Journal of Advanced Zoology

ISSN: 0253-7214

*Volume **44** Issue S-**07 Year 2023** Page 1894**:1899***

Management Of Breast Cancer Through Ayurveda

Singh Jyoti[1], Gautam Dev Nath Singh[1*], Ranjan Rohit[2], Priyanka[3], Sourav Simant[4]

[1]Department of Rasa Shastra & Bhaishajya Kalpana; Faculty of Ayurveda; Institute of Medical Sciences; Banaras Hindu University; Varanasi; jyotitulsiss@gmail.com; drdnsgautam@gmail.com
[2]Department of Samhita Siddhant; Government Ayurvedic College and Hospital; Patna; rohitranjan.dr@gmail.com
[3]Department of Sharir Rachana; Government Ayurvedic College and Hospital; Patna; drpriyankaanant@gmail.com
[4]Department of Sharira Kriya; Government Ayurvedic College and Hospital; Patna; drsimant.sourav@gmail.com

***Corresponding Author:** Prof Dev Nath Singh Gautam*
Department of Rasa Shastra & Bhaishajya Kalpana, Faculty of Ayurveda; Institute of Medical Sciences; Banaras Hindu University; Varanasi. drdnsgautam@gmail.com

ABSTRACT:

Breast cancer is the second most common cancer among women. Initial signs of cancer start in the lymph nodes located under the arm, within the breast, and near the collarbone. Many promising remedies for breast cancer are included in Ayurveda, the Indian system of medicine. Nowadays, multi-targeted herbal drugs are used as an adjuvant therapy alongside conventional medicine in the management of this type of cancer. The information for the present study was obtained from various internet sources like research articles and paper presentation documents and research book publications. The present review concentrates on the available literature found in Ayurveda regarding plants, poly-herbal and herbo mineral ayurvedic remedies available for management of breast cancer.

***KEYWORDS:** Breast cancer, ayurveda, Dosha, herb, Bhasma*

INTRODUCTION:

For decades together, cervical cancer was the most common cancer in women in India, and more deaths in women in India were attributed to cervical cancer than any other cancer.[i] However, over the last 10 years or so, breast cancer has been rising steadily, and for the first time in 2012, breast cancer was the most common cancer in women in India, a way ahead of cervical cancer.[ii] Mostly due to a rapid rise in the number of breast cancer cases, the incidence of this disease has been consistently increasing, and it is estimated that it has risen by 50% between 1965 and 1985.

It is considered as an adversary of modernization and advanced pattern of socio-cultural life dominated by Western medicine. The signalling process, associated with cancer pathology, includes metabolic changes in cellular components such as aerobic glycolysis, mitochondrial DNA degradation, alteration in the electron transport chain, and epigenetic changes regulating genomic expressions, finally resulting in abnormal cell proliferation, angiogenesis, metastasis. The BRCA1 & BRCA2 genes have been identified as predisposing

genes for hereditary factors for breast cancer pathogenesis. The majority of such tumors are fast-growing with lymph node metastasis and have triple-negative molecular subtypes.[iii]

Multidisciplinary scientific investigations are making best efforts to combat this disease, but the sure-shot, perfect cure is yet to be brought into world medicine. Recently, a greater emphasis has been given towards the researches on complementary and alternative medicine that deals with cancer management. Several studies have been conducted on herbs under a multitude of ethno botanical grounds.

The broad aim of this article is to provide a general outline on descriptions of Breast cancer and its management from an ayurvedic practitioners' perspective underlying its scientific principles involved in treating these conditions with the use of natural products. This article reviews the available literature regarding researches on anti-cancerous ayurvedic herbs and supportive ayurvedic medicines and also includes a summary of treatment strategies for various cancers.

Ayurvedic concept of Breast cancer:

Ayurveda, a traditional Indian medicine of plant drugs has been successful from very early times in using these natural drugs and preventing or suppressing various tumours using various lines of treatment.

