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# Culinary Nutrition News: Lingering Tannins

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**Mostly** associated with wine and tea, tannins are ubiquitous plant substances responsible for the astringent taste found in many foods and beverages. If you've ever felt a mouth-puckering, gum-drying sensation following a sip of over-steeped tea or a bite of unripe fruit, you've experience tannins hard at work. Tannins are actually naturally occurring polyphenols, which belong to a larger group of chemicals called antioxidants, and in recent years they have been discussed and disputed as possible cancer-reducing as well as headache-causing compounds.

## Role

The term "tannins" refers to their use in the ancient practice of tanning animal hides into leather. Tannins' primary role in plants is to bind and separate proteins. Furthermore, these compounds can affect the nutritional value of foods or beverages because they bind to proteins. While generally safe for humans, tannins can impair the digestibility of food in animals.

Many plants rely on tannins as a defense mechanism to ward off predators and offer protection against parasites. The astringency of tannins embedded in plant tissue acts as a repellent against insects and other plant-eating predators. Another defense mechanism triggered by tannins is the bitter taste of unripe fruits. They are bitter because they contain a high concentration of tannins, which prevents their consumption before the seeds are viable. The tannin levels fall as the fruit

matures and ripens. While tannins can contribute an astringent taste to the plant foods they are found in, they also play a role in the pigment of flowers and the changing leaves during the autumn season.

## In wine

Tannins are found mainly in red wines and come from the skins, seeds and stems of grapes. They are vital to the winemaking process providing both structure and flavor. The tannins in wine change during the winemaking process. They enable a long and graceful aging potential in which a wine's flavor can become softer and more elegant. Tannins also contribute to the full-bodied, rounded feel created when tannins in wine bind with proteins in our saliva. While most tannins found in wines come from grapes, aging wine in oak barrels can also impart a certain amount of tannins. Oak tannins enhance the smell and taste by offering unique notes of vanilla and liquorice. Tannins also act as a natural preservative, and prevent oxidation and spoiling.

## Where else

In general, tannins are widely distributed in nature and are present in most plant foods and some beverages. They are mainly found in fruits, especially berries, cocoa and beverages like wine, beer and tea. Cereals, such as sorghum and barley, also contain tannins. Tannins tend to concentrate in the peel of fruits or the bran of grains. For example, the concentration of tannins is higher in apples with peel than in apples without peel, much like fiber. Vegetables,

nuts and legumes—like chickpeas and beans—contain tannins. The levels of tannins vary between legume species. For example, red beans contain higher amounts of tannins than white beans. Another food with a high concentration of tannins is chocolate liquor, the liquid form of chocolate that contains both cocoa solids and cocoa butter. As a result, chocolate products made from chocolate liquor can also possess tannins. Again, the level of tannins varies depending on the type of chocolate consumed. For example, white and milk chocolate contain lesser concentrations of tannins than dark. Both tea and wine provide a rich source of tannins, and some fruit juices also contain various tannins.

## Food sources of tannins<sup>1</sup>

<b>Cereals</b>	Barley and sorghum
<b>Beverages</b>	Beer, cider, fruit juices, tea and wine
<b>Chocolate</b>	Cacao beans, chocolate liquor and cocoa powder
<b>Fruits</b>	Apples, blackberries, blueberries, cherries, cranberries, raspberries, strawberries, grapes and pomegranates
<b>Legumes</b>	Beans, chickpeas, cowpeas (black-eyed peas) and lentils
<b>Nuts</b>	Cashew nuts, peanuts, pecans and walnuts
<b>Vegetables</b>	Squash and rhubarb



Dark chocolate contains a higher concentration of tannins than milk or white chocolate.

## Health implications

For a long time, tannins were considered mere food components and void of any nutritional value or beneficial effects on health. Nowadays, most of the interest in tannin intake stems from the potential implications for disease prevention. Research accumulating over the past few years has indicated tannins' high antioxidant properties may promote human health.<sup>1</sup> There is also mounting evidence suggesting tannin intake may prevent the onset of chronic disease.<sup>2</sup> Tannins are thought to have a beneficial effect on our vascular system, suppressing arterial hardening. Tannins may also act on diabetes in two ways: lowering glucose levels by delaying glucose absorption and delaying the onset of insulin-dependent diabetes by regulating the antioxidant environment of certain cells.<sup>1</sup> On the other hand, the general protein-binding abilities of tannins may also interfere with digestion and absorption of nutrients<sup>1</sup> and therefore, it is not advisable to consume large quantities of tannins. Although scientists are unsure of the exact interaction these plant compounds have in the human body, it is believed that tannins do present some sort of biological effect.<sup>1</sup>

## Other implications

Migraines and headaches have a host of possible dietary triggers and red wine is one that tops many of the migraine-causing food lists. Some think that the tannins found in red wine may be the culprit behind the occurrence of headaches. More specifically,

some studies pinpoint certain types of red wine as a stimulant for the onset of a migraine headache. These varieties are said to have a higher tannin content. However, further research is needed considering all the other possible causes and combination

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## About the American Culinary Federation and the Chef & Child Foundation



The American Culinary Federation, Inc., established in 1929, is the premier professional organization for culinarians in North America. With over 20,000 members in more than 200 chapters nationwide, ACF is the culinary leader in offering educational resources, training, apprenticeship and accreditation. In addition, ACF operates the most comprehensive certification program for chefs in the United States. ACF is home to ACF Culinary Team USA, the official representative for the United States in major international culinary competitions, and to the Chef & Child Foundation, founded in 1989 to promote proper nutrition in children and to combat childhood obesity. For more information, visit [www.acfchefs.org](http://www.acfchefs.org).

## About Clemson University



“Culinary nutrition” is the application of nutrition principles combined with food science knowledge displayed through

a mastery of culinary skills. CU CHEFS® (Clemson University's Cooking and Healthy Eating Food Specialists Outreach Services), led by Dr. Margaret Condrasky, promotes healthy foods research and applications for culinary professionals and the food industry. Ranked No. 25 among the nation's top public institutions, Clemson University is a science- and engineering-oriented research university that maintains a strong commitment to teaching and student success.

## About French's Foodservice



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