

Muscadine Grapes



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1. Introduction - Muscadine Grapes

The muscadine grape is a powerhouse of natural phytochemicals. Muscadines have been domestically (U.S.) cultivated since Colonial times. Muscadines are one of four primary grape species that are cultivated in the United States.

Muscadine grapes flourish in the hot and humid climate of their native southeastern United States ... while other grapes can't take the heat and humidity. They grow naturally from Delaware down to Florida and across the southeast to Texas, and as far north as southern Illinois.

Muscadine grapes have two primary color types, black and bronze, with many variations from those two colors: black varieties include grapes that are pink, red, and purple in color, and bronze varieties come in shades of yellow, green, and tan. Many wild varieties stay green through maturity.

Muscadine grapes ripen between mid-September to late October in the United States.

Compared to table grapes that grow in pendulous bunches and ripen all at once, muscadines grow in loose clusters and mature one at a time. A mature vine can yield approximately twenty pounds of fruit.

The muscadine nickname "Scuppernong" originally referred to the bronze type grape, but over time scuppernong became commonly used to represent all the varieties. Muscadines have skin sufficiently tough that eating the raw fruit often involves biting a small hole in the skin to suck out the pulp inside. Muscadines need fewer chilling hours than better known grapes.

Muscadines have superior pest and disease resistance over other varieties, making their rootstock the preferred choice for many grafted grapevines.

Muscadines are not only eaten fresh, but also are used in making **wine, juice, and jelly**. Current commercial vineyards were initiated in the 1970s, and in ***the last 3 decades have seen dramatic growth.***



2. Health Benefits - Muscadine Grapes

What Is It About The Muscadine Grape That Makes It One Of The Most Powerful Foods On The Planet?

Muscadines have an extra pair of chromosomes beyond what traditional grapes have. This extra set of chromosomes is one reason muscadines are known as "super grapes" in research labs. Ellagic acid, found in muscadines but not in other grapes, may be due to the extra chromosome count.

Ellagic acid has been shown in numerous clinical studies to play a key role in the inhibition of cancer cell growth.

This unique grape has seen an explosion of clinical research on it over the last decade, showing significant preventive effects in the laboratory. While muscadines contains a range of vitamins, oils, fiber, sugars and proteins (such as Vitamin C and pectin (a dietary fiber, for starters) that are nutritious, the greater value of the muscadine to the nutraceutical industry is in the phenolic fraction.

Muscadine grapes are rich sources of polyphenols and other nutrients studied for their potent health benefits.

By today's current food standards, only vitamin C is classified as "essential," but the new-found value of antioxidants is becoming more and more conspicuous. Up until 1998, there were only a handful of new reference studies on muscadines each year, but by 2004 there were hundreds of published scientific papers. Now there are more than 100 new papers annually, and that number grows each year.

