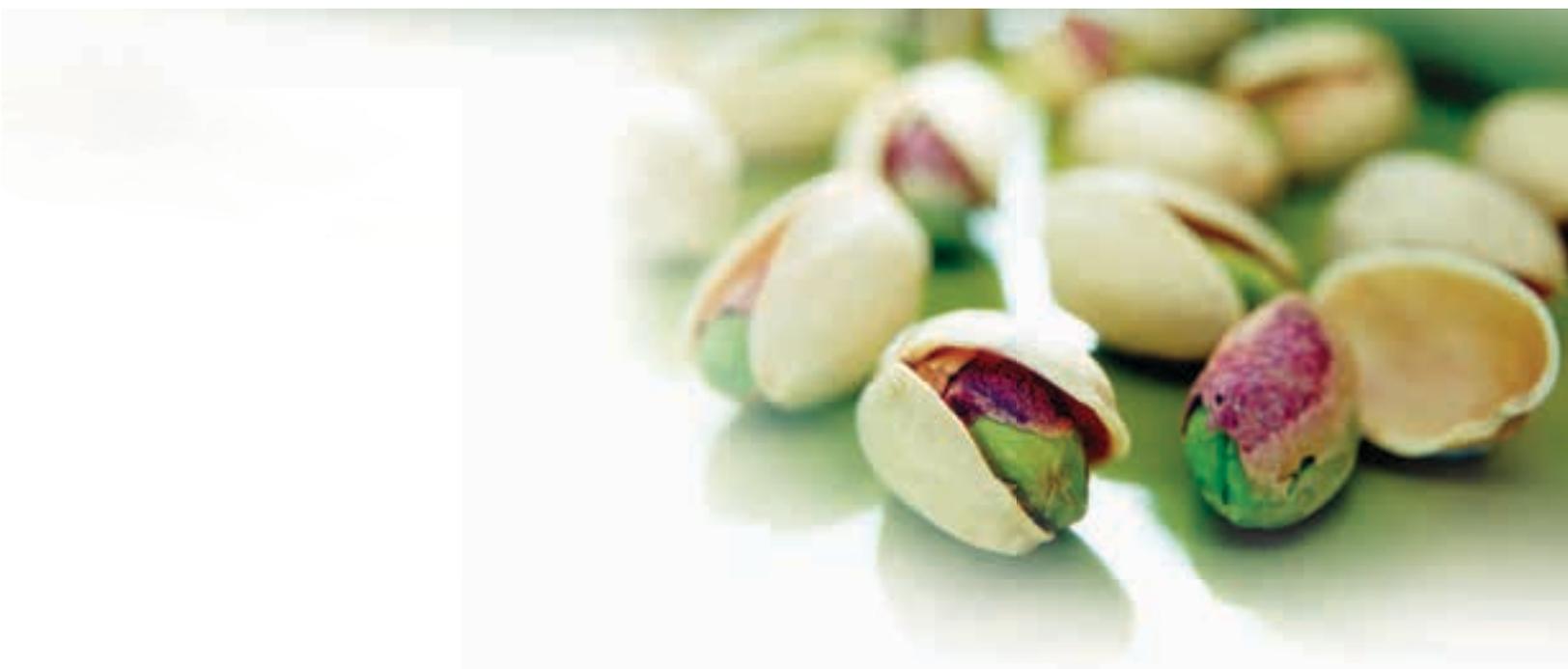




**AMERICAN PISTACHIO
PHYTOCHEMICAL DATABASE
& HEALTH FUNCTION**



RAW KERNELS



Pistachio Phytochemicals

Pistachios have been considered beneficial to health for centuries by societies all over the world.¹ In addition to being a rich source of many essential vitamins and minerals, monounsaturated fatty acids and polyunsaturated fatty acids, protein and fiber, pistachios provide an array of phytochemicals that may promote health and well-being.^{1,2,3}

These include carotenoids such as lutein, zeaxanthin and beta-carotene; phytosterols like beta-sitosterol and polyphenols like quercetin and resveratrol. Research shows that these phytochemicals have beneficial roles in the body, acting as antioxidants, cholesterol-lowering and anti-inflammatory agents.^{4,5}

