What are Polyphenols? And How Can They Support Health?

Polyphenols are naturally occurring plant compounds with antioxidant and anti-inflammatory properties. They may help prevent or reverse cellular damage caused by aging, environmental, or lifestyle factors. Research suggests these compounds act on immune cells and pathways throughout the body, including the gut to help improve cardio-metabolic health.[1,2]

Here's a look at what that means for your health and why it may be worth adding more sources of polyphenols to your diet.

What are Polyphenols?

Polyphenols are compounds that plants produce to protect themselves from stress or harm. More than 8,000 different types of polyphenols have been identified.[1] In addition to their protective functions, polyphenols provide characteristics such as color, flavor, odor, bitterness, and astringency to various plant foods.

There are four main categories of polyphenols: flavonoids, phenolic acids, stilbenes, and lignans. Of these, flavonoids have been studied the most; researchers have identified at least 4,000 varieties of flavonoids.[1] They account for the vibrant colors in flowers, fruits, and leaves of many plants, such as berries and hibiscus tea.

Plant foods usually contain a mix of polyphenol types found throughout the plant. However, a plant's polyphenol content can vary widely depending on the environment, whether the food is organically or conventionally grown, ripeness, processing, and storage conditions.[1]

Food Sources of Polyphenols

Polyphenols are present in a wide range of whole plant foods, including these: [3,4,5]

Fruits:

- Apples, pears
- Apricots, nectarines, peaches, plums
- Berries (blueberries, strawberries, blackberries, raspberries, elderberries, chokeberries)
- Cherries
- Grapefruit
- Oranges

Vegetables:

- Artichokes
- Asparagus
- Broccoli
- Eggplant
- Green beans
- Kale
- Leeks
- Onions
- Red cabbage

Legumes:

- Black, white, kidney beans
- Chickpeas
- Lentils
- Soybeans (tofu, soymilk, tempeh)

Nuts and seeds:

- Almonds
- Brazil nuts
- Cashews
- Chia seeds
- Flaxseeds
- Hazelnuts
- Macadamia
- Peanuts
- Pecans
- Pistachios
- Pumpkin seeds (pepitas)
- Sunflower seeds
- Walnuts

Grains

- Buckwheat
- Oats
- Quinoa
- Rye
- Sorghum
- Whole wheat and other whole grains

Other foods:

- Cocoa powder/dark chocolate
- Coffee

- Honey
- Olive oil
- Red wine
- Spices (basil, chilis, cinnamon, cloves, ginger, oregano, parsley, rosemary, turmeric)
- Tea (white, green, black, hibiscus)

Potential Health Benefits of Polyphenols

Polyphenols are powerful allies for reducing the risk of cardiometabolic diseases, which affect many adults by middle age. These conditions include heart disease, stroke, hypertension, diabetes, obesity, and metabolic dysfunction-associated steatotic liver disease (previously called non-alcoholic fatty liver disease).

Lab studies indicate polyphenolic compounds may help slow the progression of these conditions by stimulating immune cells, protecting healthy cells from oxidative damage caused by free radicals, and suppressing chronic inflammation.[1,6] Some studies also suggest polyphenols support a healthy response to inflammation through interactions with gut microbes by halting the growth of potentially harmful bacteria and promoting the growth of beneficial bacteria.[2] Certain species of beneficial bacteria produce short-chain fatty acids, which have health-promoting properties.

Epidemiological studies (research that follows large groups of people over time) show consuming more polyphenols has a beneficial effect on many chronic health conditions.

Cardiovascular disease

Polyphenolic compounds protect the heart and blood vessels and reduce blood pressure. They prevent the oxidation of LDL (bad) cholesterol in arteries, which helps to slow the development of plaques that can block blood flow.[1] Polyphenols also increase HDL (good) cholesterol, prevent platelets from sticking together and forming clots, and promote healthy, elastic blood vessels that can expand and contract as blood pumps through.[1]

Many human studies associate polyphenolic compounds like resveratrol from grapes and red wine, quercetin from onions, flavanols from cocoa, and EGCG, the catechin in tea, with cardioprotective benefits. All in all, research shows that people who eat more polyphenol-rich foods have a lower risk of a heart attack.[1]

Diabetes and insulin resistance

Polyphenolic compounds can support healthy glucose metabolism in several different ways.[5]

- Dietary polyphenols help slow carbohydrate digestion and absorption into the bloodstream.
- They stimulate your pancreas to release more insulin as needed.
- They activate insulin receptors and glucose uptake in insulin-sensitive tissues.

- They slow the release of extra glucose from your liver.
- Their anti-inflammatory actions help protect insulin-producing cells in your pancreas.

In a large study on more than 18,000 people, those with the highest flavonoid intake had a 9% lower risk of diabetes compared to those with the lowest flavonoid intake.[5] Studies on polyphenol-rich foods such as olive oil, blueberries, and green tea associate higher intakes with improved fasting blood sugar, A1C levels, and insulin response.[5]

Weight management

Polyphenol-rich foods have potential anti-obesity effects, and some studies have associated the following foods with reductions in body mass index, waist circumference, body weight, or body fat:[7]

- Apples
- Grapefruit
- Green tea
- Mulberries
- Onions
- Soybeans

Most evidence linking increased polyphenol intake to weight reduction comes from Mediterranean diet studies, as this diet pattern has been shown to promote weight loss in overweight individuals.[8] The Mediterranean diet is notably high in polyphenols, with its focus on fruits, vegetables, whole grains, nuts, seeds, and olive oil. However, it is also high in fiber, which promotes a feeling of fullness, and it is based on whole plant foods, which tend to be low in calories.

Nonetheless, polyphenols may play a role in reducing visceral (abdominal) obesity, which is often associated with chronic inflammation. A randomized controlled trial on nearly 300 obese individuals compared a generally healthy diet against a Mediterranean diet and a "green" Mediterranean diet, lower in meat and enriched with additional polyphenols. Both Mediterranean diets resulted in weight loss, but those who followed the green Mediterranean diet had twice as much visceral fat tissue loss.[9]

MASLD - metabolic dysfunction-associated steatotic liver disease

MASLD, formerly known as non-alcoholic fatty liver disease, is the most common chronic liver disease in the world, affecting 25% of adults.[10] MASLD is characterized by excess fat stored in the liver, chronic inflammation, and oxidative stress, a state where the body has more damaging free radicals and insufficient antioxidants to neutralize them.

Lab, animal, and some clinical studies suggest that polyphenolic compounds may be a helpful tool to reduce the inflammation and oxidative stress related to MASLD.

Compounds such as curcumin (a flavonoid derived from the spice turmeric), resveratrol, and silymarin, an extract derived from the milk thistle plant, reduced liver fat and improved other markers of metabolic health in various human studies.[10]

Research on the cardiometabolic health benefits of polyphenols is compelling. It provides another important reason to add more plant foods to one's diet, along with a high-quality polyphenol supplement for additional support.

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