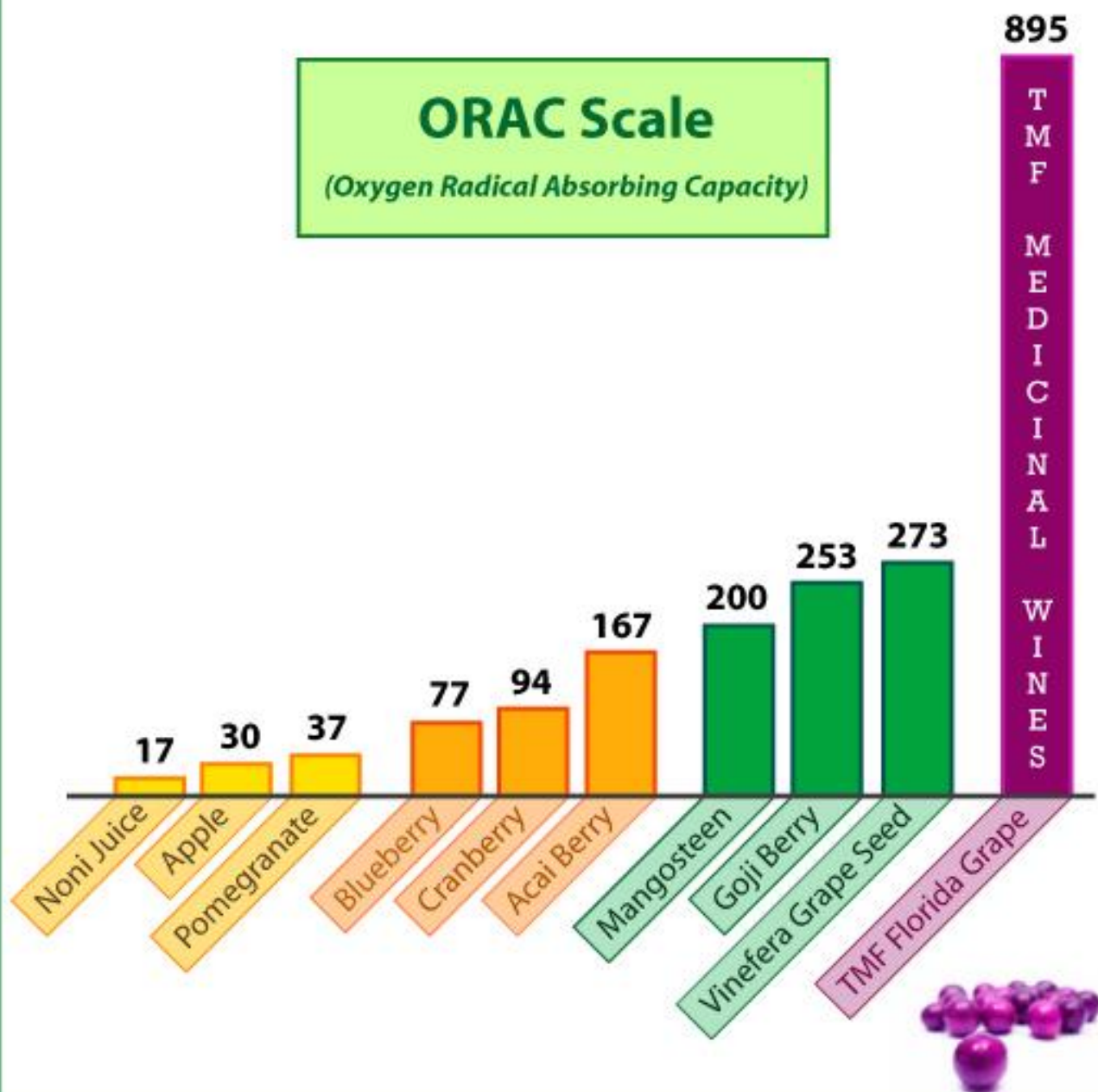
The "Muscadine Medicine" book says, "Several analytical studies on muscadines reveal a profile of potent phytochemicals. The phenolic fraction alone will contain [numerous] phytochemicals, all of which have medicinal value. While the muscadine literature is growing, it is still very small.

In comparison, the number of biomedical papers that have been written on the phytochemicals in muscadines is enormous and very supportive of the nutraceutical power of this smarter grape."

(Source: <http://muscadinenews.com>)



Anti-Oxidant Concentration Capacity



(Source: http://tmfflorida.com/z_info_TMF_grape.html)

Scientific Research - Muscadine Grapes

UNITED STATES - UNIVERSITY OF FLORIDA: MUSCADINE ANTIOXIDANT CAPACITY

Recent research on the antioxidant levels found in muscadine grapes: "[Antioxidant Capacity, Phenolic Content, and Profiling of Phenolic Compounds in the Seeds, Skin, and Pulp of Muscadine Grapes](#)," (PDF) published in March, 2010 in **The Journal of Agricultural and Food Chemistry**, from a study conducted at **The University of Florida Department of Food Science and Human Nutrition**, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

- *"A total of 88 phenolic compounds of diverse structures were tentatively identified in muscadines, which included 17 in the pulp, 28 in the skin, and 43 in the seeds. Seventeen compounds were identified for the first time in muscadine grapes."*
- *"Phenolic compounds have been linked to many positive health benefits, including protective effects against certain diseases such as cancer and cardiovascular diseases. The protective effect of phenolic compounds has been attributed in part to their antioxidant capacity."*

UNITED STATES - UNIVERSITY OF GEORGIA: MUSCADINE POMACE PRODUCTION TECH

For a thorough understanding of the processing of muscadine grape seeds and skins, read "[Evaluation Of Drying Technologies For Muscadine Pomace To Produce An Antioxidant Rich Fuctional Food Ingredient](#)," (PDF) published in May 2009 at **The University of Georgia**.

