

B L U E B E R R I E S



BRIGHT • BOLD • BEAUTIFUL



Real  Blueberries...  
They're the  
"Super Food."



U. S. HIGHBUSH  
BLUEBERRY COUNCIL  
<http://www.ushbc.org>



# B L U E B E R R I E S



## What Customers Are Saying

**"Do you have anything with blueberries?"** From bakeshops to school lunch lines, from supermarkets to restaurants, consumers of all ages are asking this same question. Part of the reason is all the good news about blueberries and health. Consumers see blueberries as a value-added ingredient because they are linked to heart health, anti-aging properties, cancer prevention, improved eyesight and better memory.

**"Give us natural."** Consumers like the fact that blueberries are a natural ingredient, nothing added, no preservatives. They can be used whole, diced, fresh or dried, freeze-dried, as purée, concentrate or juice.

**"Healthy is trendy."** New and innovative products are always being built on blueberries: ice cream cones with blueberry bits; blueberry salsas and sauces paired with nontraditional seasonings like tarragon and cider vinegar; blueberry barbecue sauce; blueberry computer pills; a pancake mix with dried blueberries; and of course health bars and sweets.

**"The kids are always asking for something new."** Because children react favorably to blue food, savvy food producers are always on the lookout for ways to add a little blue to ice creams, cookies, toppings, sauces, even savory foods. Blueberries are a natural, appealing and healthy way to add fun and color.

**"What's this about blueberries and love affairs?"** According to a study by the Eiseman Center for Color Information and Training, color is very influential in food and everywhere else. Their results stated that "In our studies, blue remains the favorite color. Consumers have a love affair with blue. It's the No. 1 color in Europe, Asia and North America."

**"Blueberries linked to good times, good feelings."** Blueberries are constantly being adopted into the world's cuisines, from Hispanic and Mediterranean to a wide variety of Middle Eastern and Asian dishes. The bright color and vibrant taste of blueberries add to the festive atmosphere surrounding celebrations, holiday feasts and even everyday meals.

## Did You Know...

Genus: *Vaccinium corymbosum* (Northern Highbush) and *Vaccinium ashei* (Southern Rabbiteye)

The highbush blueberry is also commonly called a cultivated blueberry.

This native fruit of North America is grown in 38 states. Blueberries are available virtually year round.

North America is the world's leading blueberry producer.

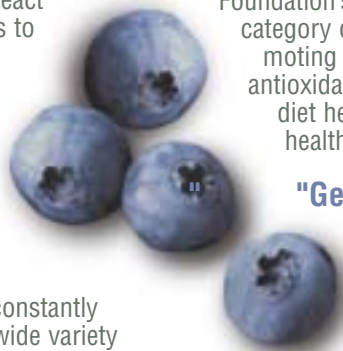
About 60% goes to the fresh market and 40% is processed.

Source: North American Blueberry Council. Blueberries 2002 Statistical Record. April 2003.

**"Five-a-Day keeps the doctors away."** The Produce for Better Health Foundation's "Five-a-Day the Color Way" lists blueberries in the Blue/Purple category of fruits and vegetables that provide varying amounts of health-promoting phytochemicals such as anthocyanins and phenolics associated with antioxidant and anti-aging benefits. Boosting the level of blue/purple in a low-fat diet helps lower the risk of some cancers and may promote urinary tract health, improved memory function, and healthy aging.

**"Get REAL."** Blueberry industry research indicated that consumers want real blueberries in blueberry identified products. We also learned that consumers rejected artificial blueberries hands down!

**"Salud!"** Scientific research indicates that beverage product development may include the production of berry juices like blueberry juice as a healthy alternative to red wine for dietary protection against heart disease.



# Highbush Blueberry Specifics

GENUS: VACCINIUM CORYMBOSUM (NORTHERN Highbush)  
AND VACCINIUM ASHEI (SOUTHERN Rabbiteye)



