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## ADVANCES AND ROLE OF INDIAN TRADITIONAL MEDICINE (AYURVEDA) IN CANCER TREATMENT AND PREVENTION

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**Abstract:** – An immunomodulator is a substance which stimulates or suppresses the components of immune system including both innate and adaptive immune responses. The modulation of immune system by various medicinal plant products has become a subject for scientific investigations currently worldwide. *Moringa oleifera* is a mysterious vegetable source in terms of its immense role in human immunomodulation and protection against diseases by building host resistance and as a potential and economical nutritional supplement majorly in third world countries. The present article has been constructed considering the future scope of research both in medicinal and veterinary science which can be explored regarding this nature's gift to us. The coconut fruit obtained from the coconut palm has numerous medical and commercial benefits. The various health related properties of coconut water, coconut milk, coconut cream, creamed coconut and other derivatives from the fruit have been highlighted in this article. The abstract provides an overall summary of different utilities and profile of different products obtained from the coconut for which it is being used as a principal ingredient by almost every consumer in Asian and Western countries in cooking and eating practices. The various derivatives from the fruit are well acceptable to consumers of all age groups, having certain limitations its high saturated fat content. Coconut has been recently proved to be a source of saturated fat that would not elevate the lipid profile in the body, except High Density Lipoprotein (HDL), which is good for health and absolutely no contraindications now to any age. Coconut is a highly valued ingredient in our eating practice for its enormous medical benefits. However, due to its high lipid and saturated fat content it is discouraged in the diet of patients suffering from cardiovascular ailments and hypertension. The major importance of the fruit is valued for the great medicinal properties of coconut water and the flesh of the fruit. The meat of mature coconut is a flavoring and texture improving ingredient in Indian and Asian homemade food. Lime is having tremendous importance in our diet and regular feeding habits due to its enormous nutritional and natural medicinal benefits from ancient time in India. It keeps away many diseases, improves resistance to diseases and provides long term profits by purifying blood in the body system naturally.

Cancer, one of the most deadly challenges spreading drastically in 21st century, has now officially become the most dangerous killer in the world according to the World Health Organization. Cancer is related to adversary of modernization and advanced pattern of irregular and stressed life dominated by Western medicine. Scientists are making their best efforts to fight this disease; however the sure-shot cure is still awaited. The excruciating experience of dying cancer patients can be ameliorated by making use of Ayurvedic principles. Ayurveda can be helpful in the management of cancer in many ways such as prophylactic, palliative, curative and supportive. Ayurvedic medicines help to improve the quality of life of the patients through various pharmacokinetic mechanisms.

**Keywords:** Cancer, Medicinal plants, Herbal extracts, Fruit



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## INTRODUCTION

Ayurveda, the oldest Indian indigenous medicine system of plant drugs is known from very early times for preventing or suppressing various tumors using these natural drugs. And nowadays scientists are keener to researches on complementary and alternative medicine for the management of cancer. The word 'cancer' may be new to the 5,000 year old Indian system of medicine, Ayurveda, which relies on natural substances for healing. But ancient Ayurvedic classics are aware of the clinical features, resembling cancer, with the names such as Apachi, Gulma, Granthi, and Arbuda. Following are names of some of the conditions mentioned in Ayurvedic classics that have relevance to cancer manifestations in modern medicine. In Ayurvedic concept, according to 'Charaka' and 'Sushruta Samhitas' cancer is described as inflammatory or non-inflammatory swelling and mentioned either as 'Granthi' (minor neoplasm) or 'Arbuda' (major neoplasm).<sup>1</sup>

Many herbal plant preparations are prescribed to strengthen host resistance. Many useful plants fall under this category. They exhibit immunomodulatory activities. One such plant, *Tinospora cordifolia*, commonly called 'Guduchi' has been examined for its immunomodulatory properties. Guduchi means to rejuvenate dead cells. It is widely used in veterinary folk medicine and has also been claimed to be beneficial according to 'Ayurveda' for the cure of jaundice, skin diseases, diabetes, anemia, emaciations and various infections for its anti-spasmodic, anti-inflammatory, anti-arthritic and anti-allergic properties. It has also been reported that it improves the phagocytic and bactericidal activities in patients suffering from polymorphism in surgical jaundice. Kolte *et al.* studied the effect of feeding *T. cordifolia* in broiler birds which were immunosuppressed with cyclophosphamide. They had found a significant rise in antibody titer against ND virus with augmentation of inflammatory reaction to skin contact sensitivity test. Rege *et al.* and Bishavi *et al.* have proved the hepatoprotective effect of *T. cordifolia*. Manjrekar *et al.* also found that aqueous extract of *T. cordifolia* is capable of increasing leukocyte count in mice.<sup>2</sup>