UNITED STATES - UNIVERSITY OF ARKANSAS: MUSCADINE PRODUCTION PROFITS

UA Grape and Wine Research Program to enhance the profitability from muscadine grape harvesting: "[The Muscadine Experience: Adding Value to Enhance Profits](#)," (PDF) published in Sep. 2004 at **The University of Arkansas**.



United States - Dr. Andrew Weil - United States - Director of Arizona Center for Integrative

2013 Mar. 10, CNN.com article by Andrew Weil, M.D.: "[U.S. manages disease, not health](#)"

"I have argued for years that we do not have a health care system in America. We have a disease-management system — one that depends on ruinously expensive drugs and surgeries that treat health conditions after they manifest rather than giving our citizens simple diet, lifestyle and therapeutic tools to keep them healthy.

... Why? A major culprit is a medical system based on maximizing profits rather than fostering good health."

("Dr. Weil is the founder and director of the Arizona Center for Integrative Medicine at the University of Arizona Health Sciences Center, in Tucson, where he is also a Clinical Professor of Medicine and Professor of Public Health and the Lovell-Jones Professor of Integrative Rheumatology. Dr. Weil received both his medical degree and his undergraduate AB degree in biology (botany) from Harvard University.")

(Source: <http://muscadinehealthresearch.wordpress.com/>)

STUDIES & STORIES ON GRAPES & INGREDIENTS

The links below are organized chronologically (by date):

2003 Aug. 1, Study published in *Journal of Agricultural and Food Chemistry*: "[Phenolic Content and Antioxidant Capacity of Muscadine Grapes](#)" ("Antioxidant capacity values were, on average, 2.4, 12.8, **281.3**, and 236.1 µM TEAC/g of FW for pulps, skins, **seeds**, and leaves, respectively.")

2005 Mar. 1, Study published in *Anticancer Research*: "[Ellagic Acid Induced ... Apoptosis in Human Bladder Cancer](#)"

2005 Sep. 3, Book, "[Muscadine Medicine](#)," by Diane Hartle, Ph.D., published September 3, 2005

2005 Nov. 2, Study published in *Journal of Agricultural and Food Chemistry*: "[Study of anticancer activities of muscadine grape phenolics in vitro](#)" ("The objective of this study was to evaluate the effect of phenolic compounds in muscadine grapes on cancer cell viability and apoptosis. ... These findings suggest that polyphenols from muscadine grapes may have anticancer properties.")

2005 Nov. 2, Study published in *Journal of Agricultural and Food Chemistry*: "[Antiinflammatory properties of the muscadine grape](#)" ("The muscadine grape possesses one of the highest antioxidant levels among fruits; yet, the effect of this fruit on mammalian metabolic systems has not received significant attention. ... These results demonstrate that the muscadine grape skin powder possesses significant in vitro and in vivo antiinflammatory properties.")

2006 July 26, Study published in *Journal of Agricultural and Food Chemistry*: "[Induction of cell death in Caco-2 human colon carcinoma cells by ellagic acid rich fractions from muscadine grapes](#)"

2007 Feb. 14, Story on The University of Georgia's Nutraceutical Research Laboratory: [receives Georgia Center of Innovation Award for work on nutraceutical value of the muscadine grape](#)

2007 Mar. 1, USDA's Agricultural Research Service ("The in-house research arm of the U.S. Department of Agriculture") report: ["America's First Grape: The Muscadine"](#) ("Last Modified: 03/01/2007")

2007 Aug. 31, Press Release from National Cancer Institute (US Govt.): ["Unique Grape Skin Extract Inhibits Prostate Cancer Cell Growth in the Laboratory"](#) (from study published in 2007 Sep. 1 issue of ["Cancer Research"](#))

2007 Oct. 26, Story in ScienceDaily.com: ["Could Muscadine Grape Seeds Offer Cardiovascular Benefits?"](#) ("The goal of the current study is to determine if daily doses of the Nature's Pearl supplement, which is specially prepared to maximize its natural antioxidant and anti-inflammatory concentrations, will have a favorable effect on cardiovascular risk factors," said David Herrington, M.D., M.P.H., lead investigator and a professor of cardiology.")

