**Some Natural Phytochemicals Preventing and Treating Breast Cancers**

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Medicinal herbs and their active compounds are recognized as complementary treatments and prevention for cancer. A lot of clinical studies have reported the beneficial effect of medicinal herbs and their active compounds for survival, immune modulation and quality of life for cancer patients, when these medicinal herbs are used with the combination of conventional treatments [1].

**Anticancer Effect of Medicinal herbs and their active compounds**

Many clinical studies have indicated the spectrums of anticancer activities of various medicinal herbs are given below.

1. **Breast Cancer**
   1. **Ginseng**

In the last two decades, ginseng has acknowledge as one of the most frequently used herbal medicine in West and many researches has been conducted on it. The ginsenoside Rh2 is a main active compound of red ginseng which has an inhibitory effect on growth of breast cancer cells in vitro study by using MCF-7 breast cancer cell line. Studies have found that by consumption of ginseng in cancer patients due to many reasons such as- improve quality of life, reduced adverse effects of chemotherapy, also enhance the chemotherapeutic drugs, treat symptoms related to cancer and better clinical outcomes. By in vivo and in vitro studies it is proven that ginseng and its active compound Ginsenoside Rh2 and Rg3 have anti -cancer effect although the molecular mechanism is yet to be illuminate.

* 1. **Garlic *(Allium Sativum)***

Garlic contain higher amount of sulphur compound which is observed mainly in fresh or crushed form of garlic. It has many active compounds as alliin, vinyldithiins, ajoene, S-allylcysteine, diallyl polysulfides, flavonoids and saponins. But the major bioactive compound in garlic is alliin it is an amino acid which is present in raw form of garlic and converted to allicin by the presence of enzyme alliinase. Allicin is responsible for unique odor of garlic. Allicin is unstable compound and due to self-reactive effect it is quickly changed into a stable compound diallyl disulphide. Various vitro studies have shown that garlic and its active compound diallyl disulphide decrease the progression of breast cancer in animal and human cells in culture. It’s mechanism of action is that induction of apoptosis, the regulation of cell-cycle arrest and stimulation of enzymes these mechanism are responsible for detoxification of carcinogens.

* 1. **Tumeric (*Curcuma longa*)**

Turmeric roots contain major active compound called curcuminoid. Curcuminoids are the polyphenol compounds this is mainly divided into three parts curcumin I, curcumin II and Curcumin III. Curcumin is non-toxic recognized safe compound. Its therapeutic importance in many diseases due to anti-inflammatory and antioxidant effects. Many studies have reported that curcumin have anti-cancer effect. These studies have demonstrated the chemo-preventative and therapeutic properties of curcumin on breast cancer. Due to chemotherapeutic compound it induces apoptosis, cell cycle arrest and its anti-proliferative effect induce the modulation of key transduction pathways and many enzymes. Curcumin act as bioenhancer for many conventional chemotherapy drugs such as paclitaxel and docetaxel. Its property may be induced by by the use of liposome carriers and nanoparticles [2].

**1.4. Green Tea (Camellia Sinenis)**

The main flavonoids found in green tea leaves are Catechins and its comprise 30-40% of the total dry weight of green tea leaves. In these catechins include epicatechin-3-gallate (ECG), epicatechin (EC), epigallocatechin-3-gallate (EGCG) and epigallocatechin (EGC) are respectively in the amount of 13%, 6.4%, 59% and 19 % [3]. Various Preclinical studies have shown that green tea and its active compound mainly epigallocatechin-3-gallate shows the chemo preventative effect breast cancer [4]. In vivo and in vitro studies demonstrated green tea has anti-cancer effect and its synergistic relationship with conventional chemotherapeutic drugs. Its mechanism of action is that it modulate different intracellular signaling pathways. Its main active compound epigallocatechin-3-gallate has important role in stimulating the apoptosis. Green tea Polyphenols and other components are also beneficial in breast cancer as they suppress the breast cancer development in premenopausal women and prevent recurrence [2].

* 1. **Flaxseed (*Linum usitatissimum*)**

Flaxseed commonly known as linseed, it is rich in short-chain ω-3 fatty acids and many other nutrients5. The possible health benefits of flaxseed is mainly due to presence of α-linolenic acid, It is rich in insoluble and soluble fibers mainly lignans which have estrogenic and antioxidant effect [2]. The studies have observed that consumption of flaxseed decreased the risk of breast cancer. By Ontario Women’s Diet and Health Study it was reported that in case control study the number of cases 2999 (breast cancer patient) and number of control 3370 (healthy person) shows that consumption of flaxseed significantly decreased the risk of breast cancer [6]. Tamoxifen is a well-known drug used for the treatment of positive Estrogen receptor and metastatic in breast cancer [7]. But it has many side effects also such as hot flashes, So by intake of flaxseed and soy which is rich in phytoestrogen decrease the side effect and enhance the effect of drug Tamoxifen [8]. Study on mice reported that consumption of flaxseed with tamoxifen decreases the growth of tumor cell by 74% and while 53% causes tumor regression [9].

* 1. **Black Cumin (*Nigella sativa*)**

*Nigella sativa* is medicinal herb which has many active compounds. But it’s main active compound is Thymoquinone. This active compound is found in *Nigella sativa* is about 30 to 48% [10]. There are many studies have shown that thymoquinone inhibits tumorigenesis and enhance the apoptosis in breast cancer cell lines [11]. It also shown the antineoplastic properties[12]. Similarly by another vitro study it was investigated the effect of long-term used of thymoquinone inhibit the proliferation in human breast cancer cell lines [13]. The combination of conventional anti-cancer drug with thymoquinone enhance the effect of drug [14].

These herbs has anti-cancer effect due to their active compounds. The anti-cancer properties of conventional chemotherapeutic drugs such as tamoxifen, doxorubicin, 5-fluorouracil and paclitaxel can improve by combination of these anti-cancer herbs and also decreased there toxicity. It is also required to nano-formulation of these active compounds and co-delivery with conventional chemotherapeutic drugs to enhance their effectiveness.

Finally, by use of these novel biologically active compounds of these herbs we can improve the quality control, toxicity and safety profiles of conventional chemotherapeutic drugs. More clinical trials are required for key evidence of these medicinal herbs.

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