Apple

WHAT WE KNOW

• The apple, or Malus, is a fruit from the Rosaceae (i.e., rose) family, which includes cherries, peaches, apricots, and plums. Apple origins have been traced to Europe and Asia, but apple trees are now grown worldwide and there are more than 7,000 varieties (e.g., Red and Golden Delicious, Pippins, Granny Smith, Fuji, Braeburn). Apples have red, yellow, green, or red mixed with green skin that covers crisp, white flesh. Apple flavors range from tart to sweet. The apple can be eaten raw, canned, dried, baked in pies and cobblers, and used in jams and sauces. In addition to its culinary value, the apple is a good source of fiber, vitamin C, and many phytonutrients (i.e., protective, plant-derived chemicals). The antihistamine, anti-inflammatory, and antioxidant properties of apple provide many health benefits such as reducing risk for asthma, constipation, diabetes mellitus, type 2 (DM2), heart disease, and cancer (e.g., skin, lung, and colon cancer).

NUTRIENTS IN THE APPLE

• The concentration of nutrients is especially high in the skin of the apple.
• Apple contains many important phytonutrients, including the flavonoids; quercetin, kaempferol, and myricetin, which provide strong antioxidant and anti-inflammatory protection and have antihistamine, antimicrobial, anti-diabetic, and anticarcinogenic (i.e., cancer fighting) properties.
• Phenolic acid (chlorogenic acid) is a plant chemical that exhibits anti-carcinogenic, antimicrobial, and antiviral properties and is believed to inhibit the build-up of low density lipoprotein (LDL) cholesterol (i.e., the “bad” cholesterol).
• The skin of red apples contains anthocyanins, which are reddish color pigments that have high antioxidant and anti-carcinogenic activity, promote urinary tract health, and support memory function.
• Epicatechin is thought to decrease risk for cardiovascular disease (CVD) and hypertension by preventing the oxidation of LDL, enhancing blood vessel relaxation, reducing inflammation, and inhibiting clot formation by simulating blood cell function.
• Apigenin has anti-mutagenic activity and has been shown to reduce the size of prostate tumors.
and prevent the development of progestin-induced breast cancer.

- The water-soluble vitamin C in apple neutralizes free radicals, protecting against inflammation and cellular damage. Adequate vitamin C intake is vital for healthy immune system function and is associated with the prevention of heart disease, stroke, and cancer.
- Apple is a good source of dietary fiber, including soluble fiber, which binds with water and slows the digestive process, allowing the body to better manage post-prandial (i.e., after eating) glucose and insulin responses. Fiber also increases the volume of the intestinal contents, which hinders the absorption of cholesterol. The added bulk leads to more regular bowel movements, promoting intestinal health.

RESEARCH FINDINGS
- There is no information in medical literature regarding recommended dosage of apple, adverse effects and contraindications of apple, or interactions of apple with medications.
- There is evidence that the nutrients and phytochemicals found in apple counteract oxidative stress, reduce inflammation, and modulate cellular interactions, which play a protective role against vascular disease and cancer. The prevention of vascular disease is attributed in part to the ability of these nutrients (e.g., epicatechin, chlorogenic acid, and vitamin C) to inhibit blood clotting and lower cholesterol and fat levels. The cancer-preventive properties of the apple lie in the ability of its constituents (e.g., flavonols, anthocyanins, apigenin, and vitamin C) to protect against DNA and cellular damage caused by oxidative stress, modulate carcinogen metabolism, prevent inflammation, induce natural cell death and renewal, and prevent or retard the spread of malignant cells into surrounding tissues. Results of studies indicate that consuming one or more apples a day reduces risk for skin, breast, colon, and lung cancers.
- Evidence indicates that drinking clear apple juice, which does not contain pectin and other important cell wall constituents, is not as effective at lowering cholesterol as eating whole apples. Researchers suggest that the fiber content of whole apples is a necessary component to achieve the cholesterol-lowering effect.
- A 2012 study analyzed the content of arsenic and lead in 15 juices containing apple. Results showed that both arsenic and lead were present in most of the juices analyzed. Although the levels of lead were below the mandated exposure levels in drinking water, 32% of the juices tested had arsenic levels that were close to or exceeded the mandated limit for exposure in drinking water of 10 parts per billion. Researchers suggested that persons who consume apple juice would be better protected if juice was mandated to comply with the same exposure limits that are currently set for drinking water. Additionally, researchers stated that regular testing of juices that contain apple and reporting results would serve to inform consumers of the higher arsenic levels contained in certain types and brands of juice.

