

A Review on Benefits of Blue Berries

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Abstract: The health benefits of fruits have been exploited since ancient days. A healthy diet not only keeps away various chronic diseases and metabolic syndromes but also confers protection from the undesirable side effects of drugs. Habitual consumption of phyto nutrient rich fruits and vegetables is a potential strategy for the prevention or delay of various diseases. Berry fruits are rich in vitamins and antioxidant polyphenolics. Blueberries, in particular, are a rich source of antioxidant flavonoids, dietary fiber, trace elements, and vitamins. Their vast health-promoting potential includes scardio, neuro, hepato, and immuno-protection, making them a preferable dietary interventional choice. Moreover, research has reported that blueberry supplementation improved ocular health offset macular degeneration, and reduced urinary tract infection. The health benefits and nutrient content in this super fruit is summarized in this article.

Keywords: Nutrient, potential, strategy, vitamins, immuno protection.

1. Introduction

Blueberries can help heart health, bone strength, skin health, blood pressure, diabetes management, cancer prevention, and mental health. One cup of blueberries provides 24 percent of a person recommended daily allowance of vitamin C. As well as anthocyanins, vitamins, and minerals, blueberries contain a diverse range of phenolic compound such as quercetin, kaempferol, myricetin, and chlorogenic acid. These contribute to the antioxidant capacity of blueberries.

2. Botanical source

Blueberries Are Low in Calories, But High in Nutrients

The blueberry bush (*Vaccinium* sect. *Cyanococcus*) is a flowering shrub that produces berries with a bluish, purple hue -also known as blueberries. It is closely related to similar shrubs, such as those that produce cranberries and huckleberries. Blueberries are small around 0.2-0.6 inches (5-16 millimeters) in diameter and feature a flared crown at the end. They are green in color when they first appear, then deepen to purple and blue as they ripen.

The two most common types are:

- High bush blueberries: The most common cultivated variety in the US.
- Low bush or "wild" blueberries: Typically, smaller and richer in some antioxidants.

Blueberries are among the most nutrient-dense berries. A 1-cup

(148grams) serving of blueberries contains:

- Fiber: 4 grams
- Vitamin C: 24% of the RDI
- Vitamin K: 36% of the RDI
- Manganese: 25% of the RDI
- Small amounts of various other nutrients

They are also about 85% water, and an entire cup contains only 84 calories, with 15 grams of carbohydrates. Calorie for calorie, this makes them an excellent source of several important nutrients.

A. Description

Blueberries have a sweet flavor, and they are succulent and nutritious. Blueberries can be eaten freshly picked or incorporated into a variety of recipes. Blueberries contain a plant compound called anthocyanin. A type of flavonoid called anthocyanin gives blueberries many of their health benefits. Flavonoids are plant compounds that often have a powerful antioxidant effect.

Anthocyanin is responsible for the blueberry's characteristic blue color. It also contributes to the numerous advantages of blueberries. Consuming a variety of fruits and vegetables has long been associated with a reduced risk of many lifestyle-related health conditions. Many studies have suggested that increasing consumption of plant foods such as blueberries decreases the risk of obesity, diabetes, heart disease, and overall mortality. Plant foods may also promote hair and skin health, increased energy, and overall lower weight.

3. Scientific classification

Commercially offered blueberries are usually from species that naturally occur only in eastern and North-Central North America. Other sections in the genus, native to other parts of the world, including the Pacific Northwest and southern United States, South America, Europe, and Asia, include other wild shrubs producing similar-looking edible berries, such as huckleberries and whortleberries (North America) and bilberries (Europe). These species are sometimes called "blueberries" and sold as blueberry jam or other products. The names of blueberries in languages other than English often translate as "blueberry", e.g., Scots *blueberry* and Norwegian *blabar*. *Blueberry*, *blabær* and French *myrtilles* usually refer to the European native bilberry (*V. myrtillus*), while *bluest* refers

to the North American blueberry. Russian blue berry does not refer to blueberries, which are non-native and nearly unknown in Russia, but rather to their close relatives, bog bilberries (*V. uliginosum*).

