

BRASSICA VEGETABLES: CABBAGE



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INDEX

1. Cabbage: An Introduction	1
2. Major Varieties and Types of Cabbage	1
3. Nutrition Value in Cabbage	1
4. Vitamin and Minerals in Common Cabbages	2
5. Nutrition in Green Cabbage	3
6. Nutrition in Red Cabbage	4
7. Savoy Cabbages	5
8. Conical/Pointed Cabbage	6
9. Health Benefits in Cabbage	7
10. Growing Practices for Cabbage	9
11. Seed Production in Cabbage	11

Cabbage: An Introduction

Cabbage is one of the most popular winter vegetables in the tropics. Cabbage is used for making various vegetable preparations, salads, pickles and vegetable soups. Cabbage is believed to be originated in the coastal southern and western Europe.

Taxonomy and Varieties

Cabbage is a biennial crop and it belongs to the Brassicaceae family. Its genus is Brassica and species is oleracea. Thus, scientific name of cabbage is Brassica oleracea var. Capitata. Major varieties of cabbages are common GREEN Cabbages, RED Cabbages, Savoy Cabbages and Conical or Pointed-Type Cabbages.

Nutrition and Food Uses of Common Cabbages

They come in two shapes: these cabbages will be either round-headed or flat-headed. Common cabbages are available in two colours: green and red. Some examples of round-headed or ball-type cabbage varieties are, Golden Acre, Pride of India, Copenhagen Market, and Mammoth Rock Red (red variety of common cabbage). An example of flat-headed (or drum-headed) cabbage is Pusa Drumhead. Raw, fresh cabbage leaves are a popular ingredient in fresh vegetable salads. Finely chopped fresh cabbages may be used as a major ingredient for making different types of fresh vegetable chutneys.



Minerals and Vitamins in Common Cabbages

Nutrient	Unit	Value/100 g
Calcium, Ca	mg	40
Iron, Fe	Mg	0.47
Magnesium, Mg	Mg	12
Phosphorus, P	Mg	26
Potassium, K	Mg	170
Sodium, Na	Mg	18
Zinc, Zn	Mg	0.18
Vitamin C	Mg	36.6
Thiamin	Mg	0.061
Riboflavin	Mg	0.04
Niacin	Mg	0.234
Vitamin B-6	Mg	0.124
Folate, DFE	μg	43
Vitamin A	IU	98
Vitamin E	Mg	0.15
Vitamin K	μg	76

Nutrition in Cooked Green Cabbages

Nutrient	Unit	Value/100 g
Water	g	92.57
Energy	kcal	23
Protein	g	1.27
Total lipid (fat)	g	0.06
Carbohydrate	g	5.51
Fiber, total dietary	g	1.9
Sugars, total	g	2.79
Calcium, Ca	Mg	48
Iron, Fe	Mg	0.17
Magnesium, Mg	mg	15
Phosphorus, P	mg	33
Potassium, K	Mg	196
Sodium, Na	Mg	255
Zinc, Zn	Mg	0.2
Vitamin C	Mg	37.5
Thiamin	Mg	0.061
Riboflavin	Mg	0.038
Niacin	Mg	0.248
Vitamin B-6	Mg	0.112
Folate, DFE	µg	30
Vitamin A, IU	IU	80
Vitamin E	Mg	0.14
Vitamin K	µg	108.7
MUFA	g	0.019
PUFA	g	0.023

Minerals and Vitamins in Red Cabbages

Nutrient	Unit	Value/100 g
Calcium, Ca	Mg	45
Iron, Fe	Mg	0.8
Magnesium, Mg	Mg	16
Phosphorus, P	Mg	30
Potassium, K	Mg	243
Sodium, Na	Mg	27
Zinc, Zn	Mg	0.22
Vitamin C	Mg	57
Thiamin	Mg	0.064
Riboflavin	Mg	0.069
Niacin	Mg	0.418
Vitamin B-6	Mg	0.209
Folate, DFE	μg	18
Vitamin A, IU	IU	1116
Vitamin E	Mg	0.11
Vitamin K	μg	38.2

Savoy Cabbages

Savoy cabbages are very hardy variety of cabbages. They are rough-looking with wrinkled leaves and mildly flavoured than common cabbages. A popular variety of savoy cabbage is Chieftain. It is mainly grown as a winter vegetable