SUMMARY
The more consumers know about the physiologic benefits of the apple, and share this information with friends and family, the better the chances are for increased apple consumption.

Apples are a good source of fiber, vitamin C, and many phytonutrients, and the nutritional benefits of apple consumption include reduced risk for asthma, constipation, DM2, heart disease, and cancer.

—Cherie Marcel, BS

REFERENCES


**REVIEWER(S)**
Darlene Strayer, RN, MBA, Cinahl Information Systems, Glendale, CA
Nursing Executive Practice Council, Glendale Adventist Medical Center, Glendale, CA

**Apricot**

**WHAT WE KNOW**
The apricot, or Prunus armeniaca, is a small stone fruit from the Rosaceae (i.e., rose) family, along with cherries, peaches, and plums. Its origins are in China over 4,000 years ago, where apricot was believed to enhance fertility. In the 1700s, Spanish explorers transported cuttings from apricot trees to the Spanish missions in California, marking the beginning of California’s cultivation of what is now 95% of the apricots grown in the United States. The soft, peach-like skin of the apricot is edible and surrounds the sugary sweet and slightly tart fleshy fruit. Apricots are a delicious culinary treat when eaten raw, canned, dried, baked into pies and cobblers, made into jams and sauces, and blended into drinks. Beyond its value in cuisine, the apricot possesses a wealth of nutrients, including beta carotene (i.e., the precursor to vitamin A), vitamin C, potassium, lycopene (i.e., a carotenoid responsible for the orange pigmentation), important polyphenolic phytonutrients (i.e., protective plant-derived chemicals), and fiber. Apricot consumption is associated with reduced risk of developing macular degeneration and prostate cancer and with providing antioxidant protection for the heart. The seed, or kernel (also known as Laetrile and vitamin B-17) of the apricot contains about 0.5 mg of cyanide, a mitochondrial toxin that can cause death within minutes to hours of ingestion. In general, this small amount of cyanide does not pose a threat to individuals eating the fruit and discarding the kernel. Although controversial, apricot kernels have been used in certain alternative medicines as a treatment for cancer. Research is lacking on the benefits of apricot kernels and their safe administration as a treatment for cancer.

**NUTRIENTS IN THE APRICOT**
- Apricots contain important phytonutrients that have antioxidant, anti-inflammatory, and anti-mutagenic properties, which act to protect deoxyribonucleic acid (DNA) against damage and enhance DNA repair.
- The water-soluble vitamin C in apricots neutralizes free radicals, protecting against inflammation and cellular damage. Adequate vitamin C intake is vital for healthy immune system function and is associated with prevention of heart disease, stroke, and cancer.
- The beta carotene in apricots is a precursor for vitamin A, which provides antioxidant protection to the heart and promotes visual health. Results of studies show that vitamin A plays a role in preventing age-related macular degeneration.
- Apricots contain potassium, which is an essential element responsible for regulating acid-base balance, maintaining fluid balance, supporting muscle contraction and cardiac function, contributing to protein synthesis and carbohydrate metabolism, and promoting cellular growth and transmission of nerve impulses.
- Apricots are an excellent source of dietary fiber, which binds and removes toxins from the colon, assists in glycemic control, and reduces high cholesterol levels.
The combination of vitamins A and C, potassium, and polyphenols found in apricots reduces triglycerides and prevents excessive platelet aggregation (i.e., blood clotting).

**Dietary Intake Guidelines**

Excessive intake of apricot kernels may cause cyanide poisoning.

- The lethal cyanide dose is 50–60 apricot kernels
- The Council of Europe and the World Health Organization have established the tolerable daily intake (TDI) of cyanide as follows: 5–9 mcg/lb (12–20 mcg/kg) of body weight
- 1.5–2.5 kernels for a female weighing 140 lb/63.5 kg
- 2–3 kernels for a male weighing 175 lb/79.4 kg
- Other than the potential for cyanide poisoning from excessive kernel ingestion, there is no information in the medical literature about adverse reactions and contraindications of apricot.

**Research Findings**

There is evidence that the nutrients and phytochemicals found in apricots counteract oxidative stress, reduce inflammation, and modulate cellular interactions, all of which play a role in protecting against vascular disease and cancer. The prevention of vascular disease is attributed in part to the ability of these phytochemicals (e.g., flavonoids and carotenoids) and nutrients (e.g., vitamin C, vitamin A, and potassium) to limit blood clotting and lower cholesterol levels. The potential chemo-preventive properties of the apricot lie in the ability of its constituents to protect against DNA and cellular damage caused by oxidative stress.