## BLUEBERRY COMPOSITION

Nutrients	Blueberries, Frozen Unsweetened (1)			
	1 cup (155 g) 5.46 oz	100 g 3.5 oz		
PROXIMATE:	Food energy	79.05	51.00 kcal	
	Protein	0.65	0.42 g	
	Total lipid (fat)	0.99	0.64 g	
	Carbohydrate, by difference	18.86	12.17 g	
	Dietary fiber	4.18	2.70 g	
	Ash	0.28	0.18 g	
	Water	134.21	86.59 g	
	MINERALS:	Calcium	12.40	8.00 mg
		Copper	0.05	0.03 mg
		Iron	0.28	0.18 mg
Magnesium		7.75	5.00 mg	
Manganese		0.23	0.15 mg	
Phosphorus		17.05	11.00 mg	
Potassium		83.70	54.00 mg	
Selenium		0.16	0.10 mg	
Sodium		1.55	1.00 mg	
Zinc		0.11	0.07 mg	
VITAMINS	Vitamin C, ascorbic acid	3.87	2.50 mg	
	Thiamin	0.05	0.03 mg	
	Riboflavin	0.06	0.04 mg	
	Niacin	0.81	0.52 mg	
	Pantothenic acid	0.19	0.13 mg	
	Vitamin B-6	0.09	0.06 mg	
	Folate	10.85	7.00 mg	
	Vitamin A	71.30	46.00 IU	
	Vitamin E	0.74	0.48 mg ATE	

g = grams mg = milligrams kcal = kilocalories IU = International Units µg = micrograms

## BLUEBERRY CHEMISTRY

pH	2.85 – 3.49
Titratable acidity (% citric acid)	0.40 - 1.31 %
Soluble solids/acid ratio	11.2 - 14.3 %
Anthocyanidins (2) cyanidin, delphinidin, malvidin, peonidin, petunidin	80-270 mg /100 g
Flavan-3-ols (-)-epicatechin	
Flavonols myricetin, quercetin	
Oxygen Radical Absorbance Capacity of fresh blueberries (3)	2400 ORAC /100 g
Total Sugars (4)	7.3 g/100 g
Fructose	49%
Glucose	48%
Sucrose	3%

Note: Fruit maturity at harvest, growing conditions, type of cultivar, and other variables affect levels. Substances and amounts shown are for general information purposes only.



*A one cup serving of fresh blueberries contains 14% DV of fiber.*

### Nutrition Facts

Serving Size: 1 cup (145g)	
Amount Per Serving	
Calories 80	Calories from Fat 0
% Daily Value*	
<b>Total Fat</b> 0g	0%
Saturated Fat	0%
<b>Cholesterol</b> 0mg	0%
<b>Sodium</b> 0mg	0%
<b>Total Carbohydrates</b> 21g	7%
Dietary Fiber 3g	14%
Sugars 14g	
<b>Protein</b> 1g	
Vitamin A 2%	Vitamin C 25%
Calcium 1%	Iron 2%
Percent Daily Values are based on a 2,000 calorie diet. Source: USDA. (8)	

## BLUEBERRY SIZE CLASSIFICATIONS

Extra large	<90 berries per cup
Large	90-129 berries per cup
Medium	130-189 berries per cup
Small	190-250 berries per cup

1 cup equals 237 ml, 1/2 pint, or 2 gills

The number of berries required to fill a one-cup measure determines berry size. (5) In the fresh market, larger sized blueberries are preferred bringing a higher price. Most blueberries are marketed as naturally sized.



*Blueberries have been called the "Super Food." Popular publications from Time magazine (6) to Healthy Cooking (7) have named blueberries as "super foods" and describe blueberries as packing a "wallop." The benefits of blueberries in the diet are also being recognized by health groups, such as the American Cancer Society, which placed the blueberry at the top of its list of foods beneficial in prevention of the risk of certain types of cancer.*



*Blueberries are very low in fat and sodium containing only 0.64 grams fat and 1 milligram sodium per 100 gram serving.*

1. USDA National Nutrient Database for Standard Reference, Release 16 (August 2003). 2. USDA Database for the Flavonoid Content of Selected Foods. Agricultural Research Service. March 2003. 3. Prior R, Cao G, Martin A, Sofic E, McEwen J, O'Brien C, Lischner N, Ehlenfeldt M, Kalt W, Krewer G, Mainland DM. Antioxidant capacity as influenced by total phenolic and anthocyanin content, maturity, and variety of Vaccinium species. J Agric Food Chem 46: 2686-2693, 1998. 4. USDA. Sugar Content of Selected Foods. Sept. 1987. 5. USDA. U.S. Standards for Grades of Blueberries. Size classifications. \$51.3477. Effective March 20, 1995. Agricultural Marketing Service. Fruit and Vegetable Division. 6. 10 Foods That Pack a Wallop. Time Magazine. January 20, 2002. 7. 10 Super Foods. Healthy Cooking. June 2002, p. 35. 8. USDA National Nutrient Database for Standard Reference. Blueberries, raw. Release 16 (August 2003).

