



Review Article

Widely Available Nature's Gift of Indigenous Plants. Herbs and Fruits and Their Uses in Pharmaceutical Sciences and Traditional Medicine: An Exclusive Review of Importance

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ABSTRACT

The present review 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.

Keywords: Medicinal plants, Herbal extracts, Fruit, Traditional medicine

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1. Introduction

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-arthritis 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 hepato-protective effect of *T. cordifolia*. Manjrekar et al. also found that aqueous extract of *T. cordifolia* is capable of increasing leukocyte count in mice.[1-5]

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.⁶⁻¹⁰

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 jackfruit 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. Jackfruit seed is 2 to 4 cm long and 1 to 3 cm thick and is white and crisp within. There may be as many as 100 to 500 edible bulbs embedded in a single fruit interspersed between thin bands of fibers. Almost all the parts of the tree secrete white sticky latex like milk (juice) when injured. [11-12]

2. 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. [13-15]

3. Medicinal Value of Coconut Water

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. [16-17]

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.[18-20]

4. Medicinal Utility of Lime and Jackfruit

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 lime 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.[21-23]

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 possesses 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.[24]

Botanically, jackfruit is another popular Asian tropical fruit belonging to *Moraceae* Family, genus: *Artocarpus*. It is scientifically known as *Artocarpus heterophyllus*. Jackfruit is rich in dietary fiber, which makes it a good bulk laxative. The fiber content helps to protect the colon mucous membrane by decreasing exposure time and as well as binding to cancer-causing chemicals in the colon. 100 g of

edible jackfruit bulbs provide 95 calories. The fruit is made of soft, easily digestible flesh (bulbs) with simple sugars like fructose and sucrose that when eaten replenishes energy and revitalizes the body instantly. Fresh fruit has small amounts of vitamin-A, and flavonoid pigments such as carotene- β , xanthin, lutein and cryptoxanthin- β . Together, these compounds play vital roles in antioxidant and vision functions. Jackfruit seeds are indeed very rich in protein and nutritious. Different variety of recipes prepared in Southern India where they are eaten either by roasting as a snack or added to curries in place of lentils. In general, the seeds are gathered from the ripe fruit, sun-dried and stored for use in rainy season in many parts of South Indian states. Fresh fruit is a good source of potassium, magnesium, manganese, and iron. Potassium is an important component of cell and body fluids that helps controlling heart rate and blood pressure. Jackfruit is a good source of antioxidant vitamin-C, provides about 13.7 mg or 23% of RDA. It contains very good amounts of vitamin B-6 (pyridoxine), niacin, riboflavin, and folic acid.[25]

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. [26-28]

Neem leaf is used diseases of the heart and blood vessels (cardiovascular disease), fever, diabetes, gum disease (gingivitis), for leprosy, eye disorders, bloody nose, intestinal worms, stomach upset, loss of appetite, skin eczema, ulcers and hepatic disorders. Papaya is also applied topically for the treatment of cuts, rashes, stings and burns. Papain, a notable protease remains present in papaya. It is believed that it can raise platelet levels in blood. Papaya may be used as a medicine for malaria and dengue fever for its antimalarial and antiplasmodial properties. The raw papaya and its leaf are also used for meat tenderizing for the papain content in the fruit. Centella is a plant which grows in tropical swampy areas. The stems of Centella are slender with creeping stolons, green to reddish-green in color, connecting plants to each other. It has long-stalked, green, reniform leaves with rounded apices which have smooth texture with palmately netted veins. The leaves are borne on pericladial petioles nearly 2 cm length. Centella grows in low lying wet areas along ditches. As the plant is aquatic in habitat, it is especially sensitive to pollutants in the water.[29,30]

Multivarious Biomedical Implications and Importance in Ayurvedic System of Medicine