Cyanococcus blueberries can be distinguished from the nearly identical-looking bilberries by their flesh color when cut in half. Ripe blueberries have light green flesh, while bilberries, whortleberries and huckleberries are red or purple throughout.

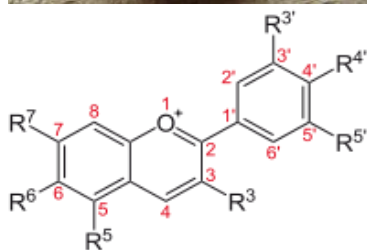
4. Action and medical uses

Blueberry is a plant; people use the fruit and leaves to make medicine. Outside of the United States, the name "blueberry" may be used for a plant called bilberry in the U.S.

Blueberry is used for a variety of conditions including improved memory and thinking skills, prevention of cancer and heart disease, and treatment of urinary tract infections (UTIs) and depression. But there is limited scientific research to support any of these uses.

How does it work?

Blueberry, like its relative the cranberry, might help prevent bladder infections by stopping bacteria from attaching to the walls of the bladder. Blueberry fruit is high in fiber which could help normal digestive function. It also contains vitamin C and other antioxidants. Blueberry also contains chemicals that might reduce swelling and destroy cancer cells.



Often labeled a super food, they are low in calories and incredibly good for you.

They're so tasty and convenient that many people consider them their favorite fruit.

Chemical constituents:

- 0 g of cholesterol, 1.1 g of protein, 0.49 g of fat, 21.45 g of carbohydrate, 3.6 g of dietary fiber, 14.74 g of total sugars.

That same one-cup serving provides:

- 24 percent of daily vitamin C, 5 percent of daily vitamin B6, 36 percent of daily vitamin K.

Blueberries also provide:

- 9 milligrams (mg) calcium, 0.41 mg of iron, 114 mg of potassium, 9 mg of magnesium, 18 mg of phosphorus, 1 mg of sodium, 0.24 mg of zinc, 9 mg of folate

Blueberries also contain Copper, β -carotene, folate, choline, vitamins A and E, and manganese. As well as anthocyanins, vitamins, and minerals, blueberries contain a diverse range of phenolic compounds such as quercetin, kaempferol, myricetin, and chlorogenic acid. These contribute to the antioxidant capacity of blueberries.

The large quantities of bioactive compounds place blueberries high on the Aggregate Nutrient Density Index (ANDI). This index rates foods based on their vitamin and mineral content, phytochemical composition, and antioxidant capacity. Blueberries are available fresh, frozen, freeze dried, and in jellies, syrups, and jams. Be sure to check the label of frozen and dried blueberries for added sugars. When selecting jellies or jams, choose all-fruit spreads without added sweeteners, juices, or fillers.

Here are some quick tips on including blueberries in meal options:

- Use blueberries as fresh toppings on oatmeal, waffles, pancakes, yogurt, or cereal for an extra burst of flavor and nutrition in your breakfast.
- Whip up a quick and easy smoothie using frozen berries, low-fat milk, and yogurt.
- Mix fresh or dried blueberries into a spinach salad with walnuts and feta cheese.
- Fold blueberries into muffins and sweet breads.

Blend them in a food processor with a little water, as part of fresh syrup to top desserts or breakfast foods.

Here are 10 proven health benefits of blueberries-

- Blue berries are low in calories but high in nutrients:
- The blueberry bush (*Vaccinium* sect. *Cyanococcus*) is a flowering shrub that produces berries with a bluish, purple hue also known as blueberries.
- It is closely related to similar shrubs, such as those that produce cranberries and huckleberries.
- Blueberries are small — around 0.2–0.6 inches (5–16 millimeters) in diameter — and feature a flared crown at the end.
- They are green in color when they first appear, then deepen to purple and blue as they ripen.
- The two most common types are:
- High bush blueberries: The most common cultivated variety in the US.
- Low bush or wild blueberries: Typically, smaller and richer in some antioxidants.
- Blueberries are among the most nutrient-dense berries. A 1-cup (148-gram) serving of blueberries contains:
- Fiber: 4 grams
- Vitamin C: 24% of the RDI (Reference Daily Intake)
- Vitamin K: 36% of the RDI

- Manganese: 25% of the RDI
- Small amounts of various other nutrients
- They are also about 85% water, and an entire cup contains only 84 calories, with 15 grams of carbohydrates.
- Calorie for calorie, this makes them an excellent source of several important nutrients.
- The blueberry is a very popular berry. It is low in calories but high in fiber, vitamin C and vitamin K.

