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Pecans

Move to the West and Their Health Benefits

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Human consumption of pecans and their nutritional components that provide physical health benefits have gained more interest and increased research in recent years. The nutritional components that lend themselves to health benefit through human consumption develop within the pecan kernel and are ultimately determined by proper management of growth, development, and cultivation of the individual pecan trees. Arizona ranks 4th in the United States in total pecan yield produced, and 2nd in total yield produced per acre. This publication is one of a multi-publication series, covering an introduction of pecans to Arizona, and an overview of the nutrition the pecan provides to the human body. Additional topics covered in this series range from an introduction of the value and history of pecans, a basic outline to the general consumer on the nut's genesis, and the various inputs or considerations required for proper fruit maturity on the tree. Furthermore, the series will include detailed cultivation practices, considerations, and inputs required to produce high-quality pecans, particularly in Arizona and the Southwest.

Pecans in the West

The pecan, or Carya *illinoinensis* botanically speaking, is native to North America. The native tribes of North America knew of its existence, where it grew naturally, and understood the significance it had to their sustainability and survival. Throughout North American history, unaffiliated tribes would often come together to harvest the pecan and utilize this time to trade and barter goods. The pecan was a staple food of many tribal communities and many Native American tribes would travel as far as 90 miles to feast on nuts in the fall. For example, the South-Central New Mexico tribe, the Mescalero Apache, followed bison herds from Sierra Blanca in New Mexico to pecan groves along the Colorado and Concho rivers in Texas. There they would gorge on nuts through winter, almost exclusively their main food staple in some cases (Wells, 2017). Today pecans continue to play an important role in the diets of many Americans and provide nutritional value to those who consume them. The native groves of pecan extend from the southern tip of Illinois, along the Mississippi River Valley, through the state of Texas, and as

far south as Oaxaca, Mexico (700 miles south of the U.S. border). *In horticulture, a fun fact: The word "grove" is used to denote a natural stand of tree fruit or nuts. The word "orchard" denotes an intentionally planted stand of trees for cultivation.*

Although commercial production of pecans began historically in the southeastern region of the U.S., particularly in Alabama and Georgia (the known leader in pecan production today) where there is ample rainfall, their climatic conditions are also conducive for pests and disease to thrive. This can limit productivity in two ways: 1) increase the input of production by additional spraying of fungicides and insecticides, and 2) limit the overall potential yield and/or quality of the pecan kernel. Therefore, the shift to more southwestern regions was primarily due to the arid climatic conditions that are less favorable for pest and disease to occur in pecan cultivation in the west, especially in the New Mexico and Arizona regions. Settlers first planted pecans in Arizona in the 19th century (Payne, 2018), but it was not until 1927 when the first 27-acre pecan seedling planting occurred in Arizona by Eva and Carl Haydon in Camp Verde, AZ. Some decades later, the first commercial pecan planting in Arizona was achieved by the Walden Family in the 1960s. Known today as Green Valley Pecan Company, it is the largest irrigated pecan orchard in the world. Currently, Arizona produces pecans on approximately 30,000 acres (Sherman, 2018). In terms of total in-the-shell pecan yield, Arizona currently ranks 4th in the United States, tying with Texas for 3rd in some years, and ranks 2nd in the U.S. by total in-shell pecan yield per acre (Duval et al., 2019). Commercially, today pecans are produced in 15 states of the United States, primarily in the southern part of the United States, as well as in Mexico.

Health Benefits of Pecans

So, why did humans throughout history, and even today, eat pecans even if it meant travelling long distances? Within the last 20-30 years, several key studies have been conducted investigating the health benefits of pecans and other nuts. According to the Food and Drug Administration, "Scientific evidence suggests, but does not prove, that eating 1.5 ounces per day of some nuts [including pecans], as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease (2003)." Unlike saturated fat, monounsaturated and polyunsaturated fats found in pecans are healthy fats that contribute to overall good health and have been found to lower the risk of heart attack and strokes. These fats also contribute to adding an important antioxidant into the body, Vitamin E (Food and Drug Administration, n.d.). The table below outlines the types of fats found in the recommended daily consumption of pecans (1.5 oz/day) (Figure 1).

Findings in overweight/obese adults, suggest a pecan rich diet (incorporated into a typical American diet) improves cardiometabolic risk factors by improving insulin sensitivity, consequently reducing demand and suppressing overproduction of insulin (McKay, Eliasziw, Chen, & Blumberg, 2018). Compared to a nut-free diet, a pecan-rich diet lowers low-density lipoprotein (LDL) cholesterol in people with normal lipid levels (Morgan & Clayshulte, 2000). Meaning, having a pecan-rich diet may have the ability to lower bad cholesterol.

