

NUTRITION

✓ Evidence Based

What Are Polyphenols? Types, Benefits, and Food Sources



Medically reviewed by [Marie Lorraine Johnson MS, RD, CPT](#) — Written by [Alina Petre, MS, RD \(NL\)](#) — Updated on [October 23, 2023](#)

[What they are](#) [Benefits](#) [Food sources](#) [Supplements](#)
[Risks & side effects](#) [Bottom line](#)

Polyphenols are a category of plant compounds. Regularly consuming polyphenols is thought to boost digestion and brain health and protect against heart

SUBSCRIBE

[NUTRITION](#) | [Meal Kits](#) ▾ [Special Diets](#) [Healthy Eating](#) [Food Freedom](#) >

compounds.

This article reviews everything you need to know about polyphenols, including possible food sources.

ADVERTISEMENT





Cavan Images/Getty Images

ADVERTISEMENT

What are polyphenols?

Polyphenols are a category of compounds naturally found in plant foods, such as fruits, vegetables, herbs, spices, tea, dark chocolate, and wine.

They can act as [antioxidants](#), meaning they can neutralize harmful free radicals that would otherwise damage your cells and increase your risk of conditions like cancer, diabetes, and heart disease (1[✓]).

Polyphenols are also thought to reduce inflammation, which is thought to be the root cause of many chronic illnesses (2[✓], 3[✓]).

ADVERTISEMENT



More than 8,000 types of polyphenols have been identified. They can be further categorized into 4 main groups (4 ✓, 5 ✓):

- **Flavonoids.** These account for around 60% of all polyphenols. Examples include quercetin, kaempferol, catechins, and anthocyanins, which are found in foods like apples, onions, dark chocolate, and red cabbage.
- **Phenolic acids.** This group accounts for around 30% of all polyphenols. Examples include ferulic and chlorogenic acids in coffee and cereal grains.
- **Polyphenolic amides.** This category includes capsaicinoids in chili peppers and avenanthramides in oats.
- **Other polyphenols.** This group includes stilbenes in grapes and berries, resveratrol in red wine, ellagic acid in berries, [curcumin](#) in turmeric, and lignans in flax seeds, sesame seeds, and whole grains.

The amount and type of polyphenols in foods depend on the food, including its origin, ripeness, and how it was farmed, transported, stored, and prepared.

Polyphenol-containing supplements are available as well. However, they're likely to be less beneficial than polyphenol-rich foods (6 ✓).

SUMMARY

Polyphenols are beneficial plant compounds with antioxidant properties that may help keep you healthy and protect against various diseases. They can be subdivided into flavonoids, phenolic acid, polyphenolic amides, and other polyphenols.

Health benefits of polyphenols

ADVERTISEMENT



May lower blood sugar levels

Polyphenols may help [lower your blood sugar levels](#), contributing to a lower risk of type 2 diabetes.

That's partly because polyphenols may prevent the breakdown of starch into simple sugars, lowering the likelihood of blood sugar spikes after meals (7 ✓).

These compounds may also help stimulate the secretion of insulin, a hormone that's required to shuttle sugar from your bloodstream into your cells and keep your blood sugar levels stable (7 ✓).

Various studies further link polyphenol-rich diets to lower fasting blood sugar levels, higher glucose tolerance, and [increased insulin sensitivity](#) — all important factors in lowering your risk of type 2 diabetes (8 ✓).

In one study, people eating the highest amounts of polyphenol-rich foods had up to a 57% lower risk of developing type 2 diabetes over 2–4 years, compared with those eating the lowest amounts (9 ✓).

Among polyphenols, research suggests that anthocyanins may offer the most potent antidiabetic effect. They're typically found in red, purple, and blue foods, such as berries, currants, and grapes (10 ✓, 11 ✓).

May lower your risk of heart disease


Adding polyphenols to your diet may [improve heart health](#).

Experts believe that this is largely due to the antioxidant properties of polyphenols, which help reduce chronic inflammation, a risk factor for heart disease (3 ✓, 12 ✓, 13 ✓).

Two recent reviews link polyphenol supplements to lower blood pressure and LDL (bad) cholesterol levels, as well as higher HDL (good) cholesterol (14 ✓, 15 ✓).

ADVERTISEMENT







intake. Lignans are a type of polyphenol typically found in [flax seeds](#) and whole grains (16 )

May prevent blood clots



Polyphenols may reduce your risk of developing a blood clot.

Blood clots are formed when platelets circulating in your bloodstream begin to clump together. This process is known as platelet aggregation and is useful in preventing excess bleeding.



However, excess platelet aggregation can cause blood clots, which can have negative health effects, including deep vein thrombosis, stroke, and pulmonary embolism (17 )


According to test-tube and animal studies, polyphenols may help reduce the platelet aggregation process, thereby preventing the formation of blood clots (18 , 19 , 20 )

May protect against cancer

Research consistently links diets rich in plant foods to a [lower risk of cancer](#), and many experts believe that polyphenols are partly responsible for this (5 , 21, 22 )

Polyphenols have strong antioxidant and anti-inflammatory effects, both of which can be beneficial for cancer prevention (23).



