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POLICY PAPER



## Underutilized vegetables and their importance

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Vegetables occupy an important place among the food crops as these provide adequate amounts of many vitamins and minerals for humans. They are rich source of carotene, ascorbic acid, riboflavin, folic acid and minerals like calcium, iron and phosphorus. In nature, there are many underutilized vegetables of promising nutritive value, which can nourish the ever increasing human population. Many of them are resilient, adoptive and tolerant to adverse climatic conditions. Although, they can be raised comparatively at lower management cost even on poor marginal lands, they have remained underutilized due to lack of awareness and popularization of technologies for utilization. Now-a-days, underutilized foods are gaining importance as a means to increase the per capita availability of foods.

### **Amaranth leaves**

Amaranth leaves are known as a superfood because they are beneficial for almost every organ of the body. It is easy to incorporate them in the diet as they taste well as a stir-fry or when combined with lentils. Amaranth leaves and stems are good sources of carotenoids, proteins, including the essential amino acids methionine and lysine, dietary fiber and minerals, such as magnesium, calcium, potassium, copper, phosphorus, zinc, iron, and manganese (Sarker & Oba, 2019a). Amaranth is also abundant in several pigments, such as carotenoids, chlorophylls, amaranthine, anthocyanins, betalains, betaxanthins, and betacyanins and natural antioxidant phytochemicals, such as vitamin C, betacarotene, flavonoids, and phenolic acids that act as reactive oxygen species (ROS) scavengers in the human body (Sarker & Oba, 2019b).

### **Health benefits**

1. Leaves carry more potassium than spinach. Potassium is an important component of the cell and body fluids that help regulate heart rate and blood pressure.

2. Amaranth greens have the highest concentrations of vitamin-K of all the edible green-leafy vegetables. 100 g of fresh greens provides 1140 µg or 950% of daily vitamin-K requirements. Vitamin-K plays a vital role in strengthening the bone mass by promoting osteoblastic activity in the bone cells and has established role in patients with *Alzheimer's disease* by limiting neuronal damage in the brain.
3. It contains ample amounts of B-complex vitamins such as folates, vitamin-B6 (pyridoxine), riboflavin, thiamin (vitamin B-1), and niacin. Folates rich diet help prevent neural tube defects in the newborns.
4. Amaranth has several antioxidant vitamins like vitamin-A (2917 IU or over 97% of daily recommended levels per 100 g) and flavonoid polyphenolic antioxidants such as *lutein*, *zeaxanthin*, and *β-carotene* which play a healing role in aging and various disease processes.
5. Fresh 100 g of amaranth leaves contains 29% DRI of iron which is an essential trace element required by the human body for red blood cell (RBC's) production and as a co-factor for the oxidation-reduction enzyme.
6. Amaranth leaves are storehouse for many antioxidants, phytonutrients, minerals and vitamins which contribute immensely to health and wellness (Sarkar *et al.*, 2018).

### Value addition

Amaranth leaf powder/leaves can be supplemented with other crops for development of value added products like noodles, biscuit, bread, chapatti, *poori*, pasta, *mathi*, *matar*, *laddoo* and *sev*.

### Fenugreek Leaves

This herb's name "Fenugreek" is derived from the Latin language, which means 'Greek hay'. Besides dried leaves, fenugreek seeds and green leaves are also for cooking various dishes. Fenugreek is also known as 'Kasuri Methi'. It is a very ancient spice which is used for flavouring various dishes. These leaves are bitter in taste, when added to any recipe it will surely titillate your taste bud. In addition to taste, it has numerous nutritional values as well. Fenugreek leaves is a natural herb which works as a nutritional supplement.

### Health benefits

1. Fenugreek leaves are known to be the best means for reducing triglycerides, cholesterol and LDL levels which in turn helps in fighting symptoms of diabetes.
2. Fenugreek leaves is commonly used in digestion related problems such as, gastritis, constipation, and stomach upset etc.
3. The leaves are a very useful medium for battling not only kidney problems but also boils and mouth ulcers and beriberi disease among various others.
4. Herbal tea made using fenugreek leaf powder is an excellent way of bringing the temperature down in case of high fever.
5. Helps in reducing the chances of unanticipated blood clotting in the heart.
6. Promotes hair growth and is good for skin as well.

