FEATURE ARTICLE

Wonders of a Veggie Diet!

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Vegetables are essential for a balanced diet. Not only do they help keep the body fit and fighting, vegetables also prevent the occurrence of several diseases.

VEGETABLES not only protect our health, they also promote our health. Location-specific vegetables are considered to be the best because they contain specific active principles that help in adjusting and adapting with the local environment or season.

Our forefathers, by trial and error or experimentation, selected specific vegetables that were naturally available within the region in a particular season. Thus, vegetables that are naturally available in the summer are diuretic, antioxidant and protective against solar radiation and, therefore, best suited for that season. Similarly, vegetables available in winter contain health protective properties that enable us to adjust and adapt to the cold climate.

During the last few decades, time-tested dietary practices, including the use of seasonal vegetables and fruits, are fast disappearing due to modern means of preservation and transportation. This has caused many health problems. It is, therefore, important to have a closer look into the traditional practices for ensuring better health.

With increasing population, the availability of vegetables is decreasing. In general, people are spending relatively less on this component of the diet. Whereas, the ground reality is that an increase in the consumption of green leaves and other vegetables could play a major role in reducing deficiency diseases like anemia, protein-energy malnutrition, vitamin deficiency, night blindness, ulcer, and wounds etc.

Vegetables contribute calcium, iron, vitamins and essential minerals. They also provide various antioxidant components like polyphenols and flavonoids, which are beneficial for protection against radiation. Vegetables are good source of fibers that act as good source of diuretics helping to flush the kidneys, purify blood and expel many toxic and undesirable substances from the body.

Vegetables remain an important source of nutrients in many parts of the world and offer advantages over dietary supplements because of low cost and easy availability. If consumed in appropriate proportions, the following percentages of the vitamins may be assured: vitamin C (ascorbic acid) 91%, vitamin A 48%, vitamin B6 27%, thiamine 17%, niacin 15%, magnesium 16%, protein 5%, minerals in appreciable range and fiber in appreciable range. Other contents include riboflavin (vitamin B2), zinc, calcium, potassium and phosphorus.

Green leafy vegetables are rich in carotenoids (vitamins), calcium, ascorbic acid, riboflavin, folic acid and appreciable amounts of other minerals. It has been noted that of the total beta-carotene (a pigment that is converted into vitamin A by the human body) available from all sources, in the country, 95% is derived from fruits and vegetables and out of this, green leafy vegetables contribute 90%.

We are fortunate that due to wide variation in ecological habitats and varying climates and seasons found in India, a number of species of edible leafy vegetables appeared here. But, although we all realize the numerous health benefits of vegetables, very few of us actually follow a diet that includes it in appropriate quantities.

Fresh vegetables can help get rid of numerous diseases such as heart disease and stroke, blood pressure, cancer, painful intestinal ailment called diverticulitis, cataract and macular degeneration and vision loss. Apart from these, vegetables have a low fat content and fewer calories, whereby they minimize the problem of excessive weight or obesity. They have anti-aging properties also. Vegetables have a rich content of nutrients, right from proteins, vitamins, potassium, phosphorus, magnesium, calcium to selenium, iron, manganese, copper and zinc.

According to experts, people consuming greater amounts of vegetables

in their diet are high on energy and feel less lethargic or stressed. Some vegetables are strong antioxidants and function to modify the metabolic activation and detoxification/deposition of carcinogens or even influence processes that alter the course of the tumor cell. Although antioxidant capacity varies greatly among fruits and vegetables, it is better to consume a variety of commodities rather than limiting consumption to a few with the highest antioxidant capacity.

Flavonoids are phenolic compounds that occur in all fruits and vegetables and are known for their antioxidant activities. The major sources of flavonoids are capsicum, pumpkin, brinjal, red carrots, tomatoes, sweet potato, black carrots, cherries, greens of the winter season, mint leaves, amla, tinda, green beans, red and yellow onions and broccoli etc. The anthocyanins found in black carrot, drumsticks, banana flower etc. may help reduce the risk of heart disease by inhibiting cholesterol formation. Dietary intake of potassium has an important role in energy metabolism and its deficiency results in muscular weakness and mental confusion and is reflected in heart malfunction.

Here are some nutritive constituents of vegetables that have positive impact on human health.

Protein

Amino acids are essential for maintenance of human body but cannot be synthesized by the body. Therefore, these have to be supplied through food. However, the concentration of proteins in most vegetables is small. Even then the plants are considered the primary source of protein. Though the quality supplied may be small, these proteins do enhance the quality of protein in the diet. Deficiency of proteins affects the growth and repair of the body adversely. Soybean, Cowpea, Common bean, and Chilli pepper are some vegetables known for their rich protein content.