A recent review of test-tube studies suggests that polyphenols may block the growth and development of various cancer cells (5 , 24 )


In humans, some studies link high blood markers of polyphenol intake to a lower risk of breast and prostate cancers, while others find no effects. Therefore, more studies are needed before strong conclusions can be made (25 )



May promote healthy digestion


ADVERTISEMENT



Polyphenols may [benefit digestion](#) by promoting the growth of beneficial gut bacteria while fending off harmful ones ([26](#) , [27](#) ).


For instance, evidence suggests that polyphenol-rich tea extracts can promote the growth of beneficial bifidobacteria ([28](#) ).





Similarly, green tea polyphenols may help fight off harmful bacteria, including *C. difficile*, *E. Coli*, and *Salmonella*, as well as improve symptoms of peptic ulcer disease (PUD) and inflammatory bowel disease (IBD) ([29](#) , [30](#) ).


Furthermore, emerging evidence indicates that polyphenols may help probiotics thrive and survive. These are beneficial bacteria that occur in certain fermented foods and can be taken in [supplement form](#). However, more research is needed ([31](#) ).

May promote brain function

Polyphenol-rich foods may [boost your focus and memory](#).

One study reports that drinking grape juice, which is naturally rich in polyphenols, helped significantly boost memory in older adults with mild mental impairment in as little as 12 weeks ([32](#) ).

Others suggest that [cocoa flavanols](#) may improve blood flow to the brain and have linked these polyphenols to improved working memory and attention ([33](#) , [34](#) , [35](#) , [36](#) ).

Similarly, the polyphenol-rich plant extract *Ginkgo biloba* appears to boost memory, learning, and concentration. It has also been linked to improved brain activity and short-term memory in those with dementia ([37](#) ).

SUMMARY

Polyphenols may help prevent blood clots, reduce blood sugar levels, and lower heart disease risk. They may also promote brain

ADVERTISEMENT



function, improve digestion, and offer some protection against cancer, though more research is needed.

Foods rich in polyphenols

Though tea, dark chocolate, red wine, and berries are likely the best-known sources of polyphenols, many other foods also contain high amounts of these beneficial compounds.

Here are the 75 foods richest in polyphenols, listed by category (38 )

Fruits

- apples
- apricots
- black chokeberries
- black and red currants
- black elderberries
- black grapes
- blackberries
- blueberries
- cherries
- grapes
- grapefruit
- lemon
- nectarines
- peaches
- pears
- pomegranate

ADVERTISEMENT



- strawberries

Vegetables

- artichokes
- asparagus
- broccoli
- carrots
- endives
- potatoes
- red chicory
- red lettuce
- red and yellow onions
- spinach
- shallots

Legumes

- black beans
- tempeh
- tofu
- soybean sprouts
- soy meat
- soy milk
- soy yogurt
- white beans

Nuts and seeds

- almonds

ADVERTISEMENT



- flax seeds
- pecans
- walnuts

Grains

- oats
- rye
- whole wheat

Herbs and spices

- caraway
- celery seed
- cinnamon
- cloves
- cumin
- curry powder
- dried basil
- dried marjoram
- dried parsley
- dried peppermint
- dried spearmint
- lemon verbena
- Mexican oregano
- rosemary
- sage
- star anise
- thyme

ADVERTISEMENT



- black tea
- capers
- cocoa powder
- coffee
- dark chocolate
- ginger
- green tea
- olives and olive oil
- rapeseed oil
- red wine
- vinegar

Including foods from each of these categories in your diet provides you a wide variety of polyphenols.

SUMMARY

Many plant foods are naturally rich in polyphenols. Including a variety of these foods in your diet is a great strategy to boost your intake of these beneficial nutrients.



What about polyphenol supplements?



Supplements have the advantage of offering a consistent dose of polyphenols. However, they also have several potential drawbacks.

First, supplements haven't been consistently shown to offer the same benefits as polyphenol-rich foods, and they don't contain any of the additional beneficial plant compounds typically found in whole foods.

ADVERTISEMENT



isolated polyphenols, such as those in supplements, are as effective as those found in foods (6 , 39 )

Finally, polyphenol supplements aren't regulated, and many contain doses over 100 times larger than those in foods. More research is needed to establish safe and effective dosages, and it's unclear whether these large doses are beneficial (39 , 40 )


SUMMARY

Polyphenol supplements may not offer the same health benefits as polyphenol-rich foods. Effective and safe dosages haven't been determined.

ADVERTISEMENT

Potential risks and side effects

Polyphenol-rich foods are safe for most people.

The same cannot be said of supplements, which tend to provide much higher quantities of polyphenols than those typically found in a healthy diet (39 )

ADVERTISEMENT



humans, they may result in an increased risk of stroke and premature death (39 ✓, 40 ✓).

