

Nutrition Action

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HEALTH LETTER®
CENTER FOR SCIENCE IN THE PUBLIC INTEREST

GOING ORGANIC

What's the payoff?

Sales of organic foods are growing by 10 to 20 percent each year in the United States. More than 10 percent of fruits and vegetables sold are now organic. By any measure, organic foods are starting to enter the mainstream American diet.

And with good reason. Organic produce often has higher levels of potentially healthy compounds. And organic farms may fare better in droughts, don't use synthetic fertilizers that contaminate groundwater, and are more hospitable to critical pollinators like bees and butterflies.

What's more, "the data show that you reduce your exposure to pesticide residues when you buy organic foods," says organics expert Charles Benbrook.

Continued on page 3.

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FOOD DAY™

OCTOBER 24, 2012

Celebrate Food Day! Share a healthy, delicious meal with your family or friends—and talk about how to eat a diet that's better for our health and for the planet.

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[#FoodDay2012](https://twitter.com/FoodDay2012)

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The Center for Science in the Public Interest (CSPI) is the nonprofit health-advocacy group that publishes *Nutrition Action Healthletter*. CSPI mounts educational programs and presses for changes in government and corporate policies.

Correction

A venti Mocha Frappuccino with 2% milk and whipped cream at Starbucks has 480 calories, not 80 calories, as we reported on the back cover of the September issue.

GOING ORGANIC

What's the payoff?



Charles Benbrook is a research professor at Washington State University's Center for Sustaining Agriculture and Natural Resources in Pullman. He has served as executive director of the Board on Agriculture of the National Academy of Sciences and as chief science consultant for The Organic Center, a research and educational organization. Benbrook spoke to *Nutrition Action's* David Schardt by phone from Troy, Oregon.

NUTRIENTS

Q: Do organic foods have higher levels of nutrients and phytochemicals?

A: Yes. In about 60 percent of the studies, organic food is higher in some nutrients than conventionally produced food. About 30 to 35 percent of the time, there's no statistical difference, and in 5 to 10 percent of the studies, the nutrient levels are higher in the conventional food. That's based on studies that compare the same varieties of fruits and vegetables grown in similar locations, which is the ideal way to do these comparisons.

In a recent Stanford University review—which claimed that organic produce isn't more nutritious than conventional—only half the studies were done that way.

Q: How much higher are the levels in organic foods?

A: Generally about 5 to 15 percent, but they can be 30 or even 100 percent higher. In a two-year study of tomatoes purchased in Barcelona markets published this spring, organic tomatoes had twice the level of some polyphenols as conventionally grown tomatoes.¹ Polyphenols are antioxidants and may be one of the main reasons fruits and vegetables are healthy for us.

Q: Why do organically grown plants have more beneficial compounds?

A: The two key factors are the stronger natural defenses of organic plants and a dilution effect in conventional plants.

Plants in an organic field have to fend off a range of insects, so their natural defense

mechanisms are turned on earlier and more fully manifest themselves. As a result, they have higher concentrations of defensive compounds that may keep us healthier.

Q: And the dilution effect?

A: If you keep putting on more and more nitrogen fertilizer the way conventional farms do, you drive yields up and produce bigger plants. But this dilutes the plants' levels of vitamins, minerals, and polyphenols.

For example, in the fall you see beautiful, huge apples in stores that are incredibly juicy and very sweet. Those apples were grown in conventional orchards where farmers have pushed up yields and

pushed up sugar concentrations by using a lot of nitrogen and irrigation water.

The trees have to do something with the extra nutrients, and the easiest thing is to convert them into sugars. These apples are juicy and sweet, yes, but the concentration of vitamins, minerals, and phytonutrients in them goes down. That's a classic example of the dilution effect.

Q: Does that affect shelf life?

A: Yes. Take apples. Organic apples store longer, and this has been shown all over the world. It's because they've got a higher concentration of antibacterial phenolic acids right under their skin, which helps to retard the growth of molds and bacteria that lead to spoilage.

Conventionally grown apples have diluted levels of these natural antibacterial antioxidants. Plus their extra nitrogen and sugar is exactly what spoilage bacteria and molds need to grow.

Q: What about contaminants that cause food poisoning?

A: Both organic and conventional foods can be a source of food poisoning outbreaks. However, in an organic system, there's a much higher level of microbial biodiversity, so there are more naturally beneficial microbes in the system and soil.

Studies show that when you introduce pathogens into an organic system, they often don't survive very long because the biologically rich community of organisms that's naturally there either competes effectively with them or uses them for lunch.

Q: And in conventional plants?

A: Pesticide use in conventional agriculture tends to reduce microbial biodiversity, both in the soil and on the surfaces of the plant. So when a pathogen does take hold, there's more of an ecological vacuum there, and the pathogen populations can grow.

Most bacteria need nitrogen, and a ready source of nitrogen can fuel spikes in their levels. So in conventional systems that have an excess of nitrogen, there's extra "gas" that can drive up pathogen levels.

Organic: How Low?

Organic produce can pick up synthetic pesticides from the environment or in packing or storage. Even so, it typically has a lower pesticide Dietary Risk Index (DRI) than conventional produce. (What's a DRI? See "Scoring Pesticides," p. 4.) Some examples:

	Conventional (DRI)	Organic (DRI)
Apples	27	1
Blueberries	17	0
Broccoli	8	0
Carrots	3	2
Celery	23	0
Grapes	12	6
Lettuce	16	0
Oranges	8	1
Pears	20	0
Potatoes	27	1
Spinach	8	2
Strawberries	48	1
Sweet potatoes	41	7

Adapted from an analysis by Charles Benbrook.

Note: Numbers may not match other tables if samples were from a different year.





Scoring Pesticides

Charles Benbrook's Dietary Risk Index (DRI) compares the average pesticide levels found on a food to the maximum levels that the U.S. Environmental Protection Agency regards as safe. (When those levels are equal, the DRI is 100.) The DRI takes into account average pesticide residue levels in an edible portion of a food, the toxicity of each pesticide, and how frequently residues are present.

Most DRIs are well below 100, as you can see from this list of conventionally grown domestic and imported produce for which at least 10 samples have been analyzed. But don't panic if your favorite fruit or vegetable is over 100. The EPA builds in a 100-fold or 1,000-fold margin of safety.

PESTICIDES

Q: Are organic foods pesticide-free?

A: No. Although organic foods are grown without the use of synthetic pesticides, they can pick up traces blown in the air from conventional farms or from water or packing materials in processing plants.

Q: Are pesticide levels on organic produce much lower than on conventional?

A: Yes, but if you measure the difference only in terms of the number of residues found, it's not nearly as dramatic as when you take into account the levels of the pesticides found and how toxic they are.

We developed and computed a Dietary Risk Index, or DRI, for the residues found in conventional versus organic strawberries, apples, grapes, blueberries, nectarines, pears, and peaches grown in the U.S. The conventional fruit's DRI averaged 24, while the organic fruit's DRI was only 3. That's impressive.

Since most consumers first seek out organic food to reduce pesticide risks, this shows that people get what they pay for.

Q: Is imported produce riskier?

A: Yes. One of the big changes in pesticide risk over the past decade is that the difference between domestic and imported produce has grown. When Congress passed the Food Quality Protection Act [FQPA] in 1996, which reformed pesticide use, about three-quarters of the dietary risk from pesticides in the food supply was from fruits and vegetables grown in the United States and one-quarter was from imports.

Now probably 80 percent of the risk is from imports and only about 20 percent is from domestically grown food. Today, the highest-risk fresh fruits and vegetables almost across the board are imported. Consumers are exposed to these mostly from December through April.

Q: Why the change?

A: The Environmental Protection Agency implemented the FQPA mostly by restricting the use of pesticides in the United States. It reduced the numbers and rates of pesticide applications and lengthened the interval between the last application and the harvesting of food.

