



Natural Herbs As Anti-Cancer Drug: A Review

Mr. Thombare Akshay P., Asst. Prof. Gaikwad Vishal

Department of Pharmaceutics, Pratibhatai Pawar College Of Pharmacy shrirampur, ahmednagar, Maharashtra, India.

ABSTRACT.

Cancer refers to a vast set of diseases that vary in type and location but all have abnormal cells growing out of control in common. It continues to develop uncontrollably, and the build up of aberrant cells results in a mass of cells known as a "cancer?" Natural secondary metabolites produced by plants are being studied for their anticancer properties, which could lead to the development of new anticancer medications, like as Vinca Alkaloids. Plant-derived anticancer medicines such as Taxanes, podophyllotoxin, and Camptothecins have been employed in therapeutic trials. As a result of the success of these substances, which have been turned into standard cancer treatments, new technologies are emerging to further advance the field. Nanoparticles for Nanomedicines are one of the newest technologies. Cancer is a worldwide threat to human beings and there are a variety of therapies available such as chemotherapy, antibiotic therapy, immunotherapy, and so on, medicinal plants are used in the treatment and prevention of cancer. However, the problem with these therapies is that they are expensive, have painful side effects, and so on. Herbal treatments have less adverse effects and are more cost-effective. Herbs play an important role in cancer prevention and treatment. This article includes examples of interesting bioactive chemicals derived from diverse plants that have medical and other therapeutic applications. The photochemical study of these plants has aided in the development of novel anticancer medications to some extent. People have been turning to natural plant items for cancer treatment in recent years due to concerns about side effects. This review also serves to outline the various strategies and methods for evaluating possible anticancer natural substances. Despite the fact that drug development from medicinal plants continues to be a valuable source of new therapeutic leads, there are a number of obstacles to overcome, including plant sourcing.

Keywords: Medicinal plants, Anticancer agents, Bioactive compounds, Cancer Medicines Plants, Breast Cancers, Chemotherapy, Cancer Cell Lines, Herbal plants, natural product.

Introduction

Cancer is the leading cause of death, affecting more than a third of the world's population and accounting for more than 20% of all deaths. Tobacco, viral infection, chemicals, radiation, environmental variables, and nutritional factors are some of the causes of cancer. In China, surgery, chemotherapy, and radiotherapy are the most common conventional cancer treatments, which are frequently augmented with complementary and alternative medicines. Plants have been utilised as an age-old cancer cure with a long history of use in cancer treatment. Etoposide and teniposide were developed as clinically effective agents in the 1960s and 1970s at Sandoz laboratories in Switzerland. They are used to treat lymphomas, bronchial cancer, and testicular cancer. These plants may aid in the development of host resistance. reality, when compared to current (allopathic) medications, therapeutic herbs are more readily available, less expensive, and have no toxicity. The creation of novel plant-derived natural compounds and their analogues for anticancer activity describes efforts to synthesis new derivatives using bioactivity- and mechanism-of-action-directed isolation and characterization, as well as rational drug design-based modification. Oncogenes are proteins that regulate cellular communication with the outside world. They are created when proto-oncogenes are mutated. Exposure to chemical, environmental, or viral carcinogens stimulates mutated oncogenes, which causes cell changes and the production of proteins that are either incorrectly expressed within their normal cell or expressed in inappropriate tissue, resulting in cellular proliferation and the formation of cancer. Genes that suppress tumour growth are known as tumour suppressor genes. Plants have been used as medicine since the dawn of humanity. About 60% of anticancer medicines come from plants, such as taxol from *Taxus flis*, camptothecin from *Cather wwine*, and so on. It has been emphasised that cancer management is still lagging, and there is an urgent need to find new medications for cancer prevention and therapy. In this perspective, plants remain a source of hope for cancer treatment. Cancer has achieved a high level in terms of morbidity and mortality in recent years, and it is now a serious public health issue around the world. Numerous studies are aimed at finding new chemicals for the treatment of cancer, and many of them are focused on plant-derived molecules. Due to their safety and lack of side effects, particularly when compared to synthetic conventional medications, medicinal plants have become increasingly popular in poorer nations in recent years. More than 35,000 plant species have been the subject of NCI research, leading to the development of numerous anticancer medications, including vincristine, vinblastine, taxol, analogues of etoposide, indicacine-N-oxide, camptothecin, and many others.

Cancer

Cancer is a disease characterised by uncontrolled cell division. Cells contain a variety of strategies for limiting cell division, repairing DNA damage, and preventing cancer. As a result, cancer is assumed to be a multi-step process in which numerous mechanisms must fail before a critical mass is achieved and cells turn malignant. These differences aid their growth, division, and tumour formation. For example, cancer cells develop the ability to spread to other parts of the body, a process known as metastasis, as well as the ability to encourage the formation of new blood vessels, known as angiogenesis (which gives tumour cells a source of oxygen and nutrients). Cancer cells also fail to undergo programmed cell death, or apoptosis, when normal cells would (e.g., when exposed to toxins).

1. Cancer Development:

Cells contain a variety of strategies for limiting cell growth, repairing DNA damage, and preventing cancer. Because cancer is a multi-step process in which numerous systems must fail before a critical mass of cells is achieved and malignant cells emerge. Most malignancies develop when cells acquire a succession of mutations (DNA changes) that allow them to divide more quickly, bypass internal and external division regulators, and avoid planned cell death. Figure 2 shows how cancer is caused by mutations. A negative cell cycle regulator is inactivated as a result of an initial mutation. A novel mutation occurs, causing an overactive positive cell cycle regulator. A third mutation occurs in one of the progeny of this second cell, inactivating a genome stability component. Once a threshold mass of mutations impacting important processes is achieved, the cell containing the mutations develops malignant traits (uncontrolled division, apoptosis evasion, metastatic capacity, and so on) and is referred to as a cancer cell. Cancer is one of the leading causes of death and illness worldwide, with an anticipated 21 million cases in 2030 [23,24]. According to estimates, there will be around 1 688 780 new cancer diagnosis cases and 600 920 cancer fatalities in the United States alone in 2017. Cancer is a disease that occurs when cells divide uncontrollably. To limit cell reproduction, repair DNA damage, and prevent cancer, cells have a variety of strategies.

