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HUMAN

GREEN ANTICANCER DRUGS

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ABSTRACT

Cancer is a frightful disease and represents one of the biggest health-care issues for the human race and demands a proactive strategy from cure. Plants are reservoirs for novel chemical entities and provide a promising line for research on cancer. Nevertheless, plants and the plant-derived product is a revolutionizing field as these are simple, safer, eco-friendly, low cost, fast and less toxic as compared with conventional treatment methods phytochemicals are selective in their functions and especially on the tumor cells without affecting normal cells. Phytochemicals are considering suitable candidates for anticancer drug development due to their pleiotropic action on the target event with multiple manners. The research is in progress for the developing potential candidates (those can block or slow down the growth of cancer cells without any side effects) form these phytochemicals furthermore; drugs for cancer treatment and their limitations have also been discussed.

Keywords*:* - cancer, phytochemicals, pleiotropic actin, tubulin,

INTRODUCTION

In most people's minds, there is no scarier diagnosis than that of cancer. Cancer is often thought of as an untreatable, unbearably painful disease with no cure. However popular this view of cancer is maybe exaggerated and over-generalized. Cancer is undoubtedly a serious and potentially life-threatening illness for example - It is the leading cause of death in Americans (under the age of 85 and the second leading cause of death). There will be 1.5 million new cases of cancer occurring in the United States coming year and over 570000 deaths because of it not including basal and squamous skin cancer which are not reported but could add 2 million cases per year (ACS 2010) [1, 2].

Cancer occurs when this cellular reproduction process goes out of control in other words cancer is a disease characterized by uncontrolled and undesirable cell division. Unlike normal cells, cancer cells continue to grow and divide for their whole lives replication into more and more harmful cell[1, 2].

The abnormal growth and division observed in a cancer cell are caused by damage in cell DNA (genetic material inside cells that determined cellular characteristics and functioning). As cancer cells divided and reflected themselves, they often form into a clump of cancer cells known as tumors. Tumors cause many of the symptoms of cancer by pressuring, crushing, and destroying surrounding noncancer cells and tissues. Tumors come in two forms benign and malignant[1, 2].

Benign tumors -are not cancerous thus they do not grow and spread to extend of a cancerous tumor. Benign tumors are usually not life-threatening.

Malignant tumor- a malignant tumor, on the other hand, grows and spread to other areas of the body the process whereby cancer cells travel from the initial tumor site to other parts of the body is known as Metastasis.

List of herbal anticancer drugs:

Table No. 1:

Plant name	**Active constituents.**
Aglaila sylvestre	Isoliquiritigenin.
Apium graveolens	Apigenin.
Bleekeria vitiensis	Ellipticine.
Catharanthus roseus	Vincristiane, Vinblastin, Vindesine.
Centaurea montata	Montamine.
Centaurea schischkini	Schischkinnin.
Cephalotaxus harringtonia	Homoharringtonine
Daphne mezereum	Mezerein.
Euphorbia semi perfoliata	Jatrophane.
Indigofera tinctoria	Indirubins.
Justicia procumbens	Justicidin A, B.
Lantana camara	Verbascoside.
Podophyllum hexandrum	Podophyllotoxin, Etoposide, Teniposide.
Cannabis sativa	Delta 9 Tetra hydro cannabinol.
Taxus buccata	Docetaxol

❖ **Podophyllum**[3-5]

Kingdom: Plantae

Order: Renuculales

Family: Barberidaceae

Genus: Podophyllum

Species: Hexandrum

Botanical Name: Podophyllum Hexandrum

Common Name:

Indian Podophyllum, Himalayan Mayapple

Geographical Distribution:

It is a native to the Himalayan region (Uttarkashi) in India. Climate and soil the species thrives best as undergrowth as well as in forests in well-drained humus-rich soil in temperature and subalpine zones.

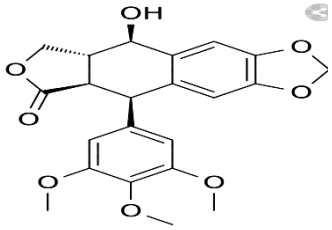
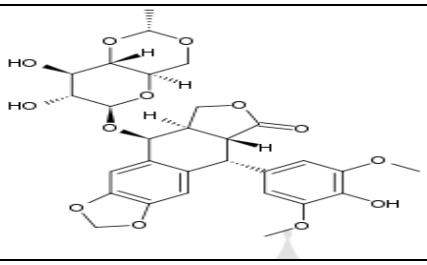
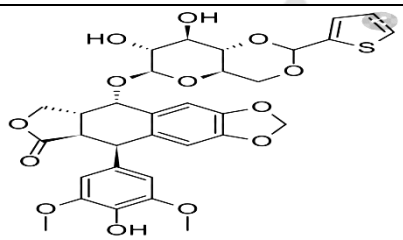
Botanical Distribution:

The Podophyllum Hexandrum herb 15-40 cm tall. It is low to ground with glossy green, grand nodule rhizome with many adventitious roots. 2-3umbrella like, lobed leaves arise on its few branches they completely unfurl.