Also, *Ocimum sanctum*, commonly known as 'tulsi' is also used in Ayurveda for various ailments including treatment of allergies. The plant has been reported to evince significant anti-stress properties. The beneficial effects of *O. sanctum* could therefore be due to its direct or indirect effect on the immune system. *O. sanctum* has been reported to modulate humoral immune response by releasing mediators for hypersensitivity reactions.

*Withania somnifera* also fall in this category with many other useful plants. They exhibit immunomodulatory activities. *Withania somnifera* (commonly called 'Ashwagandha') root

extracts possess anti-estrogenic, adaptogenic, anti-cancer and anabolic activities having beneficial effects in the treatment of arthritis, geriatric problems and stress. The root of *Asparagus racemosus* (commonly called 'Satavar') possess anti-diarrheal, anti-ulcerative, anti-spasmodic, aphrodisiac, galactagogue and other properties and has therefore gained its importance in Ayurveda, Siddha and Unani systems of medicine. It has been observed that feeding *W. somnifera* and *A. racemosus* dried root powder significantly stimulates both humoral and cell mediated immune responses in swiss albino mice by Kuttan and Kuttan. *W. somnifera* and *A. racemosus* extracts increase phagocytic activities of macrophages *in vitro*.<sup>3</sup>

*Moringa oleifera* is a highly valued plant, distributed in many countries of the tropics and subtropics. Moringa is nature's medicine cabinet. It is best known as excellent source of nutrition and a natural energy booster. Different parts of this plant are being employed for the treatment of different ailments in the indigenous system of medicine. The plant has tremendous pharmacological action and pharmaceutical application too. It possesses analgesic, anti-inflammatory, antipyretic, anti-asthmatic and wound healing properties. Also, it possesses anti-diabetic, anti-cancerous and hepatoprotective properties too.

Extract from the seeds is used as a flocculant in a low cost form of water treatment. It effectively helps in bacterial reduction in edible water. The seeds are also considered an excellent biofuel source for making biodiesel.<sup>4</sup>

### **Mechanism of Action of Ayurvedic Drugs**

Ayurveda helps in reducing the therapeutic doze of the various drugs used as proved in some studies using cow urine. Some Ayurvedic preparations can fight against tumors. They can be helpful in targeting the specific tissues as shown in some allopathic studies on nanoparticles of gold. Ayurvedic preparations can act as an adjuvant or a co-therapy along with chemotherapy or radiotherapy. It is also helpful in post-surgery care. Ayurvedic medicines help to minimise the side effects of these therapies. Ayurvedic preparations help to slow the progress of cancer in cases where chemotherapy, radiotherapy or surgery is contra-indicated, due to some reasons and patients have no other choice. The cell-protective activity of drugs prescribed in Rasayana therapy helps to improve comfort and the quality of life of individuals with cancer. The nervous system (Vata or air), the venous system (Pitta or fire) and the arterial system (Kapha or water) are three basics of Ayurveda and very important for normal body function. In malignant tumors all three systems get out of control (Tridoshas) and lose mutual coordination that causes tissue damage, resulting critical condition. Tridoshas cause excessive metabolic crisis resulting in proliferation. Ayurvedic drugs acting as supplements with chemotherapy and radiation therapy

in ameliorating cancer Interestingly, Snehana, i.e., intake of various medicated oil preparations in a classical way a week or 10 days prior to the start of chemotherapy or radiotherapy, has been found to reduce the toxic effects of such therapies. Chemotherapy is the first and significant medical modality of cancer remedy, which involves the introduction of strong chemicals. These chemicals target the fast-multiplying mutant cells. However, the toxicity they cause to normal tissues of the body proves as an obstacle. The use of antioxidants during chemotherapy enhances therapy by reducing the generation of aldehydes. Natural drugs, which are used as Rasayanas in Ayurveda, have also been proved to have antioxidant properties. The modern cancer therapy which is known to be burdened by drug-induced toxic side effects hoping for a perfect cure of disease forms the complementary and alternative medicine system. The main goal of Ayurvedic therapy is to find the ultimate cause of an illness while the therapeutic approach of Ayurveda is divided into four categories as Prakritisthapani chikitsa (health maintenance), Rasayana chikitsa, (restoration of normal function), Roganashani chikitsa (disease cure) and Naishthiki chikitsa (spiritual approach).<sup>1</sup>