2. Cell cycle of cancer

Most cancers develop as a result of a succession of mutations (DNA changes) that cause cells to cycle more quickly, escape internal and external division restrictions, and avoid programmed cell death, start superscript, end superscript. External cues (such as chemical signals) and internal cues (such as DNA damage) (such as G1 start subscript, 1, end subscript) cause the next phase to begin (such as S). Cyclins, cyclin-dependent kinases (Cdks), Maturation-promoting factor (MPF), and an enzyme complex called the anaphase-promoting factor (APF) are the core cell cycle regulators.

1) Cyclins:

Each cyclin is linked to a specific cell type. In the cell cycle, it is a phase, transition, or collection of phases that helps to drive the events of that phase or period. M cyclin, for example, supports M phase activities such nuclear envelope collapse and chromosomal segregation.

2) Cyclin-dependent kinases: A cyclin must activate or inactivate several target proteins inside the cell in order to move the cell cycle along. Cyclins work with a group of enzymes termed cyclin-dependent kinases to control the events of the G1 phase of the cell cycle (Cdk). Cdk is inactive until it binds to a cyclin, turning it into a functioning enzyme that can change target proteins. Cdks are kinases, which are enzymes that phosphorylate (add phosphate groups to) certain target proteins. The phosphate group linked to the target protein functions as a switch, making it more or less active. When a cyclin binds to a Cdk, it has two key effects: it activates the Cdk as a kinase, but it also guides the Cdk to a specific set of target proteins, ones that are relevant to the cyclin's cell cycle phase. S cyclins, for example, send Cdks to S phase goals (such as stimulating DNA replication), whereas M cyclins send Cdks to M phase targets (such as forming the nuclear envelope).

3. Maturation-promoting factor (MPF): Cyclins and breakdown (a critical early M phase event), as well as Cdks, collaborate to drive cell cycle transitions by activating targets that promote chromosomal condensation (MPF) The MPF and other events in the M phase. The function of MPF in nuclear complexes is to add phosphate tags to a variety of envelope breakdown. The MPF complex phosphorylates a number of M phase-specific substrates, which drive spindle formation, chromosomal condensation, nuclear membrane disintegration, and other early M phase processes.

4) The anaphase-promoting complex/cyclosome (APC/C)

is a complex that promotes the onset of anaphase. In addition to controlling M phase events, MPF also activates the anaphase-promoting complex/cyclosome (APC/C), a protein complex that causes M cyclins to be destroyed beginning in anaphase. The function of APC/C is to add a small protein tag called ubiquitin (Ub) to its targets. When a target is tagged with ubiquitin, it is sent to the proteasome, which can be thought of as the cell's recycle bin, and destroyed."

5) Checkpoints and regulators: Direct regulators of cell cycle transitions are Cdks, cyclins, and the APC/C. Positive stimuli, such as growth hormones, tend to boost Cdk and cyclin activity, whereas negative signals, such as DNA damage, tend to inhibit or block activity. If DNA damage cannot be repaired, p53's third and final job will be to activate programmed cell death in the injured cells. When DNA damage occurs, p53 is activated, resulting in the creation of proteins. The Cdk-Gil/S cyclin complex is inhibited by a Cdk inhibitor, which binds to it and inactivates it. This keeps the cell in G1 and keeps it from entering S phase, giving it time to repair the DNA damage. P53 is a protein that prevents mutations (DNA alterations) from being passed down to daughter cells (figure D it6 showing how DNA damaged).

Research on cancer

Cancer was originally linked to defective genes around 1980, and since then, cancer research has grown into a prominent field of study, bolstering the foundations of modern biology to a large extent. The effort of deciphering the human genome sequence was one of those out of the ordinary activities that has been fueled in large part by cancer research, and many of the exciting insights into the genetic circuits that regulate developmental processes have also come from cancer research. Various biological fields, including cytogenetics, virology, cell biology, classical and molecular genetics, epidemiology, biochemistry, and clinical sciences, are working together to develop ways to inhibit the aberrant growth that is characteristic of malignant cells.

➤ Role of Plant Based Drugs

Plant derived compounds have been of great significance to cancer therapy. The medicinal value of plants has been recognized by almost every society on this planet. In the nineteenth and earlier centuries, natural product extracts, particularly those derived from botanical species, provided the main source of folk medicines. In industrialized nations at the present times, some fifty percent of all prescribed drugs are derived or synthesized from natural products, the widely available sources for which are plants and organisms. It is considered that because of the structural and logical diversity of their constituents, terrestrial plants offer a rich and renewable resource for the discovery of potential new drugs and biological entities.

The goals of using plants as sources of therapeutic agents:

1. To produce bioactive compounds of novel or known structures as lead compounds for semisynthetic to produce patentable entities of higher activity and/or lower toxicity, eg, metformin, nabilone, oxycodone (and other narcotic analgesics), which are based, respectively, on morphine, taxol, podophyllotoxin, etc.
2. To use agents as pharmacologic tools, eg, lysergic acid diethylamide.
3. To use the whole plant or part of it as a remedy herbal.

➤ Development of Anticancer Drugs from Plants

It is estimated that there are roughly 500,000 higher flowering plant species occupying terrestrial habitats. A large number of species have only been very superficially examined for their pharmacological and medical application. Less than 1% of these species have been thoroughly investigated for their potential use as novel therapeutic agents. Traditionally, cancer drugs were discovered through large-scale screening of synthetic chemicals against animal tumour systems, primarily murine leukemias. The agents discovered in the first two decades of cancer chemotherapy (1950-1970) largely interacted with the DNA or its precursors, inhibiting the synthesis of new genetic material or causing irreparable damage to DNA itself. In the area of cancer treatment, many claims have been made for the beneficial effects of plants. Drug discovery from medicinal plants has played an important role in the treatment of cancer. Of all between 2002, 40% were natural products per se or natural product derived with product.