1) *Blueberries are the King of Antioxidant Foods*

- Antioxidants protect your body from free radicals, which are unstable molecules that can damage your cells and contribute to aging and diseases, such as cancer.
- Blueberries are believed to have one of the highest antioxidant levels of all common fruits and vegetables
- The main antioxidant compounds in blueberries belong to a family of polyphenols antioxidants called flavonoids.
- One group of flavonoids in particular anthocyanins is thought to be responsible for much of these berries' beneficial health effects.
- Blueberries have been shown to directly increase antioxidant levels in your body.
- Blueberries have the highest antioxidant capacity of all the popular fruits and vegetables. Flavonoids appear to be the berries' antioxidant with the greatest impact.

2) *Blueberries Reduce DNA Damage, Which May Help Protect Against Aging and Cancer*

- Oxidative DNA damage is an unavoidable part of everyday life. It is said to occur tens of thousands of times per day in every cell in your body.
- DNA damage is part of the reason we grow older. It also plays an important role in the development of diseases like cancer.
- Because blueberries are high in antioxidants, they can neutralize some of the free radicals that damage your DNA.
- In one study, 168 people drank 34 ounces (1 liter) of a mixed blueberry and apple juice daily. After four weeks, oxidative DNA damage due to free radicals was reduced by 20%.
- These findings agree with smaller studies that use either fresh or powdered blueberries.
- Several studies suggest that blueberries and blueberry juice reduce DNA damage, which is a leading driver of aging and cancer.

3) *Blueberries protect cholesterol in your blood from becoming damaged*

- Oxidative damage is not limited to your cells and DNA.
- It is also problematic when your "bad" LDL cholesterol is oxidized.

- In fact, oxidation of "bad" LDL cholesterol is a crucial step in the heart disease process.
- The antioxidants in blueberries are strongly linked to reduced levels of oxidized LDL. This makes blueberries very good for your heart.
- A daily 2-ounce (50grams) serving of blueberries lowered LDL oxidation by 27% over eight weeks in obese people who were obese.
- Another study determined that eating 2.5 ounces (75 grams) of blueberries with a main meal significantly reduced the oxidation of "bad" LDL cholesterol.
- The antioxidants in blueberries have been shown to reduce a predominant risk factor for heart disease by preventing oxidative damage to "bad" LDL cholesterol.

4) *Blueberries may lower blood pressure:*

- Blueberries appear to have significant benefits for people with high blood pressure, which is a major risk factor for heart disease.
- In an eight-week study, obese people who had had a high risk of heart disease noted a 4-6% reduction in blood pressure after consuming 2 ounces (50 grams) of blueberries per day.
- Other studies have observed similar effects especially for postmenopausal women.
- Regular blueberry intake is tied to lower blood pressure in numerous studies.

5) *Blueberries may help prevent heart disease*

- While eating blueberries may lower blood pressure and oxidized LDL cholesterol, it's important to keep in mind that these are risk factors not actual diseases.
- It would be much more informative to know whether blueberries help prevent hard endpoints like heart attacks, which are the world's leading cause of death.
- A study in 93,600 nurses found that those with the highest intake of anthocyanins the main antioxidants in blueberries were at a 32% lower risk of heart attacks compared to those with the lowest intake.
- Because this was an observational study, it cannot prove that the anthocyanins alone caused the reduction in risk.
- More studies are needed before any claims can be made.
- Some evidence indicates that eating fruits rich in anthocyanins such as blueberries is associated with a reduced risk of heart attacks.

6) *Blueberries can help maintain brain function and improve memory*

- Oxidative stress can accelerate your brain's aging process, negatively affecting brain function.
- According to animal studies, the antioxidants in blueberries may affect areas of your brain that are essential for intelligence.

