Review Article

Anticancer Activity of Some Natural Herbs.

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ABSTRACT

Herbs have been the highly esteemed source of medicine throughout human history. They are widely used today indicating that herbs are a growing part of modern, high-tech medicine. About 25-30 percent of today's prescription drugs contain chemical moieties derived from plants. Herbs are now part of nutrition supplements at nonprescription counters and their self-prescription has increased at large scale in hope of diseases prevention. India is the largest producer of medicinal plants. The medicinal plants having natural therapeutic values against various diseases also provide high quality of food and raw materials for livelihood. The naturally occurring plants and their products having the certain medicinally active constituents those constituents produce the desire effects, but we don't know all of them. Few only known from them and produce effective results against various diseases like cardiovascular disease, cancer, diabetes, alzheimer disease, cataracts, and age-related functional decline. But in this we concentrate on the anticancer properties of the plants and gathered information of a few herbs. Plant products with food value to keep energy balance in the body and promise substantial therapeutic value in several diseases. Many researches still going on for leading killer disease cancer that fruits and vegetables by eating in raw stage will reduce the risk of cancer. Considerable works have been done on these plants to treat cancer, and some plant products have been marketed as anticancer drugs, based on the traditional uses and scientific reports.

Keywords: anticancer agents, cancer prevention, flavonoids, malignant tumors, metastasis, natural herbs.

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INTRODUCTION

Cancer

Also said to be: Carcinoma, Malignancy, Neoplasm, and Tumor.

The world's oldest documented case of cancer hails from ancient Egypt, in 1500 B.C. The details were recorded on a papyrus, documenting 8 cases of tumors occurring on the breast. It was treated by cauterization, a method to destroy tissue with a hot instrument called "the fire drill." It was also recorded that there was no treatment for the disease, only palliative treatment. There is evidence that the ancient Egyptians were able to tell the difference between malignant and benign tumors. According to inscriptions, surface tumors were surgically removed in a similar manner as they are removed today.

The word cancer came from the father of medicine, Hippocrates, a Greek physician. Hippocrates used the Greek words, carcinos and carcinoma to describe tumors, thus calling cancer "karkinos." The Greek terms actually were words to describe a crab, which Hippocrates thought a tumor resembled. Although Hippocrates may have named "Cancer,"

Cancer begins in your cells, which are the building blocks of your body. Normally, your body forms new cells as you need them, replacing old cells that die. Sometimes this process goes wrong. New cells grow even when you don't need them,

and old cells don't die when they should. These extra cells can form a mass called a tumor. Tumors can be benign or malignant. Benign tumors aren't cancer while malignant are cancer. Cells from malignant tumors can invade nearby tissues. They can also break away and spread to other parts of the body. Most cancers are named for where they start. For example, lung cancer starts in the lung, and breast cancer starts in the breast. The spread of cancer from one part of the body to another is called metastasis. Symptoms and treatment depend on the cancer type and how advanced it is. Treatment plans may include surgery, radiation and or chemotherapy.

Food provides not only essential nutrients needed for life but also other bioactive compounds for health promotion and disease prevention. Previous epidemiologic studies have consistently shown that diet plays a crucial role in the prevention of chronic diseases. Consumption of fruit and vegetables, as well as grains, has been strongly associated with reduced risk of cardiovascular disease, cancer, diabetes, Alzheimer disease, cataracts, and age-related functional decline. Heart disease, cancer, and stroke are the top 3 leading causes of death in the most of the countries. It is estimated that one third of all cancer deaths could be avoided through appropriate dietary modification. This convincing evidence suggests that a change in dietary behavior such as increasing consumption of fruit, vegetables, and grains is a practical strategy for significantly reducing the incidence of chronic diseases.

Herbs show anticancer activities:

The chemical constituents present in certain types of plants shows anticancer properties. We choose some of them and make a review of its properties. And listed below

1. Cocoa

Cocoa (*Theobroma cacao*) (**Fig. 1**) & (**Fig. 2**) seeds have an unpleasant, bitter taste. To reduce the bitterness, they are fermented, dried, roasted, and finely ground to produce cocoa liquor (cocoa mass). Cocoa liquor is pure chocolate, composed of both cocoa (cocoa solids) and cocoa butter. Cocoa liquor contains 35-50 % fat (cocoa butter). Cocoa butter mainly consists of saturated fat, stearic acid and palmitic acid, and monounsaturated fat, oleic acid. Although a considerable reduction in antioxidants takes place during the processing of cocoa seeds, cocoa is still a significant source of antioxidant flavanols. Cocoa contains comparable or even greater amounts of flavanols than many fruits and vegetables [1-4].