# B L U E B E R R I E S



## The Highbush Blueberry



Elizabeth White

### IT ALL BEGAN WITH A YOUNG GIRL'S DREAM

North America's earliest inhabitants treasured blueberries, which they gathered and used both fresh and dried. Valued as a flavoring and revered

for their therapeutic benefits, "star berries" sustained and nourished. Then a revolutionary idea blossomed forth... As a young girl, Elizabeth White (1871-1954) dreamed of fields of succulent blueberries. Years later her dream became a reality. In 1906, at the age of 35, White began gathering cuttings from superior bushes to plant in propagation beds. She enlisted the help of local woodsmen to scour the wilds of New Jersey's Pine Barrens and identify bushes with large, tasty, aromatic berries of fine texture. (1) Their goal was to perpetuate the most desirable blueberry characteristics by cultivating plump, juicy, flavorful fruit. White wanted a "uniform product" without what she described as "tough skins," "mealy," "sour," "flat," and "skinny" traits. (2) (3)

In 1911, White read a report by Dr. Frederick V. Coville, chief botanist of the US Department of Agriculture, detailing his early experiments with Highbush blueberries. The two joined forces. Coville meticulously studied blueberry plants and carefully cross-pollinated selected varieties. White planted vigorous seedlings, which captured the fruit's finest characteristics. In 1916 White shipped the nation's first commercial crop of fresh cultivated Highbush blueberries, a total of 600 quarts,

marketed under the name, "Tru-Blu-Berries." (4) The blueberries were covered in simple brown paper fastened with tape. A few years later White introduced the use of clear cellophane to protect the berries and allow customers to see the beautiful fresh fruit. (5) Today, thanks to the creativity, dedication and foresight of these early pioneers, commercial growers provide



a bounty of succulent Highbush cultivated blueberries bright in appearance, bold in flavor, and bursting with sweetness.

### BRIGHT, BOLD, BEAUTIFUL BLUEBERRIES LOVED AROUND THE WORLD



Tasty, convenient, easy-to-use blueberries are available virtually year round. Today blueberries are grown commercially in 27 states (6) as well as Canada, South America, Australia, New Zealand and Northern and Eastern Europe. North America's blueberry producers serve domestic and export markets. Offshore exports comprise 16% of annual Highbush production. Major fresh export markets include: Japan, Switzerland, Netherlands, the United Kingdom, and Belgium. (7) Major frozen markets include: Japan, Australia, Korea, Taiwan, Hong Hong and Singapore. (8) The United States and Canada combined are the largest world producers of cultivated Highbush blueberries.

## BLUEBERRY CLASSIFICATION

All blueberries belong to the genus *Vaccinium*. The family includes the Highbush (*V. corymbosum* and *V. ashei*) and the Native American "wild" lowbush (*V. angustifolium*). All blueberries originated from the wilds. Highbush blueberries represent 57% of total North American blueberry production (223,200,000 pounds) in 2002. (9)

## US Highbush BLUEBERRY COUNCIL

The US Highbush Blueberry Council (USHBC) actively promotes the consumption of cultivated blueberries in the United States (USA) and abroad. The Council represents Highbush blueberry producers, handlers and exporters of Highbush blueberries. Activities are funded by an assessment on Highbush blueberries grown in the USA and those imported into the USA.

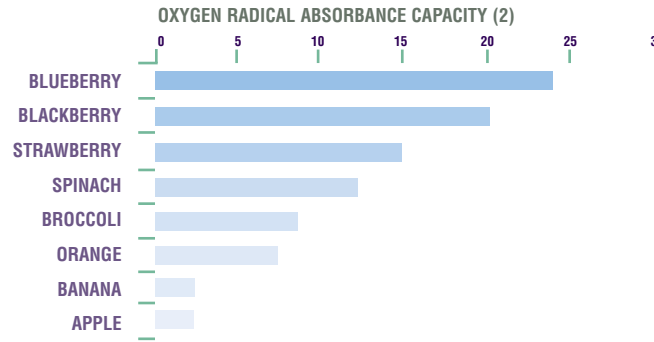


1. White Elizabeth. Taming Blueberries. Radio Garden Club, Volume 6, Digest No. 50, New Brunswick, NJ, Tuesday, July 5, 1937. Radio script. (<http://scc.rutgers.edu/njh/SciANDTech/Agriculture/radio.htm>) 2. White Elizabeth. Taming Blueberries. Radio Garden Club, Volume 6, Digest No. 50, New Brunswick, NJ, Tuesday, July 5, 1937. Radio script. (<http://scc.rutgers.edu/njh/SciANDTech/Agriculture/radio.htm>) 3. Bolger, William C. History of the Whitesbog Cranberry and Blueberry Plantation, Burlington County, New Jersey for the New Jersey Conservation Foundation. Unpublished manuscript. (<http://www.whitesbog.org/elizabethwhite.html>) 4. Distinguished Women of Past and Present. <http://www.distinguishedwomen.com/biographies/white-ec.html> 5. Ferman, A., Svihra, H., and Aqualina, GA. Better Than Our Best: Women of Valor in American History. Branden Publishing Co.: Boston. 6. North American Blueberry Council. Blueberries 2002 Statistical Record. North American Blueberry Production, p. 1, April 2003. 7. North American Blueberry Council. Blueberries 2002 Statistical Record. p. 22, April 2003. 8. North American Blueberry Council. Blueberries 2002 Statistical Record. p. 23, April 2003 9. North American Blueberry Council. Blueberries 2002 Statistical Record. April 2003