Plants as Sources of Anticancer Drugs Higher flowering plant species are estimated to number around 500,000 in terrestrial settings. For their pharmacological and medicinal applications, a huge number of species have only been superficially explored. Less than 1% of these people have special needs. Cies have been thoroughly researched for their potential application in the United States. Medicinal compounds that are novel. Historically, cancer treatments were found by screening synthetic compounds against animal tumour systems, especially murine leukemias, on a huge scale. The agents identified during the first two decades of cancer chemotherapy (1950-1970) primarily interacted with DNA or its precursors, preventing the synthesis of new genetic material or causing irreversible damage to DNA. Many claims have been made concerning the therapeutic effects of cancer treatment.

➤ Advantages of herbal drug over allopathic drug in medicinal plant

Herbal medications have a number of advantages over allopathic drugs. Medicinal plants continue to serve an important function in medicine. A system in which a considerable proportion of the world's population participates. Plants' medical and economic benefits are being more widely recognised and developed in both developing and developed countries. A plant or plant part utilised for its aroma, flavour, and/or therapeutic characteristics is known as a herb (also known as a botanical). Herbal supplements, botanicals, and phytomedicines are products manufactured from botanicals that are used to maintain or improve health. Herbal medicines, which are "crude pharmaceuticals of vegetable origin utilized for the treatment of disease states, frequently of a chronic nature, or to obtain or maintain health," have been used in the pharmacological therapy of disease for a long time.

➤ Benefits of natural drug






Traditional herbal medicines have been used to treat illness as part of local or regional healing practices. They are naturally occurring plant-derived substances with little to no industrial processing. Health promotion, disease prevention, poor outcomes and few treatment options for severe illnesses, exhaustion of conventional therapies, dissatisfaction with, or lack of ethicality of conventional therapies, significant side effects or risks associated with conventional medicine. The for using herbal drugs.

➤ Herbs that are anti-cancer Anticancer plants:

There are many distinct anticancer herbs that have been used for medical purposes by various cultures throughout history. In truth, plants and herbs are responsible for much of contemporary medicine. With such a diverse range of herbs available, it's no wonder that there are a number of anticancer herbs that can help prevent cancer. There are also a variety of different anticancer herbs that can help with symptom relief if you are currently

undergoing cancer therapy. Alfalfa is one of the anticancer herbs. Alfalfa is one of the most nutritious foods available, and it has a number of key applications for reducing the negative effects of chemotherapy. Alfalfa has antibacterial and antifungal qualities, making it an excellent cleaner and infection fighter. These anticancer herbs' high concentration of nutrient's makes them essential in restoring propervitamin levels in the bloodstream. Alfalfa has been shown to help lower cholesterol and counteract cancer in studies. Andrographis is another anticancer herb. It is an old medicinal herb that thrives as an annual plant in Asia's wastelands and woodlands. There are various types of anticancer herbs, one of which is a sort of thistle plant. Because of its primary component enicin, blessed thistle has a significantly favourable effect on tumour reuction. This reduces the amount of fluid around the tumour, cools any inflammation in the body, and helps to combat bacteria. For millennia, the root has been employed in natural medicine. Despite the fact that it was originally meant to support liver function. Burdock root has been found to have anti-tumor properties as well as cleansing properties, which can help with joint discomfort and skin health. Mushrooms, while not technically a herb, are an excellent natural remedy. Certain varieties of mushrooms have many features that aren't seen in herbs because they are fungi. The Maltase mushroom, for example, has tremendous therapeutic powers. Maitake D-fraction, which comes in capsule or tablet form, is the most potent type of mushroom extract. Maitake has been shown to be a cancer fighter. Clinical trials of a Maitake extract on patients with advanced breast and prostate cancer were recently approved by the FDA. Colorectal cancer is also a good finding in American studies, as are liver, lung, and stomach cancer in Chinese studies. Clinical trials of a Maitake extract on patients with advanced breast and prostate cancer were recently approved by the FDA. Colorectal cancer is also a favourable result in American studies, and liver, lung, stomach cancer, and leukaemia are all positive findings in Chinese studies.

<p>Licorice Sticks</p> <p><u>Family:</u> Fabaceae</p> <p><u>Biological Name:</u> Glycyrrhiza glabra</p>		<p>Turmeric Root</p> <p><u>Family:</u> Zingiberaceae</p> <p><u>Biological Name:</u> Curcuma longa</p>	
<p>Red Clover</p> <p><u>Family:</u> Fabaceae</p> <p><u>Biological Name:</u> Trifolium pratense</p>		<p>Bloodroot Flower</p> <p><u>Family:</u> Papaveraceae</p> <p><u>Biological Name:</u> Sanguinaria canadensis</p>	
<p>Artemisia Annuua</p> <p><u>Family:</u> Asteraceae</p> <p><u>Biological Name:</u> Artemisia annua</p>		<p>Barberry</p> <p><u>Family:</u> Berberidaceae</p> <p><u>Biological Name:</u> Berberis vulgaris</p>	
<p>Tea</p> <p><u>Family:</u> Theaceae</p> <p><u>Biological Name:</u> Camellia sinensis</p>		<p>Onions</p> <p><u>Family:</u> Amaryllidaceae</p> <p><u>Biological Name:</u> Allium cepa</p>	
<p>Dandelion-Flower</p> <p><u>Family:</u> Asteraceae</p> <p><u>Biological Name:</u> Taraxacum officinale</p>		<p>Foxglove-Flower</p> <p><u>Family:</u> Plantaginaceae</p> <p><u>Biological Name:</u> Digitalis purpurea (Common foxglove)</p>	
<p>Graviola</p> <p><u>Family:</u> Annonaceae</p> <p><u>Biological Name:</u> Annona muricata</p>		<p>Milk-Thistle-Flower</p> <p><u>Family:</u> Asteraceae</p> <p><u>Biological Name:</u> silybum eburneum</p>	
<p>Mistletoe Leaves</p> <p><u>Family:</u> Santalaceae</p> <p><u>Biological Name:</u> viscum album</p>		<p>Dried- Saffron</p> <p><u>Family:</u> Iridaceae</p> <p><u>Biological Name:</u> saffron crocus</p>	

