

What are antioxidants? Why are they important?
Which foods contain the most antioxidants? What is
the antioxidant premium in organic foods?



ELEVATING ANTIOXIDANT INTAKES

NATURALLY OCCURRING ANTIOXIDANTS PROVIDE HEALTH BENEFITS

Antioxidants are powerful allies in combating inflammation and lowering heart disease and cancer risk. They promote strong immune systems and help tip the odds toward graceful aging. Some antioxidants are manufactured in our bodies but our innate capacity to

arise from their impacts on "free radicals," which are unstable molecules produced in our cells as a result of breaking down food, normal metabolism, vigorous exercise, and exposure to chemicals. "Free radicals" can erode the integrity of cell walls, disrupt cellular processes, and damage the DNA in cells.

The U.S. government released dietary guidelines doubling the recommended number of servings of fruits and vegetables from "Five-a-Day" to 9-13 servings. The goal - improving public health by, in part, increasing average antioxidant intakes.

synthesize antioxidants becomes less efficient as we age, and our bodies are dependent on food for some critical antioxidants, including vitamins C and E.

Antioxidants are naturally-occurring compounds in fruits, vegetables and whole grains. The benefits of antioxidants

Antioxidants neutralize the reactivity of free radicals, diminishing their capacity to disrupt and damage cells. The more antioxidants circulating in your body, the more free radicals will be deactivated. But the life-cycle of most antioxidants in the human body is short-lived. Most of the antioxidants in those blueberries you had for breakfast have moved into your body and worked their magic by dinner. This is why we all need to consume antioxidant-rich fruits and vegetables at least a couple of times a day, every day. And also why the vast majority of Americans do not get enough antioxidants in their food. Most of us need to double our antioxidant intake to take full advantage of their health promoting potential.



Proven Strategies

Consume at least one more serving of fruit or vegetable at each meal, and a couple more as snacks. Pick ripe, fresh and brightly colored produce whenever possible.

Hand-squeeze fruit juice yourself whenever you can. Commercial squeezing (plus pasteurizing) depletes about 20 percent more of the antioxidants in raw fruit.

When selecting oils and juices in the store, look for organic brands that are not processed at high temperatures or under extremely high pressures.



PRIORITY NUMBER ONE

Eat at least nine or more servings of fruits and vegetables throughout the day, every day.

Higher antioxidant intakes are within reach of all Americans. The single most reliable way to assure no shortage of "free radical" fighting antioxidants is to eat multiple servings daily of brightly colored, relatively unprocessed fruits and vegetables. Buying fresh organic produce and organic unprocessed fruit and vegetable products will further leverage – by almost a third – the health benefits triggered by eating more fruits and vegetables.

Enjoy those processed tomato products that help liven up many favorite dishes. Cooked tomatoes, tomato soup and tomato sauce all have higher concentrations of antioxidants than raw tomatoes, because in the case of tomatoes, heat processing significantly increases antioxidant content. A recent study also concluded that organic ketchup has 50 percent higher levels of antioxidants than a group of major national brands.



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Maximizing Antioxidant Intake

Organic farming systems increase antioxidant concentrations in fruits and vegetables by, on average, about 30 percent, compared to food grown on otherwise similar conventional farms. The greater density of antioxidants per ounce – or calorie – of food consumed reinforces other health benefits linked to organic food and farming. These include higher levels of some essential vitamins and minerals and lower levels of pesticide residues in food and drinking water.

You might wonder why and how organic farming elevates antioxidant concentrations.

One explanation is linked to pest pressure and other sources of stress. When plants are under stress from pests or sunlight, they produce a diverse array of natural chemicals called secondary plant metabolites (SPMs), many of which are antioxidants. SPMs also are responsible for giving fruit and vegetables their bright coloring and distinctive flavors. Plants on organic farms typically have to deal with higher levels of pests than plants on nearby conventional farms, where pesticides are routinely applied. For this reason, plants on organic farms more fully engage their innate defense mechanisms, and in the course of doing so, elevate antioxidant concentrations.

A second explanation arises from the fact that antioxidant levels tend to be higher in organic fruit and vegetables because plants on organic farms tend to grow slower and mature at a smaller size than fast growing, heavily fertilized conventional produce. This explanation has its roots in the "dilution effect," the tendency for vitamins, minerals and antioxidant levels to be reduced – or diluted – in large, fast growing and high yielding crops.



Did You Know?

- Organic farming methods can increase concentrations of antioxidants in vegetables, fruits, grains, and dairy products, and in this way help people elevate their daily antioxidant intake without a proportional rise in calories.
- There are likely far more than 50,000 secondary plant metabolites and some 4,000 flavonoids, many of which are antioxidants.



- Tufts scientists estimate that on an average day most Americans consume less than a third of the dietary antioxidants needed to take full advantage of the health promoting benefits of antioxidants.
- Organic vegetables had 30 percent to 10-times higher levels of flavonoids compared to conventionally grown produce in a study carried out in Japan.

FOODS WITH THE HIGHEST OVERALL ANTIOXIDANT CAPACITY PER SERVING

- Blueberries
- Cranberries
- Blackberries
- Raspberries
- Strawberries
- Red grapes
- Apples
- Plums
- Potatoes
- Red grapes
- Sweet cherries
- Kidney beans
- Pinto beans
- Prunes
- Asparagus
- Grapefruit
- Peaches
- Yellow pepper
- Green grapes
- Blackeye peas
- Cooked tomatoes
- Cooked artichoke
- Red Cabbage
- Red-leaf lettuce
- Broccoli raab
- Beets



Access more information on *antioxidants and the State of Science Review*, "**Evaluating Antioxidant Levels in Food Through Organic Farming and Food Processing**" at www.organic-center.org under TOC Reports, or contact Dr. Charles Benbrook, at cbenbrook@organic-center.org.



sometimes the greatest ideas are the simplest.



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