

Vegetables: A Source of Nutraceuticals

P. Rajya Laxmi and V. Umesh Kumar

Teaching Associate, PGIHS, SKLTSU, Mulugu, Siddipet, Telangana, India

SUMMARY

Vegetables can be considered as nutraceuticals since they supply bioactive compounds effective in decreasing the risk of many diseases. Vegetables are considered to be protective foods since they contain low calories and higher vitamins and minerals. Vegetables are potentially suitable against civilization diseases, which are caused by the lack of nutrients such as omega-3 fatty acids, antioxidants (vitamin E, vitamin C, β -carotene, selenium, zinc, cryptoxanthin, lycopene etc) and other micronutrients. They are seen as a more natural way to accomplish therapeutic results with minimal side effects.

INTRODUCTION

The connection between food and good health is not a new concept. Vegetables are being used as a source of nutrition since long. The Greek Physician Hippocrates said several centuries ago that "Let food be Your Medicine" hence nutraceuticals acts as a medicine for various ailments. Nutraceutical word is a combination of Pharmaceutical and Nutrients and it was coined in 1979 by Dr. Stephen L. DeFelice, founder and chairman of the Foundation of Innovation Medicine (FIM) (Crawford, New Jersey). They are a food or part of food or nutrient that provides health benefits, including the prevention and treatment of a disease. They are the product isolated or purified from foods, and generally sold in medicinal forms not usually associated with food and demonstrated to have a physiological benefit or provide protection against chronic disease. The dietary active components are essential for the normal functioning of the human body. Vegetables are the essential part of balanced diet since they are good source of phytonutrients and nutraceutical compounds. Vegetables not only have the potential to stop the growth of disease but can also cure many diseases and boost the immune system.

Need for Nutraceuticals

- They provide minerals and nutrients which are health promoting.
- Because of the increased tendency of patients for self-medication.
- These can be a best alternative to expensive and high-tech disease treatment.
- Increase health value of our diet which helps us to live longer without any health problems.

Advantages of Nutraceuticals over Pharmaceuticals

- Pharmaceuticals work only after the onset of diseases.
- Nutraceuticals and functional foods play important role in various activities like
- The Prevention and Retardation of Diseases.
- Delay in onset of diseases and reduced severity of diseases.
- There will not be any side effects from using nutraceuticals.
- They are easily available and economically affordable.
- It may help to avoid particular or special medical condition.

Classification of Nutraceuticals

1. **Dietary supplement-** viz. Vitamins, minerals, amino acids etc. (liquid or capsule form)

2. **Functional foods:**

- Probiotic & Prebiotic foods
- Enriched food products
- Fortified food
- **Medical food-** Formulated to be consumed or administered under the supervision of a physician.
- **Pharmaceuticals-** Medically valuable compounds produced from modified agriculture crops or animals (usually through biotechnology)

Neutraceutical Values of Some of the Vegetables

1. Asparagus: The active principle Aspergine helps to cleanse the body of waste material. It is Rich in Vit A, C, K and Calcium & magnesium in ideal ratio of 2:1. The presence of anti-oxidants & glutathione helps in Cancer prevention. The minerals present in asparagus juice helps in Diabetes/Hypoglycemia. By consuming asparagus juice along with raw honey three times a day reduces Heart diseases. It is diuretic and alkaline helps in combating Kidney diseases.

2. Beet: Betacyanin and Betaine are the active principles of beet. It is rich in case of iron which regenerates anaemic and reactivates red blood cells. Betaine has anticancer properties. The beet juice acts as detoxificant. By consuming beet juic along with honey, three times a week results in speed up the healing process of gastric ulcer. The combination of beet juice and carrot juice helps in gall blader and Kidney ailments. It also acts as anti-dandruf agent when mixed with little vinegar and a cup of beet juice.

3. Broccoli: It is also known as the “King” of the Cruciferous family”. The active principles are Quercetin, Sulphoraphane, Polyphenols & Glucosinolates. A cup of broccolo juice can provide more than daily requirement of Vit. C. It acts as potent antioxidant, having anticancer activity due to the presence of Glucosinolates and Indole 3 Carbinol. It helps in bone building by consuming broccoli juice as they provide calcium for strong bones development. It is rich source of Lutein which helps in curing eye disorders and protects against age-related macular degeneration. High content of Sulphoraphane helps to cure stomach disorders

4. Bitter gourd: The active principle present in bitter gourd include Charantin, polypeptide P and contains twice the beta-carotene of broccoli. The consumption of fresh bitter gourd juice along with some lime juice results in curing blood disorders. The presence of high Beta-carotene in bittegourd improves eyesight and eye related problems. It is a good source of natural medicine for people suffering from Diabetes mellitus-Hypoglycemic compound. It can cure respiratory disorders by consuming bitter gourd juice with a cup of honey diluted in water and piles by mixing bittergourd leaves juice with a glass of buttermilk.

