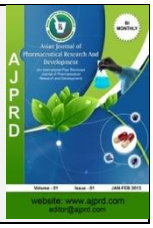
Available online on 15.08.2022 at http://ajprd.com

Asian Journal of Pharmaceutical Research and Development

Open Access to Pharmaceutical and Medical Research



Open Access

Review Article

Medicinal Plant Used Against Cancer: A Review

Rajat Srivastava *[1], Priya Tiwari [2]

[1] Assistant Professor, Shambhunath Institute of Pharmacy, Jhalwa, Prayagraj- , Uttar Pradesh, India.

[2]Assistant professor, Faculty of Pharmaceutical Sciences, Rama, University, Kanpur-, Uttar Pradesh, India.

A B S T R A C T

Nowadays natural products are considered protective markers compared to synthetic products that are considered unsafe for human health and the environment. Although a large number of synthetic drugs have been added to the world of current pharmacopoeia, there is still no drug system in the world that has been able to solve all health problems, including diseases such as Cancer. The extracts from plants have played an important role in the development of clinically effective anti-cancer agents. The plant kingdom produces naturally occurring secondary metabolites that are being investigated for their anti-cancer activities leading to the development of new clinical drugs. Global results continue to identify new anticancer compounds from plants. In recent years out of fear of adverse effects, people have chosen to make greater use of natural cancer products. This review attempted to summarize a few plants in India and outside India that have anti-cancer activity.

Keywords: Cancer, Anti-cancer agents, Medicinal Plants, Plant kingdom, etc.

A R T I C L E I N F O: Received; 17 April 2022; Review Complete; 23 June 2022 Accepted; 28 July 2022 Available online 15 August 2022

Cite this article as:

Rajat S, Priya T, Medicinal Plant Used Against Cancer: A Review, Asian Journal of Pharmaceutical Research and Development. 2022; 10(4):76-85.

DOI: http://dx.doi.org/10.22270/ajprd.v10i4.1150

*Address for Correspondence:
Srivastava Rajat, Assistant Professor, Shambhunath Institute of Pharmacy, Jhalwa, Prayagraj- 211012, Uttar Pradesh, India.

INTRODUCTION

Plants have a long history of being used in cancer treatment. In his analysis of cancer-fighting plants, Hartwell includes over 3000 kinds of plants that have been reported to be utilised in cancer treatment. The Greek physician Hippocrates (460-370 BC), known as the "Father of Medicine," created the term "cancer." Abscesses and ulcers were referred to as "carcino" and "carcinoma" by Hippocrates. Another Roman physician, Galen (130-200 AD), used the term oncos (a Greek word meaning swelling) to denote tumours [(1)].

Cancer is the world's second largest cause of death. Overall, cancer is becoming more common; in 2014, around 1,665,540 people in the United States had cancer, with 585,720 of them dying from it. As a result, cancer is a huge public health issue. Unfortunately, there are a range of diseases at the tissue level, and this variation makes precise diagnosis and successful therapy difficult. The prostate, lung and bronchus, colon and rectum, and urinary bladder all have the greatest percentages of cancer types in men. Breast cancer, lung and bronchus cancer, colon and rectum cancer, uterine corpus cancer, and thyroid cancer are the most common cancers in women. According to this data, prostate and breast cancer account for a significant part of cancer in men and women, respectively. Blood cancer, as well as malignancies of the brain and lymph nodes, account for the highest percentage of cancer cases among youngsters. Cancer is caused by a succession of gene changes that cause the cell's functions to be altered [(2)].

Cancer is a severe form of the disease that is characterized by uncontrolled cell development. There are around 100 different forms of cancer that have been identified. The origin and kind of cell are the most important factors in classifying these malignancies [(3)]. Cancer invades the body's immune system by controlling the body cells in a way that leads to the formation of lumps and masses of tissue otherwise called abscesses.

According to annual studies, cancer is responsible for over 2% of fatalities worldwide. Furthermore, according to the American Cancer Society (ACS), 14.1 million people were

newly diagnosed with cancer cases in 2012, of which 8.2 million died, and it is expected that around 21.7 million people will be diagnosed with cancer by 2030, with 13 million of them being in their terminal stage of cancer [4].

Many components of lifestyle difficulties, including as smoking, physical inactivity, poor diet, and low pregnancies, contribute to cancer risks, particularly in the American cancer community's developing countries [5].

Classification of cancer

Cancer could classify into five broader groups as follows [6]

1. Carcinoma is a cancer that affects cells both within and outside the body, including the Mammary Gland, Lungs, and Colon of the Intestine.
2. Sarcoma can be identified by the location of cells in the body, such as bones, adipose tissue, muscles, and so on.
3. Lymphoma is a malignancy that affects the lymph nodes and other immune system organs.
4. Leukemia is a type of bone marrow malignancy that frequently manifests in the blood.
5. Adenomas are cancers that originate in the secretory glands, such as the thyroid, adrenal gland, pituitary gland, and other thyroid tissues.

Plant-Derived Anti-Cancer Agents in Clinical Use

India is the world's greatest producer of medicinal plants and is appropriately known as "The World's Botanical Garden." Medicinal plants provide a source of high-quality food and raw materials for livelihoods in addition to having natural therapeutic powers and fighting illnesses. On the basis of traditional applications and scientific data, much study has been done on these plants for the treatment of cancer, and a number of plant products have been commercialised as anticancer medications. Medicinal plants are estimated to number over 8,000 species and account for around half of India's total number of higher flowering plants.

In other words, there are around 400 flowering plant families, of which India represents at least 315. Some of these plants have been shown to have medical characteristics, while others that are still utilised by locals have yet to be discovered. Western uses of these data are now being scrutinised more closely, and most academic and industrial researchers now respect national and indigenous rights to these resources. Approximately three-quarters of the world's population today uses herbs and other kinds of traditional medicine to treat ailments, according to the World Health Organization (WHO). There are at least 250,000 different plant species, with over a thousand having anti-cancer properties [7].

Advantages of Herbal Drugs over Allopathic Drugs:

Medicinal plants continue to play a significant part in the health-care system of the world's most populous country. Plants' medical and economic advantages are being more widely recognised and developed in both emerging nations and enterprises. A plant or portion of a plant that is utilised for its scent, flavour, and/or medical characteristics is known as a herbal (also known as botanical). Herbal supplements, botanicals, and phytomedicines are products manufactured from botanicals that are used to care for or improve one's health. Herbal treatments "raw herbal medications used to cure illness problems, typically incurable, or to reach or maintain a better state of health" were used in medical therapy for a long time [7].

Surgery, chemotherapy, and radiotherapy are all cancer treatments. If identified early enough, certain tumours can be treated [8].