According to the principles of Ayurveda, your body is based on the tridoshas, which include vata, pitta, and kapha.

1. An imbalance in these doshas can lead to diseases and disruption in your health. Cancer occurs when an imbalance of all the three doshas is experienced.
2. An improper diet and lifestyle account for being the primary reason for this imbalance in doshas, leading to breast cancer.
3. Your digestive fire is also affected, which leads to the accumulation of toxins, thereby blocking all the channels of your body.
4. All these factors are collectively responsible for the development of breast cancer.

Moreover, Charaka[iv] and Sushruta[v] samhitas, two well-known Ayurvedic classics, describe cancer as inflammatory or non-inflammatory swelling and mention them as either Granthi (minor neoplasm) or Arbuda (major neoplasm). Ayurvedic literature defines three body-control systems, viz., the nervous system (Vata or air), the venous system (Pitta or fire), and the arterial system (Kapha or water) which mutually coordinate to perform the normal function of the body. In benign neoplasm (Vataja, Pittaja or Kaphaja) one or two of the three bodily systems are out of control and is not too harmful because the body is still trying to coordinate among these systems. Malignant tumours (Tridosaja) are very harmful because all the three major bodily systems lose mutual coordination and thus cannot prevent tissue damage, resulting in a deadly morbid condition.[vi]

According to Sushruta, the fundamental cause of major neoplasm is the pathogens that affect all parts of the body. He called the sixth layer of the skin as 'Rohini,' (epithelium) and pathogenic injuries to this layer in muscular tissues and blood vessels caused by lifestyle errors, unhealthy foods, poor hygiene and bad habits results in the derangement of doshas, which leads to the manifestation of tumours.[vii] Excess of water or fat in the corpus of the tumour and the stability and rigid confinement of the doshas in a particular place were described as reasons for the non-infectious and non-suppurative nature of these abnormal growths.[viii,ix] Cancer in each person differs according to the person's exposure to pathogens and genetic constitutions which make each of them to react differently to the same diet.

During the 7th century BC, Atreya and Dhanwantari used herbal medicines for treating the early stages of cancer and surgery in advanced cases. In the 8th century AD, Vagbhata, a Buddhist physician composed two texts: Astanga Hrdaya[x] and Astanga sangraha[xi] where new methods for cancer treatment were introduced. Other Ayurvedic texts of internal medicine, viz., Chakradatta[xii] composed by Chakrapani (10th century AD), the Sarangadhara Samhita[xiii] by Sarangadhara (14th century AD), the Bhavaprakasha Samhita[xiv] by Bhavamisra (15th century AD), the Satmya Darpan Samhita by Viswanath (16th century AD), the Vaisajya Ratnabali by Binoda Lala Sen Gupta (18th Century AD), the Rasatarangini by Sadananda Sharma (19th century AD), etc. explain numerous remedies to treat internal and external neoplasms.

The therapeutic approach of Ayurveda has been divided into four categories as Prakritisthapani chikitsa (health maintenance), Roganashani chikitsa (disease cure), Rasayana chikitsa (restoration of normal function) and Naishthiki chikitsa (spiritual approach). Finding the cause of an illness is the basic goal of ayurvedic therapy.[xv]

A variety of herbs targeted at specific molecules for the prevention of breast cancer are broadly classified as an anti-inflammatory, Immune system activating, Endocrine suppressor, Tumor suppressor, Glut-1 inhibitor, Aromatase inhibitor, and Lectin containing plants. The majority of these molecular therapeutic targets have been shown to possess promising broad-spectrum anticancer activities. Antitumour activity derived from

medicinal plants may produce results via a number of mechanisms, including effects on cytoskeletal proteins which play a key role in mitosis (paclitaxel), inhibition of activity of topoisomerase enzymes I (camptothecin) or II (etoposide), stimulation of the immune system (Viscum album), or antiprotease-antioxidant activity. Medicinal plant-derived antineoplastic agents may be used in single agent or in combinational therapies, and have been used in first-line or second-line (including anthracycline-refractory patients) treatment of localized or metastatic breast cancer.[xvi]

Herbal decoctions consisting of multiple herbs each possessing tremendous potential for a cancer cure are commonly used in Ayurveda. These formulations are reported to work on multiple biochemical pathways and are capable of influencing several organ systems simultaneously. The benefit of an herbal decoction is that it can nourish the body as a whole by supporting various organ systems.[xvii] Many of the herbs have scientifically-proven anti-cancerous properties and are used for the treatment of breast cancers.

