



A REVIEW OF MEDICINAL PLANTS FOR CANCER TREATMENT

**^{1a} JOSHI STUTI , ^{1B} JYANI KRISHA , ^{1C} KALAL DIYA ,
^{1D} KHARVA PALAK, ^{1E} PARMAR BHAVIKA, ^{1F} PATEL
AYUSHI, ^{1G} PATEL PRACHI, ^{1H} PATHANAKSHA,
^{2*}DR.RICHA DODIYA**

**^{1a,1b,1c,1d,1e,1f, 1g,1h}, STUDENT DEPARTMENT OF
MICROBIOLOGY,ITM SLS BARODA UNIVERSITY
^{2*}ASSISTANT PROFESSOR, DEPARTMENT OF
MICROBIOLOGY, ITM SLS BARODA UNIVERSITY**

Corresponding Author's Email: richadodiya05@gmail.com

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ABSTRACT:

Cancer is a disease that affects people all over the world. For both prevention and treatment of this deadly illness, there is a constant need for new treatments. One excellent source for the discovery and creation of anticancer drugs is medicinal plants. Numerous physiologically active substances found in medicinal plants allow them to treat cancer. Since the materials are readily available, reasonably priced, and have few or no side effects, herbal medicines are being used extensively and are now receiving attention as possible sources of anticancer agents. This has sped up scientific research. Many agencies encourage the use of traditional medicines because they are safe and effective. A selection of plants with anticancer properties has been compiled in this review.

KEY WORDS: Anticancer activity, Medicinal plants.

INTRODUCTION:

Mutations in DNA, which tells cells how to divide and proliferate, are the first step in cancer.

Most DNA mutations can be fixed by normal cells, but when a mutation persists and causes the cells to proliferate, it can turn into cancer.[1]. In 2018, there were 9.6 million cancer-related deaths and 18.1 million new cases. Of the 36 types of cancer, colorectal, liver, lung, prostate, and stomach cancer are the most common in men, while breast, cervix, colorectal, lung, and thyroid cancer are the most common in women.[2] One disease that results from malfunctioning control systems is cancer. Human cells that have been partially altered and recruited. The agents of destruction in cancer are pathogenic organisms or the building blocks of tumours. Cancer is a major public health concern on a global scale. [3]According to global demographics, the number of new cases of cancer is expected to increase over the next few decades, reaching over 20 million new cases annually by 2025. An estimated 14.1 million new cases and 8.2 million deaths were attributed to cancer in 2012. The most frequently diagnosed cancers are those of the lung, prostate, colon, and breast in women. Lung cancer remains the leading cause of cancer incidence and mortality worldwide..[4] Since ancient times, medicinal plants have played a significant role in the treatment of human illnesses.[5]About 80–85% of people worldwide are thought to rely on traditional medicines for their primary medical needs, and it is anticipated that plant extracts or bioactive principles will be widely utilised in traditional therapy. The wide range of biological and therapeutic properties of medicinal plants has attracted a lot of attention lately. [6]

PLANTS WITH ANTICANCER PROPERTIES:

Curcuma longa

Haldi in Hindi and turmeric are common names for *curcuma longa*. This plant is a member of the Zingiberaceae family. Originally from Southern Asia, this plant is used for a variety of colours in Indian and Bangladeshi cooking, among other things. It contains turmerone, essential oil, diterpenes, sesquiterpenes, triterpenoids, monoterpenes, diarylpentanoids, sterols, alkaloids, and curcumin and curcuminoids. Curcumin, a polyphenol extracted from the plant's rhizome, is the plant's active ingredient and is used to prevent and treat cancer. Through the inhibition of the growth of multiple angiogenesis-associated and tumor-associated genes, curcumin exhibits a protective effect.[7]

Azadirachta indica

Azadirachta indica is a member of the Meliaceae family of plants. The neem tree's leaves, fruits, bark, and other parts are all useful in different ways. It is also very helpful in medicine. The neem plant is also widely used to treat infections and skin conditions. Neem's main

ingredients inhibit angiogenesis, cancer cell proliferation, and invasion.[8] Many bioactive substances, including melantriol, azadirachtin, and salannin, are found in neem. Enzymes that metabolise xenobiotics are the primary enzymes for chemotherapeutic targets of anticancer therapy.[9] A very pure neem leaf extract effectively reduced pro-cancer inflammatory cytokines while also impairing cell signalling and migration.[10] Ascorbic acid, n-hexacosanol, amino acid, nimbiol, nimbin, nimbanene, nimbandiol, nimbolide, and more are all present. Skin cancer, buccal cancer, mammary cancer, prostate cancer, and gastric cancer have all been treated with it.[11]