Flavanols are a subclass of flavonoids which, in turn, are a subclass of polyphenols. The most abundant flavanols in cocoa having anti cancer activities are epicatechin, catechin, and procyanidins. Epicatechin, catechin, and certain procyanidins are absorbed from the gut in an active form, to some extent, and are detectable in blood after consumption of cocoa. Epicatechin appears to be the most readily absorbed flavanols, whereas procyanidins are absorbed in very small amounts [5, 6].

Fig. 1

Fig. 2

2. Apple peels

Triterpenoids isolated from apple peels (Fig. 3) have potent antiproliferative activity and may be partially responsible for apple's anticancer activity. The apple is the pomaceous fruit of the apple tree, species *Malus domestica* in the rose family

(Rosaceae). It is one of the most widely cultivated tree fruits [7].

Bioactivity-guided fractionation of apple peels (**Fig. 4**) was used to determine the chemical identity of bioactive constituents. Thirteen triterpenoids were isolated, and their chemical structures were identified. Antiproliferative activities of the triterpenoids against human HepG2 liver cancer cells, MCF-7 breast cancer cells, and Caco-2 colon cancer cells were evaluated. Most of the triterpenoids showed high potential anticancer activities against the three human cancer cell lines. Among the compounds isolated, 2alpha-hydroxyursolic acid, 2alpha-hydroxy-3beta-{[(2E)-3-phenyl-1-oxo-2-propenyl] oxy} olean-12-en-28-oic acid, and 3beta-trans-p-coumaroyloxy-2alpha-hydroxyolean-12-en-28-oic acid showed higher antiproliferative activity toward HepG2 cancer cells. Ursolic acid, 2alpha-hydroxyursolic acid, and 3beta-trans-p-coumaroyloxy-2alpha-hydroxyolean-12-en-28-oic acid exhibited higher antiproliferative activity against MCF-7 cancer cells. All triterpenoids tested showed antiproliferative activity against Caco-2 cancer cells, especially 2alpha-hydroxyursolic acid, maslinic acid, 2alpha-hydroxy-3beta-{[(2E)-3-phenyl-1-oxo-2-propenyl]oxy}olean-12-en-28-oic acid, and 3beta-trans-p-coumaroyloxy-2alpha-hydroxyolean-12-en-28-oic acid, which displayed much higher antiproliferative activities. These results showed the triterpenoids isolated from apple peels have potent antiproliferative activity and may be partially responsible for the anticancer activities of whole apples.

Fig. 3

Fig. 4

3. Leeks

Leeks (*Allium porrum)* (**Fig. 5**) are related to garlic, onions, shallots, and scallions. The flavonoids in leeks are most concentrated in their lower leaf and bulb portion. The kaempferol is one of leeks' premiere flavonoids, and it's also most concentrated in the lower leaf and bulb. Leeks rank ahead of white onions in terms of their kaempferol content. For other types of flavonoids, including quercetin, leeks appear to provide lower concentrations than most types of onions.

Leeks (**Fig. 6**) contain important amounts of the flavonoid kaempferol, often overlooked in leeks is their important concentration of the B vitamin folate. Folate is present in leeks in one of its bioactive forms (5-methyltetrahydrofolate, or 5MTHF). Also present in leeks are impressive concentrations of antioxidant polyphenols. These polyphenols play a direct role in protecting our blood vessels and blood cells from oxidative damage. They are still a highly valuable food in terms of these phytonutrient antioxidants and provide us with important cardiovascular and anticancer benefits for this reason [8].

Unfortunately, leeks have received less research attention than their fellow allium vegetables (especially garlic and onions), and for this reason, there is less documentation of their likely health benefits. Given their substantial polyphenol content, including their notable amounts of kaempferol, we would also expect to see leeks providing measurable amounts of protection against several different types of cancer, mostly likely including colorectal cancer. It's important to remember that even in the absence of research studies to confirm health benefits, leeks still belong to the same allium vegetable family as onions and garlic and contain many health-

supportive substances that are similar to the substances in their fellow allium vegetables.

Fig. 5

Fig. 6

4. Salvestrols

Salvestrols are a new class of natural anticancer chemicals found in certain dietary plants and fruits. Unlike other natural compounds and phytochemicals that are categorized as a single chemical type of plant compound, Salvestrols are defined on the basis of their mechanism of anti-cancer action [9]. Salvestrols have the extraordinary ability to recognize cancer cell embed themselves in them and destroy them. The reason why they are able to kill cancer cells specifically while leaving normal cells unharmed is because they're able to discern the presence of an enzyme called CYP1B1 which is an intrinsic component of cancer cells, but absent in normal cells.

