

# CRANBERRIES

## HEALTH BENEFITS

There are many types of berries: blueberries, blackberries, cranberries, red and black raspberries, loganberries, currants, strawberries, gooseberries, cloudberry, boysenberries, lingonberries, goji berries, elderberries, acai berries, juniper berries, mulberries, grapes, and elderberries.

Berries are naturally low in calories and contain many nutrients such as lutein, calcium, manganese, folic acid, potassium, vitamin K, and omega-3 fatty acids. Berry fruits also contain two main types of antioxidants: polyphenols and ascorbic acid. Antioxidants, particularly phenolic antioxidants present in cranberries, provide some health benefits<sup>1</sup>. The high free radical scavenging ability of the phenolic acids has been suggested as the reason for the biological benefits of berries and fruit. They can affect enzyme activity in cells and activate or inactivate many genes.

There are many thousands of polyphenols that are grouped according to their chemical make-up: phenolic acids, phenolic alcohols, anthocyanins, flavonols, flavones, flavonoids, chalcones, stilbenes, tannins, and lignans<sup>2</sup>. The polyphenolic compo-

sition of berries varies with the species, variety, degree of ripeness and type of processing<sup>3</sup>. Phenolic compounds found in cranberries are tannic acid, catechin, epicatechin, procyanidin A2 and p-coumaric acid<sup>4</sup>. The polyphenols in cranberries and other fruits and vegetables have been reported to be effective in the prevention of certain chronic diseases.

Cranberry fruits and leaves have been used to treat a variety of medical conditions, such as wounds, urinary disorders, diarrhea, diabetes, stomach ailments and liver problems in herbal medicine throughout history<sup>5</sup>. Recently, cranberry products have been used in the prevention and treatment of urinary tract and *Helicobacter pylori* infections. *H. pylori* infection can lead to stomach ulcers or even gastric cancer over time.



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### SPECIAL POINTS OF INTEREST

Berries are naturally low in calories and contain many nutrients.

Cranberry fruits and leaves have been used to treat a variety of medical conditions.

# WHY DO WE NEED ANTIOXIDANTS?

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Certain conditions such as exercise, smoking, sunlight exposure and certain medications can cause an overproduction of oxidants, leading to an imbalance of oxidants and antioxidants in the body. The result of this imbalance is oxidative damage to lipids, DNA, and proteins. Oxidative damage can increase the risk for many chronic diseases such as cancer, heart disease, diabetes and obesity and may be prevented or delayed

by dietary antioxidants found in fruits and vegetables<sup>6</sup>. In normal metabolism, the levels of oxidants and antioxidants in humans are maintained in balance<sup>6</sup>. This is important for sustaining optimal physiological condition. Recent studies have shown that phytochemicals in fruits and vegetables are compounds that help to eliminate harmful oxidants and are, therefore, beneficial to human health.

# RESEARCH FINDINGS ON CRANBERRIES

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## URINARY TRACT INFECTIONS

There is some evidence that cranberries can be used for the **prevention** of urinary tract infections (UTI)<sup>6</sup>. The cranberry proanthocyanidins inhibit the adhesion of *Escherichia coli* in the urinary tract, the bacteria responsible for these infections, thereby reducing infections. Once an infection sets in, however, antibiotic treatment is required. Cranberry polyphenols cannot be used for treatment of UTI.



Cranberry Juice

## STOMACH ULCERS

Research has revealed that the cause of stomach ulcers is an infection by *Helicobacter Pylori*. Cranberry constituents can inhibit the adhesion of *H. pylori* to human gastric mucus<sup>1</sup>. A randomized, double-blind human trial found significantly lower levels of *H. pylori* infection in adults consuming cranberry juice.

## CANCER

Consumption of flavonoids (flavanols and anthocyanins) in fruits and vegetables can potentially reduce the incidence

of several chronic diseases<sup>7</sup>. In studies on cell cultures, they stopped or decreased the growth of various cancer cells. Antiproliferative means preventing rapid cell growth. Rapid cell growth occurs during growth and in special cells called stem cells. Proliferation also occurs in disease conditions such as cancer. Several fruit and berry flavonoids have shown relatively potent antiproliferative activities on various cancer cell cultures.

Cyclooxygenase is an enzyme responsible for various enzymatic reactions in the body. Cyclooxygenase-1 (COX-1) may be

# RESEARCH FINDINGS ON CRANBERRIES (CON'T)

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increased in cancer, while cyclooxygenase-2 (COX-2) is an enzyme produced during inflammation. Inhibition of COX-1 and-2 by fruit and vegetable phytochemicals, particularly anthocyanins, may lead to a decreased risk for the development of some cancers<sup>8</sup>.