5. Tomato: The active principles present in tomato are lycopene and beta-carotene. The consumption of tomato helps against cancer, bone and teeth health. Tomato juice is rich source of Vit.C, Calcium, Phosphorous, iron, organic acids that enhances digestive function. The high content of Potassium lowers blood pressure stress, tiredness and fatigue. The iron & Vit.C promotes synthesis of haemoglobin and prevents anemia. Lycopene, Vit. A and C promotes skin health.

6. Brinjal: The brinjal is rich source of iron, calcium, Vit B complex. It lowers the blood cholesterol level. White brinjal is considered to be good for diebetic patients. It Cures flatulation by consuming brinjal in mashed form or as soup with asafoetida and garlic. Consuming soft and baked brinjal with honey in the evening helps in having a sound sleep. Soup made up of brinjal and tomato helps in digestion.

7. Okra: The active principles in okra are mucilage having beta-carotene, xanthin and lutein, rich in fibre, vitamin A, C, and folate content. It is having anti-cancerous properties. The folate in okra builds strong bones, reduce blood cholesterol and risk of heart diseases. It consists of Insulin like properties which reduces blood sugar level and diabetes. It acts as immune Booster as it contains high anti-oxidants and Vit. C. Beta- carotenes, xanthin and antioxidants help in vision impairment issues.

8. Garlic: The active principles in garlic include Aliin, Allicin, Diallyl disulphide, Ajoene. It is having antiparasitic, anticancer, antiviral, antibacterial and antiallergic properties. It helps in buiding immune system. It controls hypertension and normalize blood pressure. It acts against diabetes by consuming one clove of garlic daily. It acts as anti-coagulant and protects against thrombosis (blockages of blood flow by clots).

9. Onion: The active principle present in onion are quercetin and volatile sulphur compounds and rich source of iron and chromium. The presence of high iron content helps in reducing anaemia. chromium helps against diabetes. It is commonly used to treat cold, cough, influenza, hair loss, bacterial infection and respiratory disorders. The onion juice is applied on scalp twice a week for 2 months can cure hair loss.

Table 1: Nutraceuticals isolated from vegetables

Chemical compound	Plant source	Properties
Allicin	Garlic, onion, parsnip	Antifungal; antibacterial; antioxidant; used to treat arteriosclerosis
Beta carotene	Carrots, pumpkins, sweet potatoes, winter squash, Watermelon.	Anti-aging; anti-cancerous; improve lung function; reduce complications associated with diabetes
Tocopherol	Broccoli, carrot, celery, onion	It is a fat-soluble antioxidant that stops the production of reactive oxygen species formed when fat undergoes oxidation
Betaine	Green leafy vegetables	Reduces toxic buildup of homocystine
Plant Glucosamine	Lettuce, peas, cabbage	Chondroitin and glucosamine are part of normal cartilage and act as a cushion between the joints
Glutathione	Cruciferous vegetables	A tripeptide, which provides antioxidant properties thereby protecting the cells against damage by free radicals
Hesperitin	Green vegetables	Anti-inflammatory
Saponin	beans, other legumes	Reduces blood cholesterol levels and the risk of cancer
Quercetin	Onion, broccoli, cabbage, lettuce, tomato	Useful in the treatment of progressive Alzheimer's disease; used in cancer and heart disease
Lignan	broccoli	Antioxidants; reduce ill effects in the body as cellular destruction, aging.
Luteoline	Cauliflower, celery, sweetpepper	A carotenoid which shows eye benefits
Ferulic acid	Turnip	Have anti-oxidizing properties that can moisturize skin, help with light and weather damage
Sulphoraphane	Broccoli	Used against breast cancer
Proanthocyanin	Red cabbage, egg plant	Help in urinary tract infections by inhibiting adhesion of microorganisms like <i>E. coli</i> to the urinary tract wall

Precautions to be followed while using Nutraceuticals:

- Brinjal is not beneficial for person having excessive bile humor and one who has acidity problem. Pregnant woman should avoid its use.
- Avoid okra if you have a history of kidney stones.
- Unripe tomatoes contain a toxic agent called solanine, it may cause gastrointestinal disorders as well as neurological symptoms, that's why tomatoes should always be consumed when fully ripe and devoid of solanine.
- Excessive consumption of bittergourd and melons (more than two per day) may cause mild abdominal pain or diarrhea.
- Mix broccoli juice with carrot and green apple juice to make it palatable and drinking.
- Broccoli juice raw is best to obtain the most nutrition out of it.
- Individuals with a history of oxalate-containing kidney stones should limit their consumption of beets.
- Asparagus is not to be taken by people with advanced kidney disease

Role of Research and Development in Nutraceuticals

- To test safety, purity and potency of products.
- To develop more effective and efficient means of producing ingredients for use in products.
- To develop testing methods for ensuring and verifying the consistency of the dosage of ingredients included in the company's products.
- Develop the new products either by combining existing ingredients used in nutritional supplements or identifying new ingredients that can be used in nutritional supplements.

CONCLUSION

Nutraceuticals are present in most of the food ingredients with varying concentration. Concentration, time and duration of supply of nutraceuticals influence human health. Manipulating the foods, the concentration of active ingredients can be increased. Diet rich in nutraceuticals along with regular exercise & stress reduction will maximize health and reduce disease risk.

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