SOME ACTIVE COMPOUNDS PREVENTING AND TREATING BREAST CANCERS

Abstract

In the whole world, cancer is the second main cause of death. Currently, many advanced medicines and techniques are available for the treatment and control of cancer, but all of them have many undesirable side effects. Although medicinal plants and their derived products, which are used as natural therapies, are safe to use in the prevention and treatment of cancer, Recently, many plant products have been used for the prevention and treatment of cancer, but in this chapter, we discuss some important medicinal plants that have shown promising anticancer effects, such as ginseng, garlic, turmeric, green tea, linseed, and black cumin. Further clinical studies are required to determine the effect of these medicinal plants in the treatment and prevention of cancer in humans.

Keywords: Black Cumin, Ginseng, Turmeric, Green Tea, Linseed.

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I. INTRODUCTION

The active ingredients in medicinal plants are acknowledged as complementary cancer treatments and cancer preventative measures. Many clinical investigations have documented the favorable effects of medicinal herbs and their active ingredients on immunological regulation, quality of life, and survival in cancer patients when combined with conventional therapies [1].

II. ANTICANCER EFFECTS OF MEDICINAL HERBS AND THEIR ACTIVE INGREDIENTS

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

1. Herbs for Breast Cancer

- **Ginseng:** Over the past 20 years, ginseng has been the subject of a great deal of research, and it is now acknowledged as one of the most often used herbs for medical purposes. In an in vitro investigation using the breast cancer cell line MCF7, the main component of red variant ginseng, ginsenoside type Rh2, suppresses the proliferation of breast cancer cells. Studies show that ginseng use among cancer patients is increasing for a number of reasons, including how it increases the efficacy of chemotherapeutic drugs, boosts quality of life, and cures symptoms connected to cancer. Rg-3 and its attributes have anticancer effects as well, albeit the molecular mechanisms are yet unclear.

- **Garlic *(Allium Sativum):*** Garlic contains a higher quantity of sulphur compounds than other foods, which are more common in fresh or crushed forms. Alliin is the most significant of the active compounds found in garlic, which include other chemicals as well. Alliin, an amino acid found in raw garlic, is converted to allicin in the presence of the enzyme alliinase. The active component allicin is what gives garlic its characteristic aroma. Due to its self-reactive properties, allicin is an unstable molecule that quickly changes into diallyl disulfide, a stable chemical. Numerous studies have shown that the active component diallyl disulfide and garlic inhibit the growth of breast cancer cells in both animal and human tissues. It works by promoting apoptosis, regulating cell cycle arrest, and turning on particular enzymes. These processes are in charge of eliminating substances that cause cancer.

- **Turmeric (*Curcuma longa*):** Curcuminoid is the primary active ingredient found in turmeric roots. The polyphenol chemicals known as curcuminoids are primarily split into three groups: curcumin 1, curcumin 2, and curcumin 3. The compound known as curcumin is safe and non-toxic. It has medical significance in the treatment of a variety of illnesses because of its anti-inflammatory and antioxidant properties. Numerous studies have shown curcumin's therapeutic and chemopreventive properties against breast cancer and reported that it has an anti-cancer effect. The anticancer medicine produces apoptosis, cell cycle arrest, and numerous enzymes are altered because of its anti-proliferative effects. Curcumin functions as a bioenhancer for a number of drugs used to treat cancer, including paclitaxel and docetaxel. Curcumin's properties can be induced via liposomes and nanoparticles. [2]

- **Green Tea (*Camellia Sinenis*):** The main active ingredient found in green tea leaves is catechins, which account for 30–40% of their dry weight. The proportional concentrations of epicatechin-3-gallate (ECG), epicatechin (EC), epigallocatechin-3-gallate (EGCG), and epicatechin (EC) in these catechins are 13%, 6.4%, 59%, and 19%, respectively [3]. Numerous clinical studies have demonstrated the antineoplastic properties of green tea and its main active component, EGCG, against breast cancer [4]. Green tea has been shown in numerous trials to have anti-cancer properties and to interact favourably with conventional chemotherapy drugs. Its mode of action involves regulating numerous intracellular signalling pathways. The main active component of this drug, EGCG, dramatically induces apoptosis. an iced green tea Polyphenols and other components are beneficial in the treatment of breast cancer because they inhibit the growth of breast cancer in premenopausal women and also prevent its recurrence [2].

- **Linseed (*Linumusitatissimum*):** Short chain omega-3 fatty acids are found in linseed, also referred to as flax seed, along with a variety of other nutrients [5]. The presence of alpha-linolenic acid in linseed is primarily responsible for any potential health advantages. It includes both soluble and insoluble fibres, primarily lignans, which have antioxidant and estrogenic properties [2]. Consuming linseed lowers the risk of breast cancer, according to studies. According to the Ontario Women's Diet and Health research, a case-control research with 2999 cases (breast cancer patients) and 3370 controls revealed that eating flaxseed considerably reduced the incidence of breast cancer [6]. A well-known drug called tamoxifen is used to treat breast cancer with metastatic spread and oestrogen receptor positivity [7].But it also has a lot of negative consequences, like hot flushes. Thus, consuming foods like flaxseed and soy, which are high in phytoestrogens, reduces the negative effects of the medication Tamoxifen and increases its effectiveness [8]. According to a study on mice, consuming flaxseed along with tamoxifen reduced tumour cell development by 74% while causing tumour regression by 53% [9].

- **Black Cumin (*Nigella sativa*):** Nigella sativa is a medicinal herb that has many active compounds. But its main active compound is thymoquinone. This active compound is found in Nigella sativa in amounts ranging from 30 to 48% [10]. There are many studies that have proven that the active compound thymoquinone inhibits tumorigenesis and enhances apoptosis in cell lines of breast cancer [11]. It also shows antineoplastic properties [12]. Similarly, in another in vitro study, it was investigated whether long-term use of thymoquinone inhibited the proliferation of breast cancer cell lines in humans [13]. The combination of conventional anti-cancer drugs and thymoquinone enhances the effect of the drug [14].

  Due to the active ingredients in these herbs, they have an anti-cancer impact. Combining these anti-cancer herbs can increase the anti-cancer effects of traditional antineoplastic medications including paclitaxel, doxorubicin, 5-fluorouracil, and tamoxifen while lowering their toxicity. To increase their potency, it is also necessary to nano-formulate these active substances and distribute them alongside traditional chemotherapy medications.

Last but not least, we can enhance the quality assurance, negative effects, and safety factor of standard antineoplastic medications by using these distinct biologically active components from these plants. Key evidence for these therapeutic herbs has to come from more clinical trials.

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