Centella helps in the increase of hemoglobin in blood. It also promotes improvement in the venous system and

encourages positive connective tissue growth. The herb is recommended for the treatment of various skin conditions such as leprosy, lupus, varicose ulcers, eczema, psoriasis, diarrhea, fever, amenorrhea, diseases of the female genitourinary tract and also for relieving anxiety and improving cognition. *Centella asiatica* is a popular addition to many skin creams and therapies. Extract of centella can be found in body slimming tonics, body-firming products, and anti-aging products. For decades, this herb has proven itself to be miraculous in terms of scar and wound healing. *Centella asiatica* is useful in alleviating many maladies, including stress, asthma, hemorrhoids and even leprosy. Doctors have used it successfully in pregnant women during and post pregnancy. It can be used to discourage varicose veins and stretch marks, and then again after birth for healing.[23]

The neem bark is used for malaria, stomach and intestinal ulcers, skin diseases, pain, and fever. The flower is used for reducing bile, controlling phlegm, and treating intestinal worms. The neem fruit is used for treatment of urinary tract disorders, bloody nose, phlegm, eye disorders, hemorrhoids, intestinal worms, diabetes, wounds, and leprosy. Neem twigs are used for cough, asthma, hemorrhoids, intestinal worms, low sperm levels, urinary disorders, and diabetes. The seed and seed oil are used for leprosy and intestinal worms. They are also used for birth control and to cause abortions. The stem, root bark, and fruit are used as a tonic and astringent. Some people apply neem directly to the skin as a skin softener and in treatment of skin diseases, wounds, and skin ulcers and as a mosquito repellent. Neem contains chemicals that might help reduce blood sugar levels, heal ulcers in the digestive tract, prevent conception, kill bacteria and prevent plaque formation in the mouth. People in the Indian villages and towns practice the chewing of neem twigs instead of using toothbrushes. Neem twigs are often contaminated with fungi within 2 weeks of harvest and should be avoided. Neem leaves are burnt to repel insects and flies from the crop fields. Neem products are popular and predominantly in demand in Ayurveda for its antibacterial, antiviral, contraceptive, anthelmintic, antifungal, antidiabetic, and sedative properties. In Ayurvedic and Unani medicine it is recommended for skin diseases. Neem oil is also used for detoxification of blood, to balance blood sugar levels, healthy hair and to improve liver function. Neem leaves have been also been used to treat skin diseases like eczema, psoriasis, etc.[21]

Papaya fruit is a source of nutrients such as provitamin A carotenoids, vitamin C, folate and dietary fiber. Papaya skin, pulp and seeds also contain a variety of phytochemicals, including lycopene and polyphenols.[22]

Significance for use in Cosmetics and Topical Supplements

Papaya is a good topical supplement for treatment of acne, skin infections and wounds. The flesh of papaya is rich in dietary fiber and thus helps in lowering blood cholesterol. It prevents premature ageing and in treatment of endoparasitic

worms in gastrointestinal tract. Papaya fruit aids in proper digestion and prevents constipation. It keeps colon infection away and helps in curing morning sickness and nausea. In addition, it contains anti-inflammatory enzymes which help in curing osteoporosis in elderly people and in alleviating joint arthritis. In obese people, it acts as a weight reducer and in controlling body weight. Papaya helps in preventing menstrual cramps and helps in maintaining regular menstrual flow. Papaya is a rich source of Vitamins A and C and thus promotes immunity.[30]

Shampoos and soaps contain papaya extracts as it helps in preventing dandruff and hair fall. It helps in regulating the growth of cancerous cells in hepatic cancers and also prevents renal problems by inducing antioxidant and oxidative free radical scavenging.[30]

5. Conclusion

Herbal formulation may be therefore recommended for use as positive immunomodulator in normal and immune compromised susceptible animals and birds. However, more sufficient researches are in demand to be carried out to establish the medicinal facts of the mentioned indigenous plants and fruits. In infants, use of neem oil is fatal. Some disadvantages of neem includes miscarriages, abortions and infertility. Although, American Cancer Society recommends the centella herb for having anticancerous properties, but research in this regard are in progress. Preliminary experimental animal researches have proved that the papaya seeds have potential contraceptive and abortifacient effect, but is non-teratogenic for the presence of phytochemicals in it.

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