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## Breast Cancer and Nutraceuticals



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### ABSTRACT

The treatment of cancer is associated with numerous side effects. Chemotherapy, surgery, and radiotherapy are the present treatment systems available for the treatment and management of cancer. Nutraceuticals are bioactive natural products with nutritional and therapeutic values. These products are being well utilized in different ways in the treatment of ailments. In the current scenario number of food products is being employed in the treatment of breast cancer because of their impact on molecular and cellular processes responsible for cancer succession. The present study aims to highlight the role of nutraceutical in the management of breast cancer.

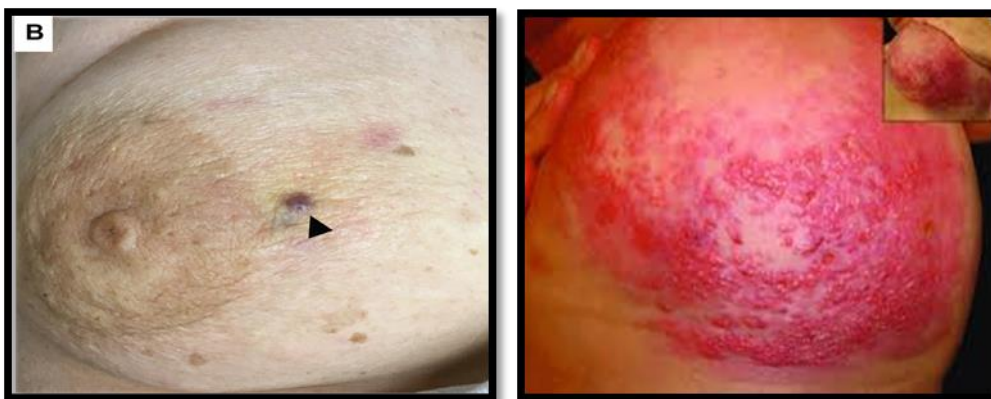


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## INTRODUCTION

Breast cancer is a tumor that forms in the cells of the breasts (female and males). Statically breast cancer is the second-largest type of cancer over seeded by skin cancer. This category of cancer is being further subdivided into angiosarcoma, ductal carcinoma *in situ* (DCIS), inflammatory breast cancer, invasive lobular carcinoma, lobular carcinoma *in situ* (LCIS), male breast cancer, Paget's disease of the breast, recurrent breast cancer, etc. In India, cancer states suggested and projected that by the year 2020, 94.1 per 1,00,000 males and 103.6 per 1,00,000 females will be suffering from cancer. The published data also presented that 1 in 29 females in India will be suffering from breast cancer too. This high ratio of breast cancer has deviated the researchers to find the alternates for the management of breast cancer through natural products instead of therapies.