Herbs and spices offer an alternative solution for breast cancer treatment, with bioactive components such as alkaloids, flavonoids, anthocyanin, phenylopropanoids, and terpenes that can inhibit biological processes associated with breast cancer cell growth. Various such herbs are used in traditional Ayurvedic treatments to prevent/inhibit cancer cell growth.

Vinca rosea

Vinca is one of the most widely available plants and has the ability to save lives. Catharanthus roseus, often known as evergreen herb, is a well-known medicinal herb used to treat cancer. Cancer is the most common disease, and Vinca possesses anti-cancer and anti-tumor capabilities. This therapeutic plant yielded a number of well-known compounds, 130 alkaloids including ajmalcine, Vincennes, vincristine and vinblastine. Vincristine and vinblastine are used to treat breast cancer, skin cancer, and lymphoblastic leukemia it has anti-oxidant, anti-microbial, anti-diabetic, wound healing, anti-ulcer, and other pharmacological activities.[xviii]

Taxus buccata

One study revealed *Taxus buccata* showing good results in breast cancer. In a Phase II study, the triplet regimen based on taxol (active constituent of *Taxus buccata*), ifosfamide, and carboplatin has proved active, safe, and easy to deliver on an outpatient basis for patients with advanced stage IIIB-IV non-small-cell lung cancer.[xix] Another combination of Herceptin with Taxol significantly improves the overall response rate, increases the time to progression and the overall survival in breast cancer patients. These effects are more pronounced in patients characterized with HER/2 +++ over expression.[xx]

Zingiber officinale

A study aimed to examine the antiproliferative potentiality of an extract derived from the medicinal plant ginger (*Zingiber officinale*) on growth of breast cancer cells. Ginger treatment suppressed the proliferation and colony formation in breast cancer cell lines, MCF-7 and MDA-MB-231. Meanwhile, it did not significantly affect viability of nontumorigenic normal mammary epithelial cell line (MCF-10A). Treatment of MCF-7 and MDA-MB-231 with ginger resulted in sequences of events marked by apoptosis, accompanied by loss of cell viability, chromatin condensation, DNA fragmentation, activation of caspase 3, and cleavage of poly(ADP-ribose) polymerase. At the molecular level, the apoptotic cell death mediated by ginger could be attributed in part to upregulation of Bax and downregulation of Bcl-2 proteins. Ginger treatment downregulated expression of prosurvival genes, such as NF-κB, Bcl-X, Mcl-1, and Survivin, and cell cycle-regulating proteins, including cyclin D1 and cyclin-dependent kinase-4 (CDK-4). On the other hand, it increased expression of CDK inhibitor, p21. It also inhibited the expression of the two prominent molecular targets of cancer, c-Myc and the human telomerase reverse transcriptase (hTERT).[xxi]

Nigella sativa

N. Sativa L., an oriental spice, has long been used as a natural medicine for treatment of many acute as well as chronic conditions. It has been used in the treatment of diabetes, hypertension, and dermatological conditions. In a research study, researchers exposed MCF-7 breast cancer cells to aqueous and alcohol extracts and in combination with H2O2 as an oxidative stressor. Measurement of cell survival under various concentrations and combinations was conducted using standard cell culture techniques, exposure protocols in 96 well plates and Fluoro-spectrosphotometry. Following cellular growth to 90% confluency, exposure to water (WE) and ethanol (AE) extracts of N. sativa and H2O2 was performed. Toxicity index (LC50) was calculated from percent survival using regression analysis. Results showed that the alcohol extract and its combinations were able to completely inactivate the MCF-7 cells (LC50 ranged from 377.16-573.79 in descending potency for H2O2 + AE, AE and Mix of WE and AE). H2O2 alone effectively inactivated MCF-7 cells (LC50 = 460.94).

