Nature's Medicine Cabinet: Plant Foods Fight Oxidative Stress

Battle the damaging effects of oxidative stress through a plant-rich diet of fruits, vegetables, whole grains, legumes, nuts, seeds, spices, coffee and tea.

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Oxidative stress occurs when levels of highly reactive molecules called free radicals exceed your body's ability to manage them. Free radicals come from external sources, such as tobacco smoke and pollution, as well as internal sources, such as metabolism. In excess, they can damage cells, promote inflammation, and interfere with blood sugar control, blood vessel function and normal cell growth. However, plant foods can bolster your body's defense to help counter oxidative stress and its damaging effects.

Foods support antioxidant defense. The body's antioxidant defense system is a complex network of enzymes, proteins and other compounds. Healthful nutrients in foods add support, including beta-carotene (orange, dark green produce) and vitamins C (**citrus, broccoli, berries**) and E (**almonds, sunflower seeds**)—antioxidants that scavenge free radicals and promote oxidative balance. "Some minerals, like zinc, copper and selenium, don't act as antioxidants themselves, but are essential parts of body antioxidant enzymes," notes Britt Burton-Freeman, PhD, MS, Director of the Center for Nutrition Research at Illinois Institute of Technology. She adds that certain natural plant compounds from food, such as polyphenols—found in many plant foods, such as berries, **tea** and **dark chocolate**—may support antioxidant defenses. For example, phytochemicals may trigger expression of genes responsible for antioxidant enzymes and support processes within cells for controlling blood sugar and blood vessel health. A number of foods may help your body fight oxidative stress, including the following:

FRUITS Top vitamin C sources include **citrus fruits, berries, kiwifruit, cantaloupe**, and tropical treats like **star fruit, guava, mango**, and **papaya**. The orange color of **apricots, cantaloupe,** mango and papaya signals beta-carotene. You get lycopene and other carotenoids from papaya, **pink guava, watermelon,** and red or pink **grapefruit.** Polyphenol compounds abound, especially in berries, citrus, **apples, grapes,** and **cherries.**

TIP **GRAPES'** resveratrol content depends on growing conditions, not choice of red or green types, so choose whichever you prefer.

VEGETABLES Some vegetables provide triple antioxidant support: the cruciferous vegetables broccoli, **Brussels sprouts, cabbage, cauliflower, kale, chard** and **mustard greens** are rich in vitamin C, beta-carotene, and isothiocyanates, compounds which further support antioxidant defense through gene and cell regulation. **Peppers,** both sweet and hot, are also vitamin C-rich. High beta-carotene content is signaled by dark green (**romaine lettuce, spinach**) or deep orange (**carrots, pumpkin, winter squash, sweet potatoes**). Most vegetables don't take up much selenium from soil, but **asparagus** and **broccoli** do. Technically not a vegetable, **mushrooms** supply selenium, zinc and copper. **Onions** provide flavonoids and allyl-sulfur compounds, both of which may support body antioxidant defenses. **Tomatoes** provide lycopene, a powerful antioxidant in laboratory studies. Although lycopene's direct antioxidant function in the body is unclear, it helps vitamins C and E to function as antioxidants, and increases body antioxidant enzymes.

TIP **RED BELL PEPPER** is over 60 percent higher in vitamin C than green pepper, and provides eight-and-a-half times as much beta-carotene.

WHOLE GRAINS Whole grains contribute small amounts of vitamin E, plus polyphenols and minerals needed for antioxidant enzymes. **Brown rice** supplies 50 percent more zinc than white rice. **Whole wheat bread** and **pasta** are high in selenium and copper. **Oatmeal, quinoa, teff** and **wild rice** are good sources of zinc; **oatmeal** and **barley** supply selenium.

TIP People who need to avoid gluten can get whole grains by choosing **BROWN** and **WILD RICE, TEFF, MILLET, QUINOA, BUCKWHEAT,** and **CORN.**

LEGUMES **Dried beans, peas** and **lentils** help the body fight oxidative stress principally through compounds like flavonoid polyphenols. In addition, some, like **tofu** and **soynuts,** are good sources of copper and selenium.

TIP If you're short on time, cook **LENTILS**, which don't need soaking and cook quickly, or use canned beans with no added salt (or rinse to cut sodium almost in half.)

NUTS & SEEDS **Cashews, walnuts, Brazil nuts, pine nuts, pistachios,** and **pumpkin** and **sunflower seeds** supply copper needed for the body's antioxidant enzymes. In addition, cashews, pine nuts and **chia seeds** are high in zinc; and sunflower seeds and Brazils are loaded with selenium. **Almonds** are high in alpha-tocopherol, the form of vitamin E recommended by the Institute of Medicine in the Dietary Reference Intakes (DRI). Other vitamin E forms also may be important, including gamma-tocopherol, which is especially high in **pecans,** pistachios, walnuts and **peanuts** (which are actually legumes, not nuts). Nuts are important sources of polyphenols, too.

TIP **BRAZIL NUTS** are high in selenium—just one supplies nearly two days' worth. Enjoy, but don't overdo or you'll surpass the upper safety limit, which may cause symptoms like nausea and diarrhea.

HERBS & SPICES These flavorful ingredients contain flavonoid and terpenoid compounds that may bolster body defenses against oxidative stress. Choices with highest content include **turmeric** (found in curry powder), **oregano, cinnamon, rosemary** and **ginger.** Although concentrated, since you use small amounts of herbs and spices their contribution of protective compounds is smaller than that of the foods highlighted above, but every bit helps.

TIP Use large portions of fresh **PARSLEY** in green salads or dishes like tabbouleh to provide flavonoid compounds, beta-carotene, and vitamin C.

TEA, COFFEE, COCOA & CHOCOLATE These plant foods and beverages rate high in laboratory tests of antioxidant capacity because of their polyphenols, which form compounds that may act within cells to bolster antioxidant defenses. EN

TIP Tip: To maximize the polyphenols you get, brew your own ice **TEA** rather than using powders or bottled tea.

—Karen Collins, MS, RDN, CDN