These changes lowered the dietary risk of domestically produced food, but they had no impact on imports.

Q: How significant are the differences?

A: Some are dramatic. The last time the

Fruit	DRI	Vegetable	DRI
Peaches (Chile)	596	Sweet bell peppers (Mexico)	608
Nectarines (Chile)	424	Cucumbers (Honduras)	172
Maximum level considered safe	100	Green beans	157
Pears (Chile)	48	Asparagus (Peru)	105
Strawberries	48	Maximum level considered safe	100
Strawberries (Mexico)	45	Sweet bell peppers	90
Apples (Chile)	42	Kale	90
Cherries (Canada)	40	Green beans (Mexico)	79
Oranges (Australia)	27	Sweet bell peppers (Canada)	53
Apples	27	Summer squash	51
Peaches	27	Cucumbers (Mexico)	51
Pears	26	Collards	41
Grapes (Chile)	26	Sweet potatoes	41
Grapes (Peru)	24	Tomatoes (Mexico)	36
Watermelon (Mexico)	18	Potatoes	27
Nectarines	17	Cucumbers	25
Blueberries	16	Celery	23
Oranges (Chile)	16	Tomatoes	20
Blueberries (Chile)	16	Summer squash (Mexico)	19
Grapes	12	Asparagus	18
Cherries	12	Lettuce	16
Watermelon (Honduras)	11	Carrots (Canada)	12
Blueberries (Canada)	8	Scallions	9
Cantaloupe (Costa Rica)	8	Spinach	8
Oranges	8	Broccoli	8
Grapes (Mexico)	7	Tomatoes (Canada)	5
Cantaloupe	5	Kale (Mexico)	4
Cantaloupe (Guatemala)	4	Carrots	3
Watermelon	4	Celery (Mexico)	3
Bananas (Guatemala)	4	Cucumbers (Canada)	3
Bananas (Colombia)	3	Spinach (Mexico)	2
Cantaloupe (Honduras)	3	Cabbage (Canada)	1
Bananas (Ecuador)	2	Broccoli (Mexico)	1
Mangoes (Guatemala)	2	Sweet corn (Mexico)	1
Apples (New Zealand)	1	Cabbage	0
Cantaloupe (Mexico)	1	Scallions (Mexico)	0
Bananas (Costa Rica)	1	Carrots (Mexico)	0
Bananas (Mexico)	1	Sweet corn	0
Bananas (Honduras)	1	Sweet bell peppers (Netherlands)	0
Mangoes (Mexico)	1	Asparagus (Mexico)	0

In all tables and graphs, DRIs have been multiplied by 100 to make it easier to compare produce. While DRIs have been rounded to the nearest whole number, positions in this table are based on unrounded numbers. Numbers are for the most recent year when each fruit or vegetable was tested.

Sources: Residue data for DRIs from USDA Pesticide Data Program. Pesticide Reference Doses and/or Population Adjusted Doses from US EPA. Adapted from an analysis by Charles Benbrook.



government analyzed domestic and imported peaches for pesticides was in 2008. If you calculate the DRIs for each sample it tested, 98 of the 100 most risky peach samples were imported from Chile, one was from Argentina, and the other was from the United States. Of the 100 peaches with the lowest DRIs, 99 were grown in the U.S.

So if I were a domestic peach grower and saw peaches high on a dirty dozen list, I would be pretty upset.

The EPA, the U.S. Department of Agriculture, and Congress need to start driving down the high-risk residues in imported fruits and vegetables, to at least match the reductions achieved by U.S. growers.

Q: How harmful are the traces of pesticides that are on conventional foods?

A: The evidence now is compelling that low-level exposure to organophosphate insecticides from food and the environment has been contributing to a suite of neurological and developmental problems, such as lost IQ points. These problems can be hard to measure in an individual, but are profound for society as a whole.

Q: How extensive has the impact been?

A: David Bellinger of the Harvard Medical School published an important analysis this spring looking at the risk factors that contribute to lower IQs in children.² He drew on high-quality studies that looked at medical conditions like preterm birth and pediatric bipolar disorders and at the environmental contaminants lead, mercury, and organophosphate insecticides.

From these studies, he estimated that prenatal exposures to

organophosphate insecticides were probably causing a greater loss of IQ points among some U.S. children aged five and younger than anything other than preterm births and lead exposure.

While the risk to a given child is small, the exposure is so widespread that the risk to the population is substantial.

Q: The harm is primarily to children?

A: Pound for pound, children are exposed to more pesticides than adults. And their developing bodies are more sensitive to the adverse effects of pesticides.

That's why pesticide regulation must focus on protecting the developing fetus and protecting children, especially during

the first two years of life, but also through adolescence. The brain continues to grow and the nervous system continues to develop throughout the teenage years.

Q: What's the evidence of harm?

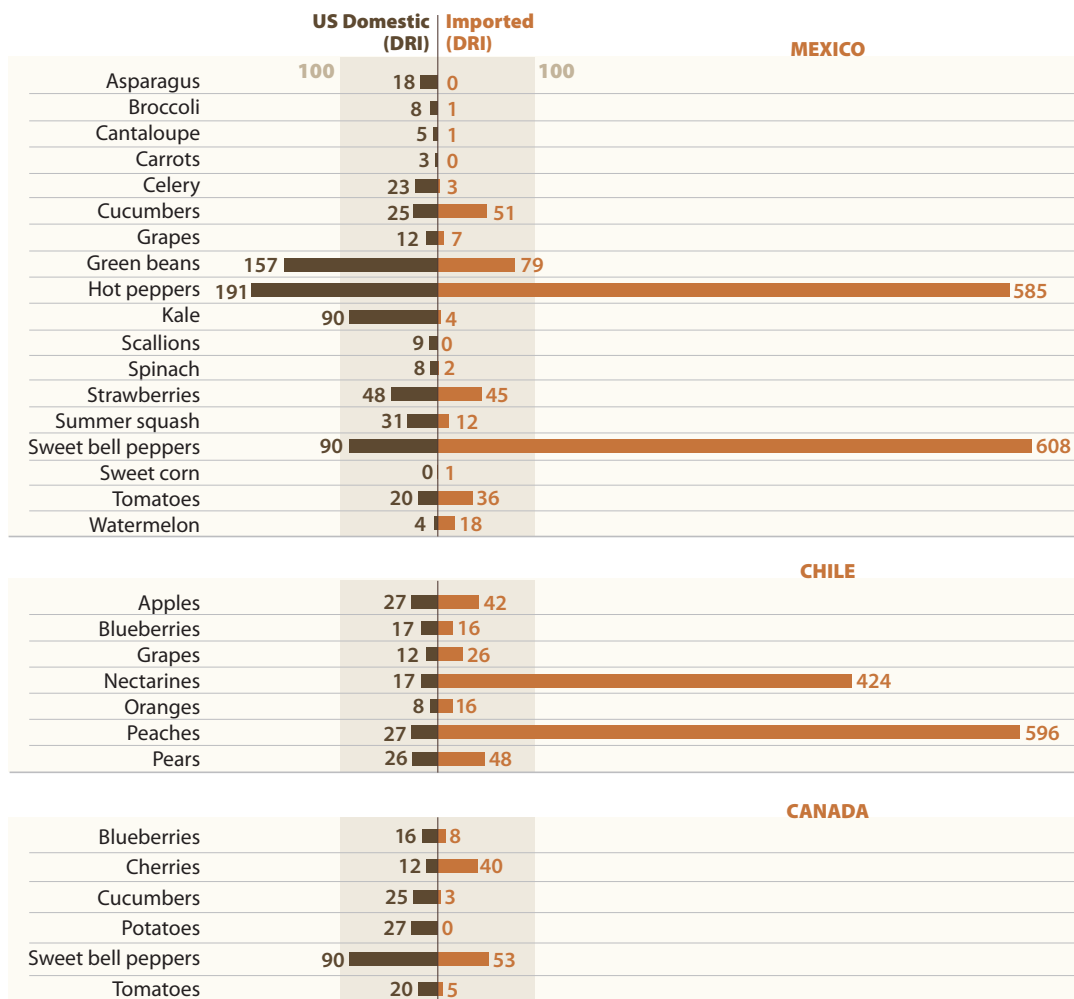
A: It's challenging to get proof of harm to children or adults. The most compelling evidence is for chlorpyrifos, an organophosphate insecticide. It's almost certainly the riskiest pesticide to humans that's still widely used on food crops.

