

A CLOSER LOOK AT VITAMIN E



Compared to other nuts, pecans have the highest levels of a form of vitamin E called gamma-tocopherols. Ella Haddad and colleagues at Loma Linda University conducted two studies to explore the potential benefits of the gamma-tocopherols in pecans, specifically the role on oxidative stress, which is implicated in cardiovascular disease.

GAMMA-TOCOPHEROLS (mg per ounce)

Almonds	0.18
Brazil Nuts	2.71
Cashews	n/a
Hazelnuts	0
Macadamias	0
Pecans	6.93
Pine Nuts	3.16
Pistachios	6.64
Walnuts	5.91

Source: USDA National Nutrient Database for Standard Reference

A 2006 randomized, controlled crossover feeding study of 24 participants published in *Nutrition Research*⁹ found that a pecan-enriched diet (equivalent to 20% of calories) helped participants increase blood levels of gamma-tocopherols and reduced markers of lipid oxidation after eight weeks. The men and women in the study (ages 25-55) were in good health with no history of heart disease. The Loma Linda University researchers concluded that pecans can serve as a valuable source of gamma-tocopherols in the diet, along with flavonoids (particularly proanthocyanidins

and flavan-3-ols), which may have positive effects on heart health; however, additional research is needed to determine the significance of this effect.

Similarly, a 2011 study published in the *Journal of Nutrition*¹⁰ investigated the effect of pecans on biomarkers of oxidation and lipid peroxidation, antioxidant capacity, and plasma tocopherols. In a placebo-controlled, three-way crossover study, 16 healthy participants (ages 23-44 years) consumed test meals of either 90

grams of whole pecans (about three servings) plus water, 90 grams of pecans blended with water, or a similar control diet without pecans. Blood samples were drawn and total polyphenols and gamma-tocopherol levels were significantly increased in both the pecan groups. Additionally, oxidized LDL decreased following the pecan meals. Whether the improvements were due to the gamma-tocopherols, flavonoids, or both acting in synergy remains to be determined, the authors concluded.

POLYPHENOLS IN PECANS

Pecans contain a mix of polyphenols, specifically flavonoids.² These bioactive compounds, particularly proanthocyanidins, anthocyanidins and flavan-3-ols, have been the focus of emerging research on cardiovascular health.¹¹⁻¹³

While these studies examined total flavonoid consumption, and not pecans specifically, pecans do help contribute to America's flavonoid intake. Pecans contain 898 mg proanthocyanidins, 18 mg of anthocyanidins and 16 mg of flavan-3-ols per 100 g, including epicatechin and catechin.²

IT'S TIME TO PICK PECANS

When it comes to America's native nut, great taste is just the beginning. Pecans should no longer be overlooked in health conversations. This nutrient-dense nut is deserving of attention – and not just during the holidays. Whether tossed in salads and grain bowls, blended in a smoothie, transformed into pecan butter, added to vegetables and main dishes or eaten whole as a snack – American Pecans™ are a wholesome and homegrown nut that's ideal any time of the year.

To learn more about American Pecans, including recipes, health research and how the country's native nut is grown and harvested, visit AmericanPecan.com.



Follow us
@americanpecan



3880 Hulen Street, Suite 105
Fort Worth, TX 76107

Email: info@americanpecan.com

REFERENCES

- USDA National Nutrient Database for Standard Reference, Release 28, May 2016.
- USDA Database for the Flavonoid Content of Selected Foods. Release 3.2, November 2015.
- Hu FB, Stamper MJ, Manson JE, Rimm EB, Colditz GA, Rosner BA, Speizer FE, Hennekens CH, Willett WC. Frequent nut consumption and risk of coronary heart disease in women: prospective cohort study. *British Medical Journal*. 1998;317:1341-1345.
- Gobbo LCD, Falk MC, Feldman R, Lewis K, Mozaffarian D. Effects of tree nuts on blood lipids, apolipoproteins, and blood pressure: systematic review, meta-analysis, and dose-response of 61 controlled intervention trials. *American Journal of Clinical Nutrition*. 2015;102:1347-56.
- Grosso G, Yang J, Marventano S, Micek A, Galvano F, Kales SN. Nut consumption on all-cause, cardiovascular, and cancer mortality risk: a systematic review and meta-analysis of epidemiologic studies. *American Journal of Clinical Nutrition*. 2015;101:783-93.
- Bao Y, Han J, Hu FB, Giovannucci EL, Stampfer MJ, Willett WC, Fuchs CS. Association of nut consumption with total and cause-specific mortality. *New England Journal of Medicine*. 2013;369:2001-11.
- Morgan WA, Clayshulte BJ. Pecans lower low-density lipoprotein cholesterol in people with normal lipid levels. *Journal of the American Dietetic Association*. 2000;100:312-18.
- Rajaram S, Burke K, Connell B, Myint T, Sabate J. A monounsaturated fatty acid-rich pecan-enriched diet favorably alters the serum lipid profile of healthy men and women. *Journal of Nutrition*. 2001;131:2275-2279.
- Haddad E, Jambazian P, Karunia M, Tanzman J, Sabate J. A pecan-enriched diet increases γ -tocopherol/cholesterol and decreases thiobarbituric acid reactive substances in plasma of adults. *Nutrition Research*. 2006;26:397-402.
- Hudthagosol C, Haddad EH, McCarthy K, Wang P, Oda K, Sabate J. Pecans acutely increase plasma postprandial antioxidant capacity and catechins and decrease LDL oxidation in humans. *Journal of Nutrition*. 2011;141:56-62.
- Grosso G, Micek A, Godos J, Pajak A, Sciacca S, Galvano F, Giovannucci EL. Dietary flavonoid and lignan intake and mortality in prospective cohort studies: systematic review and dose-response meta-analysis. *American Journal of Epidemiology*. 2017;1-13.
- McCullough ML, Peterson JJ, Patel R, Jacques PF, Shah R, Dwyer JT. Flavonoid intake and cardiovascular disease mortality in a prospective cohort of US adults. *American Journal of Clinical Nutrition*. 2012;95:454-64.
- Liu X, Liu Y, Huang Y, Yu H, Yuan S, Tang B, Wang P, He Q. Dietary total flavonoids intake and risk of mortality from all causes and cardiovascular disease in the general population: a systematic review and meta-analysis of cohort studies. *Molecular Nutrition and Food Research*. 2017; 61.
- McKay DL, Eliasziw M, Oliver Chen CY, Blumberg JB. A pecan-rich diet improves cardiometabolic risk factors in overweight and obese adults: a randomized controlled trial. *Nutrients*. 2018;10:339.

