

Top 3 Herbal Drugs For Breast Cancer- A Review

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Abstract: Breast cancer related mortality still remains the second leading cause of cancer-related deaths worldwide. Patients with breast cancer have increasingly shown resistance and high toxicity to current chemotherapeutic drugs. This lead to the identification of newer drugs/therapies for treatment of breast cancer. Plant derived products have proved to be an important source of anti-cancer drugs. This review contains the compiled data of anticancer activity of three traditional herbs- *Zingiber officinale*, *Semecarpus anacardium* and *Fagonia cretica*.

Keywords: Breast cancer, herbal drugs, therapy, anti-cancer drugs.

Introduction:

Cancer is a multi-step disease incorporating physical, environmental, metabolic, chemical and genetic factors.¹ Breast cancer is the most commonly occurring cancer in women, comprising almost one third of all malignancies.² It accounts for approximately 25% of all female malignancies with a higher prevalence in developed countries. Breast cancer is the second leading cause of cancer-related death among females in the world.³ Following genotoxic stress, an intact DNA damage response (DDR) is necessary to eliminate lethal and tumorigenic mutations.

The DDR is a network of molecular signaling events that control and coordinate DNA repair, cell cycle arrest and apoptosis.⁶ Targeting the cell cycle to induce arrest pharmacologically is known to be effective in restricting tumor growth in vitro and in vivo, particularly in transformed cells that have an aberrant response to genotoxic and cellular damage.⁷ Due to the lack of successful therapies for the treatment of cancers and other life-threatening diseases, the use of complementary and alternative therapies is increasing. Many natural products have been isolated from herbs and screened for anti-cancer activity in both cancer cell lines and in animal models of human cancer.¹

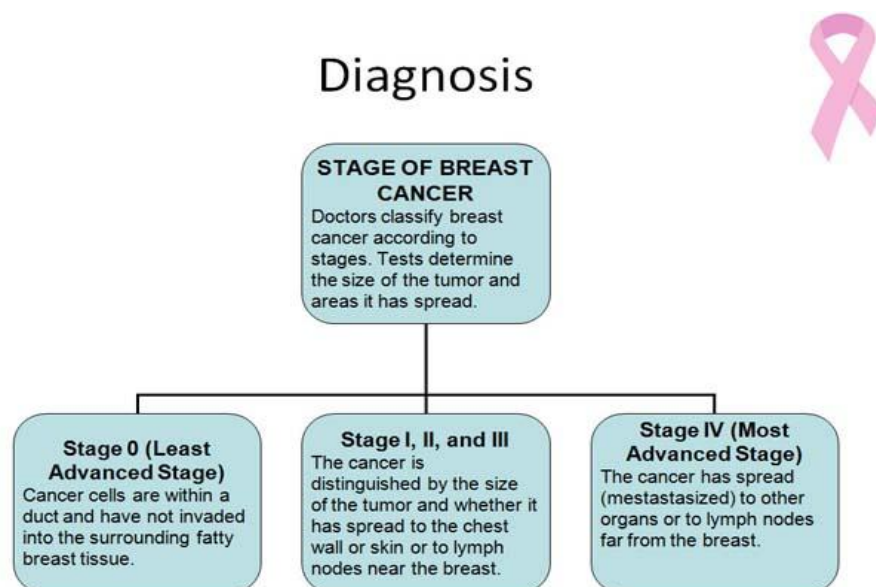


Fig 1: Stages of Breast cancer

Herbal medicines is gaining widespread acceptance globally.⁴ In Ayurveda, almost all medicinal preparations are derived from plants, whether in the simple form of raw plant materials or in the refined form of crude extracts, mixtures and so on.⁴

Medicinal plant preparations have found widespread use particularly in the case of diseases not amenable to treatment by modern method.⁵ Several herbs have been identified as an alternative for the treatment of breast cancer. Some of those herbs which have been identified and used for the treatment of breast cancer have been reviewed in this article.

Herbs in Breast Cancer:

Zinniger officinale:

Zingiber officinale belongs to the family *Zingiberaceae*.

Common names: ginger, adrak(hindi), inji(tamil).

General uses: food preservative, confectionary.