Aloe barbadensis

Aloe barbadensis, also known as aloe vera, is a member of the Liliaceae family of plants. Numerous bioactive substances, including polysaccharides, naphthalenons, and polyphenols, are found in aloe vera.[12] Aloe vera has been demonstrated to inhibit a variety of cancers, including colorectal, breast, and cervical cancers.[13] This cultivar of *Aloe barbadensis* has the best medicinal properties. Among its many qualities are strong antiseptic, antibacterial, fungicidal, and virucidal properties. It promotes cell growth, helps with detoxification, and relaxes the nervous system.[14]

Astragalus Membranaceus

Astragalus is a member of the largest genus in the flowering plant family, Leguminosae. In addition to its immunomodulatory and anti-hyperglycemic properties, *Astragalus membranaceus* has antiviral and antioxidant properties.[15] The main ingredients of *Astragalus membranaceus* are polysaccharides, flavonoids, and saponins.[16] Breast cancer treatment may benefit from the use of *Astragalus membranaceus*. It is administered in conjunction with chemotherapy drugs, which improve the reversal of drug resistance and chemosensitivity.[17] Using various cancer models and cell lines, *Astragalus membranaceus* has been demonstrated to be able to decrease or stabilise tumours through its direct anti-proliferation or pro-apoptotic effects on tumour cells.[18]

Bidens Pilosa

It is native to America and a member of the Asteraceae family. Several cancer cell lines were used to test *Bidens pilosa* extracts in hexane, methanol, and chloroform as well as their fractions. The findings demonstrated the extracts' antitumor activity, with hexane extract exhibiting the highest activity. [19] Among other substances, it includes terpenoids,

polyacetylenes, flavonoids, and phenylpropanoids. Together with other extracts, phenyl-1, 3, 5-heptatriyn exhibits a toxicity profile on normal blood cells in erythrocyte osmotic fragility experiments.[20]

Moringa oleifera

The Moringaceae family includes the drumstick, or *Moringa oleifera*. The leaves are rich in vitamins, minerals, beta-carotene, and essential amino acids. As a result, in certain nations, it serves as a substitute for nutritional supplements and growth promoters. The extract from the leaves can lower dyslipidaemia and hyperglycemia. It was discovered to influence patterns of cancer cell viability. According to the studies, *M. oleifera* extracts do not cytotoxically affect normal cells, but they also show antiproliferation against cancer cells.[21]

THE MECHANISM OF ACTION OF ANTICANCER PLANTS

The first one results in the death of cancer cells, which is also known as apoptosis. Cancer has long been thought to be caused by cumulative gene mutations that result in unchecked cell proliferation. Cancers are also thought to be immune system evasive.[22] The second one is increasing immunity to combat cancer, in which immunotherapy, chemotherapy, and radiation therapy are anticancer treatments that significantly depend on immune system modification. Immunomodulation is used to treat cancer by increasing immune system cells like CD8⁺ T lymphocytes and natural killer (NK) cells and decreasing immunosuppressive responses by macrophages and regulatory T cells. Resveratrol is a naturally occurring compound that has shown promise in modifying the immune system to enhance anticancer immunity. Numerous studies have shown that resveratrol promotes the release of anticancer cytokines like TNF- α and IFN- γ while suppressing the release of TGF- β . Additionally, it can increase CD4⁺ T cell and macrophage polarisation towards anticancer cells while decreasing immunosuppressive cell infiltration and polarisation[23].

CONCLUSION:

Millions of people die from cancer each year. Numerous treatments are available to treat cancer, but they have a number of drawbacks, including kidney damage and gastrointestinal disorders. As a result, an alternate approach to this issue is needed. Compounds derived from plants that have anti-cancer properties have drawn a lot of scientific interest. They are essential to the prevention and treatment of cancer. Numerous traditional medicinal plants have therapeutic potential that could be utilised as anticancer agents in the future, as demonstrated by this review. Numerous studies on the anticancer properties of conventional

medicinal plants around the globe have demonstrated their potential as chemotherapeutic agents in the future. The following species have more phytochemical constituents with anticancer properties: *Curcuma longa*, *Azadirachta indica*, *Aloe barbadensis*, *Astragalus Membranaceus*, *Bidens Pilosa*, and *Moringa oleifera*.

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