Due to the existence of natural antioxidants that serve as reducing agents, free radical scavengers, and singlet oxygen supplements, natural remedies have the ability to combat cancer. Bioactive compounds, such as flavones, isoflavones, flavonoids, anthocyanins, coumarins, lignans, catechins, and isocatechins, account for a large portion of their antioxidant activity, and natural products can mitigate or reduce the toxic side effects of chemotherapy and radiation by strengthening their anti-cancer action.

They test medicinal plants for cytotoxicity and investigate their anti-cancer properties. Natural products are now seen as a symbol of protection when contrasted to synthetic items, which are deemed hazardous to human health and the environment. The medical value of natural products has a medicinal value [9].

Achillea wilhelmsii

The Achillea plant, Achillea wilhelmsii, is a member of the Asteraceae family of the genus Compositaea. Achillea comes in a variety of forms, however Achillea Wilhelmsii is particularly abundant in Iran and grows in a variety of locations. Achillea Wilhelmsii is a gramineous perennial with a low height of 15 to 40 inches [15 to 40 cm]. On colon cancer cells (HT-29), methanol extraction and leaf extraction of this plant show cytotoxic effects, and the cytotoxic effects of essence are considerable. The benefits of methanol extracts of plant leaves on cell lineage of colon cancer, stomach cancer, and breast cancer have been demonstrated in various researches. The plant's methanol extract includes phenol chemicals, particularly flavonoids, which inhibit cancer cell multiplication by triggering apoptosis. 1,8-cineole and a-piene in the plant's leaf essence are two of the most significant monoterpene chemicals that trigger apoptosis in human melanoma cells [10].

Allium sativum L

Allium sativum is a plant belonging to the Aparagales order, the Amaryllidaceae family, the Allianceae family, and the genus Allium. Allium sativum is a perennial blooming plant with a 40-centimeter stalk. Its subterranean section is airtight and made up of 5 to 12 pieces, each of which is coated in a thin coating of grey matter. It has a little dark green leaf and small pink blooms that look like an umbrella at the end of a stem. Allium sativum and

organosulfuric compounds have been shown in studies to reduce the risk of cancers of the breast, larynx, colon, skin, uterus, gullet, bladder, and lungs [10]. We point to the crucial function of the Allium Sativum component, Allicin, in previous investigations, and its anticancer activities in breast and prostate cancer have been confirmed. This substance contributes to the battle against cancer by causing systemic cell death. When Allium sativum is crushed and broken down, Allicin I changes to Allicin II under the effect of the enzyme. Allicin inhibits the multiplication of cancerous human cells. Another chemical that inhibits leukaemia and causes systemic mortality is ajoene [11].

Ammi majus

The white flower with the scientific name Ammi majus is an annual dicotyledonous plant that blooms in fall and belongs to the Apiaceae family. In typical circumstances, moist and soft places, salty meadows, and coastal locations, it is a tall and tiny plant that grows up to 100 cm tall. This plant is planted throughout Europe and the Mediterranean, as well as western Asia and India [12].

The impact of this plant's ethanol extract on HeLa and MCF7 cells was investigated, and the results revealed that this plant's extraction is hazardous to these cells. Comorian compounds (as part of phenol compounds) are the primary constituents of this plant, and they are thought to be responsible for the majority of the plant's biological functions. The toxicity of coumarin compounds in cell lines has been examined, and the induction of apoptosis by these compounds has been proven. Psoralens are the most important coumarin chemicals found in this plant, and they can help fight cancer by blocking cytochrome p450 function [11].

Artemisia absinthium L

Artemisia is a member of the Asteraceae family of plants. There are 200 to 400 species of Artemisia with clusters and bitter blooms. Artemisia absinthium L, for example, is native to Central Asia, Northern Africa, and most of North America. This plant ranges in size from 80 to 120 cm in height. This shrub has yellow blooms that are compact [13].

MCF-7 breast cancer cells have been studied in the past. In the cancer cells HeLa, HT-29, and MCF7, similar results associated to the anti-cancer capabilities of this plant have been identified. In a study on the effect of this plant Artemisinin on breast cancer cells, it was discovered that a variety of reactions in cancer cells included cell growth inhibition, apoptosis, angiogenesis inhibition, cell proliferation inhibition, and decreased responses of core receptors [14]. Other chemicals found in this plant include quercetin, isorhamnetin, kamfrolinalol, alphapinin, limonene, and myrecene. Isorhamnetin suppresses the proliferation of numerous cancer cells, including MB-435, SKMEL-5, Du-145, MCF-7, and DLD, while quercetin inhibits the growth of many cancer cells, including MCF-7. Artesunate is also one of the most significant compounds. Artemisinin has an angiogenic impact, and it suppresses the formation of the angiogenic factor VEGF, in addition to its anticancer effects on K569 (leukaemia). 10 In another research, the plant's alpha-pinene, beta-pinene, limonene, and myercin were discovered to be important in the prevention of human breast cancer, liver cancer, and melanoma. HT-29 (colon cancer) cells are resistant to alpha-pinene, beta-pinene, and limonene, which are generated from methanol and ethanol recovered from this plant [15].

Boswellia serrata

Boswellia serrata often known as Olibanum or Frankincense, is a medicinal plant belonging to the Spindales order and the Burseraceae family. Bosoolia has three species: B sacara, B frereana, and B serrate. The death of cervical cancer cells (HeLa cells) is caused by hydroalcoholic extraction of this plant, and the impact is dependent on the volume and time [16].

In another research, disruption of DNA and RNA production, as well as proteins that impede plant development and promote death in cancer cells in mice, triggered the release of alcohol extract of frankincense resin. It was discovered that frankincense decreases the activity of leukemic cells HL60 in a research. The primary constituents in frankincense resin include monoterpene, diterpene, triterpene, and boswellic acid, which can cause cancer cells to die [10], frankincense extract promotes apoptosis and severe cell damage by increasing the formation of reactive oxygen species and activating caspases [17].

Camellia sinensis

This plant produces a type of tea made from the buds and petals of a fresh herb. There is less oxidation in the production of this tea. Tea contains caffeine, theophylline, thianin, and antioxidants in natural form. Green tea was discovered to inhibit 5-alfardoctase enzymes in mice in a research. This enzyme transforms testosterone into dihydrotestosterone, a prostate cancer-causing substance. As a result, it has been discovered that green tea can help prevent prostate cancer [18].

Green tea has been found to have an antitumor impact on prostate cancer in this manner. Epicatechin, epigallocatechin, and epigallocatechin-3 are polyphenols found in green tea that have anti-cancer properties. Green tea has been shown to have cytotoxic effects on breast cancer cells [10]. In a research done by Wang and colleagues in China, they discovered that drinking green tea regularly, eating a lot of food, and being in cold weather were all linked to a lower risk of stomach cancer [19].

