Ethnomedicinal plants of Odisha used against Breast Cancer - A Review

Shaktiprasad Pradhan*, Ranjit Mohapatra, and Debasish Pradhan

University Department of Pharmaceutical Sciences, Utkal University, Bhubaneswar, Odisha, India

1. Introduction

Odisha, the enormous reservoir of medicinal plants, is a main contributor to global herbal/ethnomedicines. A huge number of ethnomedicinal plants of Odisha have been used as anticancer remedies in practice after several research works. Due to a number of complicity after using allopathic cancer therapy, scientists are in search to investigate other source of medicine with minimal side effects. Currently discovered new drugs using ethnomedicinal plants are significant in treating various forms and types of cancer. Research reports explain that the presence of certain phytoconstituents in medicinal plants lead the anticancer activity. They may enhance body resistance by stimulating both specific and non-specific immunity. Some phytoconstituents possess antioxidant activity which grounds in preventing cell damages caused by free radicals. Using antioxidant rich diet from plant source defend body by radical scavenging mechanism. Vitamins like A, C, E, K, flavonoids, terpinoids, carotinoids, polyphenols, enzymes, minerals, alkaloids, xanthenes, lignans, polysaccharides, etc. are the chief phyto-antioxidants preventing and curing cancer.

Universally, one breast cancer founds in four newly diagnosed cancer in females. Accordingly, we focused on the medicinal activities of some ethnomedicinal plants of Odisha treating breast cancer with an object in sharing the information to the human race.

2. Some Ethnomedicinal Plants of Odisha Having Antibreastcancer Activity:

2.1 Aegle marmelos (Bela; Family: Rutaceae)

Pulp and seeds of fruit contain Lupeol, showing strong positive action against breast cancer, thyroid cancer and other form of malignancies. Lupeol affects the gene expression of MDA-MB-231 breast cancer cell line.
and inhibits cell proliferation. Adverse effects of both radiotherapy and chemotherapy get diminished by antioxidant property of Aegle mameleos.

2.2 Allium sativum (Rasuna; Family: Liliaceae)

The organosulfur compounds diallyl sulfide, diallyl disulfide, diallyl trisulfide, S-allylcysteine and Salyminercapto-L-cysteine have marked anticancer activity. Diallyl trisulfide is the most potent cancer chemopreventive derivative and induced apoptosis in MCF-7 human breast cancer cell line. Allium contains Selenium, which control of genes involved in carcinogenesis.

2.3 Mimosa pudica (Lajakuli; Family: Leguminosae)

It is reported to contain alkaloid, glycoside, flavonoids and tannins. It has antimicrobial, anti-convulsant, hyperglycemic, anti-oxidant, anti-venom, diuretic, anti-cancer, anti-diabetic, anti-fertility and anti-histaminic activities. Cytotoxic study suggested that flavonoid from Mimosa pudica has the maximum cytotoxic effect against MCF-7, Human breast cancer cell line.

2.4 Curcuma longa (Haladi; Family: Zingiberaceae)

The major constituents of the extracts are curcumin sulphate and glucuronide causing apoptosis in various cancer cells. Curcumin allows suppression, retardation and invasion of carcinogenesis and the most studied natural chemopreventive agent. Curcumin is also depicted as an anti-tumoral, anti-oxidant and anti-inflammatory agent. The percentage of apoptotic cells in MCF-7 cells from 5.90% in control untreated cells to 54.58% in treated cells. In MDA-MB-231 cells the treatment of 5μM C10 also increased the percentage of apoptotic cells in comparison to untreated control from 0.05% to 13.41%.

2.5 Azadiracta indica (Neem; Family: Meliaceae)

Neem possesses anti-viral, anti-microbial, anti-inflammatory, anti-tumour, anti-pyretic, anti-bacterial, anti-fungal, and anti-hyperglycaemic properties. Several studies have demonstrated that alcoholic extracts of neem leaf are more effective than aqueous extracts for cancer treatment. Alcoholic extracts of neem leaf are more effective than aqueous extracts for cancer treatment. Ethanolic neem leaf extract possessing anticancer activity against breast cancer has not been documented till now.