## HEART DISEASE

Berries have also been suggested to play a role in the prevention of heart disease<sup>6</sup>. This is likely due to the high antioxidant capacity of most berries including cranberries. The antioxidants preserve the lipids in arterial walls and thereby reduce clot formation and the risk for build-up of fatty deposits in arteries.

## DENTAL CARIES

Cranberry juice polyphenols can prevent the adhesion of caries producing bacteria to the tooth surface, reducing the risk for caries significantly after several weeks<sup>9</sup>. A combination of fluoride mouth rinse with cranberry polyphenols is an effective treatment to reduce caries development<sup>10</sup>. However, sweetened cranberry products are not effective.

## OBESITY

Recent studies show that polyphenols from berries and tea may also be effective in *preventing* obesity. The polyphenols inhibit the amount of fat that is absorbed from foods as they pass through the intestinal track<sup>11</sup>, resulting in more fat being excreted in feces. The polyphenols also suppress new fat cell formation and increase the oxidation of fat by brown fat cells<sup>12</sup>. There is an overall greater fat oxidation with increased polyphenol intake. However, berry and tea phytochemicals are not a treatment for obesity.

## GLYCEMIC CONTROL

Polyphenols influence starch digestion in the gut and slow the release of glucose in the bloodstream thereby reducing spikes in blood glucose and insulin levels<sup>11</sup>. They can also make muscle cells more efficient in how they use blood glucose and in this way bring overall blood glucose levels closer to normal.



Cranberries

# SUMMARY

Oxidative stress contributes to the development of chronic diseases, including cancer, cardiovascular disease, hypertension, diabetes, and obesity. Dietary polyphenols have been found to combat oxidative stress and reduce harmful oxidants in the cells. Fruits, berries, whole grains and tea have a variety of polyphenols that act as antioxidants in the body and remove harmful compounds.

The Dietary Guidelines for Americans (2010) and American Cancer Society recommend 2 cups of fruit and 2½ cups of vegetables a day as part of a healthy diet. The recommendation stems from findings that show a reduced risk for chronic diseases in those that regularly consume the recommended amounts of fruits and vegetables. A serving of fruit is 1 cup of raw or cooked fruit; ½ cup of dried fruit, such as dried cranberries; or 1 cup of 100% fruit juice.

Dietary polyphenols are not to be used as a treatment for chronic diseases, but as a prophylaxis. Once a chronic disease has been diagnosed, a medical treatment recommended by a physician must commence.

## References:

1. Vatter DA, et al. Asia Pac J Clin Nutr 14 (2):120-130 2005.
2. Tsao R. Nutrients 2:1231-1246, 2010; doi:10.3390/nu2121231
3. Häkkinen SH, et al. J Agric Food Chem 47(6):2274-2279, 1999.
4. Biswas, J Nutr Food Sci 3:1, 2013.
5. Herbs at a Glance. Cranberries. National Center for Complementary and Alternative Medicine (NCCAM). Available at: <http://nccam.nih.gov/health/cranberry/>
6. Birben E et al. WAO Journal 5:9-19, 2012.
7. Weaver JL, et al. Int J ONCOLOGY 34: 777-786, 2009
8. Neto C. J. Nutr. 137:186S-193S, 2007.
9. Bonifait L and Grenier D. J Can Dent Assoc. 76:a130, 2010.
10. Koo H, Duarte S, et al. Caries Res. 44(2):116-126, 2010.
11. Boath AS, Grussu D, et al. Food Dig 3:1-7, 2012.
12. Meydani M and Hasan ST. Nutrients 2:737-751, 2010; doi:10.3390/nu2070737

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- Clinical Obesity Research
- Experimental Obesity
- Functional Foods
- Health and Performance Enhancement
- Nutrition and Chronic Diseases
- Nutrition and the Brain
- Dementia, Alzheimer's and Healthy Aging
- Diet, Exercise, Weight Loss & weight Loss Maintenance

The research fostered in these areas can have a profound impact on healthy living and on the prevention of common chronic diseases, such as heart disease, cancer, diabetes, hypertension and osteoporosis.

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## MISSION

Our mission is to discover the triggers of chronic diseases through innovative research that improves human health across the lifespan. We are helping people live Well Beyond the Expected.

## VISION

Our vision is to lead the world in eliminating chronic diseases.

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