Citrullus colocynthis belongs to Cucurbitales order and Citrullus genus. The yellow and highly bitter fruit the size of an apple is the component of the plant that is utilized [20]. Extracts from this herb (Hep2) have been demonstrated to be harmful to laryngeal cancer cells in studies [21]. According to studies, chemical components of this plant, such as cucurbitales, are employed as anticancer agents in cancers of the liver (HepG2) and breast (MCF7). Quercetin

and b-sitosterol have also been explored as antitumor agents. These chemicals function by stopping the cell cycle (at G2 / M), and inducing apoptosis, which can have anticancer effects [22-25].

Saffron (Crocus sativus L)

Crocus sativus L is a member of the Iridaceae family. Khorasan is the origin of this plant in Iran. Saffron is a perennial plant with little projecting leaves that grows 10 to 30 cm tall from the bulbs of this plant. There are one to three purple blooms on this shrub. Safflower, sometimes known as saffron, is the active element in this plant [26]. Various studies have shown that saffron extracted from cancer cells in vitro has anticancer properties; for example, Escribano et al discovered that saffron-containing substances such as crocin, crocetin, picrocrocin, and safranal induce apoptosis in cancer cells in a study on the effect of saffron extracted from human cancer cells [27, 28].

The impact of saffron extract and other important chemicals called quercetin on colorectal cancer cells was explored in another study, and the results revealed that this plant is hazardous to these cells [29]. Other investigations have found that this plant has antiangiogenic properties in breast cancer cells (MCF-7), and that its release suppresses angiogenesis in these cells [30].

Colchicine

The second plant metabolite produced by Colchicum autumnale and Gloriosa superba L. is colchicine. It induces mitotic binding during the cell cycle, making it a strong anti-mitotic medication in both vitro and vivo. Colchicine extracts, such as 3-dimethyl colchicine, colchicoside, and thiocolchicocide, were created as a result of the severe toxic effects, and demonstrated better effectiveness against some leukemic cells and solid tumours [31].

Curcuma longa

Turmeric is a plant in the Zingiberaceae family with the scientific name Curcuma longa. This perennial plant requires a wet, rainy climate to thrive. Turmeric is grown mostly in tropical Asia, including India, Pakistan, Indonesia, and southern China, although it is also grown in Africa and South America. The rhizome is the subterranean stem of turmeric. These rhizomes produce a number of aerial shoots that can reach a height of 1 to 1.5 metres. The dried rhizomes of turmeric are the edible part [32].

The cytotoxic activities of turmeric have been studied in liver cancer cells (Hep-2) and it has been discovered that dose-dependent cytotoxicity of curcumin leads to cancer cell death via the mitochondrial route [33]. The findings of a research on the effects of its extract on telomerase activity in breast cancer revealed that telomerase has anti-proliferative and inhibitory properties [34].

Turmeric was discovered to have cytotoxic effects on lung cancer cells by suppressing the activity of telomerase in a dose-dependent manner in another investigation [35]. Curcumin, a key component of turmeric, has a vital role in the prevention and treatment of cervical cancer, as evidenced by several medical researches [36]. Curcumin has been proven to have anticancer properties against malignancies such as leukaemia, lymphoma, digestive, urinary, reproductive, breast, uterine, ovarian, lung, melanoma, colon cancers, and brain tumours [37].

Ferula Assafoetida

The Ferula Assafoetida plant may be found in Iran's Khorasan, Pakistan, and Baluchestan areas, as well as Kerman, Dasht-e Murghab, Abade, and Nain in the south. Asafoetida is a perennial herb with thick, fiber-rich stems. A resin is a component of this plant that is utilised as gum. The cytotoxic effect of asafoetida ethanol extract on liver cancer cells (category HepG2) [38] has been demonstrated. Consumption of this plant's gum has also been shown to lessen the incidence of colon cancer [39]. The cytotoxic action of phytochemical substances found in several Ferula species against cell lines such as ovarian carcinoma (CH1), lung cancer (A549), and melanoma (SK-MEL-28) has been investigated, and it has been discovered that these chemicals have only a minor impact on cell death [40].

Glycyrrhiza Glabra

Glycyrrhiza Glabra is a wild vegetable plant endemic to southern Europe, North Africa, and Asia's temperate zones. It may be found growing in various places of Iran, particularly in the east and northeast of Khatam Marvast, as well as the provinces and cities of Azerbaijan and Eghlid. It has compact leaves with 4 to 7 leaf pears and a sticky leaf owing to juice leakage. The roots and stems of this plant have therapeutic properties [41]. In the breast cell 4T1, extract root content causes morphological alterations and decreases activity [42]. Its root extract promotes BCL2 phosphorylation and, like Taxol, slows tumour cell lines' cell cycle progression to the G2 / M classes [43]. Glycyrrhizin is a triterpene glycoside that functions as an anti-proliferative agent against tumour cells, particularly the MCF-7 and HEP-2 lines of breast cancer cells, and plays a role through inducing apoptosis [44, 45]. Because Glycyrrhiza glabra root extract promotes apoptosis in HT-29 cells, it can be used to treat colon cancer [46].

Lepidium sativum

Watercress is an annual plant that was known in ancient Iran as Jrjizbastany and Rashad. It has green leaves and little red or white blooms with a lovely scent that create a joint at the branch's end. The fruit is oval in shape, measuring 50 mm in length and 4 mm in breadth. Methanol secretion from cress seeds has been shown to have cytotoxic effects on the bladder cell line (ECV-304) [47]. In addition, Aslani et al demonstrated the cytotoxic impact of aerial portions of the plant against K562 leukaemia bloodlines in a research of aerial parts of the plant [48]. The effects of aqueous extract of seed on breast cancer cells (MCF-7) by activation of apoptosis were established in another study [49].

Medicago sativa L

Alfalfa is a plant with the scientific name Medicago sativa L that grows widely around the world and is used in traditional medicine to cure a variety of diseases, including liver disease [50]. The plant's phytoestrogens and significant estrogenic action aid in the treatment of hormone-related cancers. Alfalfa is high in vitamins, flavonoids, digestive enzymes, coumarin, alkaloid amino acids, and trepans, and it helps to prevent breast cancer and improve breast milk production. Triconlin, a plant alkaloid molecule that has a role in the plant, is found in alfalfa. This alkaloid plant is thought to have major medicinal benefits, including as anti-cancer actions [51, 52].

Nigella sativa

The black seeds are from the Ranunculales Ranunculaceae family. Southwest Asia gave birth to this annual blooming shrub. This plant may be found in abundance in Iran's Arak and Isfahan. The antioxidant protective benefits of the Nigella plant on the liver, as well as its anticancer effects, have been studied [53]. In this regard, alcohol testing on the effects of Nigella sativa on kidney cancer cells (ACHN) revealed that these cells undergo apoptosis [54]. The effects of thymoquinone on cancer cell proliferation, death, and enhanced morphogenic mutation alterations have been studied in colorectal cancer cells. It has also been proven to cause systemic cell death, and Nigella sativa preparations have anti-cancer potential [55-58]. The efficacy and mechanism of black beans in the treatment of breast cancer have been demonstrated in research [59]. The impact of Nigella and colon cancer therapy on patients was established in a research by Elkady and colleagues [60].