SUBSTANCE	VALUE	FUNCTION
ALANINE	0.914 g per 100 g	Amino Acid Building block for making proteins. (See <i>Protein</i>)
ALPHA-LINOLENIC ACID	0.259 g per 100 g	Essential Fatty Acid Omega-3 fatty acids that is essential for life. Omega-3 fatty acids have anti-inflammatory effect. They have been shown to lower blood triglycerides levels and protect from heart disease.
ALPHA-TOCOPHEROL	2.3 mg per 100 g 0.65 mg per oz serving - (2% DV)	Vitamin E Fat-soluble antioxidant: it protects cell membranes against free radical damage. Research has shown that vitamin E is important for heart health and protects from diseases that come with aging, it boosts immune system and keeps skin and eyes healthy.
ANTHOCYANIDINS	6.06 mg per 100 g	Flavonoids (Polyphenols) Health protective bioactive compounds (Phytochemicals). Anthocyanidins, a class of flavonoid, are responsible for the intense color of berries, wine, beets and red cabbage. They are being studied for their health protective effect, antioxidant activity and anti-inflammatory potential. (See <i>Flavonoid</i>)
ARGININE	2.012 g per 100 g	Amino Acid Building block for making proteins. (See <i>Protein</i>) Arginine maintains arteries flexible and enhances blood flow by boosting nitric oxide, a compound that relaxes blood vessels.
ASCORBIC ACID	5.6 mg per 100 g 1.6 mg per oz serving - (2% DV)	Vitamin C Needed for the synthesis of collagen, and the material that holds cells together in skin, bones, muscles, and blood vessels. Water-soluble antioxidant that protects cell components against oxidation. Regenerates vitamin E.
ASPARTIC-ACID	1.803 g per 100g	Amino Acid Building block for making proteins. (See <i>Protein</i>)
BETA-CAROTENE	249 mcg per 100 g 71 mcg per oz serving	Carotenoid Health protective bioactive compound (Phytochemical) Carotenoids like beta-carotene are fat-soluble antioxidant present in plant foods and are responsible for their yellows and orange colors. Research shows that diets rich in beta-carotene protect against cardiovascular disease and keep eyes and skin healthy. Beta-carotene may also boost immune function. Beta-carotene can be converted to vitamin A in the body.

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SUBSTANCE	VALUE	FUNCTION
BETAINE	0.7 g per 100 g	Food factor that is involved in amino acid metabolism. Works closely with folic acid, and vitamins B12 and B6.
BETA-SITOSTEROL	199 mg per 100 g	Phytosterol Health protective bioactive compound (Phytochemical) Phytosterols, like beta-sitosterol, are plant-derived substances that lower blood cholesterol levels and support prostate health. May enhance immune function. Pistachios have the highest levels of beta-sitosterol among nuts.
BORON	561 mcg per 100 g	Mineral Research shows that boron may have an important role in growth and maintenance of healthy bones and joints and may protect against osteoporosis.
CALCIUM	105 mg per 100 g 30 mg per oz serving - (4% DV)	Essential Mineral Calcium is the most abundant mineral in the body since it makes up bones and teeth. It is also important for muscle contraction, nerve function, blood clotting and to regulate heart beat and control blood pressure.
CAMPESTEROL	10 mg per 100 g	Phytosterol Health protective bioactive compound (Phytochemical) Phytosterols are plant derived substances that lower blood cholesterol levels and support prostate health.
CARBOHYDRATES	27.5 g per 100 g	Macro Nutrient One of the main types of nutrients. The most important source of energy for your body. Your digestive system changes carbohydrates into glucose (blood sugar). Your body uses this sugar for energy for your cells, tissues and organs. It stores any extra sugar in your liver and muscles for when it is needed.
CATECHIN	3.6 mg per 100 g	Flavonoid (Polyphenol) Health protective bioactive compound (Phytochemical) Catechins are antioxidant compounds found in greatest abundance in tea leaves. In smaller amounts, they are found in other foods such as red wine, chocolate and berries. They belong to the flavonoid family of phytochemicals and are being studied for their health protective effects. (See <i>Flavonoid</i>)
CHLOROPHYLLS	2.5 - 20 mg per 100 g	Green pigment in plants responsible for photosynthesis. Research shows that some chlorophylls have cancer protective activity.
CHOLINE	20.2 mg per oz serving - (4% DV)	Semi-Essential Vitamin Closely related to B vitamin family, it is component of phospholipids in cell membranes and the neurotransmitter acetylcholine crucial for brain function.
CHROMIUM	24.69 mcg per 100 g	Essential Mineral (Trace Element) Enhances the effect of insulin in delivering glucose to the cells. It may help Type II diabetics control blood sugar.

