis and treatment programmes are to cure or considerably prolong the life of patients and to ensure the best possible quality of life for cancer survivors. Plants produce various phytochemicals which have anticancer properties. So medicinal plants play a major role in cure of cancer because they are natural and effective. Natural products are being derived and used for treatment of various diseases since thousands of years in various countries like Egypt, China, India, etc. Plant derived compounds like Taxol, Vinblastine, Vincristine, etc are being used as effective anticancer drugs. Many scientists have found drugs using plant leaf, stem, seed, etc. WHO supports the use of traditional medicines which are effective and non-toxic. Medicinal plants are the future hope for cancer treatments, as the clinical trials using chemical treatments are not much effective and are toxic. Various parts of medicinal plants are being studied and used for clinical trials as anticancer drugs. Medicinal plant treatments are being widely used in India and many countries. This review has focused on various medicinal plants that has reported to possess anticancer properties.

### Keywords:

*Anticancer Activity,  
Chemotherapy,  
Clinical Trials,  
Medicinal Plants,  
WHO.*

**Citation:** Vaishnu S S, Jula V, Mahalakshmi M, Senthil J\* (2020). *Anticancer Activity Of Medicinal Plants: A Review. International Journal of Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281, 3 (7), July 2020, Pp 24-29*



## Introduction

Cancer can occur in almost any organ or tissue of the body when the uncontrollable growth of abnormal cells occur, go beyond their usual boundaries to invade adjoining parts of the body and spread to other organs. Metastasizing is the latter process and is a major cause of death from cancer. A neoplasm and malignant tumour are other common names for cancer. Cancer is the second leading cause of death worldwide, accounting for an estimated 9.6 million deaths, or one in six deaths, in 2018. Lung, prostate, colorectal, stomach and liver cancer are the most common types of cancer in men, while breast, colorectal, lung, cervical and thyroid cancer are the most common among women. This disease continues to grow exerting tremendous physical, emotional and financial strain on individuals, families, communities and health systems. Many health systems in low and middle income countries are least prepared to manage this burden, and large numbers of cancer patients in the world do not have access to timely quality diagnosis and treatment. In countries where health systems are strong, survival rates of many types of cancers are improving thanks to accessible early detection, quality treatment

and survivorship care. There are various types of cancer among which *leukemia* also called as blood cancer is most dangerous. Many human habits like smoking, drinking, etc has lead to lung cancer, liver cancer, etc. (M Shoeb *et al.*, 2006).

Cure for cancer has not yet been found but clinical trials and treatments using chemicals and chemotherapy has prolonged the life of patients suffering from cancer, so for a better change and cure, scientists are studying on variety of medicinal plants in various countries for a promising drug.

## Importance Of Medicinal Plants

Plant derived drugs are desired for anticancer treatment as they are natural, readily available and they can be orally injected by patients as dietary intake. Naturally derived compounds are non toxic and more tolerable for human cells. However, there are exceptions such as cyanogenetic glycosides, lectins, saponins, lignans, lectins and some taxanes . If plant-derived drugs can demonstrate selectivity in research, and are non-toxic to normal cell lines and also show cytotoxicity in cancer cell lines, these drugs are led into clinical trials for further therapeutic development. Plant-derived drugs come under four classes of drugs with



the following activities; methyltransferase inhibitors, DNA damage preventive drugs or antioxidants, histone deacetylases (HDAC) inhibitors and mitotic disruptors.

