



Broccoli- A health beneficial vegetable

Neha Tiwari

Polytechnic in Home Science, Junagadh Agriculture University, AMRELI (GUJARAT) INDIA

(Email : neha.jau14@gmail.com)

Broccoli is known to be hearty and tasty vegetable which is rich in dozens of nutrients. It is said to pack the most nutritional punch of any vegetable. Broccoli belongs to a family of vegetables called cruciferous vegetables and its close relatives include brussel sprouts, cauliflower, and cabbage. Broccoli contains sulforaphane, a sulfur-containing compound present in cruciferous vegetables. Researchers are studying the anti-cancer properties of sulforaphane and have come to some interesting conclusions, although more research is needed. As if that's



not enough, a cup of cooked broccoli offers as much vitamin C as an orange, and is a

good source of beta-carotene. Broccoli contains vitamins B1, B2, B3, B6, iron, magnesium, potassium, and zinc too. It also provides fibre and is low in calories. Broccoli is a smart carb and is high in fibre, which aids in digestion, prevents constipation, maintains low blood sugar, and curbs overeating. Furthermore, a cup of broccoli has as much protein as a cup of rice or corn with half the calories.

Broccoli nutrients : Broccoli rich in various nutrients (Table 1), that can ensure sound health and long life. Particularly, its vitamin C content is very high.

Health benefits of broccoli :

Cancer prevention : Broccoli shares these cancer fighting, immune boosting properties with other cruciferous vegetables such as cauliflower, Brussels sprouts and cabbage. Probably the most publicized health benefit of broccoli is its possible ability to help prevent cancer. "Broccoli is a cruciferous vegetable, and all vegetables in this group may be protective against some stomach and intestinal cancer. The American Cancer Society notes broccoli's isothiocyanates, including sulforaphane and indole-3-carbinol. These chemicals boost detoxifying enzymes and act as antioxidants, reducing oxidative stress. They also may affect estrogen levels, which may help reduce breast cancer risk.

Cholesterol reduction : Like many whole foods, broccoli is packed with soluble fibre that draws cholesterol out of

your body. Broccoli can help lower cholesterol because the soluble fibre in the vegetable binds with the cholesterol in the blood. This binding makes the cholesterol easier to excrete, and consequently lessens cholesterol levels in the body.



Detoxification : Phytochemicals glucoraphanin, gluconasturtiin and glucobrassicin compose a terrific trio in broccoli. Together, they aid all steps of the body's detoxification process, from activation to neutralization and elimination of contaminants. A study published in the journal Proceedings of the



National Academy of Sciences of the United States of America found that the sprouts of broccoli may be especially potent in this regard.

Heart health : In addition to reducing cholesterol, broccoli can aid in heart health by helping to keep blood vessels strong. The sulforaphane in broccoli is also an anti-inflammatory and may be able to prevent or reverse damage to blood vessel linings caused by chronic blood sugar problems. And the vegetable's B-complex vitamins can help regulate or reduce excessive homocysteine, according to the Harvard University School of Public Health. Excess homocysteine, an amino acid that builds up after a person eats red meat, increases the risk of coronary artery disease.

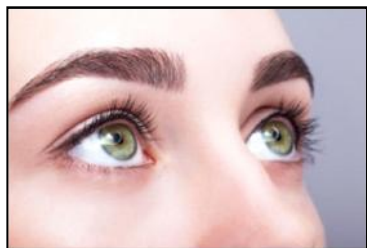
Eye health : "You've probably heard that carrots are good for your eyes, and that's because they contain lutein," Jarzabkowski said. "It's a compound antioxidant that's really good for eye health, and broccoli is also a great way to get it." Another antioxidant in broccoli called zeaxanthin is similarly beneficial. Both chemicals may help protect against macular degeneration, an incurable condition that blurs central vision, and cataracts, a clouding of the eye's lens.

Bone health : Broccoli contains high levels of both calcium

Table 1 : Nutritional consistency of Broccoli (per 100g of raw edible part)

Sr. No.	Constituents	Quantity
1.	Carbohydrates	6.64 g
	Sugar	1.7 g
	Dietary fibre	2.6 g
2.	Fat	0.37 g
3.	Protein	2.82 g
4.	Water	89.30 g
5.	Vitamins A equiv.	31 µg
6.	β-carotene	361 µg
7.	Thiamin (Vit. B1)	0.071 mg
8.	Riboflavin (Vit. B2)	0.117 mg
9.	Niacin (Vit. B3)	0.639 mg
10.	Pantothenic acid (B5)	0.573 mg
11.	Vitamin B6	0.175 mg
12.	Folate (Vit. B9)	63 µg
13.	Vitamin C	89.2 mg
14.	Calcium	47 mg
15.	Iron	0.73 mg
16.	Magnesium	21 mg
17.	Phosphorus	66 mg
18.	Potassium	316 mg
19.	Zinc	0.14 mg

Source : USDA nutrients database



and vitamin K, both of which are important for bone health and prevention of osteoporosis.