2008 May 1, Study published in *The Journal of Nutritional Biochemistry*: ["Resveratrol inhibits ... cell invasion in human breast cancer cells"](#)

2008 June 1, Special feature story in M.D. News: ["The Health Benefits of Muscadine Grapes, Wines, and Nutraceuticals"](#) (link goes to a PDF)

2008 Nov. 1, Study published in *Cancer Prevention Research*: ["Apoptosis initiated in colon cancer cells when treated with muscadine grape extract"](#)

("Research suggests strong correlations between the inflammation process and colon cancer progression, making it an attractive target for anti-inflammatory drugs and compounds.")

*Muscadines (Vitis rotundifolia), a grape species native to the Southeastern United States, are **rich in polyphenols** containing many biologically important flavonoids that may have potential **anti-inflammatory and anti-oxidant properties**. Current research has shown that the muscadine grape has a **higher total phenolic and flavonoid content than commercially available red grapes.**"*)

2009 Jan. 1, Study published in *Clinical Cancer Research*: ["Grape-seed extract kills laboratory leukemia cells, proving value of natural compounds"](#)

2009 Sep. 1, Study published in *The Journal of Nutrition*: ["Anticancer and Cancer Chemopreventive Potential of Grape Seed Extract and Other Grape-Based Products"](#)

2010, North Carolina Dept. of Agriculture: ["Muscadine Brochure"](#) ("The finding that muscadine grapes are naturally high in healthful antioxidants has led to an expansion of the industry in North Carolina. Antioxidants help protect the body from the damaging effects of oxygen free radicals, which can contribute to degenerative diseases.")

2010, North Carolina Muscadine Grape Association: ["Brunswick Biomedical Laboratories of Wareham, Massachusetts stated in 2003 that NutraGrape's Muscadine Grape Seed has the highest ORAC \(Oxygen Radical Absorbing Capacity\) of any natural substance they have yet to test."](#) (link deactivated in 2013)

2010 Mar. 23, Study published in *Cancer Prevention Research*: "[Resveratrol Suppresses Colitis and Colon Cancer Associated with Colitis](#)"

2010 May, TED Talk by William Li, Cancer researcher and co-founder of the Angiogenesis Foundation, a nonprofit that is re-conceptualizing global disease fighting: "[Can We Eat To Starve Cancer?](#)" (video, 20 minutes); at the 12:30 mark, he mentions grapes, resveratrol, and ellagic acid. (*"Can we eat to starve cancer? The answer is yes. ... What we've discovered is Mother Nature has laced a large number of foods and beverages, and herbs with naturally occurring inhibitors of angiogenesis."*)

2011 May 5, Story on The Dr. Oz Show: "[Why Wild Plants Can Protect You From Cancer](#)," by Mary Ann Lila, Ph.D., Director, Plants for Human Health Institute, North Carolina State Univ. (*"... naturally high inherent concentrations of flavonoids (resveratrol, quercetin and ellagic acid) make these grapes naturally resistant to many of the diseases that plague other types of grapes – and these same compounds are what make muscadine grapes so protective against many different types of human cancers."*)

2011, July 15, Study published in *The Journal of Alzheimer's Disease*: "[Natural Chemical Found In Grapes May Protect Against Alzheimer's Disease by Decreasing Neurotoxins in the Brain](#)" ([pubmed link](#)) (*"This is the first study to evaluate the ability of grape-derived polyphenols to prevent the generation of a specific form of β -amyloid ($A\beta$) peptide, a substance in the brain long known to cause the neurotoxicity associated with Alzheimer disease. ... Previous studies suggest that increased consumption of grape-derived polyphenols, whose content, for example, is very high in red wine, may protect against cognitive decline in Alzheimer's. This new finding, showing a selective decrease in the neurotoxin $A\beta^{*56}$ following grape-derived polyphenols treatment, corroborates those theories. ... 'Since naturally occurring polyphenols are also generally commercially available as nutritional supplements and have negligible adverse events even after prolonged periods of treatment, this new finding holds significant promise as a preventive method or treatment ...'"*)

2011 Aug. 2, Story on Charlotte, NC, Fox TV Station: "[N.C. State Fruit The Cure To Cancer?](#)" (PDF of original site; see [2-minute video here](#)) (*"... acres of muscadine vines, a thriving part of the North Carolina economy, and according to some doctors the secret to beating cancer. 'Absolutely, no question about it,' says Dr. Larry Pearce a Neurologist. Dr. Pearce has spent most of his career as a neurologist studying how drugs affect the brain, now he focuses on how natural chemicals found in muscadines can prevent cancers before they start."*)