In two studies published last year, researchers followed 400 children born around the year 2000 to women living in New York City's low-income neighborhoods.^{3,4} Some of them lived in public



Imported vs. Domestic

Roughly 80 percent of the average American's pesticide risk now comes from imported produce. But some imports are cleaner than others. Foods from Canada, for example, tend to have a lower Dietary Risk Index (DRI) than the same foods grown in the United States, while foods from Chile are more likely to have a higher DRI.



Numbers are for the most recent year when at least 10 samples of each pair of fruits or vegetables were tested. Source: Residue data for DRIs from USDA Pesticide Data Program. Adapted from an analysis by Charles Benbrook.



The Nitrogen Blues

Farming has never had a greater impact on the planet," says Derek Lynch, Canada Research Chair in Organic Agriculture and an associate professor in the department of plant and animal science at the Nova Scotia Agricultural College.

"There's a growing consensus, even within the synthetic-fertilizer industry, that we can't do business as usual," notes Lynch. "We can't sustain these huge impacts of conventional agriculture on biodiversity and on global warming anymore."

Among the ways organic agriculture is better for the planet:

■ **Nitrogen.** By saturating the Earth with nitrogen fertilizer in order to boost crop yields, we've undertaken a massive global experiment during the past 60 years, says Lynch. Half or more of the nitrogen is wasted and escapes from the soil into groundwater and waterways, where it can contaminate drinking water and have devastating effects on ecosystems.

"The yields of organic farming, which doesn't use synthetic nitrogen fertilizer, are somewhat lower," says Lynch. "But the farms aren't leaching nitrates into the local drinking water, either."

■ **Energy.** People worry about the energy costs of transporting food from farm to fork, especially if the food travels long distances. "But transport is a relatively small contributor to the energy footprint of most food," Lynch explains. Half or more of the carbon footprint of any agricultural product occurs at the farm level.

For starters, producing nitrogen fertilizer has a huge energy cost, and manufacturing pesticides also has a significant cost. "Organic farms usually come out ahead here because they just don't have those very large intensive energy inputs," says Lynch.

■ **Pesticides.** Consumers in North America are concerned primarily about the health effects from pesticide exposure, but the impact on the local ecology is just as important, notes Lynch.

Lynch's bottom line: "Organic farming systems are helping develop a new transformative form of agriculture that supports rather than degrades the health of ecosystems."

housing projects where exterminators used chlorpyrifos to kill insects in the buildings.

When the women gave birth, the researchers collected umbilical-cord blood or urine to measure how much insecticide the fetuses were exposed to in the womb. They've been tracking the children for 10 years now.

Q: What impact did chlorpyrifos have?

A: The kids from mothers with the highest levels of chlorpyrifos or other organophosphates during pregnancy were at greater risk for multiple developmental deficits, including slightly lower IQs when they were six to nine years old.

In a similar study of California farmworkers' families, children of mothers with the highest levels of organophosphates during pregnancy had IQs that were 7 points lower than children of mothers with the lowest levels.⁵

Q: How is that related to food?

A: A quarter of women of reproductive age in the United States in 2000 had average levels of organophosphates in their bodies comparable to the levels found in the high-exposure group of women in the California farmworker study.⁶

Since then, the EPA has banned nearly all home uses of chlorpyrifos, and has severely restricted most other uses of organophosphates in homes, other buildings, and urban environments. It now permits their use primarily in agriculture. So most of a woman's exposure now comes from food.

It makes sense when you realize that a person eating 3 or 4 servings of vegetables a day is probably exposed to 3 or 5 or 6 organophosphates on a daily basis. It's easy to understand how pregnant women could have these in their bodies. And very low levels may be harming their children.

Q: Hasn't organophosphate exposure decreased since 2000?

A: The EPA has driven down pesticide levels in domestically grown produce, but much less so in imports. We'll have

to wait for the next government survey of our health status and levels of contaminants like chlorpyrifos to determine whether there has been a meaningful decline in residue levels in women.

Q: And eating organic foods would lessen the exposure?

A: Yes. When researchers at Emory University in Atlanta gave children organic fruits and vegetables to eat instead of conventional ones, chlorpyrifos fell to almost undetectable levels in their urine in just five days.⁷

Many experts are both puzzled and disappointed that the EPA has not acted to end all the uses of chlorpyrifos that lead to residues in food or beverages, given our deepening understanding of the many ways that chlorpyrifos exposures can disrupt normal fetal development, leading to cognitive deficits that could have serious

lifelong repercussions.

Q: What about adults?

A: Residues in food rarely are high enough to pose acute risks to healthy adults. The concern for adults is with long-term degenerative diseases such as cancer, heart disease, diabetes, and dementia.

Much of the evidence of harm comes from studies on animals or on farmworkers, their families, and others who face the greatest exposures and the greatest risk. But these studies raise concerns about the rest of us, who are exposed to lower levels.

The evidence was strong enough for the President's Cancer Panel to recommend in 2010 that consumers choose, to the extent possible, food grown without pesticides or chemical fertilizers.⁸

Q: Are people who eat more fruits and vegetables healthier even if they don't eat organic produce?

A: Yes. That's why the single most important diet change you can make is to eat more fruits and veg-

etables and less bad fat, added sugar, and highly processed foods. The second most important thing is to seek out organic fruits and vegetables.

Q: How hard would it be to lower the pesticide risks in food?

A: The EPA could reduce by one-half or more the dietary risk in the U.S. food supply by selectively targeting just a few pesticides applied to no more than a dozen crops. Of the 200 pesticides found on our food, just six account for 66 percent of the total risk. One of them is chlorpyrifos. 🍌

¹ *J. Agric. Food Chem.* 60: 3373, 2012.

² *Environ. Health Perspect.* 120: 501, 2012.

³ *Environ. Health Perspect.* 119: 1182, 2011.

⁴ *Environ. Health Perspect.* 119: 1196, 2011.

⁵ *Environ. Health Perspect.* 119: 1189, 2011.

⁶ *Environ. Health Perspect.* 113: 1802, 2005.

⁷ *Environ. Health Perspect.* 116: 537, 2008.

⁸ deainfo.nci.nih.gov/advisory/pcp/annualreports/pcp08-09rpt/PCP_Report_08-09_508.pdf.

WHAT DOES **ORGANIC** MEAN?



ORGANIC FRUITS, NUTS, VEGETABLES, & GRAINS



ORGANIC MEAT & POULTRY



ORGANIC EGGS



ORGANIC MILK



ORGANIC SEAFOOD



PACKAGED FOODS

"100% ORGANIC"
all ingredients are organic

"ORGANIC"
at least 95% of ingredients are organic

"MADE WITH ORGANIC INGREDIENTS"
at least 70% of ingredients are organic

WHAT DO **LABELS** MEAN?

"Organic" claims are always independently verified. Other label claims only are if they're part of a certification program. So a "natural" breast of chicken may have been injected with (salty) broth and may have come from an animal raised on a factory farm.

NO ANTIBIOTICS ADDED

If beef, pork, lamb, or poultry, documentation required. No procedure for verifying claim on eggs, milk, or fish.