When Salvestrols come into contact with the CYP1B1 inside human cancer cells, they become activated and cause the cancer cells to stop growing or die [10]. The anti-cancer effect that this activation process brings about is not caused directly by the plant chemicals themselves, but by their metabolites which the salvestrols generate in the human cancer cells.

5. The cruciferous vegetables

The cruciferous vegetables, (**Fig. 7**) also known as Brassicaceae, include broccoli, cabbage, cauliflower, arugula, Brussels sprouts, collard greens, daikon, garden cress, horseradish, kale, kohlrabi, mustard, radish, rape (canola), rapini, rutabaga, tatsoi, turnip, wasabi and watercress. Numerous studies have linked higher intake of these vegetables to lower rates of cancer and other health problems, particularly when the vegetables are consumed raw.

Broccoli (*Brassica oleracea)* [11] Consumption of raw broccoli resulted in faster absorption, higher bioavailability, and higher peak plasma amounts of sulforaphane, compared to cooked broccoli. One of the plant compounds identified as partially responsible for this protective effect is sulforaphane, the main member of the isothiocyanate family that is found in broccoli. All cruciferous vegetables contain plant compounds known as glucosinolates, which are metabolized by the body into cancer-fighting isothiocyanates. Studies have suggested that sulforaphane may help activate genes that produce antioxidants to clear dangerous free radicals from the body. This effect is believed to be partially responsible for the observed lower rates in breast, bladder, cervix, colon, endometrium, liver and lung cancers among those who eat large quantities of cruciferous vegetables (**Fig. 8**). It is also believed to help protect the immune and other bodily systems from age-related decline.

Fig. 7

Fig. 8

6. Berries

The study concluded that, "We have clearly shown that berries, which contain a variety of anticancer compounds, have a genome-wide effect on the expression of genes involved in cancer development". Researchers have shown that the active compound found in black raspberries (**Fig. 9**) & (**Fig. 10**) inhibits tumor development by suppressing the activity of a protein needed for the disease to progress. Further, black raspberries reduce levels of dangerous systemic inflammation that lower tumor formation by 50 %.

Anthocyanins that berry compounds have a significant biological activity that has been shown to be a powerful inhibitor of cancers of the digestive tract. The researchers tested the chemo-protective properties of anthocyanin-rich extracts [12,13] (ARE`s) to determine which exhibited the highest antioxidant power. They found that purple corn, chokeberry, bilberry, purple carrot and grapes were at the top of the list. Anthocyanins impart the deep purple color to these foods that make them such powerful agents against cancer. Members of the berry family and foods rich in anthocyanins have been consumed by our ancestors for generations. These potent compounds provide us with an important tool to prevent many diseases. Be certain your diet includes a source of anthocyanins to dramatically lower your risk of digestive cancers.

Fig. 9

Fig. 10

7. Green tea

Fresh green tea leaf (**Fig. 11**) is unusually rich in polyphenols which may constitute up to 30% of the dry leaf weight. Polyphenols include catechins, flavanols, chlorogenic acid, epigallocatechin gallate (EGCG), and one unique to tea, theogallin. Caffeine in green tea is present at an average level of 3 % along with very small amounts of methylxanthines, theobromine and theophylline. The amino acid theanine (5-N-ethylglutamine) (**Fig. 12**) is also unique to tea [14, 15]. There is growing evidence that drinking green tea may reduce the risk for various types of cancer. However, little is known regarding the cancer preventive benefit of green tea supplements and the appropriate dosage.

Researchers at the University of Murcia in Spain and the John Innes Cente in Norwich, England have shown that a compound called epigallocatechin gallate in green tea prevents cancer cells from growing by binding to a specific enzyme [16]. They

showed for the first time that epigallocatechin gallate, which is present in green tea at relatively high concentrations, inhibits the enzyme dihydrofolate reductase, which is a recognized, established target for anti-cancer drugs. Green tea has about five times as much epigallocatechin gallate as regular tea. Green tea has been suspected to decrease rates of certain cancers but scientists were not sure what compounds were involved or how they worked. Nor had they determined how much green tea a person would have to drink to have a beneficial effect. Epigallocatechin gallate is probably just one of a number of anti-cancer mechanisms in green tea.

Epidemiological data have suggested that epigallocatechin gallate may provide protective effects against hormone related cancers, namely breast or prostate cancer. Herbal Green tea extract may interfere with a process that helps early bladder cancer to spread throughout the body. The findings bolster ongoing studies into green tea extract as a cancer treatment and may give green tea drinkers more reason to savor every cup. The investigators found that when they exposed human bladder cells to both a cancer-causing chemical and green tea extract, the extract interfered with a particular process by which early cancer cells become invasive and spread throughout body tissue.