Podophyllotoxin

The roots of two Podophyllum species, Podophyllum peltatum Linnaeus and Podophyllum emodi Wallich, contain podophyllotoxin. In the 1880s, it was dismantled, and their structure was explained in 1950. Epipodophyllotoxin is a podophyllotoxin isomer. Etoposide and Teniposide, two key therapeutic analogues derived from Epipodophyllotoxin, are highly successful in the treatment of lymphomas, bronchial and testicular cancer, leukaemia, and ovarian cancer [61, 62].

Taxanes

The Pacific Yew, Taxus brevifolia Nutt, contains paclitaxel (Taxol®) (Taxaceae). Their structure was initially discovered in 1971, and they have been selling since the 1990s. Taxus baccata, an Ayurvedic medication from India, was also utilised to cure cancer [63]. because paclitaxel is insoluble in water and poisonous, Docetaxel, a water-soluble molecule, was developed. Docetaxel (Taxotere®), a paclitaxel semi-synthetic product, is more effective. In individuals who are resistant to paclitaxel, docetaxel can be utilised. In patients with metastatic cancer, breast cancer, and cervical cancer, docetaxel and paclitaxel are utilised as first- and second-line therapies, respectively. These medications are now accessible and can be used to treat lung cancer, prostate cancer, and lymphoid malignancies. Anti-mitotic medications are named after the process by which these active compounds attach to polymerized microtubules and prevent normal mitosis from happening [64].

Trigonella foenum-graecum L

Fenugreek or Shanblid (scientific name: Trigonella foenumgraecum) is a Fabaceae plant with one vivid yellow to brown blossom that grows 10 to 50 cm tall. The plant is an edible vegetable that grows throughout Iran in several sections of the country, including Azerbaijan, Isfahan, Fars, Khorasan, Semnan, and Damghan [65]. There was selective cytotoxicity against some cell lines in a study of the effects of crude fenugreek extract, including MCF7, TCP (T-cell lymphoma), FRO (thyroid papillary carcinoma), and brain tumours [66]. DMBA (7,12-dimethylbenz (a) anthracene) also had a protective effect against breast cancer in rats, according to 988 Journal of Evidence-Based Drug-Related Drugs 22 (4) [67].

Plant extracts were demonstrated to have inhibitory effects on cancer cell development in another investigation. Anticancer properties are mediated by flavonoids and alkaloids found in the plant, including as ginger, cadence, solitary zinger, vanillin, and eugenol. Apoptosis induction is the main mechanism of anticancer activity [66, 67].

Tomato

To combat possible therapy of MCF-7 breast cancer cell lines and their toxicity towards Vero cells, researchers used tomato (Lycopersicum esculentum) leaves (methanol extract) from cancer cells. The in-vitro cytotoxicity test was used to evaluate the effect of radiation exposure on MCF-7 breast cancer cells and Vero cells, demonstrating its active components and significant inhibitory factor (IC50). With an IC50 value of 5.85 g mL, the purified sample had a favourable impact on MCF-7 breast cancer cells [68].

Vinca rosea

It belongs to the genus Vinca and the genus Oleander, and it has been an important medicinal plant of significant significance for a long time. The methanol extract of the plant had a beneficial effect on the growth of human skin cancer cell line A431, according to a research [69]. alkaloids in the aerial portions, such as vincristine, vindoline, vinblastin, vinflunine, and catharantin, differ from vincristine and vinblastine, and two combinations of plant secondary metabolism are employed as anticancer drugs today [70, 71]. The effects of this plant's alkaloids on breast, prostate, and cervix cancer cells (MCF-7, PC3-1C, HeLa) were studied, and it was discovered that these alkaloids' tubular protein links changed the structure of cancerous cells by blocking cell division; these antioxidant compounds will prevent cancer cells from progressing [69, 72].

Zingiber officinale

The Zingiberaceae family includes Zingiber officinale. Ginger, also known as Shengir, is a plant that is both tasty and medicinal. It is widely grown in India, particularly in

tropical and subtropical regions. The spicy ginger rhizomes of ginger powder are employed in traditional dishes, as are aromatic spices [73]. The stems of this plant are light green and grow on thin stalks. The blooms of the ginger plant are yellowish-green in colour with purple borders and whitish dots. The aqueous extract of Zingiber officinale is active in breast cancer cells (MCF-7 and MDA-MB-231 lines), and the morphological alterations seen in the cancer cells released at the bottom of the list suggest that the cell death process has been disrupted [74, 75].

Aloe vera

Aloe vera includes aloe-emodin, a substance that stimulates macrophages in the fight against cancer. Aloe vera also includes acemannan, which boosts immune cell function against cancer. Metastasis is inhibited by aloe vera [76].

CONCLUSION

There are a variety of cancer therapies available, and many of them come with side effects (intestinal difficulties, renal damage, and other issues). Alkaloids, phenol compounds, and monoterpenes are examples of these chemicals. Furthermore, anti-cancer markers include vinblastine, vincristine, curcumin, Taxol, boswellic acid, and umbelliprenin, as well as chemicals like quercetin, catechin, cucurbitacin, kaempferol, thymol, carvacrol, 1 and 1,8-cineole, pinene, myrecene, and b-sitosterol. These chemicals are antioxidants that prevent DNA damage, cell cycle binding (particularly in G2 and M), apoptosis induction, and angiogenesis suppression in tumour cells, and their anti-cancer activities are novel and more powerful.

ACKNOWLEDGEMENT: The authors thank Ms. Priya Tiwari for his valuable suggestion during the work.

Conflict of Interest: We declare that we have no conflict of interest.