CAGE-FREE

Poultry not confined to cages. May or may not have access to outdoors.

HORMONE-FREE

Illegal claim. All animals produce hormones.

NATURAL

Contains no artificial ingredients or added colors, and is no more than "minimally processed." Does not mean organic or raised in any particular way. Official definition applies only to meat, chicken, and eggs, not other fresh or packaged foods.

NO HORMONES ADMINISTERED

If on beef, documentation required. Meaningless on pork and chicken since hormone use is never permitted. No procedure for verifying claim on milk, fish, or eggs.

CERTIFIED HUMANE RAISED AND HANDLED

Animals have ample space and shelter and are able to perform natural behaviors like dust bathing (chickens) or rooting (pigs). No cages or crates used. Feed contains no added antibiotics or hormones. Humanely slaughtered. Other certifications with high standards: Animal Welfare Approved and American Humane Certified.

FREE-RANGE

Poultry has access to the outdoors, but for no minimum time. No official definition for beef.

FREE-ROAMING

GRASS-FED

Animals get most of their nutrients from grass throughout their lives. Unless also labeled organic, may be given antibiotics, hormones, and insecticides.

VEGETARIAN-FED

Feed does not contain animal byproducts like feather meal, chicken litter, dried blood, or ground up meat, poultry, or fish.

PASTURE-RAISED

No official meaning.

MEAT'S IMPACT

People who eat less red meat have a lower risk of heart disease, diabetes, and colorectal cancer. But cutting back would also be gentler on the planet. Here's some of the damage done to the Earth by the way we raise and feed livestock.

The information on the environmental impact of meat was compiled by Hannah Kohrman.

DRIVING RANGE

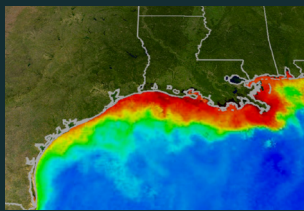


Substituting chicken, fish, or eggs for red

meat and dairy just one day a week for a year would reduce greenhouse gas emissions by an amount equivalent to not driving 760 miles. Going completely vegetarian one day a week for a year is equivalent to not driving 1,160 miles.

Source: *Environ. Sci. Technol.* 42: 3508, 2008.

END ZONES?



A dead zone is an area in a body of water where there isn't enough oxygen to support life because of excessive nutrient runoff, often from fertilizer and manure.

In the United States, the production of livestock and their feed crops is responsible for one-third of the nitrogen and phosphorous discharged into freshwater. In 2011, the dead zone at the mouth of the Mississippi River (in red) was larger than the state of Connecticut.

Source: www.wvuforestry.com/tPetty/Limnology_Carpenter1998.pdf.

MEAT & HEALTH

People who eat the most red meat (typically two servings a day) have a 40 percent higher risk of dying of heart attack, stroke, or other cardiovascular disease than those who consume the least (typically one serving every two to four days).¹ Those who eat the most meat also have a higher risk of colorectal cancer and diabetes.^{2,3}

Researchers know that the saturated fat and cholesterol in red meat boost the risk of heart attacks. But they aren't sure how meat may raise the risk of cancer and diabetes. One possibility: meat's heme iron may combine with protein and nitrites or nitrates in food to create carcinogenic N-nitroso compounds in the gut. Heme iron may also damage insulin-making cells in the pancreas.

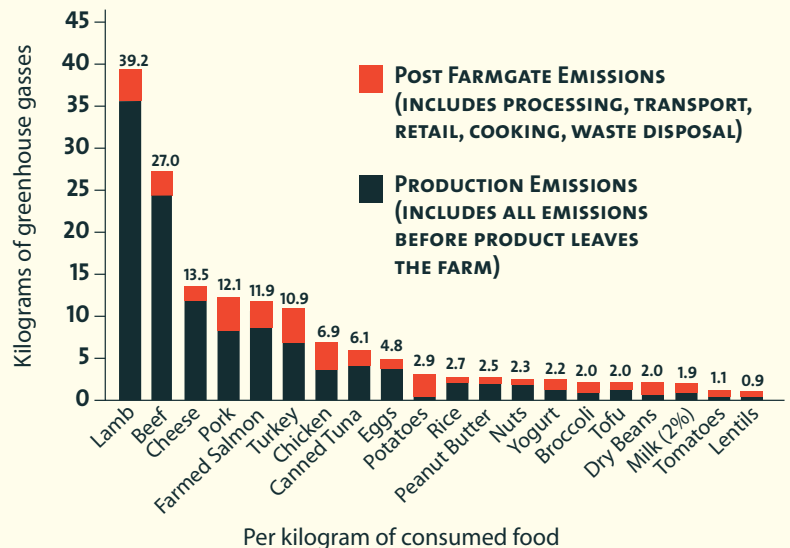
¹ *Arch. Intern. Med.* 172: 555, 2012.

² *PLoS ONE*. DOI:10.1371/journal.pone.0020456.

³ *Am. J. Clin. Nutr.* 94: 1088, 2011.

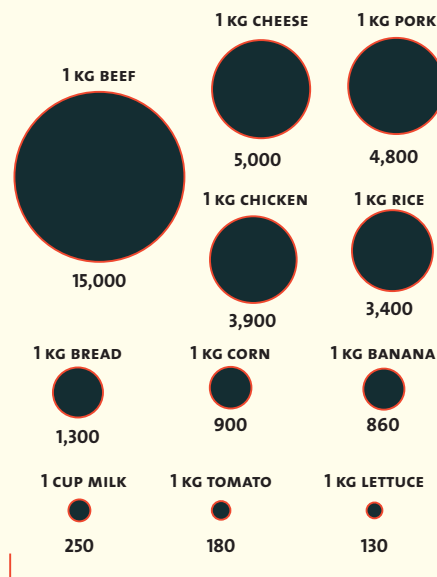
EMISSIONS IMPOSSIBLE

For every kilogram (roughly two pounds) of beef we eat, 27 kilograms of greenhouse gasses are released into the environment. That includes gasses that come from growing the animal feed and from the manure and methane emissions that beef cattle produce.



Source: ewg.org/meateatersguide.

WHERE THE WATER FALLS



A food's water footprint is the number of liters of water it takes to produce one kilogram of the food. For animals, it's not just the water they drink, but also the water it takes to grow all of the food they will eat over their lifetime. (A kilogram is roughly equal to two pounds; a liter is about a quart.)

Source: waterfootprint.org.



More repetitions may help older people.

Repeat After Us

When you're strength training, you build more muscle if you lift more weight, but not if you do more repetitions. At least that's what scientists used to think. But more reps make a difference for older people, says a new study.

Researchers had 12 young men (average age: 24) and 12 older men (average age: 70) do either three or six sets of leg extensions. The scientists then took biopsies of the men's leg muscles to measure whether they were making protein, which is important for repairing and building muscle.

In the younger men, doubling the number of sets had little or no impact. But in the older men, doubling the sets resulted in greater protein synthesis. And it didn't matter whether the men were using lighter or heavier weights. (The sets with lighter weights had more extensions than the sets with heavier weights, so the total muscle exertion was the same.) The less-sensitive muscles of older men need to do more work to activate their protein-making machinery, suggest the authors.

What to do: If you're around 65 or older, try boosting not just the weights you lift, but the number of times you repeat the lift. Scientists haven't studied women or middle-aged men.

J. Gerontol. A Biol. Sci. Med. Sci. DOI:10.1093/gerona/gls141.

Antioxidants & Asthma

Antioxidants—or the vegetables and fruits they come in—may help prevent asthma attacks.

Researchers randomly assigned 137 adults with asthma to either a high-antioxidant diet (5 servings of vegetables and 2 servings of fruit a day) or a low-antioxidant diet (no more than 2 servings of vegetables and 1 serving of fruit a day) for 14 weeks.