Furthermore, in a study utilizing self-report by Fraser et al., individuals who consumed nuts (including pecans) more than four times per week, showed reduced risk for developing coronary artery (Kim, Keogh, & Clifton, 2019). This study, among others found connections between high nut diets, particularly those with pecans, and improving coronary heart disease developments.

Overall, pecans are packed with nutrients. In the middle column of Figure 2, some of the specific nutrients are listed that a 1.5 ounce serving of pecans provides. One and a half (1.5) ounces is equivalent to approximately a handful of pecans or about 22-25 pecan halves. The right column in the table also shows the nutrients from pecans, per 100 grams or about 1 cup of pecan halves.

When compared to other nutrient-dense foods such as broccoli, spinach and pistachios, pecans have some of the highest levels of zinc and magnesium as demonstrated

Fatty Acids per 1.5 Ounce Serving (Figure 1)	
Fatty Acids	Amount Per 1.5 ounce serving
Total saturated	2.6 g
Total monounsaturated	17.4 g
Total polyunsaturated	9.2 g

(U.S. Department of Agriculture [USDA], 2019)

Nutritional Values of Pecans (Figure 2)		
Nutrient	Per 1.5 ounces (approximately 23 pecan halves)	Per 100 grams (approximately 1 cup)
Calories	294 kcal	691 kcal
Protein	3.9 g	9.17 g
Total lipid (fat)	30.6 g	72 g
Carbohydrates	5.9 g	13.9 g
Fiber	4.1 g	9.6 g
Sugars	1.7 g	3.97 g

Specific Elements and Vitamins (mg)		
Calcium	294 kcal	691 kcal
Iron	3.9 g	9.17 g
Magnesium	30.6 g	72 g
Phosphorus	5.9 g	13.9 g
Potassium	1.7 g	3.97 g
Sodium (with unsalted pecans)		
Zinc		
Vitamin C		
Vitamin B3 (Niacin)		
Choline		
Vitamin E		

(USDA, 2019)

by Release 28 created by the USDA National Nutrient Database for Standard Reference (USDA, Agricultural Research Service, 2016). Furthermore, compared to many other nuts (e.g., walnuts, macadamias, pistachios, etc.), pecans have some of the highest total Vitamin E levels (USDA, 2019). Vitamin E is important for our overall health because it helps to protect our cells from free radicals. These free radicals are formed in our bodies when converting food into energy, as well as when we are exposed to environmental influences such as air pollution or ultraviolet sun light. While the process of creating free radicals in our bodies is natural, these organic molecules are linked to aging, tissue damage, and some diseases. Vitamin E can help protect our cells from some of the long-lasting negative effects of free radicals, as well as helps to boost our immune systems to fight invading viruses and bacteria (National Institute of Health, 2020). Finally, pecans have the highest presence of antioxidants compared to any other nuts (Wu et al., 2004), as well as compared to other antioxidant-rich foods such as cranberries, blueberries, walnuts, etc. (Nutrient Data Laboratory, 2010).

Conclusion and Recommendations

Eating pecans may help you live longer, or at least healthier! According to a multiyear study, there was a significant inverse association between frequency of nut consumption and mortality, as well as an inverse association with the risk of most major causes of death in those individuals who ate at least 1 ounce of nuts (including pecans) at least 7 times a week. Additionally, participants also seemed to live healthier overall lifestyles and be leaner than those that did not (Bao et al., 2013). In other words, some research findings suggest that those

who eat nuts, especially pecans, may live longer, healthier lives and help combat some major causes of death. Finally, with heart related diseases being the number one cause of deaths in the United States, it is important to note that a recent comprehensive study found that nut consumption seems to produce protective factors on cardiometabolic (heart-related) disease including: significantly decreased cardiovascular disease mortality, decreased coronary heart disease mortality, and decreased stroke mortality, among other positive influences on negative health ailments (Kim, Keogh, & Clifton, 2019). Considering all the nutritional factors, their protective health factors, their long history of the use in the United States, and their tastiness, pecans are an excellent addition into any diet!

In order to incorporate pecans in your diet, look online for fun, simple, and tasty recipes! For recipe ideas, try the following websites and/or tips:

- https://www.choosemyplate.gov/myplatekitchen/recipes?search=pecan
- https://recipes.heart.org/en/search?searchText=pecan
- https://www.azhealthzone.org/recipes?sort=title&sdir=ASC&keywords=pecan
- https://www.mayoclinic.org/healthy-lifestyle/recipes/rhubarb-pecan-muffins/rcp-20049700
- Add pecans to any salad;
- Add pecans to any smoothie;
- Add a bag of plain or salted pecans in your car for the ride;
- Add pecans to any breakfast oatmeal or granola bars!

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