

Caneberries - An Important Food in a Healthy Diet

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Caneberries, some of the oldest known fruits to man have been used throughout the centuries for medicinal purposes as well as for subsistence. Many of the little-known aspects of history, cultivation, nutritional properties, and food uses of these berries, so cherished in summer cobbles, pies, and traditional American foods, are discussed.

Caneberries, is an umbrella term that included familiar berries, such as red and black raspberries, Marionberries, Evergreen blackberries and Boysenberries. This group of berries all grow on leafy canes in temperate regions of the world. It wasn't until the 19th century, however, that cultivated caneberry production developed in the Western United States especially in the state of Oregon.

Caneberry History

Almost two centuries ago, settlers crossed the vast deserts and plains of America via the Oregon trail, reaching what they called the "oasis at the end," the lush Willamette Valley. Here they found an abundance of berries on the sandy soils near the rivers and streams. Natives and early settlers alike cherished the wild berries, eating them fresh, using their juice as dye for clothing, making beverages and sweetening dry meats or pemmican. These original berries, such as the trailing blackberry, were cultivated and improved through natural selection. New varieties were introduced to capitalize on the ideal berry-growing climate and soil conditions. In a short time the Oregon Territory and later the state of Oregon became the premiere berry producing region in the United States.

Caneberries Offer Good Nutrition

Caneberries are a nutritious product. They are a source of carbohydrates and dietary fiber, while they contain a number of vitamins and minerals like vitamins A and C, calcium and iron. With less than 1 percent of their calories coming from fat, caneberries can be labeled as a fat free food and are considered an excellent ingredient in low fat and non fat formulations. Fruit purees are becoming increasingly popular as partial fat replacers in baked foods, and caneberry puree fits the bill perfectly. Fruit purees, including caneberry purees, provide moisture and mouthfeel, characteristics which are often lacking in low fat and non fat formulations. Using fruit purees enables food formulators to create products which are low in fat yet high in fiber, vitamins and minerals. [Table 1](#) shows the nutritional breakdown of caneberries.

Caneberry co-products like frozen caneberries and juices and purees are sources of important vitamins and minerals, like vitamins A and C, calcium and iron. For example, calcium values of about 80 mg/100g have been reported for red raspberry juice concentrate, which corresponds to 8% of the RDI (Recommended Daily Intake) for this mineral. Vitamin C values for block frozen and IQF (Individually Quick Frozen) red raspberries have been reported at 17.5 and 15.3g/100g respectively which correspond to 25% and 29% of the RDI for this vitamin.

Caneberries and caneberry co-products contain varying levels of dietary fiber, ranging from 1-6 g per 100g. Evergreen blackberries have been reported to contain the highest level of dietary fiber among caneberries. Dietary fiber values for block frozen and IQF Evergreen blackberries have been reported at 5.6g and 5.8g per 100g respectively corresponding to about 23 percent of the DRV (Daily Recommended Value) for this nutrient. One hundred grams of frozen Marionberries provide 19 percent of the DRV for dietary fiber.

Caneberries offer an easy way to add fiber and other important vitamins to the diet. Eaten as a snack, or incorporated into food formulations, caneberries are a delicious way to eat healthier.

Nutraceutical Properties

More than just a delicious snack or a highly functional food ingredient, caneberries are now recognized as a nutritious food containing components known as nutraceuticals. The term nutraceutical was first coined by the Foundation for Innovation in Medicine in 1989 to name the rapidly growing area of biomedical research which links nutrition and health. In recent years, scientific and medical professionals from around the world have delved deeper into the link between diet and health and discovered a correlation. "A nutraceutical can be defined as any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease. Such products may range from isolated nutrients, dietary supplements and diets, to genetically engineered "designer" foods, herbal products and processed foods such as cereals, soups and beverages (1)." This list also includes whole foods, such as fruits and vegetables that contain naturally occurring phytochemicals (substances found in edible fruits and vegetables that may be ingested by humans and that exhibit a potential for modulating human metabolism favorable for cancer prevention *2*), vitamins, minerals and antioxidants. Specific nutraceuticals have been shown to reduce serum triglyceride levels, improve intestinal health, prevent tissue oxidation and lower serum cholesterol levels.

Caneberries have been included in the list of foods containing the components linked to the prevention of diseases such as cancer and heart disease.

Ellagic Acid

Caneberries, along with blueberries, strawberries and apples, contain a ellagic acid, a naturally occurring organic acid that, according to medical studies inhibits the initiation of cancer cells induced by certain chemicals. In its natural form in fruits, ellagic acid is bound to glucose and may possibly protect plants against microbial infections. At this time its primary function is still unknown. However, this acid has been reported to "prevent pro carcinogens from breaking down and may act as a trapping agent for carcinogenic metabolites (3)." Purified ellagic acid, used medically to slow blood clotting time, appears to be effective against four classes of chemical carcinogens: nitrosamines, aflatoxin, polycyclic aromatic hydrocarbons, and aromatic amines.

Research on the presence of ellagic acid in red raspberries is currently underway at Hollings Cancer Research Center at the Medical University of South Carolina. According to Dr. Daniel Mixon, the ellagic acid present in red raspberries is absorbed by the human body. Studies on "at risk" and "high risk" human cancer subjects are underway to determine if the concentrations of

ellagic acid in the blood can actually block the development of cancer. Other research in laboratory mice and rats has proven that ellagic acid is an effective anti-carcinogen that inhibits induced tumors in the liver, lungs and esophagus.