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SUBSTANCE	VALUE	FUNCTION
COPPER	1.3 mg per 100 g 0.37 mg per oz serving - (20% DV)	Essential Mineral (Trace Element) Copper is involved in many body processes. It is considered an antioxidant mineral since it is part of the cells' natural antioxidant defense mechanism. It is important to keep the integrity of blood vessels and red blood cells and to keep skin healthy.
CYSTINE	0.355 g per 100 g	Amino Acid Building block for making proteins. One of the few amino acids to contain sulfur, it is necessary to make the body's own most abundant natural antioxidant. (See <i>Protein</i>)
DAIDZEIN	1.9 mg per 100 g 0.5 g per oz serving -(10% DV)	Isoflavones are phytoestrogens, which means plant-derived compounds with mild estrogenic activity. Research shows they may protect against breast cancer and have a role in bone health (see <i>Flavonoids</i>).
FLAVONOIDS	250 mg per 100 g	Polyphenols Health protective bioactive compounds (Phytochemicals). Flavonoids are a large family of polyphenolic compounds that have antioxidant activity. While not essential to human life in the same way as vitamins, flavonoids play a role in disease prevention. A diet abundant in flavonoid-rich foods has been associated with lower risk of chronic disease such as heart disease, cancer and diabetes.
FIBER	10.3 g per 100 g 2.9 g per oz serving -(10% DV)	Macro Nutrient Sometimes called bulk or roughage, dietary fiber is the non-digestible portion of plant foods. It is important for healthy intestinal function. Health agencies around the world recommend that people increase their dietary fiber intake because high fiber diets lower the risk of developing many conditions including constipation, type 2 diabetes, and obesity, and later in life, diverticulitis, colorectal cancer and cardiovascular disease.
FLUORINE	3.4 mcg per 100 g	Essential Mineral (Trace Element) Helps build strong bones and keep them that way. Valuable for preventing tooth decay.
FOLIC ACID	51 mcg per 100 g 14 mcg per oz serving - (4% DV)	Vitamin Member of the B vitamin family, it is necessary for making DNA and RNA and so new cells. It is important in growth and development, and to repair and regenerate tissue and to make new blood cells. Proper folic acid nutrition is important to prevent birth defects and to keep the heart and circulation healthy.
GADOLEIC-ACID	0.157 g per 100 g	Mono-Unsaturated Fatty Acid Healthy fat (see <i>MUFA</i>)
GAMMA- TOCOPHEROL	22.6 mg per 100 g 6.41 mg per oz serving	Vitamin Gamma-tocopherol is a form of vitamin E that is particularly high in pistachios. While very few studies have looked at the function of gamma-tocopherol in the body, those that have suggest that it may have potent physiological actions. While both alpha- and gamma-tocopherol are potent antioxidants, gamma-tocopherol has a unique function in the body and greater anti-inflammatory properties. Eating pistachios raises blood levels of this vitamin.
GLUTAMIC-ACID	3.790 g per 100 g	Amino Acid Building block for making proteins (see <i>Protein</i>)

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GENISTEIN	1.8 mg per 100 g	Isoflavones are phytoestrogens, which means plant-derived compounds with mild estrogenic activity. Research shows they may protect against breast cancer and have a role in bone health (see <i>Flavonoids</i>).
GLYCINE	0.946 g per 100 g	Amino Acid Building block for making proteins (see <i>Protein</i>)
HISTIDINE	0.503 g per 100 g	Essential Amino Acid Building block for making proteins (see <i>Protein</i>)
IRON	3.92 mg per 100 g 1.11 mg per oz serving - (6% DV)	Essential Mineral Iron is necessary to carry oxygen in the blood from the lungs to the rest of the body. It is part of hemoglobin in red blood cells and deficiency leads to anemia. Iron also helps our muscles store and use oxygen.
ISOLEUCINE	0.893 g per 100 g	Essential Amino Acid Building block for making proteins (see <i>Protein</i>)
LEUCINE	1.542 g per 100 g	Essential Amino Acid Building block for making proteins (see <i>Protein</i>)
LINOLEIC-ACID	13.485 g per 100 g	Essential Fatty Acid Healthy fat – (see <i>PUFA</i>) Building block for cell membranes and for many hormones in the body.
LUTEIN + ZEAXANTHIN	1405 mcg per 100 g 398 mcg per oz serving	Carotenoids Health protective bioactive compounds (phytochemicals). Potent antioxidants present in yellow and dark green fruits and vegetables. They are particularly important for healthy eyes. They are found in high concentrations in the macula, protecting this area of the retina against harsh light, helping maintain good vision. Pistachios are the only nuts that contain these carotenoids.
LYSINE	1.142 g per 100 g	Essential Amino Acid Building block for making proteins (see <i>Protein</i>)
MAGNESIUM	121 mg per 100 g 34 mg per oz serving - (8% DV)	Essential Mineral Magnesium is necessary for energy production, nerve function, muscle relaxation, protein synthesis and to regulate heartbeat, maintain normal blood pressure, and to keep strong bones and teeth. Magnesium is may increase insulin sensitivity and so lower type 2 diabetes risk.

