



Red raspberry

# Berries

## Healthiest Foods on Earth

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Berries, belongs to several families, such as Rosaceae (strawberry, blackberry, raspberry), and Ericaceae (blueberry, cranberry). They are rich source of several health promoting bioactive compounds and have delicious taste and flavor. Berries have generally high amount of sugars (glucose, fructose), but low in calories. They contain high dietary fiber (cellulose, pectin), organic acids (citric acid, malic acid, tartaric, oxalic), some minerals, vitamins (ascorbic acid and folic acid) and several phytochemicals, such as phenolic compounds. Among phenolic compounds include flavonoids, such as anthocyanins, and flavonols. Since berries are



abundant in several bioactive compounds so these have several health benefits.

#### Strawberry

Strawberry belongs to genus *Fragaria*, commonly cultivated variety is *F. × ananassa* and family *Rosaceae*, strawberries are popular due to their desirable sweet taste and attractive aroma, with smooth texture and red color. Fresh strawberries have ascorbic acid ranges from 5 to 50 mg/100 g fresh weight, in some cultivars up to 80 mg/100 g fresh weight. Strawberries are used as folk medicine as a potential remedy, due to their astringent and diuretic properties. They help to heal skin diseases and wounds, and the juice for inflammation of the nerves and lungs, the leaf extract of strawberries has anti-diabetic, antioxidant, anti-inflammatory and anti-apoptosis effects.

### RED RASPBERRY

Red raspberry belongs to genus *Rubus*, commonly cultivated variety: *R. idaeus* and family *Rosaceae*. Raspberries are known as bramble fruit. They are very popular for their attractive flavor (taste and aroma).

### BLUEBERRY

Blueberries are blue colored fruit; belong to the genus *Vaccinium* and family *Ericaceae*. They are classified according their height. Rabbit eye blueberries (*Vaccinium ashei*), *Vaccinium*

*angustifolium* (lowbush blueberry) and *Vaccinium corymbosum* (highbush blueberry).

### BLACKBERRIES

Blackberries belong to genus *Rubus*, commonly cultivated variety is *Rubus fruticosus* and family *Rosaceae*.

### CRANBERRIES

The cultivated cranberry *Vaccinium macrocarpon*, belongs to the *Ericaceae* family. Cranberries are good source of vitamins, such as ascorbic acid. Fresh cranberries contain 134 mg/100 g ascorbic acid.

## HEALTH BENEFITS OF BERRIES

### 1. Antioxidants

Antioxidants are compounds responsible for removal of free radicals. These free radicals normally occur in the human body or from external cause such as air pollutants, cigarette smoking and industrial chemicals. Excessive amount of free radicals can cause oxidative damage to cells, eventually leading to many chronic diseases such as atherosclerosis, cancer, diabetics, arthritis, cardiovascular diseases, chronic inflammation, aging and other degenerative diseases in humans.

Berries are a great source of antioxidants, such as anthocyanins, ellagic acid and resveratrol. These berries protect our cells



Blackberry



Blueberry



Cranberry

and may reduce the risk of disease. Blueberries, blackberries and raspberries have the highest antioxidant activity than commonly consumed fruits.

### ANTIOXIDANT ACTIVITY OF BERRIES

- Strawberries have antioxidant activity is due to the presence of anthocyanins which show human tumor cell anti-proliferative activities. Thus, they are helpful for suppressing the growth of human oral, colon, and prostate cancer cells
- Blueberries are packed with antioxidants; major contributors to their antioxidant activity are mainly anthocyanins, responsible for about 84% of total antioxidant capacity that may help keep memory sharp as you age. Blueberries containing proanthocyanidins, anthocyanins, and flavonols are beneficial in bone protection.
- Raspberries are also great source of vitamins such as ascorbic acid, generally ranges from 5 to 40 mg/100 g fresh weight. The antioxidant capacity of raspberries is due to various bioactive i.e. anthocyanins, tannins, total phenolics, and ascorbic acid. Phenolic compounds (p-coumaric acid or ellagic acid) are mainly responsible for its antioxidant capacity than anthocyanins and ascorbic acid.
- Blackberries are considered to be a promising source of active compounds with neuroprotection qualities against age-related diseases, such as neurodegeneration. It contains ascorbic acid ranges from 5–30 mg/100 mg fresh weight.
- Cranberry and its byproducts are known to prevent and treat urinary tract infections. This is due to the presence of proanthocyanidins in cranberries that can prevent adhering of *Escherichia coli* in the urinary tract cells. Cranberries could also be used for stomach ulcers.



Strawberry

## 2. Improve Blood Sugar and Insulin Response

- Raspberries could also be helpful in the diet targeted for managing early stages of type II diabetes and hypertension.
- Blueberries also exhibit anti-diabetic properties.

## 3. High in Fiber

- All berries are great sources of fiber, a nutrient important for a healthy digestive system.

## 4. Vitamins

S. No Berries Ascorbic acid (mg/100g)FW

|    |            |              |
|----|------------|--------------|
| 1. | Strawberry | 5 to 50 mg   |
| 2. | Blackberry | 5 to 30 mg   |
| 3. | Raspberry  | 5 to 40 mg   |
| 4. | Blueberry  | 10 to 100 mg |
| 5. | Cranberry  | 134 mg       |

## 5. Lower Cholesterol Levels

- Antioxidants in strawberries help to lessen the risk of cardiovascular incidents by inhibition of LDL-cholesterol (low density lipids) oxidation.
- Blueberries could also be used for

decreasing blood pressure, decreasing of blood cholesterol and, therefore, lowering of cardiovascular risk and atherosclerosis prevention.

- Extracted compounds from cranberry have shown the prevention and reduction of the cardiovascular disease risks and protection against lipoprotein oxidation.
- 6. Protect Against Cancer
  - It is known that some compounds present in strawberries, such as ellagic acid and quercetin have demonstrated anti-cancer activity. Anthocyanins show antioxidant and human tumor cell anti-proliferative activities. They could suppress the growth of human oral, colon, and prostate cancer cells
  - Blueberry phytochemicals could inhibit growth and metastatic potential of breast and colon cancer cells. The synergistic effect of polyphenol compounds and ascorbic acid correlate with inhibition of cancer cell proliferation, inhibit the growth of tumor cells.
  - It has been reported that Raspberry extracts have shown anti-proliferative effects to suppress the growth of human colon, prostate, breast, and oral tumor cells.