



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; SP4: 78-80

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(Special Issue- 4)

National Seminar

“Role of Biological Sciences in Organic Farming”

(March 20, 2019)

## Review: Vegetables an important source of nutrients

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### Abstract

Vegetables play an important role in combating various health disorders like cancer, Heart disease, High blood pressure, High cholesterol, Diabetes and prostrate problems etc. The major problem in human beings is caused by nutritional deficiency of Vitamin A, calories, Iron, Protein, Iodine, Vitamin- C, Vitamin-B, and calcium. Crops diversification is intended to give a wider choice in the production of variety of crops in a given area so as to increase production and also expand production related activities. In vegetable crops there exists a great genetic diversity to adapt themselves under vagaries of environments, (abiotic and biotic stresses). Then only the society will continue to benefit from the vital contribution that vegetable breeding (plant breeding) offer, using both conventional and biotechnological tools, because improved varieties and hybrids of vegetables rich in nutrition and resistant to abiotic stress will ensure global food security in future.

**Keywords:** Nutritional security, Global hunger index, Nutrients, Cultivars, Hybrids.

### Introduction

India is 2<sup>nd</sup> largest producer of vegetables in world occupying an area of 10.1 million hectares with the production of 169.1 million metric tonnes. A world survey showed that 402 vegetables crops are cultivated worldwide representing 69 families and 230 genera (Kays 1995) [2]. With this production, the availability of vegetables is 210gm per capita per day, which is less than the dietary requirement of 300 g per capita per day. The vegetables includes green leafy vegetable 50 g, other vegetable 200g root and tuber 50g (Krishnaswamy *et al.* 2011) [3]. Further, our population is growing at the rate of 1.8% per year. At this rate of the population growth, we will have population over 1.2 billion by year 2020. Population growth and urbanization are creating increased demand for food and there is growing concern over malnutrition. The technology in agriculture has played a vital role in increasing production but the standards of Indians have not yet risen to a satisfactory level. To meet the full dietary need of a common man, to eliminate malnutrition, deficiency diseases and to relieve over stress over cereals there is a great need of enhanced vegetable production so that vegetables can play an important role in the diversification of agriculture.

Vegetables in daily diet have been strongly associated with overall good health, improvement of gastrointestinal health, reduced risk of heart diseases, stroke, anaemia etc (Prior RL 2000) [6]. Vegetable crops comprise of annuals, biennials and perennials which are grown in tropical, subtropical and temperate climate. Since Hi-tech horticulture (protected cultivation of vegetables) increase productivity, quality and shelf life, therefore green house, polyhouse and net house technology in India should be adopted to increase vegetable production, development of new cultivars/hybrids of vegetables tolerant to high temperature, resistant to pests and diseases, short duration and producing good yield under stress condition.

### Role of vegetables in food security

Vegetables play an important role in promoting household food security and provide a sustainable solution to micronutrient malnutrition which is affecting the health of 2 billion people on the planet, especially children. Vegetable production generates employment and income of small scale farmers especially women, while safeguarding the natural resource base. The sector offers one of the highest impacts to reducing poverty and hunger, and a great potential for achieving sustained improvements in the nutrition status of the poor. On the other hand, production of vegetables is considered due to government policies and priorities on

increasing domestic production of main staples in a framework of attaining calorie based food security. However, countries wish to consider balanced approaches and explore opportunities for crop diversification to increase production of nutritionally-rich vegetable crops that will not undermine the larger goal of sustaining increased productions of horticultural crops, but will aim at ensuring the availability of a diversified range of vitamins and micronutrient rich products at an affordable price to satisfy essential human dietary requirements. A high vegetable diet had been associated with lower risk of cardiovascular disease in human (Mulie 2011)<sup>[4]</sup>. On consumption side, average per capita vegetable consumption stands nearly at a half of optimum consumption level, due to lack of availability and high price, and the lack of awareness of nutritional value of vegetables. Hence, there is a need to increase the availability of vegetables at an affordable price and to promote the awareness and advocacy. In order to be able to move on all these fronts, significant investments in strengthening research and development, capacity building, and advocacy and education are needed and regional cooperation and concerted efforts through partnerships must be further strengthened. The highly nutritive vegetables are of great importance in alleviating the malnutrition. Vegetable are rich source of carbohydrates, proteins, vitamins and minerals, hence called as protective foods.

#### • Carbohydrates

Carbohydrates are chief source of energy in the food. It is also called as protein sparing food. Daily requirement of CHO is 400-500 g. Vegetables like potato, sweet potato, cassava, elephant foot yam, taro, garlic, pea and onion are good source of carbohydrates. In fact, sweet potato is cheapest source of calorie.

#### • Proteins

Proteins are complex nitrogen containing organic compounds. They constitute a major part of protoplasm. Daily requirement of proteins is 60-70 g. Vegetables contain less protein

compared to the product of animal origin. Although sulfo-amino acids (methionine and cystine) are most of the time limited in vegetable proteins. Peas, beans and leafy vegetables are good source of proteins.

#### • Flavonoids

Like quercetin, kaempferol other flavonoids are present in vegetables. Quercetin is present in onion. The flavonoids containing vegetables help to prevent high blood pressure. (Miean and Mohammed 2001)<sup>[5]</sup> reported that onion leaves had the highest total flavinoid content is predominant. In Chive, garlic chive and leek the flavinoid is kaempferol (Bilyk 1985)<sup>[11]</sup>

#### • Folates

Folates reduce the risk of heart disease, strokes and colon cancer. Their deficiency causes anaemia in infants and pregnant women. Leafy vegetables are rich source of folic acids.

