

What's All the Noise About Coffee?

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✓ Fact Checked

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STORY AT-A-GLANCE

- › The number of Americans drinking coffee in 2017 rose after a decline of the previous four years as gourmet brews gained popularity, especially among younger consumers
- › A Los Angeles County Superior Court judge ruled that coffee must carry a cancer warning under Proposition 65 as the brew contains acrylamide, a known carcinogen and potential neurotoxin
- › Acrylamide is created when carbohydrate-rich foods are heated at high temperatures; but while the production of acrylamide starts with brewing, elimination with longer roasting means dark roast coffee contains less than light roasts
- › Caffeine is the most consumed psychoactive drug in the world, including children and adolescents; however, caffeine has demonstrated the ability to disturb sleep and had a long-lasting negative effect on brain maturation in young people

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According to the National Coffee Association¹ more Americans drank coffee in 2017 than they had in the past four years. This represents a reversal as gourmet coffee brews gain popularity, especially among younger consumers. In an online survey, National Coffee Drinking Trends² reported coffee drinking was up from 57% in 2016, reaching 62% of the general population in 2017, with the most pronounced increase in gourmet coffees.

The beverage of choice has been coffee for a number of years, far outpacing other beverages, including bottled water, soda and tea by nearly 50%.³ Dark-roasted coffee has specific health benefits related to its high levels of antioxidants.

For instance, several studies have found lower mortality rates in individuals who drink coffee compared to those who don't drink coffee at all.^{4,5} Another found those who drink moderate amounts were less likely to have calcium deposits in their coronary arteries.⁶

The likely culprit behind problems drinking a cup of joe rich in phenols and antioxidants stems from the creamers and sugar added, the pesticides sprayed on the crops or improper roasting, which increases the risk of toxic acrylamide levels. The reasons people are hooked on coffee are not consistent, but here are some interesting coffee statistics:⁷

- 31% of coffee drinkers brew coffee in the morning before any other morning behavior
- 65% of coffee drinking happens with breakfast
- 55% would rather gain 10 pounds and 52% would rather go without a shower in the morning than give up coffee
- An astounding 49% would give up their cellphones for a month before giving up coffee

Judge Rules Acrylamide in Coffee Requires Cancer Warnings

In 2018 media attention was focused on a judge who ruled coffee must come with a cancer warning in California.⁸ Despite a long list of health benefits, one ingredient found in coffee has caused Los Angeles County Superior Court Judge Elihu Berle to rule in favor for the Council for Education and Research on Toxics.⁹

The group first filed a lawsuit in 2010 seeking to require coffee sellers to warn their customers about acrylamide, a potential cancer-causing chemical found in coffee.

The Council wanted the coffee industry to remove acrylamide from processing coffee, in much the same way potato chip makers removed it after they were sued.¹⁰ After his ruling, Berle commented the coffee makers had not presented the proper evidence at trial in order to prevail. The lawsuit was brought against 90 coffee companies, including Starbucks, under California's Proposition 65 law passed in 1986.

Also known as the Safe Drinking Water and Toxic Enforcement Act, the law requires labels on products containing chemicals known to cause cancer or birth defects.¹¹ While there is evidence coffee has significant benefits, and the World Health Organization moved coffee off their possible carcinogen list,¹² the dangers related to acrylamide are real and the chemical is found in many coffees.

Coffee companies are balking at removing it from their product as they claim it will ruin the flavor, but attorney Raphael Metzger commented,¹³ "I firmly believe if the potato chip industry can do it, so can the coffee industry." In his comments prior to the ruling, he said,¹⁴ "I'm addicted to coffee, I confess, and I would like to be able to have mine without acrylamide."

A third phase of the trial is now on going and will determine civil penalties against companies who do not post obvious warnings to the consumer.

A similar case was brought against potato chip makers who, in 2008, agreed to pay \$3 million and remove acrylamide from their products rather than post cancer warnings on potato chip bags.¹⁵ Many coffee companies in California have already posted warnings but they may be posted in areas not easily visible to the consumer. So far, approximately 12 of the original 90 defendants have settled and agreed to post warnings. Among the latest were 7-Eleven and BP West Coast Products.

What Is Acrylamide?

Acrylamide is a chemical used in some industrial processes, such as making paper, dyes and plastics.¹⁶ It is also used in treating drinking water and wastewater, and can be

found in cigarette smoke, food packaging and some adhesives. The chemical is also created when carbohydrate-rich foods are cooked at high temperatures.