Table 1: Plants Used In Cancer Treatment [7]

S. no.	Botanical Names	Family	Active constituent
1	Allium sativum	Liliaceae	Alliin, allicin alliin, alliinase
2	Actinidia chinensis	Actinidiaceae	Polysaccharide known as “ACPS-R”
3	Aloe ferox, Aloe barbadenis	Liliaceae	Aloe-emodin, emodin, aloin
4	Ananas comosus	Bromeliaceae	Bromelain
5	Angelica sinensis	Umbelliferae	Polysaccharide fraction “AR-4”
6	Annona species	Annonaceae	Acetogenins
7	Arctium lappa,	Compositae	Potent anticancer factors
8	Astragalus membranaceus	Papilionaceae	Swainsonine
9	Agapanthus africanus	Agapanthaceae	Isoliquiritigenin
10	Aglaila sylvestre	Meliaceae	Silvesterol
11	Betula utilis	Betulaceae	Betulin
12	Camellia sinensis	Theaceae	Epigallocatechin gallate
13	Catharanthus roseus	Apocynaceae	Vinblastine, Vincristine
14	Hedyotis diffusa	Oocystaceae	Lysine
15	Colchicum luteum	Liliaceae	Colchicines demecolcine
16	Combretum caffrum	Combritaceae	Combretastatin
17	Corcus sativus	Iridaceae	Safranal, Crocetin, Crocin
18	Echinacea angustifolia	Asteraceae	Arabinogalactan
19	Fagopyrum esculentum,	Polygonaceae	Amygdalin, Rutin
20	Ginkgo biloba	Ginkoaceae	Ginkgolide-B, A, C and J
21	Glycine max	Leguminosae	Zinc, selenium, Vitamins (A, B1, B2, B12, C, D, E and K)
22	Glycyrrhiza glabra	Leguminosae	Glycyrrhizin
23	Gossypium barbadense	Malvaceae	Gossypol
24	Gyrophora esculenta	Umbilicariaceae	Polysaccharides β-glucans, α-glucans,
25	Lentinus edodes	Agaricaceae	Lentinan
26	Linum usitatissimum	Linaceae	Cynogenetic glycosides, Lignans
27	Mentha species	Labiateae	Monoterpene ketones
28	Ochrosia elliptica	Apocynaceae	Ellipticine and 9-methoxy ellipticine
29	Panax ginseng	Aralaceae	Ginsenosides, Panaxosides
30	Picrorrhizia kurroa	Scrophulariaceae	Picrosides I, II, III and kutkoside
31	Podophyllum hexandrum	Berberidaceae	Podophyllin,astragalin
32	Taxus brevifolia	Taxaceae	Taxanes, taxol cepholomannine
33	Withania somnifera	Solanaceae	Withanolides, Withaferin
34	Zingiber officinale	Zingiberaceae	Curcumin, gingerenone A, Gingeols, shogaols, zingerone
35	Colchicum autumnale	Liliaceae	Colchicine
36	Betula alba	-	Betulinic Acid
37	Camptotheca acuminate	Cornaceae	Camptothecia, Topotecan,CPT-11, 9-Aminocamptothecin
38	Taxus baccata	Taxaceae	Docetaxel, Taxol
39	Cannabis sativa	-	Delta-9-Tetrahydrocannabinol
40	Tabebuia impetiginosa, T. avellanedae	Cannabaceae	Beta-Lapachone, Lapachol

41	Podophyllum peltatum	Berberidaceae	Podophyllotoxin, Etoposide, Podophyllinic Acid, and Teniposide
42	Nothapodytes foetida	Icacinaceae	Acetylcamptothecin, Camptothecin, Scopolectin
43	Anemopsis californica	Saururaceae	cymene, limonene, piperitone and thymol
44	Alangium salviifolium	Alangiaceae	quercitin, kaemferol
45	Acorus calamus	Araceae	β-asarone (46.78%), linalool (0.41), farnesol (11.09%), methyleugenol (6.10%), α- and β-pinene (both 0.06%), [E]-caryophyllene (0.11%), β-elemene (0.39%), ocimene (0.7%), aromadendrene (0.26%), camphor (0.03%)
47	Antiaris Africana	Moraceae	betulinic acid, 3β-acetoxy-1β,11α-dihydroxy-olean-12-ene, ursolic acid, oleanolic acid, strophanthidol, periplogenin, convallatoxin, strophanthidinic acid, methyl strophanthinate, and 3, 39-dimethoxy-49-O-β-d-xylopyronosyl ellagic acid
49	Aegle marmelos	Rutaceae	Butylp-tolyl sulfide, 6-methyl-4-chromanone and 5-methoxypsoralen
51	Arnebia nobilis	Boraginaceae	Arnebin
52	Aesculus hippocastanum	Sapindaceae	β-escin
53	Biophytum sensitivum	Oxalidaceae	Amentoflavone, Isoorientin, Orientin, vitexin, epicatechin, 1, 2 dimethoxy benzene, linalool oxide, linalyl, acetate, isophorone
54	Cuscuta reflexa	Convolvulaceae	Kaempferol, uercitin, hydroxycinnamic acid, scoparone, melanettin, quercetin, hyperoside, cuscutalin, iso-rhamnetin-3-0-neohesperidoside, apigenin-7-0-rutinoside, lycopene, amarbelin
55	Caesalpinia bonducella	Caesalpiniaceae	Bonducin, Caesanol1, 6ß, 7ß dibenoyloxyvoiacapen-5-a-ol, Bonducellpins A, B, C, D
56	Cassia fistula, Cassia tora, Cassia absus , Cassia auriculata , Cassia senna	Fabaceae	Anthraqquinone, fistullic acid, rhein glucoside, phlobaphenes, emodin, chrysophanic acid, fistuacacidin, hexacosanol, obtusin, chryso-obtusin, obtusifolin, ononitol monohydrate, rubrofusarine, rubrofusarine triglucoside, non rubrofusarin gentiobioside ,panwar gum, chaksine, isochaksine, hydnocarpin, apigenin, raffinose, di-(2-ethyl) hexyl phthalate, sennoside A,B,C,D, palmidin A, rhein , aleo-emodin, myricyl alcohol, salicvlic acid, barbaloin
57	Cleome gynandra	Capparidaceae	Centaureidin, myricitin, taraxasterol, capric acid, lauric acid, glucocapparin, hexacosanol, viscosic acid, viscosin, glucoiberine, neoglucobrassicin, glucobrassicin
58	Centella asiatica	Apiaceae	Asiatic acid, madecassic acid, asiaticoside, asiatoside, madicassoside, brahminoside, brahmoside, centelloside
59	Cola nitida	Malvaceae	1,3,7-trimethyl-1H-purine-2,6(3H,7H)-dione, n-Hexadecanoic acid
60	Cirsium japonicum	Asteraceae	Cireneol G, ciryneol H, ciryneol C, p-coumaric acid, syringing, linarin, ciryneone F, ciryneol A
61	Citrus medica	Rutaceae	Methyl ferulic acid,dihydro-N-caffeoyltyramine, acacetin, ß-ecdysterone, (-)-balanophonin, p-methoxy cinammic acid, umbelliferone, ferulic acid, diosmetin, 4-methoxy salicylic acid
62	Cissus quadrangularis	Vitaceae	Iridoids, stilbenes
63	Clerodendrum serratum , Clerodendrum viscosum	Verbanaceae	Hispidulin, cleroflavone, apigenin, scutellarein, serratagenic, acteoside, verbascoside, clerodermic acid, clerodolone, clerodone, clerosterol
64	Crinum asiaticum	Amaryllidaceae	Criasiaticidine A, lycorine, pratorimine, crinamine, hippadine, hamayane, plaforinine, norgalanthamine, epinorgalanthamine
65	Daucus carota	Apiaceae	Carotene, carotin
66	Embelia ribes	Myrsinaceae	Embelin, christembine
67	Jatropha curcas	Euphorbiaceae	5α-stigmastane-3,6-dione, nobiletin, ß-sitosterol, taraxerol, jatropholone, jatropholone B, caniojane, daucosterol
68	Kaempferia galangal ,	Zingiberaceae	Et-p-MeO-trans-cinnamate, crotepoxide