<p>Burdock Root</p> <p><u>Family:</u> Asteraceae</p> <p><u>Biological Name:</u> Arctium lappa</p>		<p>Grapes</p> <p><u>Family:</u> Vitaceae</p> <p><u>Biological Name:</u> Vitisvinifera L.</p>	
<p>Ginger Root</p> <p><u>Family:</u> Zingiberaceae</p> <p><u>Biological Name:</u> Zingiber officinale</p>		<p>Goldenseal Root</p> <p><u>Family:</u> Ranunculaceae</p> <p><u>Biological Name:</u> Hydrate's canadensis</p>	
<p>Aloe Vera</p> <p><u>Family:</u> Asphodelaceae</p> <p><u>Biological Name:</u> Aloe Vera (L.)Burm.f.</p>		<p>Clove</p> <p><u>Family:</u> Myrtaceae</p> <p><u>Biological Name:</u> Eugenia aromaticum</p>	

1)Burdock Root

Antitussive, antibacterial, antiviral, antifungal, antiviral, antiviral, antiAnticandidal effects, anti-inflammatory and free radical scavenging action, and may protect the liver against ethanol and carbon tetrachloride toxicity, presumably due to its anticandidal properties. Blood purifier, antioxidant activity Gout, pneumonia, arthritis, venereal infections, kidney difficulties, and skin ailments are all conditions that can be treated. With this root, as well as respiratory problems” Burdock seeds contain arctiin, a compound that may protect against cancer. According to preliminary study, gut bacteria convert arctiin into estrogenic and antiestrogenic chemicals.

2)Ginger Root

Gingerol, the key chemical in ginger root, has garnered a lot of interest recently, particularly in clinical trials to see if it might stop or prevent certain malignancies. The findings of these pharmacological studies suggest that ginger may decrease tumour growth in humans. Researchers discovered that gingerol induced cancer cell death, reduced inflammation, and enhanced immunological function in ovarian cancer patients. Gingerol has also been shown to protect against colon cancer in studies. Ginger root is a staple in the diets of many Asian countries, particularly India. India has some of the world’s lowest cancer rates of any country. Ginger is antiviral, antifungal, antiparasitic, antibacterial, antioxidant, and antiviral in nature. The best spice is ginger.

3)Goldenseal

Goldenseal is a North American native that has been used by Native Americans for hundreds of years to cure a variety of illnesses, including infections of the mouth, throat, and gums. Because of its antibacterial properties, which prevent tooth decay and kill bacteria, goldenseal is a common ingredient in mouthwashes and toothpastes. Berberine, a strong chemical found in goldenseal, contains antibiotic components. This herb is now undergoing research to see if it can reduce the risk of some types of cancer. Goldenseal should be used with caution and under the direction of a doctor or herbalist, as large amounts can be poisonous. Entamoeba histolytica, Trichomonas, and other intestinal protozoa have been demonstrated to be resistant to goldenseal’s antibacterial properties.

4)Turmeric

Turmeric is a spice that originated in India and Southeast Asia. Turmeric has traditionally been used to treat inflammation, allergies, rheumatism, and liver issues. Curcumin, the main ingredient in turmeric, kills cancer cells without hurting healthy cells. It accomplishes this by inhibiting an activation pathway known as kappaB, which has been associated to a variety of disorders induced by inflammation, including cancer. Curcumin has been shown

to have anti-cancer properties in recent studies. Turmeric was found to be helpful in preventing stomach, lung, colon, breast, and skin cancer in laboratory rats when given orally.

5) Aloe Vera

Aloe vera as a burns or wounds treatment. Skin irritations, but just a few cases have been reported. Aloe vera has shown to be a promising treatment for a variety of ailments. Certain methods of cancer treatment. The chemical 1,8-dihydroxy-3,6-dihydroxymethyl anthraquinone found in aloe vera has been shown to promote cell death in human bladder cancer cells. It possesses potent anticancer properties. It halts cell viability as well as the G₂/M phase of the cell cycle. Finally, the current study found that aloe vera herbal extracts might cause cytotoxic and genotoxic effects on human hepatocellular carcinoma (HepG2) cells via inducing the apoptotic pathway. Aloe vera exhibits anti-neoplastic and anti-proliferative effects on a variety of cancer types and cell lines, and has a long history of safe use.