Energy Value

Carbohydrates provide about 70 to 80% of the energy required by the body. Carbohydrates are synthesized by plants and occur in several forms, of which structural carbohydrates of vegetables and fruits are celluloses and other polysaccharides. These are not digested but aid the movement of food through the digestive tract by maintenance of muscle tone and by their physical capacity to bind the water. A minimum of 100 g cabohydrate is needed in the diet to ensure efficient oxidation of fats. Plants rich in energy are Soybean, Cowpea, Common bean, Chilli pepper, Garlic and Banana etc.

Vitamins

Vitamins are important for their regulatory and protective functions. Unlike most other nutrients these are required in very small amounts but they are necessary because the body cannot synthesize many of these. The lack of vitamins results in definite deficiency disorders. The main vitamins are:

Vitamin C (Ascorbic acid): Low temperature favours synthesis of sugars and vitamin C (glucose being precursor to vitamin C), ascorbic acid and at the same time decreases the rate of ascorbic acid oxidation. Vitamin C is an essential nutrient and a strong reducing agent. It is involved in collagen synthesis, bone and teeth calcification and many other reactions in the body. Vitamin C deficiency causes scurvy characterized by weakness, bleeding of gums and defective bone growth. It aids wound healing, provides

Medicinal Uses of Some Vegetables Grown in North India

	Name (Family)	Hindi name	English name	Edible parts	Medicinal Uses
1	*Allium cepa* Linn. (Liliaceae)	Pyaz	Onion	Bulbs, leaves	Tonic, stomachic, diuretic, stimulant, expectorant, aphrodisiac, antimalarial and antirhumatic. Fresh juice is bactericidal. Roasted bulbs for boils and abscesses.
2	*Allium sativum* Linn. (Liliaceae)	Lehsun	Garlic	Bulb and leaves	Bulbs stimulant, diaphoretic, expectorant, diuretic, tonic, anthelmintic anti-malarial, antidiabetic, juice used in skin troubles and even used in leprosy.
3	*Amaranthus blitum* Linn. (Amaranthaceae)	Chaulai	Amaranth Leave	Leaves	Used as potherb, found rich in potassium nitrate.
4	*Brassica campestris* Hook. f. & Thoms. (Cruciferae)	Sarson	Mustard	Leaves, shoots and Seeds	Seeds yield an edible oil, which is used in muscular rheumatism, stiff neck etc.
5	*Brassica oleracea botrytis* (Linn.) Alef. (Cruciferae)	Phoolgobhi	Cauliflower	Flower	Flowers used as vegetable, it is dried and preserved.
6	*Brassica oleracea capitata* Alef. (Cruciferae)	Bandgobhi	Cabbage	Leaves	Used in the diet of patients suffering from liver troubles. Raw cabbage has vermifungal properties. Leaves are applied to blisters and in gout and rheumatism. Juice used as a cure for warts.
7	*Capsicum annuum* Linn. (Solanaceae)	Lalmirch	Red Chillies	Fruits	Good source of vitamin C. Used as prophylactic, therapeutic, stimulant and carminative. Excellent remedy for flatulence, dyspepsia and dipsomania.
8	*Chenopodium album* Linn. (Chenopodiaceae)	Bathua saag	Chenopodium	Tender shoots	Used as laxative, anthelmintic. Leaves used as anti scorbutic.
9	*Cicer arietinum* Linn. (Leguminosae)	Chana saag	Bengal gram	Leaves, tender shoots, leaves and seeds	Germinated gram used as prophylactic against deficiency diseases, particularly in scurvy.
10	*Coriandrum sativum* Linn. (Umbelliferae)	Dhania	Coriander Leaves	Leaves and seeds	Fruits diuretic, carminative, tonic, stomachic, refrigerant and aphrodisiac. Seeds chewed correct breath odour.
11	*Daucus carota* Linn. (Umbeliferae)	Gajar	Carrot	Roots and seeds	Rich source of carotene. Seeds aromatic, stimulant, diuretic, carminative, used in dropsy and kidney troubles.
12	*Glycine max* Merrill. (Papilionaceae)	Soya bean	Soybean	Beans, seeds	Rich in protein, specially used in malnutrition.
13	*Ipomoea reptans* Poir (Convolvulaceae)	Naari saag/ Kalmi saag	Ipomoea leaves	Shoots and leaves	Leaves good source of minerals and vitamins i.e. Carotene. Plant juice used as emetic in case of opium and arsenic poisoning, plants used in nervous and general debility, used for piles, buds used in treatment of ringworm
14	*Mentha arvensis* Linn. (Labiatae)	Pudina	Mint leaves	Leaves	Leaves used as carminative, antiseptic and stimulant. Decoction used in fever and heat apoplexy.
15	*Momordica charantia* Linn. (Cucurbitaceae)	Karela	Bitter gourd	Fruits, whole plant.	Seeds of ripe fruits used as condiment. Leaves are rich source of calcium, carotene, riboflavin and ascorbic acid. Fruits used as tonic, stomachic.
16	*Moringa oleifera* Lam. (Moringaceae)	Sahjan	Drum sticks	Pods, leaves, flowers and Seeds	Pods rich in leucine. Whole plant used in treatment of ascites, venomous bites, rheumatism, cardiac and circulatory stimulant. Leaves rich in vitamin A and C. Useful in scurvy and catarrhal infections. Flowers tonic, diuretic/cholagogue, seeds antipyretic.
17	*Musa paradisiaca* Linn. (Musaceae) .	Kela	Banana	Fruits and flowers	Rich source of carbohydrate, minerals and vitamins (B group). Inflorescence before opening as vegetable. Fruit is laxative, used in intestinal disorders, uremia, nephritis and hypertension.
18	*Phaseolus vulgaris* Linn. (Leguminosae)	Rajma	Beans	Seeds	Dried leaves nutritious, source of protein (like Meat). Green pod shells used as diuretic especially in kidney and heart troubles.
19	*Sesbania grandiflora* Pers. (Papilionaceae)	Agast ka phool	Agast flower	Flowers	Flowers used as nutritious food.
20	*Spinacea oleracea* Linn. (Chenopodiaceae)	Palak	Spinach	Leaves and fruits	Diuretic, a source of chlorophyll. Lipids in the leaves possess antibacterial. Fruits demulcent, diuretic, employed in fever.