Starting in week three, the high-antioxidant eaters also took a daily placebo, while the low-antioxidant eaters took either a daily placebo or a tomato extract pill (with 45 milligrams of the antioxidant lycopene).

Over the 14 weeks, people on the low-antioxidant diet were more than twice as likely to experience an "exacerbation" than those on the high-antioxidant diet. (An exacerbation meant that patients had to increase their asthma medication, start taking oral steroids, go to the doctor or hospital because of asthma, reduce their activity because of asthma, or report a

decrease in asthma control on a questionnaire.) The lycopene takers fared no better than the placebo takers.

What to do: If you have asthma, shoot for at least seven servings of fruits and vegetables a day. However, keep in mind that this study is not definitive.

First, 33 participants dropped out after the first two weeks, and most of them had been in the low-antioxidant group. Many left because they found the diet unsuitable.

Second, the study wasn't double blind, so it's possible that knowing whether they were eating more (or fewer) fruits and vegetables influenced whether or not patients experienced an exacerbation.

Finally, don't assume that fruits or vegetables may prevent asthma attacks *because* they're rich in antioxidants. In this study, the antioxidant lycopene had no benefit. Other plant constituents may matter more.

Am. J. Clin. Nutr. DOI:10.3945/ajcn.111.032623.

Why You Overate

It's hard to say what makes any one person overeat on any one occasion. But alcohol, sleep deprivation, and TV watching often create what researchers call an "obesogenic environment."

Researchers did a meta-analysis of 23 studies that measured how much people ate with or without alcohol (typically 1 to 2½ servings), TV (typically 25 to 45 minutes), or sleep deprivation (no more than 5½ hours per night vs. at least 8 hours).

Alcohol had the biggest impact, followed by sleep deprivation, then TV. Among the possible explanations: alcohol, sleep deprivation, and watching images of palatable food on TV all boost levels of ghrelin, a hormone that stimulates appetite. What's more, all three may impair our inhibitions and intensify the response to food in the brain's "reward" center.

What to do: If you're trying to avoid overeating, get enough sleep and cut back on alcohol and TV.

Am. J. Clin. Nutr. DOI:10.3945/ajcn.112.039750.

Sudden Death & Fats

Eating good fats may lower your risk of sudden cardiac death, which claims up to 300,000 lives a year. Sudden death is typically caused by a loss of heart rhythm, rather than by a blockage in an artery that feeds the heart muscle (a myocardial infarction).

Researchers tracked nearly 92,000 women in the Nurses' Health Study for more than 30 years. Those who consumed the most polyunsaturated fats had a 43 percent lower risk of sudden death than those who consumed the least.

Both omega-3 and omega-6 polyunsaturated fats were linked to a lower risk. Omega-6 fats didn't neutralize the benefits of omega-3 fats, as some people contend.

Those who ate the most saturated fat had a 44 percent higher risk than those who ate the least. Monounsaturated and trans fats were not linked to sudden death.

What to do: Replace the saturated fats (in red meats, cheese, cream, butter, and many sweet baked goods) with polyunsaturated fats (in oils, nuts, salad dressing, and fish). 🐟

Am. J. Clin. Nutr. DOI:10.3945/ajcn.112.040287.

Veggie Smart

How to preserve vitamins

Do greens that are exposed to light at the supermarket have higher or lower levels of vitamins than those kept in the dark? Plant physiologist Gene Lester wanted to know. So he held spinach in either light or dark conditions for nine days. Here's what he learned...and how to protect the vitamins in *your* veggies.



Gene Lester is a plant physiologist with the U.S. Department of Agriculture's Agricultural Research Service in Beltsville, Maryland. He spoke to *Nutrition Action's* Bonnie Liebman by phone.

Q: Why did you decide to do the study?

A: I was at the grocery store, and I asked myself, "Hmm. Which bag of spinach is better to buy: the one that sits right out front or the one that's all the way in the back in the dark?"

We know that you want to buy the bottle of olive oil that's in the back, in the dark, because exposure to light makes the oil go rancid more quickly. But what about greens?

So that's where I was coming from. I said, "Well, I'm the scientist in the United States set up to do that study." So I did.

Q: You grew your own spinach?

A: Yes. I grew two varieties—curly and the more popular flat-leaf—for two months in the field, and then I harvested and stored them.

And I found that with even as little as 24 hours of continuous exposure to grocery-store lighting, the bags of spinach in the front had higher nutrient levels of those vitamins that I measured than the very-same-aged bags of spinach that were in the dark.

Q: Was the difference in nutrients big enough to matter?

A: For some nutrients, yes. For example, folate is critically important to women of childbearing age, and they may not get enough to counteract potential damage to the fetus—spina bifida. We found a nine-fold increase in folate during the exposure to light. That definitely is a nutritionally significant difference.

Q: What about carotenoids?

A: We saw higher levels of lutein and beta-carotene and also vitamin K, which is important for blood and bones, in the spinach at the front of the case. We didn't see a significant increase in vitamin C. But there wasn't any reduction either, which is normally the case with any post-harvest fruit or vegetable. And we saw an increase in both forms of vitamin E—alpha- and gamma-tocopherol.

Q: Do the results apply to other leafy greens?

A: Yes, because you're dealing with a very common system in all leafy greens, and



Baby greens are typically more nutritious than more mature greens.

all these vitamins are essential for photosynthesis. As long as the plant is green, it's got photosynthesis, and it will have these same vitamins.

Q: Because the plant is making the vitamins for itself?

A: Absolutely. The plant isn't making them for us. It's just that we have evolved with the plants, and we've learned to utilize plants to get these vitamins from them that are important for our bodies.

Q: Is there any downside to vegetables' being stored in the light?

A: That depends on the cultivar, or variety. In spinach, there's a flat-leafed type that tended to wilt with days under light exposure. But others have a quilted sort of leaf structure, and that architecture prevented it from wilting.

So if we as a community wanted to grow and store greens under light to increase their nutrient level, we could just select cultivars that have a more quilted texture as opposed to a flat leaf structure. For example, you've got flat-leaf and curly-leaf parsley. The curly-leaf wouldn't wilt, whereas the flat-leaf likely would.

Q: Is the spinach that's ordinarily in grocery stores flat or quilted?

A: It tends to be the flat-leaf type. The quilted is a savoy type, which is sometimes called curly-leaf.

Q: Would a shopper notice the wilting?

A: Yes, but you wouldn't see it right away. It was only after three days of continuous exposure to light that the wilting began, and we got the greatest wilting at nine days. In the grocery store, the chances of your finding a package of spinach more than nine days old is slim to none.

YOUNGER IS BETTER

Q: Is baby spinach more nutrient-rich than mature spinach?

A: That's what we found. The leaves are more biologically active than older, more

mature leaves. The same is true of some other vegetables, like mustard greens, collards, and kale.

We've continued to monitor this since 2010, when we first grew spinach, then separated it into older leaves and younger leaves. What we find is that the younger leaves always have greater nutrient density than the older leaves.

We're just finishing a study where we're looking at spinach grown in Texas in the winter and in Canada in the summer. And we're finding that the older leaves have much lower levels of nutrients than the younger leaves.

Q: What else can people do to get higher nutrient levels in their produce?

A: We've just done a very interesting study on microgreens, which are immature greens. There are no true leaves, just the seedling leaves. They're also called cotyledonary leaves.

We looked at 25 different species of microgreens and found that most had substantially higher levels of vitamin C, the carotenoids, the alpha-tocopherol form of vitamin E, and vitamin K than their mature-leaf forms. Of course, most people eat a smaller serving of microgreens.

Q: Where are they available commercially?

A: They're being used now at very trendy, high-end restaurants, which sprinkle them on salads, soups, salmon burgers, and that sort of thing because they add a great deal of color. They can be magenta or red or purple or green or yellow.