This occurs whether the foods are baked, fried, roasted, grilled or toasted. Acrylamide is the byproduct of a chemical reaction occurring between sugars and the amino acid asparagine under high heat. As a general rule, it forms when plant-based foods are heated and become either fairly dry and brown, or charred.¹⁷ It is most readily found in:¹⁸

- **Potatoes** – Chips, french fries and other roasted or fried potato foods
- **Grains** – Bread crust, toast, crisp bread, roasted breakfast cereals and various processed snacks such as crackers and cookies
- **Coffee** – Roasted coffee beans and ground coffee powder. Surprisingly, coffee substitutes based on chicory actually contain two to three times more acrylamide than real coffee
- **Cocoa products**

Although it has become a standard component in the American diet, it's important to note the U.S. Food and Drug Administration (FDA) issued an update advising people to reduce consumption of foods in which acrylamide is plentiful, noting this toxic byproduct is found in nearly 40% of calories consumed by the average American.¹⁹

The International Agency for Research on Cancer (IARC)²⁰ classifies acrylamide as "probable human carcinogen." The National Toxicology Program classifies it as "reasonably anticipated to be a human carcinogen." The U.S. Environmental Protection Agency (EPA) classifies it as "likely to be carcinogenic to humans."

Despite these classifications,²¹ the FDA does not regulate acrylamide in food. In 2016 guidelines were issued to reduce the amount in specific foods, but these were not regulations.

On the other hand, the EPA regulates acrylamide in drinking water and sets a level of exposure they consider acceptable in spite of the knowledge 40% of calories consumed contain acrylamide and water does not contain calories.

This means it is highly likely your consumption of acrylamide is higher than anticipated, as the FDA's estimate 40% of calories consumed by the average person contains the carcinogen does not include calorie-free water. Researchers from the department of environmental chemistry at Stockholm University related in one study:²²

"The unexpected finding that humans are regularly exposed to relatively high doses of acrylamide through normal consumption of cooked food was a result of systematic research and relevant developments in methodology over decades, as well as a chain of certain coincidences."

California Prop 65 Aimed at Protecting California Residents

While California has taken a lead role in warning citizens about cancer-causing chemicals in their environment, some believe the state law is nothing more than a way to shake down large corporations.²³ However, even the author acknowledges it is the attorneys who walk away with nearly 70% of the settlements, poking a rather large hole in the argument.

Proposition 65 identified nearly 900 chemicals already in products distributed across the U.S. known to cause cancer or birth defects, and they require manufacturers to place warning labels on such products to inform consumers about the potential risks. Proposition 65 allows private citizens, advocacy groups and attorneys to collect a portion of civil penalties if companies fail to provide these warnings.

William Murray, president and CEO of the National Coffee Association, believes the lawsuit made a mockery of Proposition 65.²⁴ The industry claimed acrylamide is present at harmless levels and should be exempt from a law protecting citizens from carcinogenic chemicals since the chemical is produced naturally as a result of a cooking process to bring out the flavor in the coffee beans.²⁵

Using this argument, potato chips and other foods containing acrylamide must also be exempt, but Berle did not see it this way.

Although some California residents saw the Prop 65 warnings on products as little more than a nuisance, it is important knowledge to have if you strive to avoid as many toxic chemicals as possible. If the ruling stands, stiff financial penalties may be levied against manufacturers and coffee houses if warnings are not posted.

Although California has a rather large population, manufacturers would have found it difficult to tailor warning labels specific to California stores. This means citizens across the U.S. may have this warning advantage as well. In the end, Prop 65 passed, but the California Office of Environmental Health Hazard Assessment (OEHHA) decided the acrylamide dose in coffee is too low to be a carcinogenic risk, so no labels were placed on coffee.²⁶

Health Benefits of Dark Roast Coffee

Levels of acrylamide in coffee are influenced by the raw materials and the manufacturing process.²⁷ **Coffee beans** are dried, roasted and then ground before being brewed into coffee.²⁸ Once the coffee beans have been picked, they are processed using either a dry or wet method and then milled to remove the hulls.

The beans are then bagged and prepared for shipping to manufacturers where samples are tested and analyzed for the purpose of blending different beans to create a specific roast.

At this point the coffee beans are roasted into the aromatic brown bean you purchase at your favorite store. Most roasting machines maintain a temperature over 500 degrees Fahrenheit (F) while the beans are kept moving to keep them from burning.

When the bean reaches an internal temperature of nearly 400 °F they start to turn brown. After roasting, the beans are immediately cooled and packaged. Roasting generally occurs in the country where the coffee will be sold to ensure the freshest beans to reach the consumer as quickly as possible.²⁹

It is during the roasting process that acrylamide is produced in the coffee bean.³⁰ While it might seem reasonable to assume a light roast has lower amounts of acrylamide

since the bean is roasted for a shorter amount of time, researchers have determined more of the chemical is formed at the beginning of the roasting process and declines rapidly toward the end as acrylamide is eliminated from the bean. This means dark-roasted coffee contains lower amounts of acrylamide.