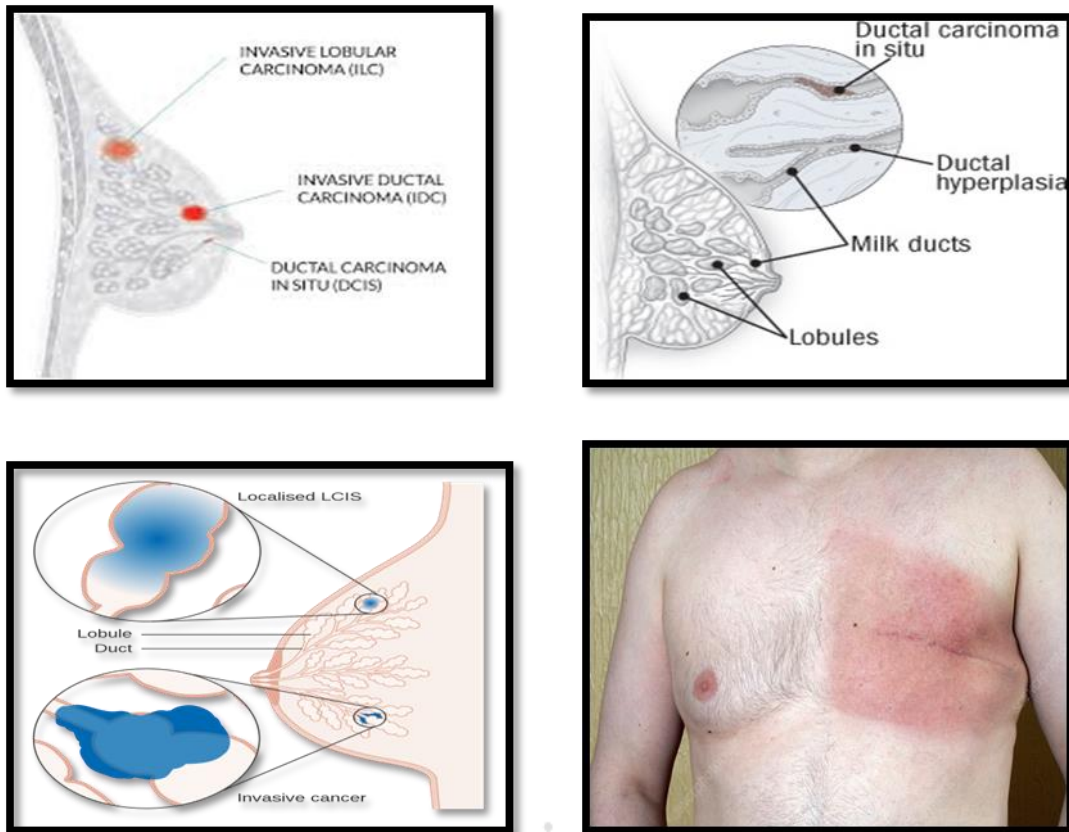
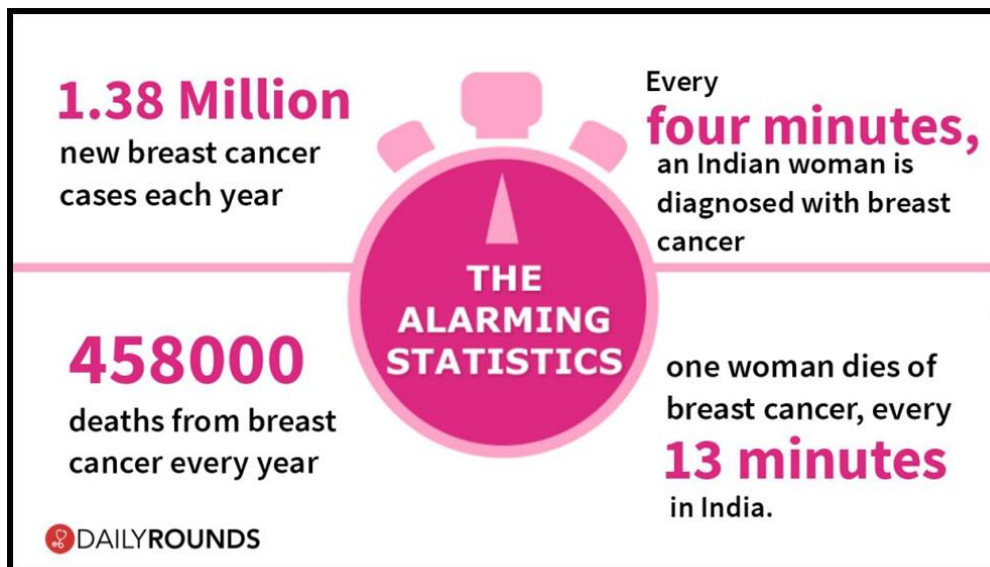


Figure No. 1: Different Types of Breast Cancers

Breast cancer can be detected and diagnosed by different signs and symptoms. These symptoms include breast lumps development, change in the size and shape of the breast, dimpling, newly inverted nipple, peeling/scaling/crusting of nipples, and redness or pitting in the breast. All these manifestations are considered alarming signs and need to be taken care of.



### Nutraceuticals in Breast cancer

The review of the literature suggested that there is number of food and plant products that can be used as remedies for the prevention of breast cancer and other ailments [1-15]. Many fruits and vegetables form the foundation of a breast cancer prevention diet. The phytochemicals (especially antioxidants) present in the plant products have protective power against the cell damage that can lead to breast cancer. In chemo-preventive approaches, foods containing chemicals that have anticancer properties can be supplemented in diets to prevent precancerous lesions from occurring.