	Kaempferia rotunda		
69	Lanata camara	Verbanaceae	Valecene, isocarypohyllene, bicyclogermacrene, germacrene D
71	Limonia acidissima	Rutaceae	Bergapten, orientin, vitedin, marmin, feronolide, feronone, feronialactone, geranyl umbelliferone, marmesin, ursolic, flavanone glycoside-7-O-methylporiol-4'-ß-xylopyranosyl-D-glucopyranoside
72	Macrotyloma uniflorum	Fabaceae	Psoralidin, agglutinin, pyroglutamylglutamine
73	Mimosa pudica	Mimosaceae	Mimosine, 2-mercaptoaniline
74	Nicotiana tabacum	Solanaceae	Rutin, chlorogenic acid, glutamic acid, anabasine, myosmine, cotinine, tabacinine, tabacine, anthalin, nicotelline, nicotianine
75	Rhinacanthus nasuta	Acanthaceae	Rhinacanthin, rhinacanthin-C, rhinacanthin-D.
76	Zanthoxylum armatum	Rutaceae	α-amyrin, armatonaphthyl arabinoside, 1-linoleo-2,3-diolein
77	Xanthium strumarium	Compositae	Spathulenol, α-cadinol, α-muurolene, copaene
78	Salvadora persica	Salvadoraceae	Salvadoricine, salvaoside, salvadoraside, manisic acid, salvadourea [1,3-bis(3-methoxy-benzyl)-urea]
79	Symplocus cochinchinensis	Symplocaceae	Phloretin-2-glucoside
80	Vernonia cinerea	Asteraceae	Luteolin-7mono-beta-D-glucopyranoside, lupeol acetate
81	Vitex trifolia	Verbanaceae	Artemetin, 7-desmethyl emetin, sabinene, α-pinene, caryophyllene, vitricin
82	Solanum nigrum	Solanaceae	Diosgenin
83	Tinospora cardifolia	Menispermaceae	COlumbin, tinosporaside, jatrorhizine, tembeterine, tinocordifolioside, tinosporic acid, tinosporal, tinosporon
84	Momordica dioica	Cucurbitaceae	Momordicin, momodicaursenol, gypsogenin
85	Cynodon dactylon	Poaceae	Ortho hydroxyphenyl acetic acid, syringic acxid, para coumaric acid
86	Drosera indica	Droseraceae	Rossoliside, hyperoside
87	Barleria grandiflora	Acanthacae	Iridoids, acetylbarlerin, scutellarein-7-rhamnosyl.
88	Terminalia chebula	Combretaceae	Arjunglucoside I, arjungenin, chebulosides I and II, chebulin, 2,4-chebulyl-ß-D-glucopyranose, chebulinic acid, chebulic acid, terchebin
89	Cucurbita maxima	Cucurbitaceae	Cucurbitacin, cucurbitin, pheophytin A, niacin, thiamine

REFERENCE:

1. Zishan M, Saidurrahman, Anayatullah, Azeemuddin, Zeeshan A, Hussain MW. Natural products used as anti-cancer agents. Journal of Drug Delivery and Therapeutics. 2017; 7(3):11-18.
2. Hassanpour SH, Dehghani M. Review of cancer from perspective of molecular. Journal of Cancer Research and Practice. 2017.
3. Hiatt H, Watson J. D. and Winsten J. A. Origins of human cancer. Book A. Incidence of cancer in humans; Book B. Mechanisms of carcinogenesis; Book C. Human risk assessment. Cold Spring Harbor Laboratory, Box 100, Cold Spring Harbor, NY 11724, USA 1977.
4. Edge S.B. American cancer society AJCC cancer staging handbook from. The AJCC cancer staging manual 2010.
5. Adam, René. "Introduction Loco regional Tumor Therapy." Springer, Berlin, Heidelberg. (2015): 1-2.
6. Gospodarowicz, M. K, Brierley J. D, and Wittekind C. "TNM classification of malignant tumours." John Wiley & Sons. (2017): 714-718.
7. Chanchal DK, Alok S, Rashi S, Bijauliya RK, Yadav RD and Sabharwal M. various medicinal plants used in the treatment of anticancer activity. International Journal of Pharmaceutical Sciences and Research. 2018; 9(4): 1424-29.
8. Agarwal D, Ranawat MS, Chauhan CS, Kamble R. Formulation and Characterization of Colon Targeted pH Dependent Microspheres Of Capecitabine For Colorectal Cancer. Journal of Drug Delivery and Therapeutics. 2013; 3(6):215-222
9. Nema R, Khare S, Jain P, Pradhan A, Gupta A, Singh D. Natural products potential and scope for modern cancer research. American journal of plant sciences, 2013; 4:1270-1277.
10. Kooti et al. Effective Medicinal Plant in Cancer Treatment, Complementary & Alternative Medicine. 2017; 22(4): 982-995.
11. Greenwell M and Rahman PKSM. Medicinal Plants: Their Use in Anticancer Treatment. International Journal of Pharmaceutical Sciences and Research. 2015; 6(10): 4103-12.
12. Al-Snafi AE. Chemical constituents and pharmacological activities of Ammi majus and Ammi visnaga-a review. Int J Pharm Ind Res. 2013; 3:257-265.
13. Bora KS, Sharma A. The genus Artemisia: a comprehensive review. Pharmaceutical Biology. 2011; 49:101-109.
14. Asgarpanah J, Ariamanesh A. Phytochemistry and pharmacological properties of Myrtus communis L. Indian Journal Traditional Knowledge. 2015; 14:82-87.
15. Akrout A, Gonzalez LA, Hajer El J. Antioxidant and antitumor activities of Artemisia campestris and Thymelaea hirsuta from southern Tunisia. Food and Chemical Toxicology. 2011; 49(2):342-47.
16. Poeckel D, Werz O. Boswellic acids: biological actions and molecular targets. Current Medicinal Chemistry. 2006; 13:3359-3369.
17. Yasumoto R, Kawanishi H, Tsujino T, et al. Clinical evaluation of long-term treatment using cernitin pollen extract in patients with benign prostatic hyperplasia. Clinical Therapeutics. 1995; 17:82-87.
18. Wang Y, Duan H, Yang H. A case-control study of stomach cancer in relation to Camellia sinensis in China. Surgical Oncology. 2015;

24:67-70.