Minerals and Vitamins in Raw Savoy Cabbages

Nutrient	Unit	Value/100 g
Calcium, Ca	mg	35
Iron, Fe	mg	0.4
Magnesium, Mg	mg	28
Phosphorus, P	mg	42
Potassium, K	Mg	230
Sodium, Na	Mg	28
Zinc, Zn	Mg	0.27
Vitamin C	Mg	31
Thiamin	mg	0.07
Riboflavin	mg	0.03
Niacin	mg	0.3
Vitamin B-6	mg	0.19
Folate, DFE	µg	80
Vitamin A, IU	IU	1000
Vitamin E	mg	0.17
Vitamin K	µg	68.8

Conical/Pointed Cabbages

Heads of these cabbages are pointed and its overall shape is like a cone. An important variety is Jersey Wakefield

Nutrition in Conical/Pointed Cabbages

Nutrient	Unit	Value/100 g
Water	g	92.52
Energy	Kcal	24
Protein	g	1.21
Total lipid (fat)	g	0.18
Carbohydrate	g	5.37
Fiber, total dietary	g	2.3
Calcium, Ca	Mg	47
Iron, Fe	Mg	0.56
Magnesium, Mg	Mg	15
Phosphorus, P	Mg	23
Potassium, K	Mg	246
Sodium, Na	Mg	18
Zinc, Zn	Mg	0.18
Vitamin C	Mg	51
Thiamin	Mg	0.05
Riboflavin	Mg	0.03
Niacin	Mg	0.3
Vitamin B-6	Mg	0.095
Folate, DFE	µg	57
Vitamin A, IU	IU	126
Fatty acids, total saturated	Mg	0.023
MUFA	g	0.013
PUFA	g	0.087

Health Benefits of Cabbages

Cabbage is an Excellent Source of Dietary Fiber

Dietary fiber is good for human body. High fiber foods are good for weight loss as they take long time to get digested and also make you feel full for a long period of time. High fiber food aids in digestion, cures constipation, lowers blood cholesterol, cleanses the gastrointestinal tract and may reduce the risk of developing diabetes and colorectal cancer

Cabbage is Excellent Source of Vitamin C

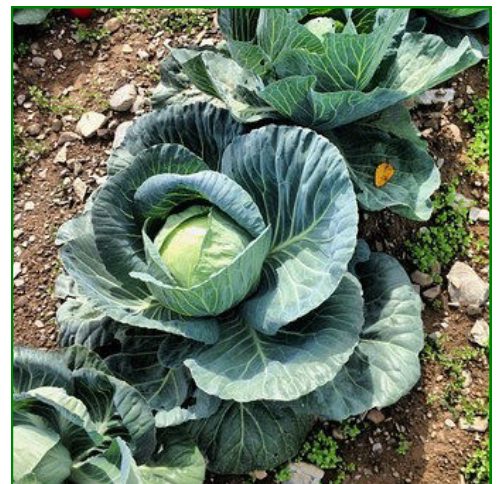
According to U.S. FDA (Food and Drug Administration), daily value (DV) of Vitamin C for an adult is 60mg (milligrams). It is a powerful antioxidant vitamin. Vitamin C helps in absorption of iron and calcium and also increases body's natural immunity. Vitamin C deficiency results in a disease called scurvy. Major symptoms of scurvy are bleeding gum, joint pain, and hair loss.

Cabbage is a Moderate Source of Potassium

According to U.S. FDA (Food and Drug Administration), daily value (DV) of Potassium for an adult is 3500mg (milligrams). Potassium is an essential mineral that plays an important role in lowering blood pressure. It is also needed by our body for carbohydrate metabolism, fluid balance, growth and development, heart function, muscle contraction, nervous system function and protein formation

Cabbage is a Good Source of Zinc

According to U.S. FDA (Food and Drug Administration), daily value (DV) of Zinc for an adult is 15mg (milligrams). Zinc is essential for growth and development, and it also strengthens body immune system. Zinc is essential for regulating functions of our nervous system. Zinc helps in clotting of blood, thus helping in wound healing, and for the synthesis and digestion of proteins. It also helps in regulation of blood sugar and cholesterol. Zinc deficiency results in diarrhoea, loss of appetite, rashes on skin, weakness in sensing, night blindness, weak immune system etc.



Cabbage is an Excellent Source of Vitamin K

According to U.S. FDA (Food and Drug Administration), daily value (DV) of Vitamin K for an adult is 80mcg(micrograms). Vitamin K is essential for the formation of strong bones, for blood clotting, and for preventing heart diseases, cancer, and osteoporosis. Vitamin K deficiency results in bleeding gums and bleeding nose

Cabbage is a Moderate Source of Vitamin E

According to U.S. FDA (Food and Drug Administration), daily value (DV) of Vitamin E for an adult is 30 IU. Cabbages contain moderate amounts of Vitamin E. It is a powerful antioxidant vitamin which helps in formation of new blood vessels and it also increases body's natural immunity.