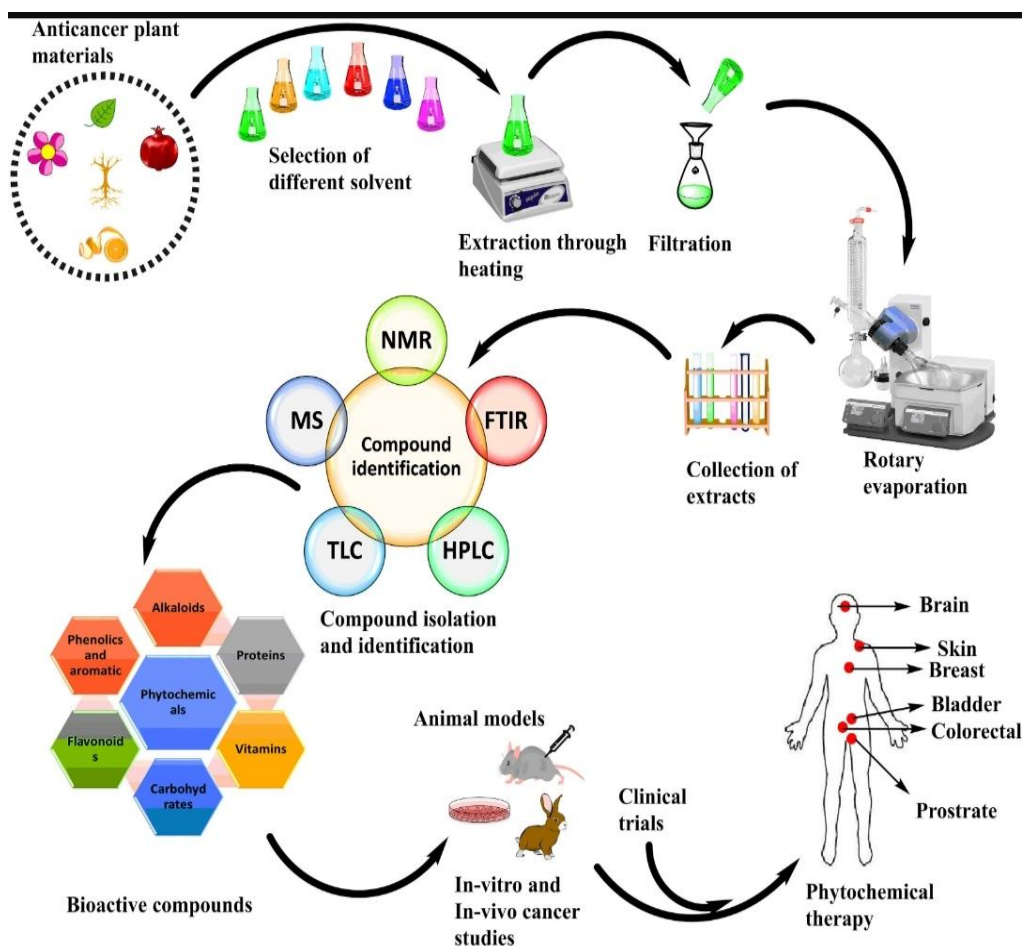
6) Clove

Clove is the dried flower buds of trees that are native to India, Pakistan, Zanzibar, and Madagascar. Clove oil from cloves has been examined for its ability to boost immunological function, implying that it can help prevent or treat cancer. According to the American Pharmaceutical Association's Practical Guide to Natural Medicines, clove oil contains antioxidant chemicals that have the potential to act as anticancer agents. Cloves have antiseptic, antibacterial, antifungal, antiviral, and antifungal activities, however their anticancer potential is uncertain. Clove oil has the highest antioxidant activity of any single item examined by the ORAC (Oxygen Radical Absorbance Capacity), a lab test that seeks to assess the antioxidant activity of foods (antioxidant capacity total). According to the American Cancer Society,

7) Artemisia Annu (Annual Artemisia):

Sweet Annie, sweet fern, sweet wormwood, or annu wormwood are all names for *Artemisia annua*. This little-known herb, which was recently dubbed wormwood, had the potential to be a formidable anti-cancer agent. Her. These scientists were interested in *Artemisia annua* since it was particularly effective against breast cancer cells. Artemisinin, a chemical derived from this plant, has been shown to have anticancer and antimalarial properties, as well as antiviral properties against hepatitis B and C, and herpes simplex.

➤ Plants that are anti-cancer.



1)AcronychiaBauer

The triterpene lupeol, as well as the alkaloids melicopine, acronycine, and normelicopidine, were isolated from the bark of the Australian plant *Acronychia Baueri* Schott (*Bauerella Australians Borzi*) using a differential extraction approach. Acronycine was found to be responsible for the experimental anti-tumor action linked with the crude alkaloidal mixture derived from the ether extract. Acronycine has the largest anticancer spectrum of any alkaloid identified to date in these facilities, according to experimental findings presented here. It represents a novel lead in the quest for drugs effective in the chemotherapeutic management of human neoplasms because it is chemically unrelated to any of the already used antitumor medicines.”

2)Garlic (*Allium sativum* L.) has a long history as a food with a distinct flavor and odor, as well as some medical properties. Garlic’s extensive range of dietary and therapeutic effects can be related to the sulfur compounds found in or created by garlic, according to modern scientific studies. Although garlic manufactures over 20 distinct sulphide compounds from a few sulfur-containing amino acids, their activities vary; for example, allicin, methyl allyl trisulfide, and diallyl trisulfide have antimicrobial properties. Garlic (*Allium sativum*) is one of the oldest cultivated plants on the planet. For thousands of years, it has been utilised as a therapeutic agent. It’s an amazing plant. Antimicrobial, antithrombotic, hypolipidemic, antiarthritic, hypoglycemia, and anticancer activities are just some of the benefits of this compound. Garlic’s chemopreventive action has been proven in a number of studies employing various garlic preparations such as fresh garlic extract, aged garlic, garlic oil, and a number of organosulfur compounds produced from garlic. The presence of organosulfur compounds in garlic is thought to be responsible for its chemopreventive properties.

3)Camptothecin (CPT) is an anticancer and antiviral alkaloid produced by the Chinese tree *Camptotheca acuminata* (Nyssaceae) and various Apocynaceae, Olacaceae, and Rubiaceae families. The medication is currently sourced from bark and seeds. Several attempts to make CPT from cell suspensions have been made, however the poor yields obtained limit this strategy. Cultures of distinct cell types could be another way to make alkaloids.