19. Srivastava R, Ahmed H, Dixit RK, Saraf SA. Crocus sativus L. A comprehensive review. Pharmacognosy Reviews. 2010; 4:200-208.
20. Hussain AI, Rathore HA, Sattar MZ, Chatha SA, Sarker SD, Gilani AH. Citrullus colocynthis (L.) Schrad (bitter apple fruit): a review of its phytochemistry, pharmacology, traditional uses and nutritional potential. Journal of Ethnopharmacology. 2014; 155:54-66.
21. Tavakkol Afshari J, Rakhshandeh H, Zamani AR, Mahdavi Shahri N, Ghazezadeh L, Norozi M. Cytotoxicity effects of Citrullus colocynthis on Hep2 and L929 cell lines. Hakim Research Journal. 2005;8(2):47-54.
22. Hatam NA, Whiting DA, Yousif NJ. Cucurbitacin glycosides from Citrullus colocynthis. Phytochemistry. 1876;28:1268-1271.
23. Wasfi IA. Some pharmacological studies on Citrullus colocynthis. Journal of Herbs Spices & Medicinal Plants. 1994;2(2):65-79.
24. Ayyad SEN, Abdel-Lateff A, Alarif WM, Patacchioli FR, Badria FA, Ezmirly ST. In vitro and in vivo study of cucurbitacins-type triterpene glucoside from Citrullus colocynthis growing in Saudi Arabia against hepatocellular carcinoma. Environmental Toxicology & Pharmacology. 2012;33:245-251.
25. Tannin-Spitz T, Grossman S, Dovrat S, Gottlieb HE, Bergman M. Growth inhibitory activity of cucurbitacin glucosides isolated from Citrullus colocynthis on human breast cancer cells. Biochemical Pharmacology. 2007;73:56-67.
26. Escribano J, Alonso GL, Coca-Prados M, Fernandez JA. Crocin, safranal and picrocrocin from saffron (Crocus sativus L.) inhibit the growth of human cancer cells in vitro. Cancer Letters. 1996; 100(12):23-30.
27. Abdullaev FI, Frenkle GD. Effect of saffron on cell colony formation and cellular nucleic acid and protein syntheses. Biofactors. 1992; 3:201-204.
28. Mousavi M, Baharara J, Asadi-Samani M. Anti-angiogenesis effect of Crocous sativus L. extract on matrix metalloproteinase gene activities in human breast carcinoma cells. Journal of HerbMed Pharmacology. 2014; 3:101-105.
29. Aung HH, Wang CZ, Ni M, et al. Crocin from Crocus sativus possesses significant anti-proliferation effects on human colorectal cancer cells. Experimental Oncology. 2007;29:175-180.
30. Dubey KK, Ray AR, Behera BK. Production of demethylated colchicine through microbial transformation and scale-up process development. Process Biochemistry. 2008, 43(3), 251-7.
31. Sadooghi SD, Nezhad-Shahrokh-Abadi KH, Zafar Balanezhad S, Baharara J. Investigating the cytotoxic effects of ethanolic extract of Ferula assa-foetida resin on HepG2 cell line. Feyz. 2013; 17: 323-330.
32. Fallah Huseini H, Zahmatkash M, Haghighi M. A review on pharmacological effects of Curcuma longa L. (turmeric). Journal of molecular pathology. 2010;1(33):1-15.
33. Ayyadurai1 N, Valarmathy N, Kannan S, Jansirani D, Alsenaidy A. Evaluation of cytotoxic properties of Curcuma longa and Tagetes erecta on cancer cell line (Hep2). African Journal of Pharmacy and Pharmacology. 2013;7:736-739.
34. Ranjbari J, Alibakhshi A, Arezumand R, et al. Effects of Curcuma longa extract on telomerase activity in lung and breast cancer cells. Zahedan Journal of Research in Medical Sciences. 2014;16(10):1-6.
35. Mohammad P, Nosratollah Z, Mohammad R, Abbas A, Javad R. The inhibitory effect of Curcuma longa extract on telomerase activity in A549 lung cancer cell line. African Journal of Biotechnology. 2010; 9(6). http://www.ajol.info/index.php/ajb/article/view/78098. Accessed February 27, 2017.
36. Hosseinimehr SJ. A review of preventive and therapeutic effects of curcumin in patients with cancer. Journal of Clinical Excellence. 2014;2(2): 50-63.
37. Anand P, Sundaram C, Jhurani S, Kunnumakkara AB, Aggarwal BB. Curcumin and cancer: an "old-age" disease with an "age old" solution. Cancer Letters. 2008;267:133-164.
38. Guo C, Yang J. Antioxidant activities of Ferula assafoetida as determined by FRAP assay. Nutrition Research. 2003; 23: 1719-1726.
39. Valiahdi SM, Iranshahi M, Sahebkar A. Cytotoxic activities of phytochemicals from Ferula species. Daru Journal of Pharmaceutical Sciences. 2013; 21: 39-45.
40. Kooti W, Hasanzadeh-Noohi Z, Sharafi-Ahvazi N, Asadi-Samani M, Ashtary-Larky D. Phytochemistry, pharmacology, and therapeutic uses of black seed (Nigella sativa). Chinese Journal of Natural Medicine. 2016; 14:732-745.
41. Khanahmadi MM, Naghdi Badi H, Akhondzadeh S, et al. A review on medicinal plant of Glycyrrhiza glabra L. Journal of Molecular Pathology. 2013; 2(46):1-12.
42. Hamta A, Shariatzadeh SMA, Soleimani Mehranjani SMA, Fallah Huseini H, Hosseinabadi F. The cytotoxic effects of Glycyrrhiza glabra L. root extract on 4T1 cell line derived from BALB/c mice mammary tumors. Journal of Medicinal Plant. 2014; 2(50):92-103.
43. Harwansh RK, Patra KC, Pareta SK, Singh J. Pharmacological studies on Glycyrrhiza glabra. Pharmacology online. 2011;2:1032-1038.
44. Baltina LA. Chemical modification of glycyrrhizic acid as a route to new bioactive compounds for medicine. Curr Med Chem. 2003;10:155-171.
45. Rossi T, Castelli M, Zandomeneghi G, Ruberto A, Benassi L, Magnoni C. Selectivity of action of glycyrrhizin derivatives on the growth of MCF-7 and HEP-2 cells. Anticancer Res. 2003; 23(5A):3813-3818.
46. Nourazarian SM, Nourazarian A, Majidinia M, Roshaniasl E. Effect of root extracts of medicinal herb Glycyrrhiza glabra on HSP90 gene expression and apoptosis in the HT-29 colon cancer cell line. Asian Pac J Cancer Prev. 2015;16:8563-8566.
47. Raval ND, Pandya TN. Pharmacognostic study of Lepidium sativum Linn (Chandrashura). Ayu. 2011;32:116-119.
48. Al-FatimiM, Friedrich U, Jenett-Siems K. Cytotoxicity of plants used in traditional medicine in Yemen. Fitoterapia. 2005;76: 355-358.
49. Aslani E, Naghsh N, Ranjbar M. Cytotoxic effects of hydroalcoholic extracts of cress (Lepidium sativum)—made from different stages of the plant—on k562 Leukemia cell line. Hormozgan Med J. 2015;18:411-419.
50. Servatyari K, Ahmadi A, Kashefi H, Menbari MN, Rostami R, Moloudi MR. The effects of hydroalcoholic extract of Medicago sativa on liver functional test, blood biochemical and coagulation system parameters in male rat. Sci J Kurdistan Univ Med Sci. 2017;21(6):16-26. https://sjku.muk.ac.ir/article-1-2819-en.pdf. Accessed February 27, 2017
51. Huyghe C, Bertin E, Landry N. Medicinal and nutraceutical uses of alfalfa (Medicago sativa L). A review. In: Acharya SN, Thomas JE, eds. Advances in Medicinal Plant Research. Trivandrum, India: Research Signpost; 2007:147-172.
52. Singh Bora K, Sharma A. Phytochemical and pharmacological potential of Medicago sativa: a review. Pharm Biol. 2011;49:211-220.
53. Kooti W, Hasanzadeh-Noohi Z, Sharafi-Ahvazi N, Asadi-Samani M, Ashtary-Larky D. Phytochemistry, pharmacology, and therapeutic uses of black seed (Nigella sativa). Chin J Nat Med. 2016; 14:732-745.
54. Tabasi NS, Khajavi-Rad A, Mahmoudi M, et al. The effects of Nigella sativa ethanolic extract on proliferation and apoptosis of renal cell carcinoma ACHN cell line. J Shahrekord Univ Med Sci. 2010;12(3):7-14.
55. Ait Mbarek L, Ait Mouse H, Elabbadi N, et al. Anti-tumor properties of blackseed (Nigella sativa L.) extracts. Braz J Med Biol Res. 2007;40:839-847.