Cabbage is a Good Source of Folate

According to U.S. FDA (Food and Drug Administration), daily value (DV) of folate for an adult is 400mcg. Folic acid or Folate is essential for energy production from food. It helps in synthesis of nucleic acids and proper functioning of immune system and blood production by facilitating functioning of iron and increasing production of RBCs. It also helps in controlling amino acid metabolism. Major deficiency symptoms include birth defects in new born babies, diarrhoea, hearing loss due to ageing, improper functioning of immune system, weakness, fatigue and headaches. Regular consumption of folic acid helps in slowing down progression of hearing loss with ageing; to prevent birth related defects in new born babies; for protection from cancer, heart diseases, depression and degeneration of body due to ageing; and to prevent memory loss and osteoporosis.

Cabbage is a Moderate Source of Iron

According to U.S. FDA (Food and Drug Administration), daily value (DV) of iron for an adult is 18mg. Iron is essential for RBC (red blood cell) formation and transfer oxygen between the tissues and within the blood. Red colour of blood is due to the presence of iron in it. Iron is essential for increasing body immunity and also for the synthesis of neurotransmitters. Iron deficiency results in anaemic appearances, and it also increases heart rate and breathing. Other symptoms of iron deficiency include poor immune system, yellowing of the body and severe headaches.

Growing Cabbage: Climate and Soil

Cool moist climate is the most ideal climate for growing cabbages. Sandy loam soil is considered best for early crop of cabbage. If high yields are desired, clay loam soils are the best. Optimum pH range for cabbage is between 5.5 and 6.5. Acidic soils should be avoided.

Growing Cabbage: Sowing Seeds

Seeds are sown in pre-treated nursery beds in August-September for the early crop and in September-October for late crop. In the hills seeds are sown from March to June for fresh vegetables and in July and August for seed production. Seed rate varies from 200-250 g per acre for the early crop to 300 g for the late crop. Seedlings are transplanted when four to six weeks old, depending on the season in a well-prepared field

Growing Cabbage: Manuring

Cabbage crop requires heavy manuring for its healthy growth. Research studies reveal that 50-ton yield per hectare of cabbage removes 220 kg of nitrogen from soil. So in order to get a good yield of crop, it is recommended that 200 to 250 quintals of farmyard manure (per one hectare of land area) or compost should be incorporated in the top soil about three weeks before transplanting to enhance soil fertility.

Fertilizer and Irrigation Schedule

First application of fertilizers may be done @325 kg of ammonium sulphate and potash per hectare 2-3 weeks before transplanting. Second application of fertilizers may be done @325 kg of ammonium sulphate as top-dressing about five to six weeks after the first application. Cabbage requires regular irrigation throughout its growth. Once heads are formed, light irrigation should be followed because a heavy irrigation may cause bursting of heads

Hoeing and Weeding

Hoeing and manual weeding are recommended for weed control. Weeding should be done in between irrigations. Deep hoeing is not recommended as it may damage cabbage roots.

Harvesting

Cabbage is harvested when the heads reach a suitable size for consumption. Cabbage heads at the time of harvesting should be firm but tender. Size of Head and Quality are two important criteria that are considered while grading cabbages

Storage Conditions

- Optimum Storage Temperature: Optimum storage temperature is 0 Degree Celsius
- Optimum Humidity is 90-95 % relative humidity

Yield

Yield varies from 30 to 35 tons per hectare (15-20tons/acre) for the early crop and 35 to 45 tons for the late crop. Seed Yield: Seed yield per hectare is about 500 to 650 kg.

Cabbage Disease: Black Leg

It is caused by a fungus called *Phoma lingam* and it destroys the base of the stem and roots resulting in plant wilt. Cabbage seedlings are more susceptible to this disease. It can effectively be controlled by crop rotation, and seed treatment and hot water treatment of seeds before sowing

Cabbage Disease: Yellowing

It is caused by a fungus called *Fusarium oxysporum*. Affected plants turn yellowish soon after transplanting. Plant growth remains stunted and defoliation occurs. It can effectively be controlled by cleaning and sterilization of seed-beds and by growing resistant varieties.



Seed Production in Cabbage

1. Head intact method: Head remains intact and only a cross-cut is given to the head in order to facilitate the emergence of the flower stalk.
2. Core Intact Method: In the core intact method, only the outside leaves are removed and the central portion is kept intact so that the flower stalks come out from here. Once flowering is over, seeds are collected and stored for further use.
3. The Stump Method: In this method, the head is removed and only the stump is left



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