Name	Biological source	Geographical source	Chemical constituent	Uses
<i>Aconite</i>	Dried root of <i>aconitum napellus</i> , <i>Ranunculaceae</i>	Hungary, germany, spain Switzerland	Aconitine, hypaconitine, neopelline, napelline, neoline	Treatment of rheumatism, inflammation.
<i>Allium Sativum</i> (Garlic)	Bulb of the plant know as <i>allium sativum</i> , <i>lilaceae</i>	Central asia, southern Europe, USA and India	Carbohydrate, protein (albumin), fat, mucilage	Carminative, aphrodisiac, expectorant, stimulant, disinfectant
<i>Artemisia</i>	Unexpanded flower heads of <i>Artemisia cina</i> , <i>Artemisia buwifolia wall</i> , <i>Artemisia maritime</i> , <i>composites</i>	Pakistan, turkey, from Kashmir to kumaon in Himalayas	Essential oil, santonin, artemisin	Anthelmintic

Name	Biological source	Geographical source	Chemical constituent	Uses
	International Journal of Research Publication and Reviews, Vol 3, no 6, pp 2728-2739, June 2022			2735
<i>Camellia sinensis</i>	Prepared leaves and leaf buds of <i>Thea sinensis</i> , <i>Theaceae</i>	India, Sri lanka, china, Indonesia, japan	Caffeine, theobromine, theophylline, gallatonic acid	CNS stimulant, diuretic
<i>Comptothea accuminata</i>	Dried stem wood of <i>comptothea acuminata</i> , <i>nyssaceae</i>	China, Tibet, southern china	Quinoline id, 10 alkaloid, camptothecin, hydroxy camptothecin, methoxy ¹⁰ camptothecin	DNA topoisomerase Inhibitor's, antitumour, antileukemia
<i>Catharanthus roseus</i>	Dried whole plant of <i>catharanthus roseus</i> , <i>apocunaceae</i>	South africa, india, USA, Europe, australia	Vincristine, vinblastine, ajmalicine	Antineoplastic, acute leukemia, hodgkin's disease
<i>Curcuma longa</i>	Dried as well as fresh rhizome of the plant known as <i>curcuma longa</i> , <i>zingiberaceae</i>	Tamil Nadu, Andhra Pradesh, kerala	Curcuminoids, curcumin, volatile oil, starch	Anti inflammatory, anti arthritic, cervical cancer
<i>Glycyrrhiza glabra</i>	Dried peeled or unpeeled root and stolon of <i>glycyrrhiza glabra</i> , <i>leguminosae</i>	Spain, sickly, England	Glycyrrhizin, glycyrrhizic acid which on hydrolysis yield glycyrrhetic acid	Expectorant, demulcent, antigastric effect
<i>Panax ginseng</i>	Dried root of <i>panax ginseng</i> , <i>Araliaceae</i>	Korea, china, Russia, Canada, USA	Ginsenosides, panaxosides, chikusetsusaponin	Immunomodulatory drugs
<i>Podophyllum peltatum</i>	Dries rhizomes and root of <i>podophyllum peltatum</i> , <i>barberidaceae</i>	From Kashmir to Sikkim and parts of U.P	Podophyllin, podophyllotoxin, alpha and beta peltatins	Cytotoxic action, treatment of venereal, purgative
<i>Taxus brevifolia</i>	Dried leaves, bark and root of various species of <i>taxus</i> , <i>taxaceae</i>	India, Canada, America	Taxane, cephalomannine, 10deacetyl baccatin, taxol	Lung carcinoma, gastric and cervical cancers and also carcinomas of head, neck, prostate and colon
<i>Viola odorant</i>	Dried aerial parts obtained from <i>viola odorants</i> , <i>violaceae</i>	India (Kashmir, himachal Pradesh, kumaon hills)	Essential oil, alkaloid, saponins, glycoside of methyl salicylate.	Expectorant, diaphoretic, antipyretic, antibacterial
<i>Zingiber</i>	Rhizomes of <i>zingiber officinale roscoe</i> , <i>zingiberaceae</i>	South asia, Africa, Australia, Mauritius, jamaica, Taiwan, india.	Volatile oil, starch, fat, fibre, inorganic material, residual moisture, acrid resinous matter.	Stomachic, aromatic, carminative, stimulant, flavouring agent.

➤ **Natural herb as anti-cancer drug**

Bloodroot:

Eastern North America, Nova Scotia, and Canada are the original home of bloodroot. It is arguably the most well-known anti-cancer herb available and has been used externally as a home treatment for skin cancer. Bloodroot has the potential to be an effective anticancer drug, according to numerous articles. Bloodroot can shrink tumours and has proven to be effective in the treatment of sarcomas. Its consistent anti-neoplastic activity has been demonstrated in numerous studies. All parts of the plant can be utilised externally, however the sap is poisonous if swallowed in amounts greater than minute. It is frequently applied in naturopathic skin cancer therapies.

Red clover

Flor Essence, an American Indian medicine, is still a well-liked herbal tonic used by cancer sufferers. Red clover is the primary component (trifolium pretense). Red clover has been shown by the University of Maryland Medical Center to help prevent some cancers. These same researchers state in their report that they don't think women with breast cancer or women who have a family history of breast cancer should drink red clover. The majority of health food stores sell red clover supplements in the form of tablets, capsules, or tinctures. Tea made from dried red clover leaves is frequently consumed; a common dose is 4 grammes of dry red clover to 30 millilitres of water. Another component is red clover.

Liqueur Root

Ancient Chinese medicine employed licorice root as an anti-virus, anti-inflammatory, and anti-ulcer agent. Licorice root offers defence against the kind of DNA damage that is frequently caused by carcinogens. Additionally, polyphenols included in licorice root promote the apoptosis (automatic death) of cancer cells. Licorice modulates your adrenal glands' hormone production while lowering stress-related substances. Cancer cell proliferation is frequently sparked by persistent stress. A South Korean study found that licorice root inhibits the growth of breast cancer cells in people. It modifies the expression of the apoptotic regulatory proteins Bcl-2/Bax (B-cell lymphoma 2). Licorice root upregulated the expression of cell cycle-related genes and downregulated the expression of tumour suppressor genes p53 and p27 in a dose-dependent manner.

Mistletoe:

The extracts from mistletoe and the products that come from this extract, especially iscador, is one of the most commonly used oncological drug in Europe. It's been used as an overall treatment for cancer for years. One randomized and nonrandomized matched pair study that involved more than 10,000 cancer patients, iscador was to prolong the survival time of cancer patients".