American Pecan Council, 2018



American
PECANS™

CRACKING OPEN THE NUTRITION
STORY OF OUR NATIVE NUT



**YOU THINK OF THEM FOR PIE.
YOU ADORE THEM IN PRALINES.
BUT DID YOU KNOW PECANS
ARE ACTUALLY EXTREMELY
NUTRIENT DENSE?**

So don't be fooled by their rich, buttery texture and naturally sweet taste.

Pecans contain the same beneficial unsaturated fats that are found in other nuts, and nearly two decades of research suggests that nuts, including pecans, may help promote heart health.

In each 1-ounce serving of raw pecans you'll get 12 grams of "good" monounsaturated fat, with zero cholesterol or sodium.¹ Compared to other nuts, pecans are among the lowest in carbs and highest in fiber.

Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts, such as pecans, as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease.*

U.S. Food and Drug Administration



*One serving of pecans (28g) contains 18g of unsaturated fat and only 2g of saturated fat.

The macronutrient profile of pecans is appealing to many people: protein (3 grams), carbohydrate (4 grams) and fat (20 grams).

A handful of pecans – about 19 halves – is a good source of fiber, thiamin and zinc, and an excellent source of copper and manganese.

To top it off, pecans contain polyphenols, specifically flavonoids – which are the types of bioactive compounds found in brightly colored produce.²

Another analysis of epidemiologic studies⁵ found that nut consumption was associated with a lower risk of cardiovascular disease, cancer mortality and all-cause mortality for individuals with the highest consumption of nuts compared to those who do not eat nuts. The findings are reported as pooled risk ratios that include multiple factors. The authors identified several qualifiers that the presence of confounding factors should be considered when interpreting the findings.

In a 30-year observational study of 76,464 female nurses and 42,498 male health professionals, the participants who regularly consumed a 1-ounce serving of nuts, including pecans, seven times or more a week, were shown to have a hazard ratio for death of 20% lower compared to those who did not eat nuts. Likewise, those participants consuming nuts five or more times per week had a 29% lower hazard ratio for death from heart disease compared to those who did not eat nuts.⁶

Epidemiological or observational studies establish associations, not causality, and not all findings from observational studies have been confirmed in controlled, randomized clinical trials.

The unique mix of unsaturated fats, plant sterols, fiber and flavonoids all add up to make pecans a heart-healthy nut.

In one of the first pecan studies on heart health, researchers at New Mexico State University tested the effect of pecans on cholesterol levels.⁷ The researchers used a randomized parallel study design to compare blood lipid concentrations of 19 men and women with normal blood cholesterol levels. In the study, 10 participants were assigned to the pecan group (68 grams or about ¾ cup of pecans per day) for eight weeks. The control group of nine avoided nuts and consumed self-selected diets. The participants who consumed pecans experienced a 10% reduction in LDL "bad" cholesterol at week 4 and a 6% reduction at week 8. Body mass indexes and body weight were unchanged in both groups.

A 2001 investigation published in the *Journal of Nutrition*⁸ found that a pecan-enriched diet not only reduced total cholesterol, LDL cholesterol levels and triglycerides, it also increased "good" HDL cholesterol among the participants. Using a controlled metabolic protocol, subjects were randomized to either the American Heart Association Step 1 diet as a control, or a pecan-enriched Step 1 diet with pecans (20% of total calories or about 60 grams per 2,000 calories). The 23 participants were men and women with normal to moderately high blood cholesterol levels.