**TABLE 1: LIST OF MEDICINAL PLANTS HAVING ANTICANCER ACTIVITY**

PLANT NAME	FAMILY	PART USED	REFERENCE
Allium wallichii	Amaryllidaceae	Whole Plant	Bhandari et al., 2017
Artemisia annua	Asteraceae	Whole Plant	Efferth et al., 2017
Berberis aristata	Berberidaceae	Stem	Mamatha et al., 2015
Camellia sinesis	Theaceae	Leaf	Kumari et al., 2017
Cedrus deodara	Pinaceae	Bark	Gaidhani et al., 2013
Curcuma longa	Zingiberaceae	Rhizomes	Ooko et al., 2017
Elusine coracana	Poaceae	Seed	Srikanth et al., 2016
Ginkgo biloba	Ginkgoaceae	Leaf	Xiong et al., 2016
Glycyrrhiza glabra	Leguminosae	Root	Zhang et al., 2016
Herba epimedii	Berberidaceae	Leaf	Yong et al., 2017
Nigella sativa	Ranunculaceae	Seed	L.Y.Tu et al., 2016
Ocimum sanctum	Lamiaceae	Leaves	Karthikeyan et al., 1999
Paeonia suffruticosa	Paeoniaceae	Seed	Zhang et al., 2016
Peganum harmala	Zygophyllaceae	Root	Ayoob et al., 2017
Picrorhiza kurroa	Plantaginaceae	Rhizomes	Hemanth et al., 2014
Piper longum	Peparaceae	Fruit	Sawhney et al., 2011
Thymus vulgaris	Lamiaceae	Essential oil	Sertel et al., 2011
Vicia faba	Fabaceae	Seed	Amin et al., 2016
Vitex negundo	Lamiaceae	Leaf	Nandu et al., 2009

**TABLE 2: LIST OF PLANTS IN CLINICAL TRIALS (TO CHECK ANTICANCER ACTIVITY)**

PLANT NAME	COMMON NAME	FAMILY
Allium sativum	Garlic	Amaryllidaceae
Camellia sinensis	Green Tea	Theaceae
Catharanthus roseus	Madagascar Periwinkle	Apocynaceae
Ocimum basilicum	Great Basil	Lamiaceae
Taxus brevifolia	Pacific Yew	Taxaceae
Zingiber officinale Rosc.	Ginger	Zingiberaceae

When the medicinal plants are subjected to clinical trials, they show a promising effect. World Health Organization (WHO) has defined herbal medicines as finished labelled medicinal product that contain an active ingredient, aerial, or underground parts of the plant or other plant material or combinations. According to a report of WHO, about 80% of the world population is reported to rely on traditional medicine for their primary health care needs. Even in the developed countries, complementary or alternative medicine is gaining popularity. Herbal drugs possess a long history of its use and better patient tolerance. These are cheaper and easily available in countries like India due to rich agro culture conditions. There is lack of scientific evidence to evaluate safety and efficacy of herbal drugs. The quality of the trial drug has to be tested for batch-to-batch uniformity of the active

constituents. It is very difficult to have active and control groups with identical colour, smell and taste of the herbal drug, which cannot be imitated while manufacturing a placebo. These challenges can be reduced or overcome by applying most recent methodologies and guidelines for clinical trials. Since the quality control of herbal medicines is complicated and difficult, relevant and appropriate requirements should be established for the assessment of safety and efficacy for different categorized herbal medicines to reduce cost and expenditure.

#### **Plant Phytochemicals Associated With Anticancer Activity**

Modern drug development program based on ayurveda concepts has gained wide acceptance in present healthcare system. Plant derived natural products are nontoxic to normal cells



and also better tolerated, hence they gain attention of modern drug discovery. Estimated figures reveal that plant kingdom comprises at least 250,000 species and only 10 percent have been investigated for pharmacological applications. Phytochemicals and their derived metabolites present in root, leaf, flower, stem and bark perform several pharmacological functions in human systems. Alkaloids, flavonoids, phenolics, tannins, glycosides, gums, resins and oils are such responsible elements. These elements or their altered forms have shown significant antitumor potential. Vinblastine, vincristine, taxol, elliptinium, etoposide, colchicinamide, 10-hydroxycamptothecin, curcumol, gossypol, ipomeanol, lycobetaine, tetrandrine, homoharringtonine, monocrotaline, curdione, and indirubin are remarkable phytomolecules in this regard.

## CONCLUSION

Cancer is a dangerous disease and it is incurable if it reaches the last stage since now. But can be controlled or prolong the life of patients by treating with chemical drugs. Now the only hope is herbal drugs from medicinal plants that can cure cancer. There are variety of medicinal plants across world which shows

anticancer properties. Various studies are done on wide variety of plants for anticancer activity. The treatment using synthetic drugs are less effective, costly and has side effects while the use of herbal drugs is non-toxic, safe, less expensive and are available as a gift of nature.

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