Saffron:

Crocetin is a carotenoid component found in saffron. This substance has the potential to be a potent anti-tumor agent, according to the findings of investigations done in vivo and in vitro. Another study⁵³ discovered that saffron prevented skin cancer in animals. According to recent studies conducted on animals, this common spice has a potent chemopreventive impact against liver cancer. Chemotherapy can occasionally have a number of undesirable side effects. Natural remedies, such the usage of cancer therapy materials made from plants, may lessen unfavourable side effects. A few plant-based products are now utilised to treat cancer. *Crocus sativus L* is mostly grown in a number of nations with mild and dry climates and is a member of the liliaceae family of plants. On the anticarcinogenic and anticancer effects of saffron and its primary components, there are documented in vivo and in vitro investigations. The 54,⁵⁵ According to biomedical research, saffron and its constituents may be helpful in treating conditions like Parkinsonism, mild to moderate depression, ischemic retinopathy and/or age-related macular degeneration, coronary artery disease, abnormal blood pressure, acute and/or chronic inflammatory disease, and neurodegenerative disorders with associated memory impairment. Saffron and its component have also been discovered to exhibit antioxidant, antimutagenic, antigenotoxic, tumoricidal, and antioxidant activity.

Graviola:

Graviola (guanabana), also referred to by the name of its fruit, sour sop, has drawn a lot of attention recently due to its potentially effective components as a natural anti-cancer agent. An evergreen tree called graviola is used as a treatment for arthritis, herpes, bacterial and parasitic infections, and coughs. Guanabana selectively targets and eradicates 12 distinct cancer cell types in laboratory experiments, including colon, breast, prostate, pancreatic, and lung cancer. Large-scale human investigations have not, however, been conducted. These cells have a high level of resistance to standard treatments. Graviola kills pancreatic cancer cells by blocking a number of signalling channels that these cells depend on to control their survival and metastatic lifetime.

Onion:

The strong antioxidant activity of onions is linked to a number of pharmacological effects, including as anti-inflammatory, antibacterial, and anti-carcinogenic properties. One study found that aged rats given onions had higher antioxidant activity. The use of onions and the risk of common malignancies are definitely related. Data on onion consumption and cancer rates was obtained by researchers from the Italian Mario Negri Institute for

Pharmacological Research using multivariate logistic regression models and data from Italian and Swiss controlled studies. Onions decreased the risk of colorectal cancer, ovarian cancer, renal cell cancer, prostate cancer, esophageal cancer, mouth cancer, and breast cancer. The risk rates for these diseases vary

Name	Biological source	Geographical Source	Chemical Constituent	Uses
Aconite	Dried root of <i>Aconitum napellus</i> , Ranunculaceae	Hungary, Germany, Spain Switzerland	Aconitine, hypaconitine, neopelline, napelline, neoline	Treatment of rheumatism, Inflammation.
Allium Sativum (Garlic)	Bulb of the plant known as <i>allium sativum</i> , liliaceae	Central Asia, southern Europe, USA and India	Carbohydrate, protein (albumin), fat, mucilage	Carminative, aphrodisiac, expectorant, stimulant, disinfectant
Artemisia	Unexpanded flower Heads of <i>Artemisia cina</i> , <i>Artemisia buvifolia</i> wall, <i>Artemisia maritima</i> , compositae	Pakistan, turkey, from Kashmir to kumaon in Himalayas	Essential oil, santonin, artemisin	Anthelmintic
Camellia sinensis	Prepared leaves and leaf buds of <i>Thea sinensis</i> , Theaceae	India, Sri Lanka, china, Indonesia, Japan	Caffeine, theobromine, theophylline, gallatonic acid	CNS stimulant, diuretic
Comptothea acuminata	Dried stem wood of <i>comptothea acuminata</i> , nyssaceae	China, Tibet, southern china	Quinoline alkaloid, camptothecin, 10 hydroxy camptothecin, 10 methoxy camptothecin	DNA topoisomerase inhibitors, antitumour, antileukemia
Catharanthus roseus	Dried whole plant of <i>catharanthus roseus</i> , apocunaceae	South Africa, India, USA, Europe, Australia	Vincristine, vinblastine, ajmalicine	Antineoplastic, acute leukemia, hodgkin's disease
Curcuma longa	Dried as well as fresh rhizome of the plant known as <i>curcuma longa</i> , zingiberaceae	Tamil Nadu, Andhra Pradesh, Kerala	Curcuminoids, curcumin, volatile oil, starch	Anti inflammatory, anti arthritic, cervical cancer
Glycyrrhiza glabra	Dried peeled or unpeeled root and stolon of <i>glycyrrhiza glabra</i> , leguminosae	Spain, Sicily, England	Glycyrrhizin, glycyrrhizic acid which on hydrolysis yield glycyrrhetic acid	Expectorant, demulcent, antigastric effect
Panax ginseng	Dried root of <i>panax ginseng</i> , Araliaceae	Korea, china, Russia, Canada, USA	Ginsenosides, panaxosides, chikusetsusaponin	Immunomodulatory drugs
Podophyllum peltatum	Dries rhizomes and root of <i>podophyllum peltatum</i> , berberidaceae	From Kashmir to Sikkim and parts of U.P	Podophyllin, podophyllotoxin, alpha and beta peltatins	Cytotoxic action, treatment of venereal, purgative
Taxus brevifolia	Dried leaves, bark and root of various species of <i>taxus</i> , taxaceae	India, Canada, America	Taxane, cephalomannine, 10-deacetyl baccatin, taxol	Lung carcinoma, gastric and cervical cancers and also carcinomas of head, neck, prostate and colon
Viola odorata	Dried aerial parts obtained from <i>viola odorata</i> , violaceae	India (Kashmir) Pradesh, Kumaon hills)	Essential oil, alkaloid, saponins, Glycoside of methyl salicylate.	Expectorant, diaphoretic, antipyretic, antibacterial
Zingiber	Rhizomes of <i>zingiber officinale</i> roscoe, zingiberaceae	South asia, Africa, Australia, Mauritius, Jamaica, Taiwan, India	Volatile oil, starch, fat, fibre, inorganic material, residual moisture, acrid resinous matter.	Stomachic, aromatic, carminative, stimulant, flavouring agent.