#### • Vitamins

Vitamins are biologically active compounds and are essential for normal physiological process. Specific vitamin deficiency produces characteristics symptoms. Tomato fruits are an excellent source of vitamin C (Rao 2007)<sup>[7]</sup>

#### • Minerals

Minerals play major role in functioning of physiological activities. They are components of various vital body constituents. As for example. (Trinidad *et al.* 2010)<sup>[9]</sup> extended the mineral availability in vitro of iron, zinc and calcium in ten local legumes. Calcium is essential component of bones and teeth. Iron is important component of hemoglobin. Phosphorus along with C, H, O and N are the components of DNA. Iodine is vital constituents of thyroid hormones, thyroxin and triiodothyronine. Mg is required for cellular metabolism. Zinc is cofactor of many enzymes and performs a range of functions in body.

**Table 2:** Nutritional composition of vegetables per 100 g edible portion

Vegetable crops	Energy (Kcal)	Moisture (g)	Protein (g)	Fat (g)	Carbo hydrates (g)	Fibre (g)
Amaranth	45.0	85.7	4.0	0.5	6.1	1.0
Asparagus	26.0	91.7	2.5	0.2	5.0	0.7
Basella	32.0	90.8	2.8	0.4	4.2	-
Bittergourd	25.0	92.4	1.6	0.2	4.2	1.7
Bottle gourd	12.0	96.1	0.2	0.1	2.5	1.5
Brinjal	24.0	92.7	1.4	0.3	4.0	-
Broad bean	48.0	85.4	4.5	0.1	7.3	-
Broccoli	37.0	89.9	3.3	0.2	5.5	2.6
Brussel's sprout	45.0	85.2	4.9	0.4	8.3	1.5
Bengal gram leaves	97.0	73.4	7.0	1.4	14.1	-
Cabbage	24.0	92.4	1.3	0.2	5.4	1.5
Capsicum	29.0	92.5	1.2	0.2	4.0	2.5
Chilli	29.0	82.6	2.9	0.6	6.1	6.7
Carrot	42.0	88.6	1.1	0.2	9.1	1.0
Coriander leaves	44.0	66.3	3.3	0.6	6.3	-
Cassava	157.0	59.4	0.7	0.2	38.1	-
Cauliflower	27.0	91.0	2.7	0.2	5.2	0.9
Celery	17.0	94.1	0.9	0.1	3.9	1.4
Cucumber	18.0	96.3	0.4	0.1	2.5	0.6
Drumstick leaves	92.0	76.0	6.7	1.7	12.7	0.9
Fenugreek leaves	49.0	86.1	4.4	0.9	6.0	1.1
French bean	30.0	62.0	6.3	0.1	29.8	4.0
Garlic	32.0	90.1	1.9	0.2	7.1	0.8

Kale	53.0	82.7	6.0	0.8	9.0	1.5
Knolkhol	29.0	90.3	2.0	0.1	6.6	1.1
Leek	77.0	78.9	1.8	0.1	17.2	1.3
Lettuce	14.0	95.1	1.2	0.2	2.5	0.6
Mint	48.0	84.9	4.8	0.6	5.8	2.0
Musk melon	17.0	95.2	0.3	0.2	3.5	0.6
Mustard leaves	34.0	89.8	4.0	0.6	3.2	1.5
Okra	35.0	89.6	1.9	0.2	6.4	1.2
Onion	50.0	86.6	1.2	0.1	11.1	0.5
Pea	84.0	78.0	6.3	0.4	14.4	4.0
Potato	97.0	74.7	1.6	0.1	22.6	1.6
Parsley	16.0	90.0	2.2	0.3	1.3	-
Pointed gourd	20.0	92.0	2.0	0.3	2.2	3.0
Pumpkin	25.0	92.6	1.4	0.1	4.6	0.5
Radish	17.0	94.4	0.7	0.1	3.4	0.7
Sponge gourd	18.0	93.2	1.2	0.2	2.9	0.5
Spinach	26.0	90.7	3.2	0.3	4.3	-
Spinach beet	46.0	86.4	3.4	0.8	6.5	0.7
Sweet potato	124.0	68.5	1.8	0.7	28.0	1.0
Tomato	22.0	93.5	1.1	0.2	4.7	0.7
Turnip green	67.0	8.9	4.0	1.5	9.4	-
Watermelon	26.0	92.6	0.5	0.2	6.4	0.2
Nadru (Lotus root)	53.0	85.9	1.7	0.1	11.3	-
Yam	102.0	74.0	1.5	0.2	24.0	-
Taro corm (Arvi)	97.0	73.1	3.0	0.1	22.1	-
Giant Taro (Kachloo)	71.0	81.2	0.6	0.1	17.0	-
Cowpea leaves	51.0	84.6	4.3	0.2	8.0	-

(Sharma, 2009).

### Conclusion

Vegetables play an important role in combating various health disorders like cancer, Heart disease, People who eat fruit and vegetables as part of their daily diet have a reduced risk of many chronic diseases. Vegetables are important part of healthy eating and provide a source of many nutrients, including potassium, fiber, folate (folic acid) and vitamins A, E and C. Options like broccoli, spinach, tomatoes and garlic provide additional benefits, making them a superfood. Potassium may help to maintain healthy blood pressure. Dietary fiber from vegetables helps reduce blood cholesterol levels and may lower risk of heart disease. Folate (folic acid) helps the body form healthy red blood cells. Women of childbearing age who may become pregnant and those in the first trimester of pregnancy need adequate folate to reduce the risk of neural tube defects and spina bifida during fetal development. So we should consume different kinds of vegetables as they are rich source of nutrients and nutraceuticals.

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