Antioxidant Nutrients

In the unprocessed form, caneberries are a source of two of the major antioxidant nutrients: vitamin C and carotenoids. Scientific evidence has linked these vitamins to the prevention and/or delay of onset of major degenerative diseases of aging, including cancer, cardiovascular disease and cataracts. The antioxidants are believed to exert their effects by counteracting oxidative processes that contribute to the causation of these chronic diseases (4).

The current interest in nutraceuticals stems from the fact that diet is implicated in 6 of the 10 leading causes of death in the United States (heart disease, cancer, stroke, diabetes, atherosclerosis and liver disease). Consumption of a diet high in fruits, vegetables, whole grains and legumes is believed to be beneficial to better health. The protective effects of fruits and vegetables against cancer is also clinically significant. Generally, people with low dietary intake of fruits and vegetables have twice the risk of cancer seen in those with high intakes of these foods. The evidence is particularly strong for vitamin C and beta-carotene, while less is known about vitamin E in terms of cancer prevention. It may be likely that the high concentration of biologically active phytochemicals in a plant-based diet can lead to a reduction of cancer risk (5,6).

The naturally occurring phytochemicals present in caneberries include: catechins, monoterpenes and phenolic acids. Catechins have been linked to low rates of gastrointestinal cancer and may aid the immune system, and lower cholesterol. Monoterpenes are cancer-fighting antioxidants that inhibit cholesterol production and aid protective enzyme activity. Phenolic acids are being studied for their help in aiding the body to resist cancer by inhibiting nitrosamine formation and affecting enzyme activity (7).

Utilizing Caneberries in Diet Therapy

As the awareness of the ways diet affects health increases throughout the health care community, dietitians and nutritionists are increasingly being called upon for advice on the intake and usage of nutraceutical foods, such as caneberries. In America, the rapidly aging population makes it critical to introduce healthful eating habits to Americans aged 65 and above. By the year 2030 the number of citizens aged 65 and above is expected to make up 22 percent of the total population. Improved nutrition intervention could dramatically improve the quality of life of older Americans.

However, while numerous animal studies have been conducted to show the optimal levels of intake of nutraceutical foods necessary to achieve health benefits, these levels are often hard to extrapolate to human dietary intake requirements. Studies on the occurrences of diseases such as cardiovascular disease have shown that the intake levels of antioxidants should be based on individual requirements necessary to achieve optimal levels of micronutrients. Hence health care professionals need to base their advice related to the intake of nutraceuticals on specific patient and individual needs.

Incorporating a variety of foods, like caneberries with potential health benefits in the diet is easy. Caneberries can be incorporated into foods that are easy to prepare and easy to metabolize. Shakes, purees, low-fat desserts, snacks and baked goods are some of the examples of foods that are appetizing yet healthful and in which caneberries can be used. The predominant natural sugar in caneberries, fructose, is metabolized differently from sucrose and is the choice of diabetics and those seeking a more natural form of sweetener.

In general, emphasizing good nutrition to all age groups will be instrumental in lowering health care costs in the future. Fruits are one of the key components of a healthy diet and consumption of fresh fruits has been shown to decrease the incidence of some of the most expensive medical problems, namely heart disease, cancer, stroke and diabetes.

Variety of Forms Available

Caneberries come in many forms all of which are available year round. Fresh red raspberries and marionberries are a preferred healthy snack, they are fat free yet provide a number of key nutrients. Fresh caneberries are excellent ingredients in shakes and protein drinks, improving the color, nutrition profile and flavor of these foods. Other forms of caneberries like frozen, puree and juice concentrate are extensively used in product development and food formulations. Frozen forms are available in both straight pack and IQF (Individually Quick Frozen) and may be incorporated into a variety of formulas. Puree and juice products (single strength or concentrated) add natural color and flavor and are available in different Brix levels to suit specific product needs. The essence is an excellent flavoring for specialty beverages such as teas, flavored waters, dessert toppings and juice drinks. Essences are easy to measure and dispense and can also be used to enhance the flavor of shakes, dessert purees, and drinks. Shelf stable products like canned, bakery/fruit fillings and aseptic packs are ready to use and depending on the supplier come in varying fruit levels. These are ideal for use in snack bars, breakfast bars and pastries.

Dehydrated forms like drum dried and freeze dried products are ideal for low moisture applications and come in whole pieces, granules and powder forms. The popularity of caneberries, in particular raspberries, make them an ideal addition to products such as snack bars, low-fat desserts, baking formulations and beverages.

Physical & Chemical Characteristics of Caneberries

The ideal physical and chemical properties of caneberries including red raspberries and Marionberries makes them a preferred ingredient in many food formulations. While differences exist in the color and size of caneberries ([Table 2](#)), their chemical properties ([Table 3](#)) are quite similar. Caneberries have a naturally low pH and are a source of a number of mono- and disaccharides, which gives them a pleasant sweet/tart flavor and makes them a welcome addition in a range of products from dairy foods to snacks and condiments.

Caneberries are a good source of nutrition and are easily incorporated into the diet, as a snack or as part of a baking or cooking formulation. While research is still being conducted in the area of nutraceuticals, caneberries are believed to be a source of important phytochemicals and antioxidants that when included as part of a healthy diet, are beneficial to long term health.

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