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ETHNOMEDICINAL PLANTS FOR PREVENTION AND TREATMENT OF BREAST CANCER: A REVIEW

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ABSTRACT

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The plant kingdom plays a major role in the life of human beings and animals. A great deal of Pharmacological research has considerably improved the quality of herbal drugs in cancer treatment. Phytochemical tests in Pharmacognosy, structure elucidation in medicinal chemistry and various screening procedures in pharmacology helped to boost immune system in the body against cancer as breast cancer is the most serious problem in Oncology and fifth most leading cause of mortality in developed and also developing countries. Scientists have contributed number of years to investigate a remedy with no side effects and interested in finding a potent phytotherapeutic agent from herbs for this disease. They performed several research works by taking the active principles of many herbs and developed various herbal formulations which inhibit growth and spread of breast cancer on the metastatic phase stage IV. Some important ethanomedicinal plants (indigenous system of medicine) evidenced for breast cancer by scientific study have been discussed here.

INTRODUCTION: It has been well recognized that allopathic anti cancer drugs have more side effects and are cytotoxic to human beings¹. Since this modern medicine has no effective cure for cancer, scientists are intended to investigate different source of medicines with effective cure and no side effects². Recent pharmacological studies have been contributed in discovering new drugs using ethnomedicinal plants to treat several types of cancers like breast cancer, lung cancer, colon cancer, liver cancer, ovarian cancer, etc.

It has been reported that one in four new cancers diagnosed worldwide each year is a breast cancer in females³. Certain changes (mutations) in DNA can cause normal breast cells to become cancer. In breast cancer mutation always occurs in breast lobules which manufacture milk and in ducts that carry milk to the nipple. For instance, BRCA1 and BRCA2 are tumor

suppressor genes when they are mutated; cancer is more likely to develop⁴.

This review article contains the information regarding the plants having the medicinal value to treat the breast cancer. Most of the medicinal plants have versatile immunomodulatory and antioxidant properties which show protective effect against breast cancer. Many investigations reported that antioxidant property is due to presence of active phyto-constituents such as vitamins (e.g., A, C, E and K), carotenoids, terpenoids, flavonoids (e.g., anthocyanins, catechins, flavones, flavonones and isoflavones), polyphenols (e.g., gallic acid, ellagic acid and tannins), enzymes (e.g., superoxide dismutase, catalase and glutathione peroxidase), minerals (e.g., copper, manganese, zinc and iodine), alkaloids, poly-saccharides, saponins, lignins, xanthonenes and certain pigments^{1, 4, 5, 6, 7}.

The objective of the review article is to share the information regarding the plants having the medicinal value to treat the breast cancer to the society.

Some important Medicinal Plants used for Breast Cancer Treatment: The search for anti-cancer agents from plant sources started in the late 1950's with the discovery and development of Vinca alkaloids²⁸. Sixty percent of currently used anticancer agents are derived from natural sources. Therefore the usage of Ethnopharmacology or traditional herbs shows the pathway for the discovery of biologically active molecules⁵³. In the drug discovery, many modern drugs have their origin in traditional medicine of different cultures. Hence, despite the advantages of

the synthetic and combinatorial chemistry as well as molecular modeling, medicinal plants remain an important source of new drugs⁹.

Herbal medicines are relatively simple, although they are not quite well understood and distinct from modern medicine with no side effects and effective therapeutic effect. Doctors also recommend that several vegetables and fruits can reduce the risk of getting breast cancer¹. It has been estimated that diets rich in phytochemicals can reduce cancer. Diet has a major role in the etiology of breast cancer⁸. In this review article, we report the information gathered from books, articles and journals related to traditional medicinal plants.

SOME IMPORTANT PLANTS USED FOR BREAST CANCER TREATMENT⁹⁻⁷⁷:

Botanical name (with common name)	Family	Parts used and their main active components
<i>Achillea santolina</i> (Achillea millefolium)	Asteraceae	Aerial parts contain essential oils
<i>Allium sativum</i> (Garlic)	Alliaceae	Bulb contains Allicin
<i>Amoora rohituka</i> (Rohitak)	Meliaceae	Stem bark contains Amooranin
<i>Andrographis paniculata</i> (Creat)	Acanthaceae	Whole plant contains Andrographolide
<i>Annona hypoglauca</i>	Annonaceae	Whole plant
<i>Anoectochilus formosanus</i> (Jewel Orchid)	Orchidaceae	Whole plant contains Butanoic acid
<i>Arctium lappa</i> (Burdock)	Compositae	Seeds contains Fixed oils
<i>Artemisia asiatica</i>	Asteraceae	Whole plant contains Eupatilin
<i>Artemisia princeps var orientalis</i>	Asteraceae	Leaves
<i>Astrodaucus persicus</i>	Apiaceae	Root contains Furanocoumarin, Falcarindiol
<i>Azadirachta indica</i> (Neem)	Meliaceae	Stem bark, leaf, flowers and seeds contains Liminoids and Nimbolide
<i>Centella asiatica</i> (Madukaparni)	Umbelliferae	Whole plant contain Terpenoidsaponins, Asiaticoside and Aglycones
<i>Citrus sinensis</i> (Orange)	Rutaceae	Whole plant contains Flavones
<i>Coriandrum sativum</i> (Coriander)	Apiaceae	Seeds contains Lipolytic and Antioxidant compounds
<i>Crocus sativus</i> (Saffron)	Iridaceae	Whole plant contains Crocetin
<i>Dendrophthoe falcate</i> (Honey suckle)	Loranthaceae	Whole plant contains Lavonoids
<i>Eclipta prostrate</i> (False daisy)	Asteraceae	Whole plant contains Wedelolactone
<i>Embllica officinalis</i> (Amla)	Euphorbiaceae	Fruit contains Ellagic acid, Gallic acid, Quercetin and Kaempfrol
<i>Botanical name (with common name)</i>	<i>Family</i>	<i>Parts used and their main active components</i>
<i>Gleditsia sinensis</i> (Soap bean)	Fabaceae	Fruit contains Oleanolic acid and Terpenoids
<i>Gleditsia sinensis</i> (Soap bean)	Fabaceae	Fruit contains Oleanolic acid and Terpenoids
<i>Glycyrrhiza glabra</i> (Licorice)	Fabaceae	Roots contains Glabridin, Licoagrochalcone
<i>Glycyrrhiza glabra</i> (Licorice)	Fabaceae	Roots contains Glabridin Licoagrochalcone
<i>Glycyrrhiza uralensis fisch</i> (Gan cao)	Leguminosae	Whole plant contains Glycyrrhizin

<i>Glycyrrhiza uralensis fisch (Gan cao)</i>	Leguminosae	Whole plant contains Glycyrrhizin
<i>Inula graveolens (Inula)</i>	Asteraceae	Whole plant contains Flavonoids and Coumarin
<i>Inula graveolens (Inula)</i>	Asteraceae	Whole plant contains Flavonoids and Coumarin
<i>Laurus nobilis (Sweet bay)</i>	Lauraceae	Seed contains Isoflavones
<i>Laurus nobilis (Sweet bay)</i>	Lauraceae	Seeds contains Stachydrine and Flavones
<i>Leonurus japonicus (Honey weed)</i>	Lamiaceae	Seeds contains Stachydrine and Flavones
<i>Leonurus japonicus (Honey weed)</i>	Lamiaceae	Fruit contains Ataulfo and Phenolics
<i>Mangifera indica (Mango)</i>	Anacardiaceae	Fruit contains Ataulfo and Phenolics, leaves contain Alkaloids, Saponin and tannin
<i>Mangifera indica (Mango)</i>	Anacardiaceae	leaves contain Alkaloids, Saponin and tannin
<i>Mangifera pajang (Bambangan)</i>	Anacardiaceae	Seed kernel contains Antioxidants
<i>Mangifera pajang (Bambangan)</i>	Anacardiaceae	Seed kernel contains Antioxidants
<i>Morinda citrifolia (Bartundi)</i>	Rubiaceae	Fruit contains Damnacanthal, Rubiadin-methyl ether, Alizarin, Morindone Polysaccharides
<i>Morinda citrifolia (Bartundi)</i>	Rubiaceae	Fruit contains Damnacanthal, Rubiadin -methyl ether, Alizarin, Morindone, Polysaccharides
<i>Musa sapientum (Sweet banana)</i>	Musaceae	Fruit pulp contains Albuminoids, Fats, Tannin, Starch, Iron, vitamin-B, C
<i>Musa sapientum (Sweet banana)</i>	Musaceae	Fruit pulp contains Albuminoids, Fats, Tannin, Starch, Iron, vitamin-B, C
<i>Nicotiana tabacum (Tobacco)</i>	Solanaceae	Leaf contains Narcotine, Piperidine, N-methylpyrroline, and Pyrrolidine
<i>Nicotiana tabacum (Tobacco)</i>	Solanaceae	Leaf contains Narcotine, Piperidine, N-methylpyrroline and Pyrrolidine
<i>Operculina turpethum (Indian jalap)</i>	Convolvulaceae	Root contains Turpene and Turpentienes
<i>Operculina turpethum (Indian jalap)</i>	Convolvulaceae	Root contains Turpene and Turpentienes
<i>Origanum vulgare (Origanum vulgare)</i>	Lamiaceae	Seed contains Isoflavones
<i>Origanum vulgare (Origanum vulgare)</i>	Lamiaceae	Seed contains Isoflavones
<i>Oryza sativa L. indica (Black rice)</i>	Poaceae	Aleurone layer contains Anthocyanin
<i>Oryza sativa L. indica (Black rice)</i>	Poaceae	Aleurone layer contains Anthocyanin
<i>Panax ginseng (Asiatic)</i>	Araliaceae	Whole plant contains Panaxadiol
<i>Panax quinquefolium (American ginseng)</i>	Araliaceae	Root contains Ginsenosides
<i>Phaleria macrocarpa</i>	Thymelaeaceae	Whole plant contains Galic acid
<i>Phoradendron tomentosum (Mistletoe)</i>	Viscaceae	Whole plant contains Phoratoxins
<i>Phyllanthus amarus (Sleeping plant)</i>	Euphorbiaceae	Whole plant contains Amarin, Alkaloids
<i>Piper interruptum (China)</i>	Piperaceae	Stem contains Piperine
<i>Piper sarmentosum (Chaa-Plu)</i>	Piperaceae	Root contains Piperine
<i>Plumbago indica (Fire plant)</i>	Plumbaginaceae	Root contains Plumbagin
<i>Plumbago zeylanica (Chitra)</i>	Plumbaginaceae	Root contains Plumbagin
<i>Polygonatum odoratum (Solmon's seal)</i>	Asparagaceae	Root contains Isoflavone
<i>Punica granatum (Pomegranate)</i>	Punicaceae	Fruit contains Polyphenols
<i>Radix ranunculi ternate (Catclaw)</i>	Ranunculaceae	Whole plant contains Essential oils