Medical uses: common cold, flu, headache, motion sickness, nausea, vomiting, osteoarthritis, prevents blood clotting.



Fig 2: *Zingiber officinale*

Anti cancer activity

The effect of ginger on two human breast cancer cell lines (MCF-7 and MDA-MB-231) were determined using TBA (thiobarbituric acid) and MTT [3-(4,5-dimethylthiazolyl)-2,5-diphenyl-tetrazolium bromide] assays in the study conducted by shahedur rahman. According to their study, some compounds in Bangladeshi ginger varieties at young age possess anticancer activities and may contribute in the therapeutic effect of this medicinal herb. In their study, of all extracts investigated, Syedpuri rhizomes that were obtained from plants grown under elevated CO₂ concentration exhibited the strongest anticancer activities towards cancer cells.¹ A number of active compounds such as flavonoids, diterpenoids, triterpenoids and alkaloids have been shown to possess anticancer activity. According to the report of the American National Cancer Institute (NCI), the criterion of anticancer activity for the crude extracts of herbs is an IC₅₀<30 µg/ml.⁸

Semecarpus anacardium:

Semecarpus anacardium belongs to the family *Anacardiaceae*.

Common names: marking nut, bhallatak(hindi).

Medicinal uses: antiatherogenic, antiinflammatory, antioxidant, antimicrobial, anti-reproductive, CNS stimulant, hypoglycemic, anticarcinogenic and hair growth promoter.



Fig 3: *Semecarpus anacardium*

Anti-cancer activity:

In a study conducted by P. Madhivathani, *Semecarpus anacardium*(SA) was tested for its inhibitory effect on human breast cancer cells (T47D). SA was discovered to induce rapid Ca²⁺ mobilization from intracellular stores of T47D cell line, and its cytotoxicity against T47D was well correlated with altered mitochondrial transmembrane potential. At the molecular level, these changes are accompanied by decrease in bcl₂ and increase in bax, cytochrome c, caspases and PARP cleavage, and ultimately by internucleosomal DNA fragmentation.⁹ Cytotoxicity analyses suggested that these cells had become apoptotic.

Arulkumaran, studied the protective efficacy of preparation named as Kalpaamruthaa (KA) (*Semecarpus anacardium* nut milk extract, dried powder of *Phyllanthus emblica* fruit and honey) on the peroxidative damage and abnormal antioxidant levels in the hepatic mitochondrial fraction of 7,12-dimethylbenz(a)anthracene (DMBA)-induced mammary carcinoma rats. DMBA-treated rats also showed decline in the activities of mitochondrial enzymes. In contrast, rats treated with SA and KA showed normal lipid peroxidation antioxidant defenses in mitochondrial enzymes, and indicate the anticarcinogenic activity of KA during DMBA-initiated mammary carcinogenesis. On the basis of the observed results, KA can be considered as a readily accessible, promising and novel cancer chemopreventive agent.¹⁰

***Fagonia cretica*:**

Fagonia cretica belongs to the family *Zygophyllaceae*.

Common names: dhamasa (powder form)

Medicinal uses: cancers especially blood and liver cancer.



Fig 4: *Fagonia cretica*

Anticancer activity:

Matt lam, demonstrated for the first time that an aqueous extract of *Fagonia cretica* can induce cell cycle arrest and apoptosis via p53-dependent and independent mechanisms, with activation of the DNA damage response. They also showed that FOXO3a is required for activity in the absence of p53. Their findings indicate that *Fagonia cretica* aqueous extract contains potential anti-cancer agents acting either singly or in combination against breast cancer cell proliferation via DNA damage-induced FOXO3a and p53 expression.⁷

Conclusion:

It is an undeniable fact that herbs have been taken for their health-giving properties for thousands of years. When we take the objective and scientific look at the effect of chemotherapy, the idea of using potent herbs for the treatment of breast cancer is very inviting. Literature provides data that, few of the many herbs available were studied for their medicinal effect on breast cancer. Of these, *Zingiber officinale*, *Semecarpus anacardium* and *Fagonia cretica* were found to be more effective. The findings on each herb, suggests that they have wide therapeutic application on breast cancer.

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