BEETROOT FOR HEALTHY LIVING

A. Akhila[1], Jessie Suneetha. W[2*],
J. Hemantha Kumar[2], B. Anila Kumari[1] and
A. Gnanakeerthana[1]
[1]PGRC, PJTS Agricultural University, Rajendranagar, Hyderabad
[2]Krishi Vigyan Kendra, PJTS Agricultural University, Wyra, Khammam Dt.

INTRODUCTION:

Beetroot (*Beta vulgaris*) is the taproot portion of beet plant and commonly known as beets in Canada and USA while as per British English is referred to as table beet, garden beet, red beet, dinner beet or golden beet. Beta is the ancient Latin name for beets and one of several cultivated varieties. It is a popular root crop grown for its fleshy roots which are used as cooked vegetable, salads, for pickling and canning. Young plants along with tender leaves are also used as pot herbs.



MAIN COMPONENTS OF BEETROOTS:

Betanins:

They are also called beetroot red, the most common pigment in beetroots, responsible for their strong red color. They are water-soluble nitrogen-containing pigments that are divided into red-violet betacyanins and yellow-orange betaxanthins. Betanin (Betanidin-5-O-β-glucoside) is the most common betacyanin in the plant kingdom. Betanin is a scavenger of reactive oxygen species exhibiting gene-regulatory activity. It may induce phase II enzymes and antioxidant defense mechanisms with possibly preventing LDL oxidation and DNA damage.

The treatment with betalains and betalain-rich diets is not only nontoxic and can be a promising alternative to supplement therapies in oxidative stress, inflammation and dyslipidemia-related diseases such as stenosis of the arteries, atherosclerosis, hypertension and cancers to a certain extent.

Inorganic nitrate:

The inorganic nitrates include nitrates, nitrites and nitric oxide. It is found in generous amounts in green leafy vegetables, beetroots and its juice extract. The inorganic nitrate turns into nitric oxide in the body with many important body functions specially the potential blood pressure lowering effect.

Vulgaxanthin:

A yellow or orange pigment found in beetroots and yellow beets.

BRIEF HISTORY OF BEETROOT:

Beet root originated from *Beta vulgaris* L. ssp. maritima by hybridization with *Beta patula*. The crop has site of origin probably in Europe with earlier varieties being long rooted like carrot. Beet root, sugar beet and palak belong to species *B. vulgaris* and are cross compatible.

Beets were domesticated in the ancient Middle East primarily for its greens followed by the Ancient Egyptians, Greeks and Romans. But the Roman era saw the use of roots along with the leaves. Besides being used as a food, beets have been as a food colourant and medicinal plant. From the Middle Ages, beetroot was used to treat illnesses relating to digestion and blood. During the middle of the 19th century, wine was often coloured with beetroot juice to get the desired redness.

BEETROOT CULTIVATION:

The period of 55 to 65 days is needed from germination to harvest of this root. The optimum temperatures for growth and development are 15 to 18°C with minimum of 5°C and maximum of 24°C. Although beetroot is a cool-season crop, it is fairly tolerant to high temperatures when soil moisture is adequate. The plant can withstand moderate frosts, but growth will be affected due to excess frosting. The beet root is sown in cold areas (heavy frosts) from August to March, warm areas (light frosts) although the year and hot areas (frost-free) from February to September.

The root colours vary between red to dark red with different degrees of zoning when sliced. Usually, the deep purple beet roots are eaten boiled, roasted, raw alone or combined with any other salad vegetables. The yellow-coloured beetroots are grown on a very small scale for home consumption.

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PROCESSING OF BEETROOT:

A large proportion of the commercial production include boiled and sterilized beets as well as used for pickling. In Eastern Europe, beet soup like borscht is a commonly consumed delicacy. In Indian cuisine, chopped, cooked and spiced beet is a common side dish. The green, leafy portion of the beet is also edible with the young raw leaves use in salads whereas matured leaves are commonly served boiled or steamed due to its similarity with spinach.

Beetroot can be boiled or steamed, peeled and then eaten warm with or without butter as a delicacy, can be cooked, pickled and eaten cold as a condiment, peeled, shredded or sliced raw and eaten as a salad. Pickled beets are a traditional food in many countries round the world.

NUTRITIONAL VALUE OF BEETROOT:

Beetroot is a rich source of protein with 1.70 g in 100 g followed by carbohydrates with 9.56 g, fat of 0.17 g, sugars of 6.76 g, dietary fiber of 2.80 g and energy of 43.0 Kcal. They are low in calories due to water content of 88.0% along with high amount of valuable vitamins and minerals like calcium of 200 mg, phosphorus 55 mg and vitamin C 88 mg in 100g beetroot. Its leaves are rich in iron with 3.1 mg, vitamin A of 2100 IU, thiamine of 110 µ g and ascorbic acid of 50mg/100g sample.

The consumption of 100g of beetroot can meet RDI of 6.0% for vitamin C, 20.0% of folate, 3.0% of magnesium, 9.0% of potassium, 4.0% of phosphorous, 16.0% of manganese and 4.0% of iron. Beetroot can be boiled or steamed, peeled and then eaten warm with or without butter as a delicacy, can be cooked, pickled and eaten cold as a condiment, peeled, shredded or sliced raw and eaten as a salad. Pickled beets are a traditional food in many countries round the world.

HEALTH BENEFITS OF BEETROOT:

Beets contain inorganic plant compounds like nitrates and pigments with a number of health benefits.

Checks body blood pressure:

Beets contain a high concentration of nitrates which have a lowering effect on blood pressure leading to reduced risk of heart attacks, heart failure and stroke. The nitrates in them also may help increase blood flow to the brain, improve cognitive function and possibly reduce the risk of dementia.

Enhance athletic performance:

Eating beets may enhance athletic performance by improving oxygen use and reduce the exhaustion time. For maximum benefit, beets should be consumed 2 – 3 hours prior to training or competing. They contain pigments called betalains which may possess a number of anti-inflammatory properties.

Promote digestive health:

The fiber in beets may promote weight loss by reducing appetite, promote feelings of fullness and reduce gastric emptying time thereby reducing overall calorie intake. Fiber resists digestion upon entering the colon, where it either feeds the friendly gut bacteria or adds bulk to stool. This can promote digestive health and prevent digestive conditions like constipation, piles, inflammatory bowel disease and diverticulitis. Moreover, fiber has been linked to a reduced risk of chronic diseases including colon cancer, heart disease and type 2 diabetes.

Reduce muscle soreness:

Muscle soreness caused by exercise, sprinting or jumping can be reduced by drinking beetroot juice a few times a day for about 48 hours.

INDUSTRIAL USES:

Betanin obtained from the roots is used industrially as red food colorant to improve the colour and flavour of tomato paste, sauces, desserts, jams, jellies, ice cream, candies, and breakfast cereals. When beet juice is used, it is most stable in foods with a low water content like frozen novelties and fruit fillings. According to the regulation on food additives betanin is permitted *quantum satis* (amount which is enough) as a natural red food colorant (E162) in different foods. It is also used as colorant in cosmetics and pharmaceuticals world over.

CONCLUSION:

Beets contain chemicals that might reduce swelling and cholesterol. Also, they can increase levels of nitric oxide in the body which is a vasodilator that helps to relax the inner muscles of blood vessels causing them to widen for increased blood flow and possibly reducing blood pressure and making it easier to exercise. The consumption of beetroots may improve running and cycling performance, increase stamina, boost oxygen use and lead to better exercise performance overall.

Thus, consumption of beetroot benefits digestive health with antioxidant content and anti-inflammatory nature of beets can be of interest to researcher for combating life style diseases.