<i>Raphanus sativus</i> (Radish)	Brassicaceae	Root contains Raphanin, Vitamin C
<i>Rheum palmatum</i> (Mandarin)	Polygonaceae	Root contains Rhein emodin
<i>Rhinacantus nasutus</i> (Snake jasmine)	Acanthaceae	Roots and stem contains Rhinacanthin
<i>Rhus verniciflua</i> (Lacquer Tree)	Anacardiaceae	Stem contains Chalcone butein
<i>Rumx acetosella</i> (Sheep sorrel)	Polygonaceae	Leaves contains Binoxalate, Tannic acid
<i>Salvia dominica</i> (Dominican sage)	Lamiaceae	Whole plant contains Coumarin
<i>Salvia triloba</i> (Greek sage)	Lamiaceae	Seed contains Isoflavones
<i>Scutellaria barbata</i> (Barbata Skullcap)	Labiatae	Whole plant contains Pheophorbide
<i>Semecarpus anacardium</i> (Marking nut)	Anacardiaceae	Kernel of nut contains Catchol
<i>Soymida febrifuga</i> (Indian redwood)	Meliaceae	Root callus contains Methyl Angolensate and Tetranortriterpenoid
<i>Trifolium pretense</i> (Red clover)	Fabaceae	Whole plant contains Isoflavones, Flavonoids, Coumarins and Pterocarpans
<i>Ulmus fulva</i> (Slippery elm)	Ulmaceae	Whole plant contains Mucilage Campesterol and Sesquiterpenes
<i>Vernonia amygdalina</i> (Bitter-tea vernonia)	Asteraceae	Leaves contains Vernodoline and Vernolide
<i>Viscum album</i> (Banda)	Loranthaceae	Whole plant contains Lectin alkaloids, Lupenol, Viscotoxin, Flavonoids and Digallic acid
<i>Vismia guianensis</i> (Orali)	Hypericaceae	Roots contains Benzophenones, Vismiaguianones A, E and coumarins, Vismiaguianins A and B
<i>Vitis vinifera</i> (Grapes)	Vitaceae	Seeds contain Olic acid and Linolic acid
<i>Wedelia calendulacea</i> (Chinese wedelia)	Asteraceae	Whole plant contains Wedelolactone
<i>Withania somnifera</i> (Ashwagandha)	Solanaceae	Root contains Withanolides and Alkaloids (Withanone and Withanofrone)
<i>Zingiber officinale</i> (Ginger)	Zingiberaceae	Rhizome contains Gingerol

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