#### **Medicinal properties of *Moringa oleifera***

Moringa leaves and pods are helpful in increasing breast milk in the breastfeeding months. One tablespoon of leaf powder provides 14% of the protein, 40% of the calcium, 23% of the iron and most of the vitamin A needs of 1-3 years aged children. Six tablespoons of leaf powder will provide nearly all of the woman's daily iron and calcium needs during pregnancy and breastfeeding. The Moringa seeds yield 38–40% edible oil (called ben oil from the high concentration of behenic acid contained in the oil). The refined oil is clear and odorless and resists rancidity at least as well as any other botanical oil. The seed cake remaining after oil extraction may be used as a fertilizer or as a flocculent to purify water. The bark, sap, roots, leaves, seeds, oil and flowers are used in traditional medicine in several countries. The Moringa tree has great use medicinally both as preventative and treatment. Much of the evidence is anecdotal as there has been little actual scientific research done to support these claims. India's ancient tradition of ayurveda says the leaves of the Moringa tree prevent 300 diseases. There have been reports on significant antibiotic activity of this tree.<sup>5</sup>

#### **Medicinal Value of coconut water**

Coconut water is considered to be sterile unless the fruit is damaged from an external source. There have been reports of coconut water used for intravenous administration where normal saline solution for medical purpose was unavailable in developing countries or on the war front. Coconut water is rich in mineral content with high potassium and anti-oxidant contents which

has various medical utilities. Coconut water also contains cytokinin which is one of the beneficial components in it. Coconuts in which water to be used for drinking purpose are harvested from the coconut palms when they appear green in color. Coconuts sometimes due to natural calamities fell on the ground and they are susceptible to get damaged and get exposed for being damaged by insects or pests and animals. Coconut water acts as a natural energy or sports drink, as it is rich in mineral content especially in potassium levels. Coconut water has a high demand among consumers for its nil fat content and low contents of carbohydrates, calories, and sodium. Coconut water serves as a potential healthy drink for adults and old persons as it has promising health utilities. Coconut milk has tremendous importance especially in Ayurvedic traditional medicinal purposes. It is generally used to maintain the electrolyte balance and to rule out dehydration losses. Also, it is used for treatment of ulcers in the mouth. Some recent studies have suggested that coconut milk has anti-microbial properties in the gastrointestinal tract, hyperlipidemic balancing qualities and useful for topical applications. In addition, the coconut milk contains auric acid as saturated fat which has medicinal utilities in the cardiovascular system.<sup>6</sup>

### **Medicinal utility of lime**

Limes are acidic in nature and serve as rich source of vitamin C, citric acid, sugar, certain minerals like calcium and phosphorus. Fresh lime juice possess medicinal property which is well known from ancient ages in India. It is also called as sacred fruit in the *Vedas*. Sharangdhara and Charaka. The latter two famous physicians of ancient India had used the lime juice for alleviating orthopedic ailments therapeutically. The vitamin C as a primary component of the lime juice increases the resistance of individuals to several diseases, helps in wound healing and increases the health of eyes. It improves the maintenance of good dentition and keeps away toothache, dental caries, swollen gums, fragility of bones and bleeding of the gums. Lime is vital in the treatment of gastric disorders like indigestion, constipation and peptic ulcer. It stops the occurrence of indigestion, burning in the chest due to high acidity in the stomach, abrupt bilious vomiting and excessive accumulation of saliva in the mouth. Lime juice with a pinch of soda bicarb mixed in water improves indigestion and gastric upset due to severe acidity after heavy rich/ spicy meals. It can also be used as carminative in indigestion and sedation is produced by release of carbonic acid and gas. In chronic constipation by promoting biliary secretion from the liver, it improves intestinal motility. The acidic juice of lime facilitates the lipid and alcohol absorption and neutralizes excessive bile produced by the liver. The juice reduces gastric acidity by counteracting with the effects of greasy food. It is, therefore, useful in the treatment of peptic ulcers. Acidic juice of the fruit acts as curative for tonsillitis. Oral

ingestion of lime juice mixed with salt in water provides relief from burning sensation and also stops bleeding in cystitis (inflammation of urinary bladder). It is also a recommended therapy in weight reduction and in obesity. During mornings at empty stomach, lime juice with honey in lukewarm water to be ingested for 2-3 months for effective weight reduction. Of course, low calorie diet is also a must along with this.<sup>7</sup>