Phytoconstituents:

Podophyllum hexandrum also contain no. of compounds with significant pharmacological properties which is given below:

Table No. 2:

Name Of Chemical Constituents	Structure	Uses
Podophyllotoxin		It is nonalkaloid to toxin lignin from the roots and rhizomes of podophyllum it is used on the skin as a topical treatment of external genital warts It is used in lung cancer and lymphomas
Etoposide		Etoposide is used as a form of chemotherapy for cancers such as Kaposi's sarcoma, lung cancer, and glioblastoma multiform.
Teniposide		It is a chemotherapeutic medication used in the treatment of childhood acute lymphocytic leukemia

Uses:

Genital warts: Applying podophyllum resin also called podophyllin as a 10% to 25% suspension in tincture of benzoin or as 2% to 4% gel directs to the affected area is effective for the removal of words caused by human papilloma – mavirus[3-5]**.**

Mechanism of action:

Etoposide compound form is useful in anticancer drugs which kills the cancerous cells .these blocks the action of the cell on the DNA of cancer cells that will prevent their development, thereby killing them. Etoposide is an anticancer agent that belongs to the drug type topoisomerase inhibitor. Etoposide forms a ternary complex with DNA and the topoisomerase II enzyme prevents relegation of DNA strands and by doing so causes DNA strand to break. Etoposide uses in lung cancer and testicular cancer.

Teniposide inhibits DNA synthesis by forming a complex with topoisomerase II and DNA these complexes induce break DNA double-strand and prevents repair by topoisomerase II binding. Accumulated breaks in DNA prevents cells from entering into the mitotic phase of the cell cycle and leads to cell death[3-5].

MARKETED PREPARATIONS

Table No. 3:

Name of drug	Mfg.	Content in formulation	ROA	Use	Adverse effect
Cytoblastine	Cipla.Ltd	10 mg	Intravenous	Breast cancer	Decreased appetite

❖ **VINCA[3-5]:**

Kingdom: Plantae

Order: Gentianales

Family: Apocynaceae

Genus: Catharanthus

Species: Roseus

Botanical name: *Catharanthus roseus*

Geographical Distribution: Plant is native of West Indies. It is distributed throughout the tropical and subtropical parts of India. Tamil Nadu, Gujarat, Karnataka, Andhra Pradesh, Assam are ideally suited for the cultivation of the plant.

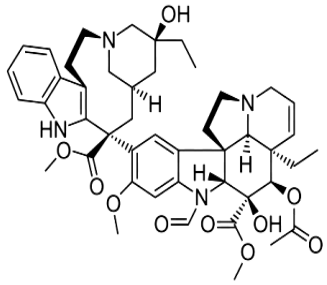
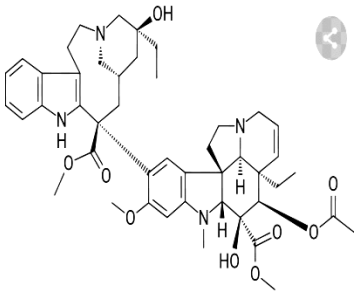
Botanical Description:

Plants growing 1 meter tall. The leaves are oval (2.5-9cm long and 1-3.5cm broad), greens and roots are pale greys. Flowers are violet pink-white or carmine-red. Odour is slight.

Chemical constituents:

Vinblastine and vincristine, a chemotherapy medication used to treat several types of cancer are found in the plant Major constituents in Catharanthus Roseus are given below:

Table No. 4:

Name Of Chemical Constituents	Structure	Uses
Vinblastine		Vinblastine is a component of chemotherapy regimens, including ABVD for Hodgkin lymphoma.
Vincristine		Vincristine is delivered via intravenous infusion for use in various types of chemotherapy regimens. It mainly uses are in non-Hodgkin's lymphoma.

Mechanism of Action[3-5]

The vinca alkaloids are cytotoxics. The stop the division of cells and cause cell death. During cell division, vinca alkaloid molecules bind to the binding blocks of protein called Tubulin. Inhibiting its formation. The drug work during the M –phase of cell reproduction. Tubulin protein normally works in cells to create “spindle fibers” (also called microtubules). These microtubules provide the cell with both the structure and flexibility they need to divide and replicate. Without microtubule, the cell cannot divide.

Uses:

1. *Catharanthus roseus* can improve the body supply to the brain which results in increasing oxygen and glucose to the brain and also preventing the abnormal coagulation of blood.

2. This plant increases insulin production and utilization of sugar from food which helps in curing diabetes.

3. It helps to increase the level of serotonin.

4. Phenolic compounds are the products of secondary metabolism of plants and acts as an antioxidant, anti-inflammatory, anti-allergic agent.

Marketed preparations:

Table No. 5:

Brand name	Mfg.	Content in formulation	ROA	Use	Adverse effect
Ectoplasm	Neon Laboratories Ltd	50mg 100mg	Oral	Testicular cancer	Vomiting, Hair loss, Nausea

SUMMARY

Medicinal plants have contributed rich health to human beings. Plants and their bioactive compounds present in them which are responsible for anticancer activity have to be screened for their valuable information. This review gave 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 diseases and toxicity studies along with the clinical trials.

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