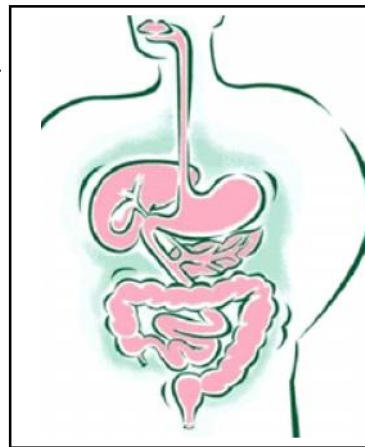
Digestion : Broccoli's digestive benefits, which she chalked up mostly to

the vegetable's high fibre content. Broccoli has nearly 1 gram of fibre per 10 calories. Fibre helps keep you regular and helps maintain healthy bacteria levels in the intestines. Broccoli also aids in digestion by helping to keep your stomach lining healthy. The sulforaphane in broccoli helps keep the stomach bacteria *Helicobacter pylori* from becoming overgrown or clinging too strongly to the stomach wall. A 2009 Johns Hopkins study on mice found that broccoli sprouts are especially good at helping in this way. Mice that were fed broccoli sprouts daily for two months reduced the levels of *H. pylori* in their stools by more than



40 per cent.

Anti-inflammatory benefits : Broccoli is a great anti-inflammatory and may slow down the damage to joints associated with osteoarthritis. A 2013 study at the University of East Anglia found that broccoli's sulforaphane may help people suffering from arthritis because this chemical "blocks the enzymes that cause joint destruction by stopping a key molecule known to cause inflammation."



Broccoli's isothiocyanates and omega-3 fatty acids also help to regulate inflammation. Furthermore, a 2010 study published in the journal *Inflammation Researcher* suggested that the flavonoid kaempferol lessens the impact of allergens, especially in the intestinal tract, which can reduce chronic inflammation.

Diet aid: Broccoli is a good carb and is high in fibre,

which aids in digestion, prevents constipation, maintains low blood sugar, and curbs overeating.

Health risks of Broccoli : In general, broccoli is safe to eat, and any side effects are not serious. The most common side effect is gas or bowel irritation, caused by broccoli's high amounts of fibre. "All cruciferous vegetables can make you gassy. "But the health benefits outweigh the discomfort."

According to The Ohio State University Wexner Medical Center, people taking blood-thinning medications should watch their broccoli intake, since the vegetable's vitamin K content may interfere with the medication's effectiveness. Those with hypothyroidism should also limit their intake of broccoli.

Selection and storage : Fresh broccoli heads can be available year around. In the market, choose fresh, bright, compact, firm textured flower heads with rich flavor. Avoid those with over mature florets featuring yellow flower buds, excessive branching and hollow stem ones. Whenever possible, buy organic farm produces to get maximum health benefits.

Once at home, rinse flower head by dipping it upside down in salted water for upto 30 minutes and then wash again in running cold water before use in cooking in order to remove any pesticide residues and dirt. Broccoli greens should also be treated in the same way as you do in washing any other greens like spinach.

Eat broccoli while they are fresh. Otherwise, it can be placed inside the refrigerator wrapped in a zip pouch where it may keep well for few days.

Raw, steamed or boiled: Which is more nutritious?:

The way you prepare broccoli can affect the amount of nutrients you get, and which ones. People looking to broccoli for its anticancer benefits will want to be sure not to cook the vegetable too long. A 2007 University



of Warwick study found that boiling broccoli can

undermine the effects of the food's good, cancer-fighting enzymes. Researchers studied the effects of boiling, steaming, microwave cooking and stir-fry cooking on fresh broccoli, Brussels sprouts, cauliflower and green cabbage.

Boiling led to the biggest losses of cancer-fighting nutrients. Steaming for upto 20 minutes, microwaving for upto three minutes and stir-frying for upto five minutes produced no significant loss of cancer-preventive substances. Raw broccoli maintains all of its nutrients, but it is also more likely to irritate your bowels and cause gas.

Tips for use: If you are interested in lowering cholesterol, the fibre-related components in broccoli do a better job of binding together with bile acids in your digestive tract when they've been steamed. When this binding process takes place, it's easier for bile acids to be excreted, and the result is a lowering of your cholesterol levels. Raw broccoli has slightly less effect on cholesterol but more in other areas.

Avoid overcooking broccoli as about half of its beneficial substances may be destroyed in the process. Also, microwaving is thought to remove valuable nutrients from broccoli.

Light steaming is best. Steam the broccoli for just a couple of minutes, until it turns bright green. Stop cooking while it still has a bit of firmness to it.

- Add broccoli and cauliflower to soups and stews.
- Eat broccoli or cauliflower raw or lightly steamed with dip or pour an Olive Oil Lemon Dressing over it.
- Chop lightly steamed broccoli and cauliflower and add to a pasta salad.
- Toss pasta with olive oil, pine nuts and steamed broccoli florets. Add salt and pepper to taste.
- Purée cooked broccoli and cauliflower, then combine with seasonings of your choice to make a simple, yet delicious, soup.
- Add broccoli florets and chopped stalks to omelettes.

For significant anti-cancer benefits, some researchers are recommending 3 cups per day. This means don't just use a garnish – cook up a lot.

Received : 27.07.2016

Revised : 22.10.2016

Accepted : 07.11.2016

RNI : UPENG /2006/18360

ONLINE ISSN : 0976-8343

ISSN : 0973-4899

Accredited By NAAS : NAAS Rating : 3.21

ASIAN JOURNAL OF BIO SCIENCE

An International Research Journal

Visit :www.researchjournal.co.in