Q: Can you buy microgreens at the supermarket?

A: My understanding is that you can find them in some of your higher-end stores like Whole Foods or Harris Teeter.

DON'T COOK IT OUT

Q: If you cut broccoli and leave it out on the counter, does it lose vitamin C?

A: Yes. With vitamin C, the warmer the product, the more rapid the loss. However, if you blanched the broccoli quickly

and then refrigerated or froze it, you could probably maintain the vitamin C a lot longer. That's because you would destroy the enzymes that break down the vitamin C.

Q: Does that apply to other nutrients?

A: Other nutrients aren't so heat labile or heat damaged, so if you left the vegetables

Q: Are some nutrients more easily absorbed when vegetables are cooked than when they're eaten raw?

A: Yes. That's primarily the carotenoids like alpha-carotene, beta-carotene, lycopene, and lutein. They're pigments that give plants their orange or yellow color, and some are converted to vitamin A in the body.

When the plant is cooked, it breaks down the cell walls and the cell membranes, and that helps release the carotenoids. That's why tomato paste or tomato sauce on pizza is going to give you more lycopene—the red coloring pigment in tomatoes and tomato sauce—than if you ate a fresh tomato.

The other benefit of having tomato sauce on pizza is the fat from the cheese or the meat or what-have-you. Carotenoids and vitamins D, E, and K are fat soluble. In order for the body to absorb them, some fat has to be present.

Q: Could you also get the fat from a salad dressing, as long as it's not fat-free?

A: Absolutely. Or make sure you put some oil and vinegar on your salad to get your carotenoids and your vitamins E, D, and K.

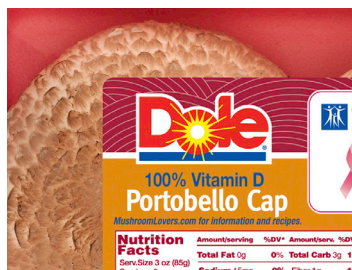
See D Light

Light doesn't just matter for greens. It can turn mushrooms into a rich source of vitamin D, a nutrient that's hard to find in foods.

Ordinary mushrooms have little or no vitamin D. But if they're grown under UV light, a plant sterol (ergosterol) gets turned into vitamin D.

So far, growers seem to be mostly exposing portobellos to UV light. According to the Mushroom Institute, you can expect 375 IU of vitamin D in each cap. That's roughly half of the 800 IU a day recommended for people over 70 and nearly two-thirds of the 600 IU recommended for everyone else.

Which mushrooms have seen the light? Don't worry. The label will make sure you know.



out on the counter, they're not going to have a loss. In fact, if you leave them out on the counter with the lights on, you actually might see an increase.

Q: Just ordinary indoor light?

A: Yes. You need a full spectrum of light. Then within that full spectrum, you need some of the red and some of the blue spectrum. So full-spectrum white light has what you need to grow plants. And that comes from white indoor lighting.

Q: Like energy-efficient compact fluorescent, or CFL, bulbs?

A: Yes. In our study, we used white fluorescent lights like the ones that most grocery stores use. Incandescent would do just fine too. Actually, it would be good if you had a mix of fluorescent and incandescent. Together, they have a broader spectrum.

Q: Is quick cooking better for retaining vitamin C?

A: Yes. If you roast, you're going to lose most of the vitamin C. If you boil the vegetables, for sure.

Q: Because of heat or leaching into the water?

A: For vitamin C, both. With the exception of vitamins A, D, E, and K, the rest of the vitamins are water soluble. That's all your B vitamins and vitamin C. So if you boil, you would leach out the water-soluble ones. You want to do a quick steam or a quick sauté to reduce the loss into the cooking medium.

Q: What about a soup?

A: You'd lose the vitamin C because of heat, but your B vitamins would be in the broth. A soup broth is actually very nutritious. 🍲



FOOD DAY FAVORITES

BY KATE SHERWOOD

Planning a dinner party to celebrate Food Day on October 24th? Here are a few dishes that will make your feast fabulous. 🍏

Got a question or suggestion? Write to Kate at healthycook@cspinet.org.

Apple & Walnut Salad

Total Time: 15 minutes



- 1 cup apple cider
- 2 Tbs. red wine vinegar
- ½ tsp. kosher salt
- ¼ cup minced red onion
- 2 tsp. Dijon mustard
- 3 Tbs. canola oil
- 10 oz. mixed salad greens
- 2 apples, cored and thinly sliced
- ½ cup chopped walnuts
- 4 oz. crumbled gorgonzola or goat cheese (optional)

We made this fall salad with Granny Smith and Braeburn apples, though you can also use pears. The salad is delicious with or without the cheese.

Boil the cider until reduced to ¼ cup (the consistency of syrup), 5-7 minutes. • In a large bowl, whisk the reduced cider with the vinegar, salt, onion, mustard, and oil. • Toss the salad greens with the dressing. Top with the apple, walnuts, and cheese. • Serves 8.

Per Serving (2 cups), without the cheese: Calories 160; Total Fat 12 g
Sat Fat 1 g; Protein 2 g; Carbs 13 g; Fiber 2 g; Sodium 160 mg

Pomegranate & Pumpkin Seed Tabouli

Total Time: 15 minutes



- ½ cups bulgur
- 2 Tbs. extra-virgin olive oil
- ¼ cup lemon juice
- ½ tsp. kosher salt
- 1 cup flat-leaf parsley leaves, chopped
- ¼ cup mint leaves, chopped (optional)
- 3 scallions, thinly sliced
- 1 cup pomegranate seeds
- ½ cup toasted pumpkin seeds

This cool dish packs a big punch—crunchy, toasted pumpkin seeds, fresh herbs, and the sweet pop of pomegranate makes a tasty and beautiful dish. If you can't find pomegranate seeds, you can substitute ½ cup of dried cranberries.

In a medium saucepan, bring 2 cups of water to a boil and stir in the bulgur. Cover and turn off the heat. Let the bulgur stand until the water is absorbed, about 8 minutes. Uncover and fluff with a fork, then allow the bulgur to cool. • In a large serving bowl, whisk together the oil, lemon juice, and salt. Mix in the parsley, mint, scallions, and pomegranate seeds. Mix in the bulgur and sprinkle with the pumpkin seeds. • Serves 8.

Per Serving (¾ cup): Calories 190; Total Fat 8 g; Sat Fat 1 g; Protein 6 g
Carbs 26 g; Fiber 7 g; Sodium 130 mg

Green Beans & Caramelized Shiitakes

Total Time: 15 minutes



- ½ lbs. green beans, trimmed
- ½ lb. shiitake mushrooms, caps sliced, stems discarded or saved for stock
- 3 Tbs. extra-virgin olive oil
- 3 cloves garlic, chopped
- 2 Tbs. balsamic vinegar
- ½ Tbs. reduced-sodium soy sauce

Green beans have never tasted better. Shiitake stems are too woody and tough to eat, but you can save them for stock.

Steam the beans until tender, about 5 minutes. • In a large sauté pan over medium-high heat, sauté the mushrooms in 2 Tbs. of the oil until browned, about 5 minutes. • Push the mushrooms to one side and add the remaining 1 Tbs. of oil. Sauté the garlic in the oil for 30 seconds, then add the balsamic vinegar and soy sauce. Stir together with the mushrooms and sauté until all the sauce is absorbed, 1-2 minutes. • Toss the green beans with the mushrooms and heat through. • Serves 8.

Per Serving (¾ cup): Calories 90; Total Fat 6 g; Sat Fat 1 g; Protein 3 g
Carbs 8 g; Fiber 3 g; Sodium 110 mg



— VEGETABLES —

You Say Tomato...

Scoring Veggies

BY BONNIE LIEBMAN & JAYNE HURLEY

How do you rank vegetables? It's a bit like ranking the cuteness of the three-year-olds in a preschool class. Not easy.