2.6 Cissus quadrangularis (Hadasankari; Family: Vitaceae)

The plant is used in the treatment of anorexia, dyspepsia, colic, flatulence, tumours, convulsions, asthma, epistaxis, otorrhoea, irregular menstruations, inflammations, pain, and syphilitic infections. The aerial part of the plant has potential antioxidant and anticancer activities. The flavonoid fraction possess potent anticancer property against breast cancer cells - MCF7 with IC50 value of 40 μg/mL.

2.7 Trapa bispinosa (Panisingida; Family: Trapaceae)

In Indian system of medicine, Trapa is used in the problems of stomach, genitourinary system, liver, kidney, and spleen. It has also bitter, astrigent, stomachic, diuretic, febrifuge, and antiseptic property. The whole plant is used in genital disorder like gonorrhea, menorrhagia, and also useful in diarrhea, dysentery, ophthalmopathy, ulcers, and wounds. Trapa acornis exhibited the antiproliferative effect on human breast cancer cell lines SKBR3 and MDA-MB435 via G2/M cell cycle arrest, thus it should interact with tubulin.

2.8 Terminalia chebula (Arjuna; Family: Combretaceae)

The fruit powder has been used in digestive diseases, urinary diseases like renal calculi, diabetes, skin diseases, heart diseases, irregular fevers, nervous disorder like nervous weakness, nervous irritability, constipation, etc. The phenolics chebulinic acid and ellagic acid possess moderate inhibition and they may be responsible for the inhibiting cell proliferation. Ethanolic extract of T. chebula fruit inhibited cell proliferation and induced cell death in a dose dependent manner in several malignant cell lines including human breast cancer cell line, MCF-7 and mouse breast cancer cell line, S115.

2.9 Mangifera indica (Amba; Family: Anacardiaceae)

Abundant number and type of bioactive compounds give rise to the multi health beneficial characteristics of mango. Ethanolic extract of peel has the phenolic content accountable for its antioxidant and anti-proliferative action. Butylated hydroxytoluene (BHT) most abundantly found in the extract is a highly antioxidant compound and Apigenin 7-glucoside, a phenolic compound having both antioxidant and anticancer potentials. Ethanolic mango kernel extract on MCF-7 and MDA-MB-231 cell lines showed significant cytotoxic effect in a dose-dependent manner.

2.10 Centella asiatica (Thalkudi; Family: Umbelliferae)

It has been used as memory tonic, in many neurodegenerative disorders, extensive wounds eczema, ulcer, leprosy, etc. in indigenous system of...
Thaludki extract is reported to have a wide range of therapeutic activity against diabetes, hypertension, oedema, etc. along with chemopreventive and antiproliferative effect. MECA and asiatic acid inhibited the proliferation of human breast cancer cell line MCF-7.

2.11 Rubia cordifolia (Barheipani/Manjistha; Family: Rubiaceae)

Rubia cordifolia leaves are reported and documented for antiviral and in vitro free radical scavenging activity. Other activities include blood purification, hepatoprotection, nephroprotection, gastroprotection, immunomodulation, antiduretic, antidiabetic, anticancer, antibacterial, anti-inflammatory, analgesic, etc. Roots illustrate cytotoxicity against MCF-7 breast cancer cell lines strongly, and inhibitory action for DNA topoisomerase I and II.

2.12 Ocimum gratissimum (Rama tulasi; Family: Lamiaceae)

Ocimum gratissimum reportedly used as chemopreventive, anticarcinogenic (against breast cancer), radioprotective and numerous other pharmacological uses. It has the property to restrain the succession of human breast cancer, as natural non-toxic inhibitor of MMP-2/9.

3. Conclusion

In this review, special importance is specified to the anticancer property carrying plants against breast cancer cell line MCF-7 and MDA-MB-231. Anticancer activity of bioactive compounds makes plants more diversified. Identification of safe and more effective anticancer phytoconstituents with modified mechanism of action would be done from future research on this area. This will help to improve antibrastcancer molecules with economy friendly range.

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