The least effective combinations in descending potency were WE + H2O2, WE + AE + H2O2, and WE (LC50 were 725.79, 765.94, and 940.5 respectively. Combinations other than AE + H2O2 showed possible interactions, which lead to reduction in their potency. In conclusion, N. Sativa alone or in combination with oxidative stress were found to be effective in vitro in inactivating MCF-7 breast cancer cells, unveiling opportunities for promising results in the field of prevention and treatment of cancer.[xxii]

Piper nigrum

Several studies have reported that active compounds isolated from *Piper nigrum* possess anticancer properties. Two bioactive compounds, (−)-kusunokinin and piperlonguminine, were isolated from *P. nigrum*. Cytotoxicity and the molecular mechanism were measured by methyl thiazolyl tetrazolium (MTT) assay, flow cytometry and Western blot analysis. We found that the active compounds, which effect cancer cell lines were (−)-kusunokinin and piperlonguminine. These compounds have potent cytotoxic effects on breast cancer cells (MCF-7 and MDA-MB-468) and colorectal cells (SW-620). (−)-Kusunokinin demonstrated a cytotoxic effect on MCF-7 and MDA-MB-468 with IC_{50} values of 1.18 and 1.62 μg/mL, respectively. Piperlonguminine had a cytotoxic effect on MCF-7 and MDA-MB-468 with IC_{50} values of 1.63 and 2.19 μg/mL, respectively. Both compounds demonstrated lower cytotoxicity against normal breast cell lines with IC_{50} values higher than 11 μg/mL. Cell cycle and apoptotic analysis using flow cytometry, showed that the (−)-kusunokinin and piperlonguminine induced cell undergoing apoptosis and drove cells towards the G2/M phase. Moreover, both compounds decreased topoisomerase II and bcl-2. The increasing of p53 levels further increased p21, bax, cytochrome *c*, caspase-8, -7 and -3 activities, except caspase-9. These results suggest that the (−)-kusunokinin and piperlonguminine have been shown to have potent anticancer activities through extrinsic pathway and G2/M phase arrest.[xxiii]

Elettaria cardamom

Cardamom has several medical properties such as Guna (qualities), Rooksha (dryness), Katu (digestion), and Sheeta (cold potency). A variety of nutritional essential oils in spices such as cardamom have been found effective in the chemoprevention and chemotherapy of cancer. Cardamom has been demonstrated to have antioxidant properties and shows chemopreventive activity in the prevention and inhibition of breast cancer growth. It contains the compounds DCM (diindolylmethane) and IC3 (indole-3-carbinol). Cardamom DCM and IC3 compounds can kill breast cancer cells and inhibit proliferation. In Ayurveda, cardamom is known as Tridoshic and is used in balancing human health by the three doshas. Regular consumption of cardamom compounds such as IC3 and DIM can prevent various forms of breast cancer. The essential components of cardamom are manganese, iron, and potassium, which are found at especially high levels in cardamom. Cardamom regulates multiple cancer-related processes such as cell cycle, hormonal regulation, differentiation, apoptosis, inflammatory responses, DNA repair, and carcinogen metabolism to prevent breast cancer.[xxiv]

Cinnamomum cassia

In one study Cells were treated with C.cassia bark extract 20 μg/ml for 24 h along with control group. These results revealed that C.cassia bark inhibited the proliferation of MCF-7 cells, changed the cytoplasmic morphology, promoted the apoptosis of MCF-7 cells, reduced the invasion and migration ability of MCF-7 cells, and exhibited anti-breast cancer effects. Therefore C.cassia bark primary constituents are linked to apoptosis, invasion, and metastatic targets in breast cancer cells. Overall the results of this study suggest that c.cassia extract could be employed as a possible anti- tumor agent.