### **Value addition**

It is popularly used for flavouring dishes and making herbal tea. This herb also used for many medicinal purposes. Wheat flour supplemented with germinated fenugreek powder at 5–10% levels increased the total proteins, fibers, iron, zinc, calcium, vitamin B2, carotene, vitamin E, and vitamin C contents (Wani and Kumar, 2018). It has been used to fortify bakery flour for pizza, cake mix, bread, bagel, muffins, flat bread, tortilla and noodles, fried, baked corn chips. Bakery foods such as bread, pizza, cakes and muffins have been prepared by using flour fortified with eight to ten percent soluble dietary fiber. When fiber fortified flour was used for making oil fried snacks, 8–15% of less oil absorption only takes place which is really appreciable in terms of unwanted fat intake (Im and Maliakel, 2008).

### **Sweet potato**

Sweet potato, a commonly grown root vegetable of winter season is valued for its high nutritive value, flavours and digestibility. Sweet potatoes are an important source of dietary protein, substantial amount of vitamins (Beta carotene, B complex and vitamin C) minerals, trace elements and high energy value. Sweet potato is widely used in India for food consumption after boiling, baking or frying. However, in other countries, flour of the sweet potato is often used in biscuits, cakes and pudding. The advantage of sweet potato over other vegetables is that it has got the shorter growth period and adverse weather conditions rarely causing a complete crop loss. Sweet potatoes often referred to as “poor people’s food” or “poor men’s crop” has difficulties in marketing and processing (Chaudhary, 2000).

### **Health benefits**

1. Help strengthen immune system
2. Support digestion
3. Contains anti-inflammatory properties
4. Help manage stress and anxiety
5. Support healthy blood sugar levels
6. Support eye health
7. May help improve memory

### **Value addition**

Processing of sweet potato tuber increases their availability and reduces post harvest wastage. Sweet potato flour can be incorporated in wheat flour for bread and biscuit baking, hot cakes, gruel, noodles, candy, puddings and other preparations. It can be mixed with wheat flour for making *chapati* and bread. This flour functions as a stabilizing agent in ice-creams.

### **Diplazium fern (Kasrot, Lingru, Pako)**

*Diplazium esculentum*, is a perennial fern of moist, humid areas. Plant height ranges from 0.5 to 1.5m having large green leaves with profuse smooth shiny leaflets.

Young leaves are curled, some sort scaly and opens gradually are known as fronds. Stem is rhizomatous. Nutritional importance: The young curled leaves or fronds are edible. This is rich source of proteins, minerals, dietary fibre, vitamins and good source of antioxidants. The young tender fronds of lingad (*Diplazium esculentum*) are mucilaginous. One hundred grams of fresh fronds contain 91.3 g moisture, 1.0 g protein, 100 mg fat, 1.4 g fibre, 600 mg of mineral matter. They also contain 0.98 mg/100 g of beta carotene. *Pteridium aquilinum* fronds, both fresh as well as boiled, are known to have antioxidative activities higher than alpha tocopherol. These are low in beta-carotene, medium in Vitamin E, and low in riboflavin, ascorbic acid, calcium and iron. The protein content is 3.2 per cent (Devi, 2020).

### Health benefits

1. They are an excellent source of many natural polyphenolic flavonoid compounds such as  $\alpha$  and  $\beta$ -carotenes. Carotenes convert into vitamin-A inside the body.
2. Vitamin C present in it helps scavenge harmful free radicals, and offer protection from cancers, inflammation, and viral cough and cold.
3. Fern shoots are a very good source of minerals and electrolytes, especially potassium, iron, manganese, and copper. Potassium helps reduces blood pressure and heart rate by countering sodium effects.
4. Fiddlehead ferns are unique by their appearance, taste, and nutrition profile. The curly young shoots carry just 34 calories per 100 g.

### Value addition

*Diplazium esculentum* uses include light blanching as a leafy green vegetable, addition to stir fry or part of a soup or stew. The fiddleheads are also pickled.

### Conclusion

Underutilized vegetables with rich nutritional potentials along with ability to stand against adverse climatic conditions may prove boon to all concerned – environmentalists, growers and consumers. The possible reasons for the low utilization of underutilized vegetables, in spite of their importance may be due to lack of availability of planting material, lack of awareness about nutritional and medicinal importance and lack of information on production technique of these crops. Underutilized vegetable crops require special attention and must be popularized in order to utilize their potential to treat many lifestyle related diseases. Research in the direction of domestication and utilization of these crops is of profound importance as far as nutritive value is concerned. These crops also provide employment opportunities in agro-based industries, packaging, storage, preservation, canning and transportation.

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