healthy immune system, and prevents cardio-vascular diseases.

Ascorbic acid occurs widely in plant foods, particularly in fresh green vegetables. Because of its reducing action when vegetables become dry and stale, or cut and exposed to air most of the vitamin C originally present is destroyed. When dry pulses and beans are allowed to germinate, vitamin C is formed. Fruits like amla and guava are the richest sources of vitamin C and can help prevent cancer of the throat and stomach. It is found in cabbage, citrus fruits, pepper, potato, tomato and all the leafy green vegetables.

Vitamin A (Carotenoids): The maximum beta-carotene (vitamin A) content occurs at a range of $15\text{-}21^0$ C, but beta-carotene content is reduced if temperatures are higher or lower than this range, principally due to the temperature sensitivity of lycopene, the precursor of beta-carotene and a yellow or orange pigment lutein found in some fruits and vegetables. This component is known to concentrate in the retinas of the eyes of the human body and is necessary for good vision. A diet rich in lutein may lower the risk of developing cataracts and macular degeneration.

Improving the quantity of food consumed and taking steps to ensure that diets are nutritionally well balanced helps in removing malnutrition.

Lutein may also help prevent or slow down arteriosclerosis, the thickening of arteries, which is a major risk for cardiovascular disease.

Carrot, turnip greens and spinach contain large amounts of vitamin A and also lutein. It is also found in dark green vegetables like amaranth, coriander, and drumstick leaves and also in orange vegetables like pumpkin and tomato. It prevents night blindness, chronic fatigue, psoriasis, heart diseases, stroke and cataract.

Vitamin K: Found in green onions, cabbage, leafy greens and sprouts and reported very effective in osteoporosis.

Vitamin E (Tocopherols): Found in corn, dry beans, lentils, chickpea and dark green leafy vegetables and acts as very good remedy for heart disease, diabetes and also for cancer.

Niacin: It includes both nicotinic acid and nicotinamide. Niacin works in close association with co-enzymes that contain riboflavin and is necessary for growth. Vegetables contain very small amount of niacin.

Minerals

Above twenty years of age, micronutrients are essential for human health and for the proper growth and development of human beings. About 4 to 6 per cent of body weight is made up of mineral elements. The largest concentration of minerals is found in bones and teeth. These do not act singly in their regulation of body process; therefore, a certain concentration of each element must be present for efficient functioning of the body.

Micronutrient deficiencies are prevalent as public health problems in developing countries; over two hundred million people experience micronutrient deficiencies in the world. Besides calcium and iron, phosphorus, potassium, sodium, chlorine, sulphur, copper, magnesium, manganese, iodine, fluorine, zinc, cobalt and selenium are important for human health. Surprisingly, the micronutrient wave has not yet crested, and special emphasis is to be given for alleviation of malnutrition. Some of the important micronutrients are:

Calcium: Green leafy vegetables (spinach, cabbage), other vegetables (green beans, onion) are good source of calcium though only a part of the calcium from these is available in the body. Some spices such as cumin and coriander seeds contain enough calcium to make a contribution if these are used frequently in sufficient quantity in the diet. It is found in all cooked vegetables, beans, tomatoes, peas, papaya, pumpkin and cauliflower. It is a proven remedy forosteoporosis, teeth problems and blood pressure.