Although both diets lowered blood lipids, the pecan-enriched diet altered the lipid profile more favorably than the Step 1 diet, including 6.7% reduction in total cholesterol, 10.4% reduction in LDL cholesterol, and 11.1% reduction in triglycerides after four weeks. HDL "good" cholesterol was increased by 5.6%, and there were no changes in body weight.

The researchers said the observed alterations in blood lipids were greater than expected when calculated by predictive equations based on changes in dietary fatty acids and cholesterol.

While these studies provide insights into the potential relationship between pecan-rich diets and cholesterol levels, the results are unique to the study design. Since evidence is limited, more research is needed to understand how compounds in pecans may play a role in supporting normal cholesterol and blood lipids.



CARDIOMETABOLIC HEALTH

The most recent study on pecans found that a handful of pecans each day (about 1.5 ounces) helped improve certain markers of cardiometabolic disease, which includes cardiovascular and metabolic diseases, such as Type 2 diabetes and metabolic syndrome.¹⁴ The 2018 randomized, placebo-controlled feeding trial conducted by researchers at Tufts University studied the impact of a pecan-rich diet among 25 overweight and obese adults (ages 45 and older, 21 men and five women).

After four weeks on the pecan-rich diet, participants experienced statistically significant changes in serum insulin, insulin resistance and pancreatic beta cell function compared to the control diet. When using a composite score of five clinically relevant markers of cardiometabolic risk (such as blood lipids, gluco-regulation and insulin), the researchers found that the pecan diet had a concurrent and statistically significant effect on insulin-related markers associated with cardiometabolic risk. Additionally, there were subgroup differences noted by gender and glucose levels that modified the effects of the pecan diet.

DELICIOUS KERNELS OF GOODNESS

Pecans are a complex whole food packed with multiple health-promoting nutrients and bioactive compounds.

PHYTONUTRIENTS

10 mg of flavonoids
36 mg of plant sterols

PLANT PROTEIN

3 grams of plant-based protein

UNSATURATED FAT

18 grams of monounsaturated fat, including oleic acid (only 2 grams of saturated fat)



DIETARY FIBER

Good source of dietary fiber, 11% DV

ANTIOXIDANT VITAMINS

8 mcg of beta carotene, or provitamin A
7 mg gamma-tocopherols, a form of vitamin E

MINERALS

A trio of essential minerals:
60% DV manganese,
40% DV copper and 10% DV zinc

Serving size = 1 ounce or about 19 halves
DV = % Daily Value

Source: USDA National Nutrient Database for Standard Reference

A HEART-SMART FOOD

Like other nuts, pecans contain primarily unsaturated fats, but they're among the highest in monounsaturated fats, especially the beneficial oleic acid that's found in olive oil.¹ Four large epidemiological studies, including the Harvard-based Nurses' Health Study,³ have consistently shown that nut consumption is associated with a reduced risk of cardiovascular disease.

An analysis of 61 controlled intervention trials⁴ examined the effects of tree nuts on a number of cardiovascular biomarkers, including blood lipids and blood pressure. Reductions were seen for total cholesterol and LDL cholesterol in both randomized and nonrandomized trials. The stronger effects were observed when participants consumed 60 grams or more of nuts per day.

For apolipoprotein B (ApoB), stronger effects were observed among people with type 2 diabetes than in healthy individuals. No significant effects were identified for HDL cholesterol, apolipoprotein A (ApoA) or blood pressure.



Pecans are a heart-healthy food certified by the American Heart Association's® Heart-Check Program

All certified pecans must meet the American Heart Association's® nutrition requirements which include a limit of 140mg or less of sodium per label serving size. The Heart-Check Food Certification does not apply to hyperlinks, recipes, or research unless expressly stated. For more information, see the American Heart Association's® nutrition guidelines at heartcheckmark.org/guidelines. American Heart Association® and the Heart-Check Mark are registered trademarks of the American Heart Association®.

Nutrition Facts

Serving size **1 ounce or about 19 halves (28g)**

Amount per serving
Calories 200

	% Daily Value*
Total Fat 20g	26%
Saturated Fat 2g	10%
Trans Fat 0g	
Polyunsaturated Fat 6g	
Monounsaturated Fat 12g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 4g	1%
Dietary Fiber 3g	11%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 3g	6%
Vitamin D 0mcg	0%
Calcium 20mg	2%
Iron 0.7mg	4%
Potassium 116mg	2%
Vitamin A 1mcg RAE	0%
Vitamin C 0.3mg	0%
Vitamin E 0.4mg	2%
Thiamin 0.2mg	15%
Riboflavin 0.04mg	4%
Niacin 0.3mg	2%
Vitamin B6 0.06mg	4%
Folate 6mcg	2%
Phosphorus 79mg	6%
Magnesium 34mg	8%
Zinc 1.3mg	10%
Copper 0.3mg	35%
Manganese 1.3mg	60%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

PECAN NUTRITION BY THE NUMBERS



Source: USDA National Nutrient Database for Standard Reference