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SUBSTANCE	VALUE	FUNCTION
MANGANESE	1.2 mg per 100 g 0.340 mg per oz serving -(20 % DV)	Essential Mineral (Trace Element) Manganese is important for many reactions in the body. It is part of our body's antioxidant defense system, for wound healing and for healthy bones and joints
METHIONINE	0.335 mg per 100 g	Essential Amino Acid Building block for making proteins (see <i>Protein</i>)
MUFA	23.82 g per 100 g	Mono-Unsaturated Fatty Acids Healthy fats which nutritionists recommend for a healthy heart and circulation. Replacing saturated fats with mono- and poly- saturated fats, like those found in nuts can lower total blood cholesterol and LDL (bad) cholesterol levels.
NIACIN	1.300 mg per 100 g	Vitamin B3 Niacin is necessary to release energy within the cells. It is involved in more than 50 different processes in the body and works with other members of the B vitamin family to keep body running smoothly.
NICKEL	13.4-34.0 mcg per 100 g	Mineral Widely distributed in plant foods, may activate several enzymes. May be essential to humans though function is unknown.
OLEIC-ACID	0.473 g per 100 g	Mono-Unsaturated Fatty Acid Healthy fat (See <i>MUFA</i>)
PALMITIC-ACID	4.994 g per 100 g	Saturated Fatty Acid See (<i>SFA</i>)
PALMITOLEIC-ACID	0.473 g per 100 g	Mono-Unsaturated Fatty Acid Healthy fat (See <i>MUFA</i>)
PANTHOTENIC ACID	0.520 mg per 100 g 0.147 mg per oz serving -(2% DV)	Vitamin Member of the B vitamin family. Necessary to convert carbohydrate and fats into energy.
PHENYLALANINE	1.054 g per 100 g	Essential Amino Acid Building block for making proteins (See <i>Protein</i>)

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SUBSTANCE	VALUE	FUNCTION
PHOSPHORUS	490 mg per 100 g	Essential Mineral The second most abundant mineral in the body. It is part of bones and teeth and is integral part of cell structure and function, necessary for energy transfers involved in all cellular activity.
PHYTOSTEROLS	214 mg per 100 g	Plant Sterols Health protective bioactive compounds (Phytochemicals). Phytosterols--like beta-sitosterol, campesterol and stigmasterol--are plant-derived substances that lower blood cholesterol levels and support prostate health.
PROLINE	0.805 g per 100 g	Amino Acid Building block for making proteins (See <i>Protein</i>)
PROTEIN	20.25 g per 100 g 5.75 g per oz serving - (12% DV)	Essential Nutrient Protein is the basic material that is needed for growth, development and maintenance of body tissue. This includes structural roles (e.g. in muscle, skin, hair, nails), enzymes, hormones and neurotransmitters that keep the body working.
PUFA	13.744 g per 100 g	Poly-Unsaturated Fatty Acids Healthy fats which nutritionist recommend for a healthy heart and circulation. Replacing saturated fats with mono- and poly-saturated fats, like those found in nuts can lower total blood cholesterol and LDL (bad) cholesterol levels.
PYRIDOXINE	1.70 mg per 100 g 0.35 mg per oz serving - (15% DV)	Vitamin B6 Member of the B vitamin family. Necessary for protein metabolism (convert protein in foods to protein in the body), carbohydrate and fat metabolism, and formation of red blood cells and immune function.
QUERCETIN	1.5 mg per 100 g	Flavonoid (Polyphenol) Health protective bioactive compound (Phytochemical). Quercetin is one of the most common flavonoids in the human diet. It is a potent antioxidant and has been extensively studied for its biological activities, including cardiovascular protection, anti-cancer activity, and anti-inflammation. (See <i>Flavonoids</i>)
RESVERATROL	009 - 0.167 mg per 100 g	Polyphenol Health protective bioactive compound (Phytochemical) Found in wine, berries and some nuts (like peanuts and pistachios) this compound increases life span, has anti-carcinogenic and anti-inflammatory effects in experimental animals. May be in part responsible for the "French Paradox" (protection from stroke and heart disease by red wine)
RIBOFLAVIN	0.160 mg per 100 g 0.045 mg per oz serving - (4% DV)	Vitamin B2 Member of the B vitamin family. Necessary for the metabolism of carbohydrate, protein and fat for energy and for tissue growth and repair.