2011 Aug. 11, Story on LiveStrong.com: "[Health Benefits of Muscadine Grapes](#)"

2011 Oct. 21, Story on The Dr. Oz Show: "[Quick Fixes to Prevent the Diseases You Fear Most](#)" (*"Fight back against the second leading cause of death: cancer. Full of antioxidants, grape seed extract helps protect your cells from free radicals, which can damage cells. Lab studies have also shown that grape seed extract may help prevent breast and colon cancer."*)

2012 Jan. 26, Study published in the journal *Carcinogenesis*: "[Grape seed extract kills head and neck cancer cells, leaves healthy cells unharmed](#)"

2012 Mar. 15, Article from *The Outer Banks Voice*: "[Muscadine grape shows promise in fighting cancer](#)"

2012 Apr. 26, Research presented at the "[2012 Experimental Biology Conference](#)": "[Grape Consumption May Offer Benefits for Anxiety and Related Hypertension, Learning and Memory Impairments](#)" (*"Grape antioxidants may defend against contributing oxidative stress"*)

2012 Apr. 26, Study published in the journal [*The American Journal of Cardiology*](#): “[Resveratrol-rich grape extract shows heart health benefits: Human data](#)” (“the longest human trial reported thus far using a resveratrol-containing product”)

2012 May 21, Article from *The Washington Post*: “[Cancer Doctors Put Competition Aside To Share Treatment Options For Their Patients](#)” (“... specialists were exchanging notes about drugs, radiation, and muscadine grape skin extract for a disease that strikes two of every three men older than 65”)

2012 May 21, From the W. Post story above, proof that Johns Hopkins Univ. is conducting the clinical study with a muscadine supplement: “[Effects of Two Doses of MPX Capsules on Rising Prostate-specific Antigen Levels in Men Following Initial Therapy for Prostate Cancer](#)”

2012 Oct. 24, Article from *The Southern Pines Pilot*: “[Stomping Out the Truth About Grape Seed Supplements](#)”

2012 Nov. 16, Statement by Medical University of South Carolina Cancer Researcher [Mehrdad Rahmaniyan, M.D.](#), on muscadine health benefits: “[Muscadine Grape and its Antioxidant Activity](#)”

2012 Dec 17, Article from 303Magazine.com: “[Hot To Squat: Exceedingly Good Seed](#)”

2013 Jan. 7, Study published in the “Journal of Applied Microbiology” doi: 10.1111/jam.12129: “[Activities of Muscadine Grape Skin and Polyphenolic Constituents against Helicobacter pylori](#)” Department of Biological Sciences, Clemson University, Clemson, SC ([Pubmed link](#))

2013 Feb. 20, Article from BeachCarolina.com: “[Conference to Present a Discussion on Value-Added Products from Muscadine Grapes](#)”

2013 March 15th, Article from GreenMedInfo.com: “[Grape Seed Extract May Beat Chemo in Late-Stage Cancer](#)”

2013 Apr. 22, Study presented at the “Experimental Biology conference”: “[Grape intake may protect against metabolic syndrome-related organ damage](#),” University of Michigan Health System; (“Study shows grapes reduced inflammation and fat storage, improved antioxidant defense.”)

2013 May 6, MedicalNewsToday.com story on study published in the “[Journal of Nutritional Biochemistry](#)”: “[Grapes Activate Genes Responsible For Antioxidant Defense In The Heart](#)”; (“A study appearing in the *Journal of Nutritional Biochemistry* demonstrates that grapes are able to reduce heart failure associated with chronic high blood pressure (hypertension) by increasing the activity of several genes responsible for antioxidant defense in the heart tissue.”)

2013 Nov. 19, Study published in the “Journal of Proteome Research”: “[iTRAQ-Based Quantitative Proteomics of Developing and Ripening Muscadine Grape Berry](#),” The Center for Viticulture and Small Fruit Research, Florida A&M University, and earlier this year presented at “[the largest Ag-Genomics Meeting in the world](#),” and supported by a [USDA/CBG grant](#); (The study found “statistically significant changes in the berry proteome, detecting a total of 674 proteins”; “Detailed analysis of function-related protein profiles helped discover a set of proteins that appears to play key roles in regulating enological and disease tolerance characteristics of grape berry.” The publication uses the term “muscadine berry” numerous times, which is also noteworthy.)

(Source: <http://muscadinehealthresearch.wordpress.com/>)