Some polyphenol-rich supplements can interact with nutrient absorption or interact with medications. For instance, they may reduce your body's ability to absorb iron, thiamine, or folate (39 ✓, 41 ✓, 42 ✓).

If you have a diagnosed [nutrient deficiency](#) or are taking medications, it may be best to speak to your healthcare provider about polyphenol supplements before taking them.

In addition, some polyphenol-rich foods, such as beans and peas, may be rich in lectins. When consumed in large quantities, [lectins](#) may cause unpleasant digestive symptoms, such as gas, bloating, and indigestion (43 ✓).

If this is an issue for you, try soaking or sprouting your legumes before eating them, as this can help reduce the lectin content by up to 50% (44 ✓, 45 ✓).

SUMMARY

Polyphenol-rich foods are considered safe for most people, while supplements may cause more harm than good. To reduce gas, bloating, and indigestion, try soaking or sprouting polyphenol-rich legumes before eating them.

The bottom line

Polyphenols are beneficial compounds in many plant foods that can be grouped into flavonoids, phenolic acid, polyphenolic amides, and other polyphenols.

They may improve digestion, brain function, and blood sugar levels, as

ADVERTISEMENT



More research is needed to identify effective and safe polyphenol supplement dosages.

Therefore, for the time being, it's best to rely on foods rather than supplements to boost your intake of these healthful compounds.

How we reviewed this article:

HISTORY

Our experts continually monitor the health and wellness space, and we update our articles when new information becomes available.

Current Version

Oct 23, 2023

Written By

Alina Petre

Edited By

John Bassham

Medically Reviewed By

Marie Lorraine Johnson MS, RD, CPT

Copy Edited By

Copy Editors

Jul 8, 2019

Written By

Alina Petre

Edited By

Alina Sharon

Share this article

ADVERTISEMENT



READ THIS NEXT

Top Foods with Polyphenols

Medically reviewed by [Natalie Olsen, R.D., L.D., ACSM EP-C](#)

Learn about which foods have the most polyphenols.

[READ MORE →](#)

Coffee and Antioxidants: Everything You Need to Know

Written by [Alex Marceau](#)

Coffee is incredibly high in antioxidants. Several studies have shown that people get more antioxidants from coffee than any other food group.

[READ MORE →](#)

Does Milk Block Antioxidants in Foods and Beverages?

Written by Taylor Jones, RD

Some experts have suggested that substances in milk can inactive antioxidants in foods and beverages. This article explores whether this i...

[READ MORE →](#)

ADVERTISEMENT



10 Evidence-Based Benefits of Green Tea

Written by [Kris Gunnars, BSc](#) and [Dylan Bailey, MS, RD, FAND](#)

This is a detailed article about green tea and its health benefits. Green tea is high in antioxidants that can improve the function of your body and...

[READ MORE →](#)

Antioxidants Explained in Simple Terms

Written by [Atli Arnarson BSc, PhD](#)

Antioxidants are incredibly important, but most people don't really understand what they are. This article explains it all in human terms.

[READ MORE →](#)

10 Impressive Benefits of White Tea

Written by [Ryan Raman, MS, RD](#)

White tea may help reduce the risk of heart disease, combat skin aging and even help with weight loss. This article lists 10 science-backed...

[READ MORE →](#)

Should You Take Antioxidant Supplements?

ADVERTISEMENT



Antioxidant supplements are popular, but evidence suggests that they have several drawbacks. This article explains what antioxidant...

[READ MORE →](#)

‘Liquid Gold’: Bovine Colostrum Is TikTok’s Latest Supplement Trend. Does It Work?

Bovine colostrum supplements, which are made from the first milk cows produce after giving birth, are skyrocketing in popularity thanks to claim...

[READ MORE →](#)

6 Popular Herbal Supplements That May Damage Your Liver

Herbal supplements are going viral on TikTok due to their reported health benefits, but new research finds six of the most popular (including green...

[READ MORE →](#)



Get our wellness newsletter

Filter out the noise and nurture your inbox with health and wellness advice that’s inclusive and rooted in medical expertise.

ADVERTISEMENT



Your [privacy](#) is important to us

[About Us](#)

[Health Topics](#)

[Contact Us](#)

[Sitemap](#)

[Terms of Use](#)

[Medical Affairs](#)

[Privacy Policy](#)

[Content Integrity](#)

[Privacy Settings](#)

[Newsletters](#)

[Advertising Policy](#)

[Your Privacy Choices](#)

© 2025 Healthline Media LLC. All rights reserved. Healthline Media is an RVO Health Company. Our website services, content, and products are for informational purposes only. Healthline Media does not provide medical advice, diagnosis, or treatment. [See additional information.](#)

[About](#) | [Careers](#) | [Advertise with us](#)

OUR BRANDS

[Healthline](#)

[Medical News Today](#)

[Greatist](#)

[Psych Central](#)

[Bezzly](#)

ADVERTISEMENT