- They appear to benefit aging neurons, leading to improvements in cell signaling.
 - Human studies have also yielded promising results.
 - In one of these studies, nine older adults with mild cognitive impairment consumed blueberry juice every day. After 12 weeks, they experienced improvements in several markers of brain function.
 - A six-year study in over 16,000 older individuals found that blueberries and strawberries were linked to delays in mental aging by up to 2.5 years.
 - The antioxidants in blueberries seem to benefit your brain by aiding brain function and delaying mental decline.
- 7) *Anthocyanins in blueberries may have anti-diabetes effects:*
- Blueberries provide moderate amounts of sugar compared to other fruits. One cup (148 grams) holds 15 grams of sugar, which is equivalent to a small apple or large orange. However, the bioactive compounds in blueberries appear to outweigh any negative impact of the sugar when it comes to blood sugar control. Research suggests that anthocyanins in blueberries have beneficial effects on insulin sensitivity and glucose metabolism. These anti-diabetes effects occur with both blueberry juice and extract.
 - In a study in 32 obese people with insulin resistance, two blueberry smoothies daily caused major improvements in insulin sensitivity.
 - Improved insulin sensitivity should lower the risk of metabolic syndrome and type 2 diabetes, which are currently two of the world's biggest health problems.
 - Several studies demonstrate that blueberries have anti-diabetes effects, improving insulin sensitivity and lowering blood sugar levels.
- 8) *May help fight urinary tract infections*
- Urinary tract infections (UTIs) are a common problem for women.
 - It is widely known that cranberry juice can help prevent these types of infections.
 - Because blueberries are closely related to cranberries, they boast many of the same active substances as cranberry juice.
 - These substances are called anti-adhesives and help prevent bacteria like E.coli from binding to the wall of your bladder.
 - Blueberries have rarely been studied for their impact on UTIs, but they likely have similar effects as cranberries. Like cranberries, blueberries contain substances that can prevent certain bacteria from binding to the wall of your bladder, which may help prevent UTIs.
- 9) *Blueberries may reduce muscle damage after strenuous exercise*
- Strenuous exercise can lead to muscle soreness and fatigue.
 - This is driven partly by local inflammation and oxidative stress in your muscle tissue.
 - Blueberry supplements may lessen the damage that occurs at a molecular level, minimizing soreness and reduced muscle performance.
 - In a small study in 10 female athletes, blueberries accelerated muscle recovery after strenuous leg exercises. One study suggests that blueberries may aid muscle recovery after strenuous exercise, though more research is needed.
 - Blueberries are incredibly healthy and nutritious.
 - They boost your heart health, brain function and numerous other aspects of your body.
- 10) *Risks*
- People who are taking blood-thinners, such as warfarin, must not suddenly change their intake of blueberries or other sources of vitamin K. Vitamin K plays a key role in blood clotting, and it could affect the blood-thinning action of the drug. The overall diet is more important than any single food in preventing disease and achieving good health. It is better to eat a varied diet as the key to healthful living, rather than to concentrate on individual food.

5. Conclusion

Blueberries are a rich source of polyphenols, which include anthocyanin bioactive compounds. Epidemiological evidence indicates that incorporating blueberries into the diet may lower the risk of developing type 2 diabetes (T2DM). These findings are supported by pre-clinical and clinical studies that have shown improvements in insulin resistance (i.e., increased insulin sensitivity) after obese and insulin-resistant rodents or humans consumed blueberries. Insulin resistance was assessed by homeostatic model assessment-estimated insulin resistance (HOMA-IR), insulin tolerance tests, and hyperinsulinemic-euglycemic clamps. Additionally, the improvements in glucose tolerance after blueberry consumption were assessed by glucose tolerance tests. However, firm conclusions regarding the anti-diabetic effect of blueberries cannot be drawn due to the small number of existing clinical studies. Although the current evidence is promising, more long-term, randomized, and placebo-controlled trials are needed to establish the role of blueberries in preventing or delaying T2DM. Blueberries, bilberries, strawberries, cranberries, berries, anthocyanins, diabetes, insulin, glucose, diabetes.

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