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Folate (Folic acid): Though the amount of iron in the body is only about 2-3 g, its presence is essential. Iron combines with proteins for the development of haemoglobin, the red colouring matter of the blood. Among the plant foods, dark green leafy vegetables such as spinach, amaranth, fenugreek leaves etc. are good source of iron. Presence of ascorbic acid helps iron absorption. If a proper dose of iron is not available to the body, it results in anaemia due to insufficiency of haemoglobin. Persons lacking iron get tired easily or feel faint due to inability of the body to carry sufficient oxygen to the cells for respiration. It is found in dark leafy green vegetables, legumes, chickpea and green peas. It is also an important remedy for cancer, heart diseases and problems of nervous system

Phosphorus: It is necessary for the body as an essential part of all living cells. Phosphorus compounds are important co-factors in various metabolic processes like energy metabolism etc. Perhaps no mineral element has as many widely differing functions as phosphorus. It is usually considered that one gram of phosphorus should be consumed in the diet. Phosphorus is widely available in plants. A diet rich in protein and calcium will provide sufficient phosphorus. Although milk, meat and cereals are the main source of phosphorous in our diet, carrot, beans (legumes like soybeans) and oil seeds etc. also contain fairly good amount of phosphorus.

Magnesium: The amount of magnesium, present in the body, is much smaller than that of calcium and phosphorus. In plants, magnesium is present in chlorophyll in a chemical structure similar to the iron in haemoglobin. Vegetables provide 19.8% magnesium in the diet. Green leafy vegetables e.g. red spinach, spinach etc, and dry beans, peas, nuts and soybeans are especially good sources of magnesium. It is also reported from spinach, potato, banana and corn. It is useful in problems of osteoporosis and it also improves the immune system.

Iodine: About one third of the iodine in the adult body is found in the thyroid gland and is stored as thyroglobulin. In food, it is ingested as inorganic iodides and as organic compounds. The water of the oceans contains iodine. The amount of iodine in plants is dependent on the presence of minerals in the soil. The ashes of dry sea plants, which contain iodine, have been successfully used in the treatment of goiter.

Potassium: Found in potato, banana, beans and cooked greens. Reported as an effective remedy for hypertension, stroke and arterial-sclerosis.

Monthly Calendar of Vegetables Grown in North India

January	Carrot, Beetroot, Turnip, Radish, Brinjal, Tomato, Cauliflower
February	Brinjal, Chilies, Radish, Turnip, Bitter Gourd, Ivy Gourd, Mint
March	Lady's Finger, Brinjal, Radish, Round Gourd, Pumpkin, Ginger, Mint
April	Lady's Finger, Round Gourd, Brinjal, Cowpea Beans, Spinach, Amaranth Leaves, Pumpkin
May	Summer Radish, Lady's Finger, Spinach, Amaranth Leaves, Cocoyam, Cowpea Beans
June	Snake Gourd, Cowpea Beans, Ghuinya (Coco yam), Lady's Finger, Bitter Gourd, Garden Beans and Brinjal
July	Early Cauliflower, French Beans, Brinjal, Chillies, Capsicum, Tomato, Ganth Gobhi (Knol-khol)
August	Cauliflower, Ganth Gobhi, Onion, Lettuce, Tomato, Drumsticks, Brinjal
September	Capsicum, Tomato, Lettuce, Ganth Gobhi, Onion, Cabbage, Curry leaf
October	Peas, Potato, French Beans, Radish, Pointed Gourd, Garlic, Beet Root
November	Peas, Cabbage, Potato, French Beans, Ganth Gobhi, Beet Root, Carrot
December	Cabbage, Lettuce, French Beans, Tomato, Bottle Gourd, Ringed Gourd, Mint

Dietary Fibers

Providing macro- and micronutrients, vegetables contain digestible residue, which adds bulk fiber to the diet. Dietary fibers have the ability to absorb water, thus serving a useful purpose in the elimination of intestinal wastes. Fiber stimulates the peristaltic (rhythmic) movements of the gastrointestinal tracts by adding bulk to the intestinal contents. Fiber is known to be associated with reduced incidence of coronary heart diseases, reduces the risk of colon cancer and is reported to be a proper cure of diabetes. It is suggested that an intake of 40 g dietary fibers per day is desirable, which can be obtained from most fresh vegetables, beans and peas.

Vegetables are recognized as essential for a balanced diet that helps prevent numerous diseases. Clearly, the ultimate goal in attainment of nutritional food security is to ensure that people consume a diversity of vegetables and fruits that provide them with the required quantities of all essential macro- and micronutrients on a continuing basis. Improving the quantity of food consumed and taking steps to ensure that diets are nutritionally well balanced helps in removing malnutrition. Food-based approaches are emphasized as the only sustainable way to improve the nutritional status of the individual, family, society and the nation.

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