### Importance of other miscellaneous herbs and plants

The plant derived and herbal growth promoters supplemented in the diet or added in the drinking water in the broiler and poultry birds have a promising biological effect on their growth performance, to reduce the pathogenic bacteriological load in different parts of digestive tract and to increase villus height in different segments of small intestine mainly in duodenum. The plant derived growth promoter enhance productive performance of the broiler in terms of body weight gain with minimum alteration of gut morphology and the possibility of bacterial invasion can be regulated.<sup>8,9</sup>

### Various Ayurvedic Herbal Preparations

Commonly used herbal decoctions reported in Ayurveda are made of multiple herbs possessing great potential for a cancer cure; scientifically these formulations work on multiple biochemical pathways and influence different organ systems all together and nourish the body as a whole by supporting body's defence systems. Herbs help total healing, reduces the side effects and cancer-associated complications. *Andrographis paniculata*, *Annona atemoya*, *Phyllanthus niruri*, *Piper longum*, *Podophyllum hexandrum*, *Tinospora cordifolia*, *Semecarpus anacardium*, *Vitis vinifera*, *Baliospermum montanum*, *Madhuca indica*, *Pandanus odoratissimum*, *Pterospermum acerifolium*, *Raphanus sativus*, *Barleria prionitis*, *Prosopis cineraria*, *Amorphopallus campanulatus*, *Oxoxylum indicum*, *Basella rubra*, *Flacourtia romantchi*, *Moringa oleifera*, *Ficus bengalensis*, *Curcuma domestica*, *Allium sativum*, *Calotropis gigantean*, *Datura metel*, *Hygrophila spinosa*, *Juniperus indica*, *Moringa oleifera*, *Nigella sativa*, *Picrorrhiza kurroa*, *Rubia cordifolia*, etc. are various plants having scientific evidence of anticancer property. Nowadays, many herbs are under clinical studies and being investigated phytochemically to understand their anticancer potential. More than 25% of drugs used during the last 20 years are directly derived from plants, while the other 25% are chemically altered natural products. Nine plant-derived compounds including vinblastine, vincristine, etoposide, teniposide, taxol, navelbine, taxotere, topotecan and irinotecan have been approved for use as anticancer drugs. 10-hydroxycamptothecin, monocrotaline, d-tetraandrine, lycobetaine, indirubin, colchicinamide, curcumol, curdione, gossypol and homoharringtonine are few more plant-derived compounds

of high hope. Each herb contains multiple active principles that often operate synergistically producing therapeutic benefits and lowering the risks of adverse effects; and avoids the need for supplemental therapy to manage cancer cachexia. Now it is important to raise awareness and encourage implementation of Ayurvedic therapies for combating cancer and suggest an integrated approach in tumor management and treatment.<sup>1</sup>

## CONCLUSION

Most commonly, all the drugs which are used in Rasayana therapy have the ability to reduce the three doshas or imbalances related to vaata, pitta and kapha. The most commonly prescribed Rasayana drugs are Triphala (*Terminalia Chebula*, *Embellica officinale*, and *Terminalia ballarica*), Guduchi (*Tinospora cordifolia*) and Punarnava (*Bohhervia diffusa*). According to clinical studies, such drugs have shown very impressive effects on protecting body from the side effects (of chemo and radio therapies) like alopecia, nausea, constipation, anorexia and vomiting. The patients who receive Ayurvedic treatment along with chemotherapy have shown more regularity in maintaining the chemotherapy cycles as the hematological levels can be maintained up to a normal state. More than 50 research studies on cancer carried out at various post-graduate institutes, have shown that Ayurvedic preparations are very effective as chemo-preventive and radio-preventive agents.

The present editorial summarizes the wide use of various plant extracts and herbal fed additives in a specific dose during the scheduled vaccination regimen may be helpful in obtaining higher protective antibody against different infections including production and development of more effective cell mediate immune response for protection against various bacterial, viral and other diseases. Herbal formulation may be therefore recommended for use as positive immunomodulator in normal and immunocompromized susceptible animals and birds.

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