**Table No. 1 specifies the biological products used as nutraceuticals for the prevention of breast cancer [16]**

S. No.	Plant /Vegetables/Fruits	Details/Specification
1.	Turmeric	Given along with the other drug therapy. Have got the anti-inflammatory effect.
2.	Broccoli	Many research suggested that it can block tumor growth. Widely suggested in case of breast tumor.
3.	Garlic and Onion	Both these products contain allyl sulfides which have got a vital role in cell cycling. Utilizing this property can be very useful in breast cancer cells.
4.	Apple	Apple peel is rich in antioxidants and research suggested that peels can be used to prevent breast cancer.
5.	Pomegranates	It can prevent the spread of cancer (breast cancer) because it can maintain the level of estrogen in the body, which is responsible for a large number of cancers.
6.	Walnuts	It contains omega 3 fatty acids which is helpful the inflammatory breast cancer as it has got an anti-inflammatory effect.
7.	Flaxseed	Research published in Applied Physiology Nutrition and Metabolism, 2014 suggested that flaxseeds are utilized for the prevention of breast cancer.
8.	Soyabean	They contain isoflavone which can maintain estrogen. This property can prevent estrogen-related cancer (viz breast cancer).
9.	Berries	Blueberries, blackberries, raspberries, and strawberries contain an ample amount of anti-oxidants and have got anti-inflammatory properties.
10.	Green tea	A study published in 2016 in Nutrients suggested that green tea may be effective in slowing tumor growth and influencing other biological processes that contribute to breast cancer.

### Reported Advances in Breast Cancer Therapy Using Nutraceutical Approach [17-24]

1. Salami *et al.*, 2013 suggested that the allyl sulfur compounds derived from garlic have significant anti-proliferate activity against human cancers specifically for breast cancer.
2. Wargovich *et al.*, 2010 concluded that some plant-based agents may; indeed, impact late-stage cancers (breast cancer), influencing molecular processes corrupted by tumor cells to evade detection, expand clonally, and invade surrounding tissues.
3. Nwanodi 2017 pointed out that nutraceuticals, such as the natural MMP inhibitors, 3-azido WA, aqueous cinnamon extract, green tea extract, curcumin, fenugreek derived steroidal saponin and a marine compound derived chit oligosaccharides have broader applicability in the treatment of breast cancer. They also suggested that phytoestrogens monoterpene umbelliprenin have very limited curative anti-cancer effects that can be limited to single cancer.
4. Xie *et al.*, 2019 through their research work concluded that the utilization of the whole grain can prevent and treat breast cancer.
5. Hareesh *et al.*, 2010 conducted research and came up with the results that nutraceuticals like curcumin, green tea polyphenols, coenzyme Q, quercetin, thymoquinone, etc when packaged as nanoparticles established to be useful in nanochemoprevention and nanochemotherapy.
6. Lotha and Sivasubramanian 2018 Flavanones, daidzein, genistein, quercetin, luteolin present in soya beans, legumes, parsley, thyme, onions, cherries, apples, kale broccoli, tomato, berries, tea, red wine, Tartary buckwheat, etc can affect MCF-7 cell lines and prove to be useful in breast cancer therapy.
7. Dutta *et al.*, 2018 studied the encapsulation of various nutraceuticals in a liposome as a carrier and suggested that this system was quite effective in the treatment of breast cancer along with other cancer types.
8. Qadir and Irshad 2018 through the review work suggested that the Mediterranean diet is rich in fat has plentiful chances of managing and treating patients with breast cancer development.

## CONCLUSION

The present review work suggested that nutraceuticals play a vital role in compensating for the spread of breast cancer. The mechanism of action of different bioactive components can vary still it commonly prevents lesion formation in case of breast malignancy. The anti-inflammatory effects of many phytochemicals constituents too prevent breast cancer-associated problems. Moreover, the review work also suggested that these nutraceuticals can be delivered in the form of nano-formulation for chemotherapy.

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