We tallied up the vitamins, minerals, and fiber in a (modest) serving of 73 vegetables and let the scores fall where they may. As expected, the leafy greens and dark orange veggies led the pack. But that's no reason to leave the mushrooms out of your sauté or the cucumber out of your salad. When it comes to a 20-calorie vegetable, you can double the serving—and the score—without any downside.

Here's our ranking of vegetables...and 10 things you may not know about them.

The information for this article was compiled by Emily Caras.

1. They're a calorie bargain. Vegetables are mostly water. That's why most range from 10 to 50 calories per serving. Sure, there are exceptions (like potatoes, avocado, and lima beans). But you can eat an entire bell pepper, a cup of grape tomatoes, or half a sliced cucumber, and add no more than 20 to 60 calories. And you won't find a more filling snack.

TOP
5
VITAMIN C

Red bell pepper
Broccoli
Green bell pepper
Green chili pepper
Brussels sprouts



To lose—or not gain—weight, the key is to eat veggies instead of (not on top of) other foods, and to go easy on the salad dressings, sauces, butter, or sauté oils.

2. They've got more than just vitamin C. Everyone knows that vegetables have vitamins. But if that leads you to think that an energy bar or a bottle of Vitaminwater or a vitamin pill can take the place of a bowl of broccoli, think again.

Vegetables not only supply vitamins that are often added to pills or foods (like A, C, and folate), they're also rich in potassium, lutein, magnesium, vitamin K, fiber, and

TOP
5
FOLATE

Spinach
Asparagus
Curly endive
Romaine lettuce
Turnip greens



other nutrients that aren't so easy to find. And vegetables have other phytochemicals that may turn out to protect your health.

3. They may protect your heart.

People who eat more vegetables have a lower risk of heart disease. In a meta-analysis of 12 studies that tracked roughly 278,000 people for 11 years, those who averaged more than three servings of vegetables a day had a 16 percent lower risk of heart disease than those who averaged less than 1.7 servings a day.¹

Maybe that's because healthier people eat more vegetables. But it's also possible that potassium, carotenoids, or something else in kale or spinach or other veggies makes a difference. For example, feeding people more fruits and vegetables makes their arteries more flexible.²

TOP
5
FIBER

Artichoke
Peas
Avocado
Lima beans
Jicama



4. They may lower your risk of stroke.

In 2006, British researchers examined eight studies that monitored more than 235,000 people for an average of 13 years. Those who ate more than five servings of vegetables a day had a 19 percent lower risk of stroke than those who ate less than three servings.³

Of course, you'd expect as much. High blood pressure boosts your risk of stroke more than anything else, and a healthy

diet rich in vegetables (and fruits) lowered blood pressure in the Dietary Approaches to Stop Hypertension (DASH) and Omni-Heart studies.^{4,5}

In fact, a 2002 study found a four-point drop in blood pressure among people who ate just 1½ more servings of vegetables and fruit a day.⁶

5. They're potassium depots.

Potassium explains, at least in part, why vegetables help lower blood pressure and the risk of stroke. And most Americans don't get enough potassium.

TOP
5
POTASSIUM

Sweet potato
Lima beans
Spinach
Swiss chard
Portobello mushrooms



Experts now recommend 4,700 milligrams a day. That'll take more than a banana (420 mg). In fact, of the five vegetables that have at least 10 percent of a day's potassium, only two (spinach and Swiss chard) are low in calories.

The other three (lima beans, white potatoes, and sweet potatoes) have roughly 100 calories per serving. And those are *small* potatoes. Expect about 200 calories in a typical white or sweet potato. (We left white potatoes out of our Top 5 list because Americans already eat too many fries and potato chips.)

Solution: double those servings of broccoli, cauliflower, mushrooms, zucchini, and other veggies that have 5 percent of a day's potassium but only around 20 calories. And eat more vegetables (and fruit), period. After all, potassium can counter the blood-pressure-raising sodium that you consume. Doctor's orders: Eat your portobellos!

6. They may shield your eyes.

Spinach, kale, broccoli, collards. Green vegetables are rich in lutein and its cousin zeaxanthin, which are the main carotenoids in the lens of the eye.

In a study of roughly 35,000 postmenopausal women, those who consumed the

>>>>>



most lutein and zeaxanthin had an 18 percent lower risk of cataracts over the next 10 years.⁷ It would take more evidence to nail down whether lutein—and not something else about vegetable eaters—protects the eye. But why wait when that bowl of garlicky sautéed spinach beckons?

It's not just the lens. The retina is also loaded with lutein. The Age-Related Eye Disease Study 2 (AREDS2) is testing supplements that contain lutein (along with vitamins and fish oil) on macular



degeneration. The macula, which is the center of the retina, is responsible for detailed vision. Macular degeneration is the most common cause of blindness in older people.

7. They may not prevent cancer.

It's a disappointment. The largest studies have found no lower risk of cancer in people who eat more vegetables and fruit.⁸ (Veggies would help lower your cancer risk if they helped you stay trim, but the studies looked for protection beyond any impact on weight.)

Still, there are a few hints that some vegetables might protect against some cancers. For example, a recent study found a 13 percent lower risk of estrogen-negative breast cancers—tumors that don't



respond to estrogen—among women who eat more red, yellow, orange, and dark green fruits and vegetables.⁹

But overall, don't expect that salad or spinach to ward off cancer.

8. Greens may prevent diabetes.

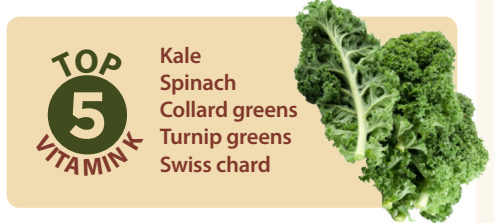
Studies don't find a lower risk of type 2 diabetes in people who eat more vegetables. (Those studies compare people of the same weight, though. If veggies helped keep you



lean, they would lower your risk.)

But eating more of some kinds of vegetables may make a difference. In a meta-analysis of six studies, for example, people who ate the most green leafy vegetables (at least 1½ servings a day) had a 14 percent lower risk of diabetes than those who ate the least (one serving every five days).¹⁰ That could be because green leafies are so rich in magnesium, which may keep insulin working...or because people who eat them do something else to lower their risk.

9. Don't fear vitamin K. Green leafy vegetables—like kale, spinach, and collards—are the places to get vitamin K, which is best known for its role in helping blood clot. But that has led many people



who take Coumadin or other blood thinners to steer clear of leafy greens.

In fact, Coumadin takers just have to avoid huge swings in their intake of vitamin K from one day to another. If you typically have a spinach or green leafy salad with lunch or dinner, your doctor can adjust your dose of medicine to account for the extra vitamin K.

10. They're delish. Veggies are used to being the butt of jokes. But the joke's on people who miss out on broccoli in garlic sauce, roasted Brussels sprouts, sautéed spinach, and braised asparagus tips. Mmm. 🍷

¹ *J. Hum. Hypertens.* 21: 717, 2007.

² *Circulation* 119: 2153, 2009.

³ *Lancet* 367: 320, 2006.

⁴ *N. Engl. J. Med.* 336: 1117, 1997.

⁵ *JAMA* 294: 2455, 2005.

⁶ *Lancet* 359: 1969, 2002.

⁷ *Arch. Ophthalmol.* 126: 102, 2008.

⁸ *Brit. J. Cancer* 104: 6, 2011.

⁹ *Am. J. Clin. Nutr.* 95: 713, 2012.

¹⁰ *BMJ* 341: c4229, 2010.

Mushroom Math

We calculated a score for each vegetable by adding up its percentage of: (1) the Recommended Dietary Allowance (RDA) or Adequate Intake (AI) for seven nutrients, (2) the Daily Value (DV) for fiber, and (3) the daily targets that we've devised for lutein (plus zeaxanthin) and carotenoids other than lutein.