56. Gali-Muhtasib H, Diab-Assaf M, Boltze C, et al. Thymoquinone extracted from black seed triggers apoptotic cell death in human colorectal cancer cells via a p53-dependent mechanism. Int J Oncol. 2004;25:857-866.

57. Shoeib AM, Elgayyar M, Dudrich P, Bell J. In vitro inhibition of growth and induction of apoptosis in cancer cell lines by thymoquinone. Int J Oncol. 2003;22:107-113.

58. Muhtasib H, Roessner A, Schneider R. Thymoquinone: a promising anti-cancer drug form natural sources. Int J Biochem Cell Biol. 2006;38:1249-1253.

59. Khalife R, Hodroj MH, Fakhoury R, Rizk S. Thymoquinone from Nigella sativa seeds promotes the antitumor activity of noncytotoxic doses of topotecan in human colorectal cancer cells in vitro. Planta Med. 2016;82:312.

60. Elkady AI, Hussein RA, El-Assouli SM. Mechanism of action of Nigella sativa on human colon cancer cells: the suppression of AP-1 and NF-kB transcription factors and the induction of cytoprotective genes. Asian Pac J Cancer Prev. 2015;16:7943-7957.

61. Shoeb M. Montamine, a unique dimeric indole alkaloid, from the seeds of Centaurea Montana (Asteraceae), and its in-vitro cytotoxic activity against the CaCo2 colon cancer cells, Tetrahedron, 2006, 62, 72-77.

62. Thomson M, Ali M, Current Cancer Drug Targets, 2003, 3(1), 67-81.

63. Kingston DGI, The shape of things to come: structural and synthetic studies of taxol and related compounds, Photochemistry, 2007, 68 (14), 1844-1854.

64. Hait WN, Rubin E, Alli E, Goodin S, Tubulin targeting agents, Update on cancer therapeutics, 2007, 2(1), 1-8.

65. Ulbricht C, Basch E, Burke D, et al. Fenugreek (Trigonella foenum-graecum L. Leguminosae): an evidence-based systematic review by the natural standard research collaboration. J Herb Pharmacother. 2007;7:143-177.

66. Alsemari A, Alkhodairy F, Aldakan A, et al. The selective cytotoxic anti-cancer properties and proteomic analysis of Trigonella foenum-graecum. BMC Complement Alternat Med. 2014;14:114.

67. Amin A, Alkaabi A, Al-Falasi S, Daoud SA. Chemopreventive activities of Trigonella foenum graecum (fenugreek) against breast cancer. Cell Biol Int. 2005;29:687-694.

68. Chik WW, Amid A, Jamal P, Purification and cytotoxicity assay of tomato (Lycopersicon esculentum) leaves methanol extract as potential anti-cancer agent, Journal of Applied Sciences, 2010, 10(24), 3283-8.

69. Khazaei Poul Y, Majd A, Labibi F, Moini Zanjani T. Cytotoxic effect of methanolic extracts of vegetative and reproductive parts of Vinca rosea on A431, a human skin squamous carcinoma cell line. J Physiol Pharmacol. 2014; 18:364-372.

70. Roepkea J, Salima V, Wua M, et al. Vinca drug components accumulate exclusively in leaf exudates of Madagascar periwinkle. Proc Natl Acad Sci U S A. 2010;107:15287-15299.

71. Siddiqui S, Ismail Z, Saidan N. Simultaneous determination of secondary metabolites from Vinca rosea plant extractives by reverse phase high performance liquid chromatography. Pharmacogn Mag. 2011;7(26):92-96.

72. Jayakumar D, Mary SJ, Santhi RJ. Evaluation of antioxidant potential and antibacterial activity of Calotropis gigantea and Vinca rosea using in vitro model. Indian J Sci Technol. 2010;3:720-723.

73. Marx WM, Teleni L, McCarthy AL, et al. Ginger (Zingiber officinale) and chemotherapy-induced nausea and vomiting: a systematic literature review. Nutr Rev. 2013;71:245-254.

74. Moheghi N, Tavakkol Afshari J, Brook A. The cytotoxic effect of Zingiber officinale in breast cancer (MCF7) cell line. Ofoghe-Danesh. GMUHS J. 2011;17(3):28-34.

75. Rahman S, Salehin F, Iqbal A. In vitro antioxidant and anticancer activity of young Zingiber officinale against human breast carcinoma cell lines. BMC Complement Alternat Med. 2011;11:76.

76. Xu L, Lao LX, Ge A, Yu S, Li J, Mansky PJ, Chinese herbal medicine for cancer pain, Integrative Cancer Therapies, 2007, 6(3), 208-34.