Crocus sativus

Saffron plant (*Crocus sativus* L.) is being used as a source of saffron spice and medicine to cure or prevent different types of diseases including cancers. A report was carried out on isolation, characterization of bioactive small molecule ([crocetin (β-D-glucosyl) ester] from the leaf biowastes of saffron plant of Kashmir, India. MTTC assay and Bio-autography aided approach were used to assess anti-oxidant activity and anti-cancer properties of crocin (s) against DPPH free radical and breast cancer cell line respectively. Crocetin beta-D-glucosyl ester restrained proliferation of human breast adeno-carcinoma cell model (MCF-7) without significantly affecting normal cell line (L-6).[xxv]

Nano *Swarna Bhasma*

The preclinical in vitro and in vivo investigations, in breast tumor bearing mice, established unequivocally that the NSB Nano-Ayurvedic medicine-gold nanoparticles-based drug is highly effective in controlling the growth of breast tumors in a dose dependent fashion in vivo. These encouraging pre-clinical results prompted us to

seek permission from the Indian Government's holistic medicine approval authority, AYUSH, for conducting clinical trials in human patients. Patients treated with the NSB drug capsules along with the "standard of care treatment" (Arm B) exhibited 100% clinical benefits when compared to patients in the treatment Arm A, thus indicating the tremendous clinical benefits of NSB drug in adjuvant therapy.[xxvi]
Another Ayurvedic drug containing S. anacardium, Amura rohitaka, Glycyrrhiza glabra and copper powder were reported to inhibit breast tumour development in mice by significantly extending the survival period. This drug was also found to be efficient in clinical trials.[xxvii]

CONCLUSION:

Free radicals are the cause of oxidative stress, which may cause injury to cells, gene mutation, and may lead to cancer. Oxidative stress causes cancer, by the interaction with intracellular signal transduction and transcription factors, directly or indirectly. The exact cause of breast cancer is unknown in most cases. Ayurvedic perspectives on the development, treatment, side effects, and supportive care for breast cancer offer valuable insights. Medicinal plants are main sources in healing of the cancer around the world. This property of the plants is because of the presence of potent anti-cancer substances. Several medicinal plants, poly herbal and Herbo- mineral ayurvedic drugs have been known to cure and control Breast cancer. Most of the medications used worldwide contains herbal product, with no side effects. It is no longer an option to ignore ayurvedic drugs or treat them as something unconventional from regular medical practices. The challenge put before this medicine is to move forward carefully, using both reasoning and wisdom.

REFERENCES:

[i] Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015;136:E359-86.
[ii] Asthana S, Chauhan S, Labani S. Breast and cervical cancer risk in India: An update. Indian J Public Health 2014;58:5-10.
[iii] Reddy, G.M., Suresh, P.K., Pai, R.R., 2017. Clinicopathological Features of Triple Negative Breast Carcinoma, 11, pp. 3–6. https://doi.org/10.7860/JCDR/2017/ 21452.9187.
[iv] Sharma PV. Charaka samhita. Varanasi: Choukhamba Orientalia; 1981.
[v] Bhishagratha KL. Sushruta samhita. Varanasi: Choukhamba Orientalia; 1991.
[vi] Bhishagratha KL. Sushruta samhita. Varanasi: Choukhamba Orientalia; 1991.
[vii] Sankaran PS. Swellings. In: Prasad GC, Udupa KN, editors. Susruta's contribution to surgery. Varanasi: Indological Book House; 1976. p. 99–111.
[viii] Bhishagratha KL. Sushruta samhita. Varanasi: Choukhamba Orientalia; 1991.
[ix] Dash B, Kashyap L. Diagnosis and treatment of Galaganda, Gandamala, Apaci, granthi and arbuda. In: Dash B, Kashyap L, editors. Diagnosis and treatment of diseases in ayurveda. New Delhi: Concept Publishing Company; 1987. p. 437–66.
[x] Ram A. Astanga-hrdaya of vagbhata. vol. III. Uttara-sthana. Delhi: Uppal Publishing House; 1999.
[xi] Kinjavadekara RS. Astanga sangraha. New Delhi: Uppal Publishing House; 1998.
[xii] Sharma PV. Chakradatta: a treatise on principles and practices of Ayurvedic medicine. New Delhi: Vedams Books International; 1998.
[xiii] Murthy KRS. Sarangadhara samhita. Varanasi: Chaukambha Orientalia; 1987
[xiv] Murthy KRS. Bhavaprakasa of bhavamisra. vol. II. Madhya and Uttara Khanda. Varanasi: Krishnadas Academy; 2001.
[xv] Thatte U, Dhahanukar S. Ayurveda, the natural alternative. Sci Today 1991;2001:12–8.
[xvi] Mantle D, Lennard TW, Pickering AT. Therapeutic applications of medicinal plants in the treatment of breast cancer: a review of their pharmacology, efficacy and tolerability. Adverse drug reactions and toxicological reviews. 2000 Aug 1;19(3):223-40.
[xvii] Treadway S. An Ayurvedic herbal approach to a healthy liver. Clin Nutr Insights 1998;6:1–3.
[xviii] Dada WP, Nilima W. VINCA ROSEA: AS AN POTENT ANTI-CANCER AGENT.
[xix] Zaniboni A, Ardizzoni A, De Marinis F, Portalone L, Boni C, Meriggi F, et al. Phase II study of Taxol combined with ifosfamide and carboplatin in the treatment of stage IIIb-IV non-small-cell lung cancer. Am J Clin Oncol 2003;26:84–8.
[xx] Lang I. Possibilities and results with Herceptin-Taxol combination in the treatment of breast cancer. Magy Onkol 2002;46:195–6.

[xxi] Elkady AI, Abuzinadah OA, Baeshen NA, Rahmy TR. Differential control of growth, apoptotic activity, and gene expression in human breast cancer cells by extracts derived from medicinal herbs Zingiber officinale. Journal of Biomedicine and Biotechnology. 2012 Oct;2012.
[xxii] Farah IO, Begum RA. Effect of Nigella sativa (N. sativa L.) and oxidative stress on the survival pattern of MCF-7 breast cancer cells. Biomedical Sciences Instrumentation. 2003 Jan 1;39:359-64.
[xxiii] Sriwiriyajan S, Sukpondma Y, Srisawat T, Madla S, Graidist P. (−)-Kusunokinin and piperloguminine from Piper nigrum: An alternative option to treat breast cancer. Biomedicine & Pharmacotherapy. 2017 Aug 1;92:732-43.
[xxiv] Vutakuri N, Somara S. Natural and herbal medicine for breast cancer using Elettaria cardamomum (L.) Maton. Int J Herbal Med. 2018;6(2):91-6.
[xxv] Mir MA, Ganai SA, Mansoor S, Jan S, Mani P, Masoodi KZ, Amin H, Rehman MU, Ahmad P. Isolation, purification and characterization of naturally derived Crocetin beta-d-glucosyl ester from Crocus sativus L. against breast cancer and its binding chemistry with ER-alpha/HDAC2. Saudi Journal of Biological Sciences. 2020 Mar 1;27(3):975-84.
[xxvi] Khoobchandani M, Katti KK, Karikachery AR, Thipe VC, Srisrimal D, Dhurvas Mohandoss DK, Darshakumar RD, Joshi CM, Katti KV. New approaches in breast cancer therapy through green nanotechnology and nano-ayurvedic medicine–pre-clinical and pilot human clinical investigations. International journal of nanomedicine. 2020 Jan 13:181-97.
[xxvii] Prasad GC. Studies on cancer in Ayurveda and its management. JRAS 1987;3:147–67.