There are health benefits to drinking organic, dark-roasted coffee. For instance, in two large studies lasting nearly 16 years and taking place in 10 European countries, researchers concluded three cups of coffee per day may lower your mortality risk. Men were 12% less likely to die during the follow-up and women were 7% less likely to die during the same period.³¹

The 2015 edition of Dietary Guidelines for Americans for the first time also included coffee, recommending Americans could safely consume up to five cups a day with no detrimental effects.

The recommendation was based on a meta-analysis and other studies evaluating the link between coffee and chronic diseases, including cancer, Type 2 diabetes, heart disease, Parkinson's and Alzheimer's disease. In fact, because Americans drink so much, coffee might be the No. 1 source of antioxidants in the U.S. diet.³²

In one large study,³³ data revealed those who drank three to five cups a day were less likely to have arterial calcium deposits than those who drank no coffee or those who drank more. In a study evaluating coffee drinkers over 45, researchers found a 22% decreased risk of all-cause mortality when those who drank four cups a day increased to six cups a day.³⁴

Those who were at least 45 when the study began received the most benefits, with a 30% lower risk of death over the following 10 years for every two cups of coffee they consumed daily. Other studies have shown coffee may benefit your heart health. These include:

- A meta-analysis³⁵ of 11 studies and nearly 480,000 people found drinking two to six cups of coffee a day was associated with reduced stroke risk. The analysis also noted drinking one to four cups of coffee a day was associated with a significantly

lower risk of coronary heart disease in women, and coffee consumption was inversely associated with risk of Type 2 diabetes.³⁶

- Another study³⁷ showed moderate coffee drinking reduces your chances of being hospitalized for heart rhythm problems.
- Japanese researchers found drinking a cup of coffee may trigger a 30% increase in blood flow in your small blood vessels, which might take some strain off your heart. The effect lasts for about 75 minutes.
- Researchers at Beth Israel Deaconess Medical Center and Harvard School of Public Health found moderate coffee consumption, defined as two 8-ounce servings a day, may protect against heart failure.³⁸
- Research³⁹ has even shown coffee consumption is inversely associated with premature death. The more coffee people drank, the lower their risk of death became, including deaths from heart disease, respiratory disease, stroke, diabetes and infections.

Consider Age Warnings

Caffeine is a commonly ingested psychoactive drug with an increasing number of young consumers. While most parents would never condone the use of drugs or alcohol in their children, many are buying them Frappuccinos.

Today nearly 75% of children in the U.S. consume caffeine on any given day.⁴⁰ In one study, researchers found the mean caffeine intake had not increased in children and adolescents, but the type of intake had changed from soda to a heavier emphasis on coffee and energy drinks.

However, while caffeine consumption has been common among children and adolescents for decades, researchers are finding this stimulant has a potent effect on heart, blood pressure and brain development.

Cardiovascular effects of caffeine drinks appear to be higher in adolescent boys, who experienced slowed heart rate and rising blood pressure.⁴¹ The study's lead author

Jennifer Temple, an associate professor at the University of Buffalo's School of Public Health and Health Professions, commented on the results, saying:⁴²

"This study shows that what we would consider to be a low dose of caffeine – what some might not think twice about giving to an 8-year-old – is having an effect on the cardiovascular system. And right now we don't have enough data in kids to know what the long-term effects of repeated exposure to caffeine would be."

Caffeine consumption can cause side effects in children, including jitteriness, nervousness, upset stomach, and problems sleeping and concentrating.⁴³ In high amounts, severe symptoms may result, including nausea, vomiting, frequent urination and an irregular heartbeat. One study⁴⁴ confirmed caffeine consumption in adolescence would reduce the number of sleeping hours.

The data demonstrated caffeine intake was inversely associated with sleep duration in adolescents, finding for every 10 milligram dose per day increase in caffeine, the odds for sleeping 8.5 hours or less increased. These results were confirmed in a follow-up study, which found caffeine-induced sleep loss also resulted in loss of deep sleep.⁴⁵ This loss may be critical in childhood and adolescence as the brain matures fastest during this period.

In a study using rat animal model,⁴⁶ pubescent rats were administered caffeine, which resulted in a delay in brain maturation. The goal of the study was to evaluate the relationship between brain maturation, sleep and the effect of caffeine consumption.

The researchers found consumption during critical development demonstrated long lasting negative effects on cognitive development in the animal model as demonstrated by changes in the rat's behavior. So, while consumption of four to six cups of organic dark-roasted coffee has demonstrated significant positive health benefits for adults, it is wise to consider restricting caffeine in children and adolescents. Pregnant women should also avoid coffee.

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