Tea has more than 700 distinct chemicals, many of which are already known for their capacity to combat disease, according to a 2006 USDA study. Polysaccharides, flavonoids, certain vitamins, and amino acids are a few of these substances that have been shown to combat disease¹⁷. High quantities of antioxidants, which are potent anti-aging and anti-tumor agents, have been detected in all types of tea, including green, white, black, and oolong. Tea has a lot of vitamin C, which is believed to fight free radicals, which are known to cause cancer. Tea has potent cleaning qualities and a low glycemic index. Tea consumption on a regular basis has long been linked to a reduced risk of diabetes and heart disease.

Aloe Vera

Alce-emodin, found in aloe vera, stimulates macrophages to fight cancer. Acemannan, another component of aloe vera, boosts immune system action against cancer. Aloe vera has been shown to prevent metastases.

Vinca Alkaloids

Vinca alkaloids are a significant class of anti-cancer medications. The way vinca alkaloids work is by disrupting the microtubular dynamics during mitosis, which results in a distinctive block during mitosis that eventually leads to apoptosis. To raise the therapeutic index, specific semi-synthetic analogues have been created. The two main naturally occurring active substances extracted from the Madagascar periwinkle, *Catharanthus roseus* G. Dan, are vinblastine (VLB) and vincristine (VCR) (Apocynaceae). These substances showed potential anti-lymphocytic leukaemia action in mice. The two semi-synthetic analogues derived from the active molecules are vinorelbine (VRB) and vindesine (VDS). They displayed promising effectiveness against advanced testicular cancer, lymphomas, and leukaemia. Lung cancer and breast cancer When combined with other chemotherapy medications, the treatment of lung cancer and Kaposi's sarcoma Vinca alkaloids are most frequently supplied once a week through short IV injection (1–15 minutes), with continuous infusion occurring less frequently. The only alkaloid that is currently commercially available is vinorelbine, which is given once a week. Non-small cell lung cancer and metastatic breast cancer are both treated with vinorelbine. Vinorelbine is less hazardous than other vinca alkaloids in terms of neurotoxicity and just mildly toxic in terms of thrombocytopenia. The bladder condition has been treated with vinflunine. Its primary side effects are myelosuppression and constipation, which are reportedly easier to manage than the other side effects, and it is used to treat non-small cell lung cancer and breast cancer.

Podophyllotoxin

Podophyllum species, specifically *Podophyllum peltatum* Linnaeus and *Podophyllum eodi* Wallich, produce podophyllotoxin in their roots. Epipodophyllotoxin, an isomer of podophyllotoxin, was discovered in the 1950s after being identified in the 1880s. Etoposide and Teniposide, two therapeutically significant semi-synthetic analogues made from epipodophyllotoxin, have shown great promise in the treatment of lymphomas, bronchial carcinoma, and testicular cancer. Leukemia, Hodgkin's disease, non-lymphoma, Hodgkin's and ovarian cancer are all treated with podophyllotoxin, an active component of podophyllin.

Taxanes

The bark of the Pacific Yew, *Taxus brevifolia* Nutt, is used to make paclitaxel (Taxol) (Taxaceae). They joined the market in the 1990s after their structure was originally discovered in 1971. A distinct species. Additionally used for cancer treatment is the Indian Ayurvedic drug *Taxus baccata*. Paclitaxel: was shown to be poisonous and only moderately water soluble. Paclitaxel was shown to be more effective than Docetaxel, which was produced from semi-synthetic Docetaxel (Taxotere 1). Patients who are resistant to treatment can take docetaxel. Toward paclitaxel Patients with metastatic cancer, breast cancer, and ovarian cancer receive first- and second-line treatments with docetaxel and paclitaxel, respectively. These medications have been reported to be effective against lymphoid malignancies, lung cancer, and prostate cancer. The process

Tomato

Methanol extract from ripe fruits of SNL was prepared and the mechanism underlying its growth-inhibitory effect on MCF-7 human breast cancer cells was examined. Tomato (*Lycopersicon esculentum*) leaves were used to address potential therapeutic in MCF-7 breast cancer cell lines. Tritium uptake results from a proliferation assay revealed that SNL ethanol extract significantly reduced the ability of MCF-7 cells to proliferate. MTT assay and trypan blue exclusion assays, which demonstrated a very strong link between the SNE extract concentration and the surviving cell counts, served as additional confirmation of this. Based on the appearance of DNA laddering and an increase in DNA fragmentation, the SNL extract-mediated inhibition of cell growth was proven to be apoptotic.

Ginseng

Ginseng (*Panax ginseng*) has a long history of use as a popular treatment for a number of illnesses, including cancer. It was proposed that the ginsenoside R_{p1} in ginseng inhibits the insulin-like growth factor-1 receptor (IGF-1R/WAK pathway), which in turn inhibits the proliferation of cancer cells. First, the effectiveness of R_{p1} was evaluated against the Luman breast cancer cell lines. R_{ol} treatment reduced breast cancer cell proliferation as

well as colony formation of anchorage dependent and independent breast cancer cells.

Conclusion

Medicinal plants have greatly improved human health. Bioactive components of plant extracts chemicals in them that are accountable. Screening for their anticancer efficacy is necessary. Useful information. This evaluation had provided some of the plants with anticancer properties for many cancers. This review can aid others in their further exploration of herbs and their application in toxicity and illness investigations in addition to clinical trials. In both wealthy and underdeveloped nations, cancer is gaining in popularity. The WHO reported in 2007 that 7.6 million people died from cancer-related illnesses in 2005, the majority of whom resided in low-income nations. According to estimates, there were approximately 1.5 million new instances of cancer in 2010 in the United States, where it is the primary cause of 1 in 4 fatalities. According to Cancer Research UK, 8.2 million individuals worldwide died from cancer in 2012, and 14.1 million adults received a cancer diagnosis. As a result, there is a huge need for a cancer treatment and prevention. Other cancer therapies already exist, and chemically derived medications have been developed. Humans today enjoy a high level of health thanks to medicinal plants.

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