Reduced breast cancer risk Compounds in green tea may help protect women against breast cancer [17]. Rats that drank water containing green tea had reductions in the size and malignancy of breast tumors compared with rats that drank only water. Additionally, the tumors of tea-drinking rats developed later and were less invasive. While more research needs to be conducted, the findings, coupled with observations of lower rates of breast cancer in countries where green tea is consumed daily, suggest that green tea may benefit women as part of an overall healthy diet. Polyphenols, compounds that are abundant in green tea, red wine and olive oil, may protect against various types of cancer. Polyphenols are potent antioxidants [18]. compounds that help neutralize disease-causing free radicals. These cell-damaging molecules occur naturally in the body and are linked with heart disease, aging and a number of other disorders. Dry green tea leaves, which are about 40 % polyphenols by weight, may also reduce the risk of cancer of the stomach, lung, colon, rectum, liver and pancreas, study findings have suggested.

Fig. 11

Fig. 12

8. Winter cherry plant

Winter cherry (*Withania somnifera*) (**Fig. 13**) is also known as Ashwagandha, Indian ginseng, Ajagandha, Kanaje. It is a small or medium-sized, upright shrub, growing upto 1.5 metres in height. It is native to India.

The herb contains an alkaloid somniferine. Its roots contain traces of a volatile oil. The water-soluble portion of root extract contains indistinct amorphous substances and an amount of sugar. The water-soluble extract consists mainly of a black resin [19], which contains besides other factors, an assortment of some fatty acids. It also consists of potassium nitrate, tannin, colouring matter, glucose and some alkaloids.

In Ayurveda, the roots of Ashwagandha are used medicinally. Sometimes, the fresh roots are boiled in milk, so as to leach out undesirable constituents and then dried. The chemical components in Ashwagandha

are somewhat similar to those found in ginseng. Some of the important chemicals and alkaloids present in the roots of Ashwagandha are anaferine, anahygrine, beta-sisterol, cuscohygrine, pseudotropine, somniferinine, somniferiene, tropanol, withanine and withananine [20].

Ashwagandha (**Fig. 14**) is widely used in the prevention and treatment of cancer. According to scientific research, this wonderful herb is toxic to several types of cancer cells and increases the effects of radiation therapy. It also reduces the side-effects from chemotherapy. Ashwagandha reduces tumor cell-proliferation and help in increasing overall survival period of the individual. Recent research has revealed that long term use of Ashwagandha not only saves from the dreaded disease i.e. cancer, but also slows down ageing process and prevents cell destruction. Laboratory trials have found that Ashwagandha has toxic anti-cancerous compound, which not only kills cancer cells in the body but also helps in the protection of normal cells and tissues. Various results have indicated that Ashwagandha slowdowns the growth of lung, breast and colon cancer cells [21].

Fig. 13

Fig. 14

9. Soy

A high consumption of soy- based food such as tofu is thought to protect against cancer, and now researchers suggest a reason why a compound found in soy (**Fig. 15**) & (**Fig. 16**) , called genistein, suppresses the production of stress proteins in cells proteins that otherwise help cancer cells survive destruction by the immune system [22]. Isoflavones are organic compounds found in soy and other legumes and it is thought that methylated isoflavones [23,24] (glycitein, biochanin A, formononetin) may have greater anticancer activity than those without methyl groups (genistein, daidzein, equol). Epidemiological evidence also suggests that the anticancer effects of soy may be greatest during the precancerous stages of prostate cancer.

Fig. 15

Fig. 16

10. Tomatoes

Tomatoes (*Solanum lycopersicum)* (**Fig.17**) In recent years, more and more medical research indicates that tomatoes have a very good effect in promoting human health, it can protect cells from oxidant

erosion, can slow or prevent breast cancer, pancreatic cancer, and cervical cancer process. Introduction of anti-cancer effect of the tomato [25], cannot fail to mention the lycopene. The lycopene is a carotenoid, (**Fig. 18**) it was first isolated from tomato. Lycopene having the strongest antioxidant activity, the anticancer mechanism of carotenoid is mainly inhibition of cancer cell phospholipids metabolism [26,27], lycopene regulates tumor suppressor genes, and reduces the incidence of tumors, and experimentally proved that it can be inhibit tumor cell proliferation effect.

Fig. 17

Fig. 18

CONCULSION

In general says healthy foods give healthy life. Herbal plants can be used for various purposes because they are beneficial in nature. They are used for cooking, decorating and treating living things. But almost all herbs are used for improving human health. By adding the above described plants in your diet will keep the distance from the devastating diseases and make the life happy.

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