Although warnings about the toxicity of apricot kernels due to their cyanide content have prevented apricot use among most healthcare practitioners, some clinicians report their belief in the anti-cancer effects of Laetrile. There are very few recorded cases of death from consuming apricot kernels despite its relatively widespread use as alternative medicine since the 1970s, suggesting that the actual occurrence of cyanide poisoning and death is rare. Results of several studies and many anecdotal accounts supported the medicinal effectiveness of Laetrile extracts for treatment of cancer, bacterial infections (e.g., caused by Staphylococcus aureus or Escherichia coli), and the overgrowth of Candida albicans (i.e., an infectious fungus). Some researchers suggest that more studies be conducted to thoroughly investigate whether or not apricot kernels should be used medicinally and in what quantities and preparations.

**Summary**

Consumers should be aware of the physiologic benefits of apricot consumption and the risks associated with apricot kernel ingestion. Apricots are a good source of fiber, vitamin C, potassium, beta carotene, lycopene and many important polyphenolic phytoneutrients. The nutritional benefits of apricot consumption, include reduced risk of developing macular degeneration and prostate cancer and providing antioxidant protection for the heart. It is also important to note that there is the potential for cyanide poisoning from excessive kernel ingestion.

—Cherie Marcel, BS

**References**


Avocado

What We Know

- The avocado tree, or Persea americana, produces a fruit that is native to Mexico, Central America, and South America, although the avocado is now predominantly grown in California. The meaty, pale green fruit of the avocado grows around a large pit (i.e., the seed) and is surrounded by a thick, dark green skin. The outer skin provides the fruit’s protection against disease and insects, reducing the need for using harmful pesticides.
- While avocado is known to be high in fat, approximately 60% of that fat is monounsaturated and 20% is polyunsaturated, leaving only 20% saturated fat. This is valuable because monounsaturated fat protects against heart disease. Avocado is a good source of protein, potassium, magnesium, folate, thiamin, riboflavin, niacin, biotin, pantothenic acid, vitamins E and K, and many phytonutrients (i.e., beneficial plant-derived chemicals). As a result of these nutrients, avocado has been shown to have antioxidant, anti-inflammatory, anti-carcinogenic, anti-thrombotic (i.e., anti-blood clot forming) and anti-hypertensive (i.e., blood pressure lowering) properties. Among the health benefits associated with avocado consumption are prevention of heart disease, cancer (e.g., oral, skin, prostate), diabetes mellitus, type 2 (DM2), obesity, and osteoarthritis (OA).
- Avocado is delicious raw and can be sliced onto salads, spread onto sandwiches, blended into guacamole, or used as a topping on baked potatoes. Because of the smooth texture and fat content, avocado can also be used as a substitute for other fats in some baking recipes.

Nutrients in the Avocado

- Avocado is rich in nutrients, making it a functional food (i.e., a food that provides health benefits exceeding basic nutrition). Included in these nutrients are the following:
  - The monounsaturated fatty acid, oleic acid promotes the production of antioxidants and lowers triglyceride (i.e., main constituent of fat in humans) levels, reducing the risk of atherosclerosis (i.e., thickening of artery walls), heart disease, and cancer.
  - Vitamin E protects lipids (i.e. fats) from oxidation, reducing harmful free radicals in the body.
  - The fat-soluble vitamin K acts as a coenzyme involved in maintaining normal levels of blood clotting proteins and contributes to bone remodeling.
  - The minerals, potassium and magnesium help maintain homeostasis or cell regulation, control blood pressure, promote bone and teeth formation, produce blood cells, and support normal nerve and muscle function.
  - Niacin is involved in oxidation-reduction reactions (i.e. transfer of electrons) that derive energy from carbohydrates, lipids, proteins, and alcohol and is integral for the reactions necessary to make new fatty acids and cholesterol.
  - Thiamine conducts the flow of nerve and muscle cells and contributes to the function of the nervous system; thiamine contributes to the metabolism or break down of carbohydrates and production of hydrochloric acid, both of which are vital for digestion.
  - Pantothenic acid contributes to the metabolism of carbohydrates, proteins, and lipids. It also plays a role in the synthesis of acetylcholine, a neurotransmitter (i.e., transmits nerve impulses) in the central and peripheral nervous systems.
  - Folate is essential for the production and maintenance of red blood cells, the metabolism of homocysteine (i.e., an amino acid or broken down protein), and the synthesis of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA), the genetic code for cells.
  - Riboflavin activates proteins for respiratory reactions in order to produce energy; plays a role in fatty acid oxidation (i.e., energy production);