# When Put to the Test Blueberries Get High Score

**Hippocrates once advised**, "Let your food be your medicine." Scientists are discovering that the health benefits of blueberries may be as far reaching as preventing cancer and heart disease, preventing urinary tract infections, strengthening collagen, regulating blood sugar, improving night vision, reducing replication of the HIV virus and treating diarrhea, to retarding the effects of aging - particularly the loss of memory and motor skills. (1) As links are made between diet and health, the wisdom of Hippocrates rings true.



## FRESH BLUEBERRIES

Approximately 60 percent of Highbush sales go to the fresh market. (7) In the last 10 years, the total US fresh market blueberry production increased from 38,683 tons (1993) to 64,300 tons (2002). Annual U.S. consumption of fresh blueberries rose from 4.3 oz. (1990) to 6.3 oz. (2002) per person. (8)

### PRODUCT

Fresh

### PROCESS

Fresh blueberries > packaged

### PACKAGING

Consumer packs: plastic clam shells, cello packs Cartons: 2-1/2 lb., 5 lb. (2.3 kg), 10 lb. (4.5 kg), 20 lb.

### CHARACTERISTIC / APPLICATION

Available almost year round. Fresh or glazed topping for cakes.

### STORAGE

32 to 34°F (-0.6 to 1°C) 90-95% relative humidity

## FRESH BLUEBERRY AVAILABILITY

In the United States fresh blueberries are available virtually year round. Summer months in the Southern Hemisphere correspond favorably with those months when North American blueberries are off-season. (9) (10)

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
USA				●	●	●	●	●	●	●		
Argentina											●	●
Canada					●	●	●	●	●	●	●	●
Chile	●	●	●	●							●	●
New Zealand		●	●	●							●	●

## US BLUEBERRY CROP SEASON

The US blueberry crop begins in the south in early spring and moves north and westward providing a bountiful supply of fresh Highbush blueberries.

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
South				●	●	●	●					
Midwest						●	●	●	●	●	●	
Northeast							●	●	●	●		
West				●	●	●	●	●	●	●	●	

7. North American Blueberry Council. Blueberries 2002 Statistical Record. p. 9, April 2003. 8. North American Blueberry Council. Blueberries 2002 Statistical Record. P. 31-32, April 2003. 9. USDA. Fresh Fruit and Vegetable Shipments By Commodities, States, and Months. FVAS-4 Calendar Year 2002, March 2003. p. 7, 8, 14, 10. The Packer's 2002 Availability and Merchandising Guide. Vance Publishing Corp., Lenexa, KS. P. 52-53.

## Blueberries: Powerful Antioxidant!

Compared to nearly 40 other fruits and vegetables, blueberries rank highest in disease-fighting antioxidants. An assay, called ORAC (oxygen radical absorbance capacity), quantifies the antioxidant-capacity of foods. (2) Blueberries provide 2400 ORAC units per 100 grams. From an antioxidant capacity standpoint, 100 grams (3.5 oz.) of fresh blueberries could deliver the equivalent antioxidant capacity of five servings of some fruits and vegetables.



## Blueberries and the Fountain of Youth

Research funded by

The National Institute on Aging and the US

Department of Agriculture (3)

show that blueberries may act to protect the body against damage from oxidative stress, one of several biological processes implicated in aging and in the development of a number of neuro-degenerative diseases. On tests of working memory, aging animals fed a diet supplemented with fruit (including blueberries) and vegetable extracts with potential antioxidant effects outperformed the control groups and showed compelling evidence of protection against oxidative stress in their brains. The animals were fed a diet supplemented with 1 to 2 percent blueberries (the human equivalent of one cup of blueberries). Research has shown that animals fed a diet of blueberry extract had fewer changes in brain function due to aging, which could mean improved cognitive and motor skills. Research is also finding neuron growth in the brains of animals fed blueberry extract. (4) (5) (6)

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