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SUBSTANCE	VALUE	FUNCTION
SELENIUM	7.0 mcg per 100 g 2.0 mcg per oz serving - (4% DV)	Essential Mineral (Trace Element) Necessary for the body's antioxidant defense mechanism to protect cell membranes from oxidation. Helps vitamin E work more effectively.
SERINE	1.216 g per 100 g	Amino acid Building block for making proteins. (See <i>Protein</i>)
SFA	5.556 g per 100 g	Saturated Fatty Acid Predominant in animal fats. Fatty acids can be burned by the body for energy.
SODIUM	1 mg per 100 g Less than 1 mg per oz serving	Mineral Table salt is made up of the elements sodium and chlorine - the technical name for salt is sodium chloride. Your body needs some sodium to work properly. It helps with the function of nerves and muscles. It also helps to keep the right balance of fluids in your body. Your kidneys control how much sodium is in your body. If you have too much and your kidneys can't get rid of it, sodium builds up in your blood. This can lead to high blood pressure. High blood pressure can lead to other health problems.
STEARIC-ACID	0.476 g per 100 g	Saturated Fatty Acid (See <i>SFA</i>)
STIGMASTEROL	5 mg per 100 g	Phytosterol Phytosterols, like beta-sitosterol, are plant derived substances that lower blood cholesterol levels and support prostate health.
SUCROSE	6.87 g per 100 g	Nutrient Simple carbohydrate (table sugar).
SULFUR	287 mg per 100 g	Essential Mineral Mineral present in all cells of the body but most abundant in the skin. It is part of amino acids and is necessary to make new proteins.
THIAMIN	0.870 mg per 100 g 0.247 mg per oz serving -(15% DV)	Vitamin Member of the B vitamin family. Necessary for the metabolism of carbohydrates for energy, tissue growth and repair- especially nerves, heart, muscle and skin.
THREONINE	0.667 g per 100 g	Essential Amino acid Building block for making proteins. (See <i>Protein</i>)

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SUBSTANCE	VALUE	FUNCTION
TRYPTOPHAN	0.271 g per 100 g	Essential Amino acid Building block for making proteins. (See <i>Protein</i>)
TYROSINE	0.412 g per 100 g	Essential Amino acid Building block for making proteins. (See <i>Protein</i>)
VALINE	1.230 g per 100 g	Essential Amino acid Building block for making proteins. (See <i>Protein</i>)
VANADIUM	0.8 mg per 100 g	Mineral Function and essentiality in humans is unknown. May be involved in fat metabolism. Essential to animals.
ZEAXANTHIN + LUTEIN	1405 mcg per 100 g 329 mcg per oz serving	Carotenoids Health protective bioactive compounds (phytochemicals). Potent antioxidants present in yellow and dark green fruits and vegetables. They are particularly important for healthy eyes. They are found in high concentrations in the macula, protecting this area of the retina against harsh light, helping maintain good vision. Pistachios are the only nuts that contain these carotenoids.
ZINC	2.20 mg per 100 g 0.62 mg per oz serving - (4% DV)	Essential Mineral (Trace Element) Zinc is necessary for the formation of genetic material (DNA and RNA) and it is a component of many enzymes and including those involved in the body's antioxidant defense system. It is important for normal bone formation and wound healing.

Sources: Nutrient data from the USDA National Nutrient Database for Standard Reference, Release 26, 2014. Flavonoid data from the USDA Database for the Flavonoid Content of Selected Foods, Release 2.1 2007; Phytosterol data from the USDA Nutrient Database Standard Reference, Release 26, 2014; Proanthocyanidin data from USDA Database for the Proanthocyanidin Content of Selected Foods, 2004. Other values from Dr. Duke's Phytochemical and Ethnobotanical Databases <http://www.ars-grin.gov/duke/>

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Contact Information:



AMERICAN PISTACHIO GROWERS
9 RIVER PARK PLACE EAST, SUITE 410
FRESNO, CALIFORNIA 93720 USA
TEL: 559.475.0435 / FAX: 559.475.0624
E-MAIL: Info@AmericanPistachios.org
AmericanPistachios.org