For example, half a cup of cooked spinach has 320 percent of our target for lutein and 178 percent of our target for other carotenoids, 8 percent of the DV for fiber, plus 350 percent of the RDA (or AI) for vitamin K, 31 percent for folate, 18 percent for magnesium, 17 percent for iron, 10 percent for calcium, 9 percent for vitamin C, and 8 percent for potassium. That gives it a score of 949 points.

We counted calcium, iron, folate, and magnesium in our scores but they're not in the chart. Ditto for carotenoids other than lutein, which include alpha-carotene, beta-carotene, and lycopene. We included lutein in the chart because of growing evidence that it may help prevent cataracts. There is no RDA or AI for lutein, so we set our own (3,000 micrograms) based on studies on cataracts. (The RDAs and AIs—daily targets set by the Institute of Medicine—vary slightly by age and gender. We picked the highest level for adults, excluding pregnant and lactating women.)

Key

- ⊕ Contains 100% or more of the Recommended Dietary Allowance (RDA)
- ⊕ Contains 20%-99% of the RDA
- ⊕ Contains 15%-19% of the RDA
- ⊕ Contains 10%-14% of the RDA
- ⊕ Contains 5%-9% of the RDA
- ⊕ Contains less than 5% of the RDA

Recommended Dietary Allowances (RDAs)

Calcium: 1,200 mg

Fiber: 25 g¹

Folate: 400 mcg

Iron: 18 mg

Lutein: 3,000 mcg²

Magnesium: 420 mg

Other carotenoids: 3,000 mcg²

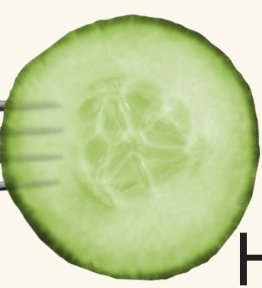
Potassium: 4,700 mg³

Vitamin C: 90 mg

Vitamin K: 120 mcg³

¹ Daily Value (DV). ² Level based on available research.

³ Adequate Intake (AI). (We used AIs for nutrients that don't have RDAs.)



Mind Your Peas and Cukes

(3 oz. —about 1/2 cup—cooked, unless noted)

How can you fit in the recommended 11 servings a day of vegetables and fruits? It's easy. A serving is usually only half a cup, so just eat two—or three—servings at a time. Don't like our Superstars? Ignore the rankings and eat your faves.

	Score	Calories	Vitamin K	Lutein	Vitamin C	Potassium	Fiber
Superstars (Score = 150+)							
Kale	1,392	20	+	+	+	+	+
Spinach, raw (2 cups)	968	20	+	+	+	+	+
Spinach	949	20	+	+	+	+	+
Collard greens	737	20	+	+	+	+	+
Swiss chard	717	20	+	+	+	+	+
Turnip greens	714	20	+	+	+	+	+
Pumpkin, canned	577	40	+	+	+	+	+
Mustard greens	550	10	+	+	+	+	+
Sweet potato, with skin (1 small)	492	100	+	+	+	+	+
Radicchio, raw (2 cups)	467	20	+	+	+	+	+
Carrots	399	30	+	+	+	+	+
Broccoli rabe (4 stalks)	392	30	+	+	+	+	+
Romaine lettuce, raw (2 cups)	340	10	+	+	+	+	+
Baby carrots, raw (8)	335	30	+	+	+	+	+
Red leaf lettuce, raw (2 cups)	304	10	+	+	+	+	+
Green leaf lettuce, raw (2 cups)	298	10	+	+	+	+	+
Arugula, raw (2 cups)	293	20	+	+	+	+	+
Broccoli (2 spears)	268	30	+	+	+	+	+
Curly endive, raw (2 cups)	264	10	+	+	+	+	+
Brussels sprouts	247	30	+	+	+	+	+
Broccoli, raw (3 spears)	246	30	+	+	+	+	+
Red bell pepper	225	20	+	+	+	+	+
Butternut squash (1/3 cup)	208	30	+	+	+	+	+
Bibb or Boston lettuce, raw (2 cups)	201	10	+	+	+	+	+
Red bell pepper, raw (1/2 large)	198	30	+	+	+	+	+
Peas	173	70	+	+	+	+	+
Bok choy	154	10	+	+	+	+	+
Veggie Good (Score = 50-149)							
Savoy cabbage, raw (1 cup)	139	20	+	+	+	+	+
Tomato (1/3 cup)	136	20	+	+	+	+	+
Red cabbage, raw (1 cup)	135	30	+	+	+	+	+
Asparagus (6 spears)	134	20	+	+	+	+	+
Tomato, raw (1/2 cup)	126	20	+	+	+	+	+
Cabbage, raw (1 cup)	120	20	+	+	+	+	+
Green bell pepper	113	20	+	+	+	+	+
Green bell pepper, raw (1/2 large)	112	20	+	+	+	+	+
Zucchini, raw (1/2 medium)	103	10	+	+	+	+	+

	Score	Calories	Vitamin K	Lutein	Vitamin C	Potassium	Fiber
Red cabbage	95	30	+	+	+	+	+
Okra	94	20	+	+	+	+	+
Scallions, raw (1/3 cup)	91	10	+	+	+	+	+
Zucchini	88	10	+	+	+	+	+
Cauliflower, raw (7 florets)	87	20	+	+	+	+	+
Green beans	83	30	+	+	+	+	+
Leeks (3/4 cup)	82	30	+	+	+	+	+
Lima beans	82	110	+	+	+	+	+
Green chili pepper, raw (1/2)	81	10	+	+	+	+	+
Cauliflower (5 florets)	77	20	+	+	+	+	+
Avocado, raw (1/2)	75	110	+	+	+	+	+
Kohlrabi	71	30	+	+	+	+	+
Artichoke (1/2)	69	30	+	+	+	+	+
Jalapeño pepper, raw (2)	68	10	+	+	+	+	+
Potato, with skin (1 small)	64	100	+	+	+	+	+
Celery, raw (2 medium stalks)	63	10	+	+	+	+	+
Yellow squash	60	20	+	+	+	+	+
Corn	58	80	+	+	+	+	+
Parsnips	55	60	+	+	+	+	+
Red chili pepper, raw (1/2)	55	10	+	+	+	+	+
Iceberg lettuce, raw (2 cups)	54	10	+	+	+	+	+
Gotta Love 'em (Score = 0-49)							
Jicama, raw (2/3 cup)	48	30	+	+	+	+	+
Rutabaga	44	30	+	+	+	+	+
Beets	43	40	+	+	+	+	+
Jerusalem artichoke (sunchoke), raw (1/2 cup)	41	60	+	+	+	+	+
Beets, canned	33	30	+	+	+	+	+
White (button) mushrooms	33	20	+	+	+	+	+
Turnips	28	20	+	+	+	+	+
Cucumber, raw, with peel (1/3 med.)	27	10	+	+	+	+	+
Portobello mushrooms (2/3 cup)	24	30	+	+	+	+	+
Eggplant (3/4 cup)	21	30	+	+	+	+	+
Onion (1/3 cup)	21	40	+	+	+	+	+
Spaghetti squash	20	20	+	+	+	+	+
Shiitake mushrooms	19	50	+	+	+	+	+
White (button) mushrooms, raw (5 medium)	19	20	+	+	+	+	+
Radishes, raw (3 large)	13	10	+	+	+	+	+
Onion, raw (3 Tbs.)	9	10	+	+	+	+	+

Source: U.S. Department of Agriculture National Nutrient Database (ndb.nal.usda.gov).



The Center for Science in the Public Interest (CSPI), founded in 1971, is an independent nonprofit consumer health group. CSPI advocates honest food labeling and advertising and safer and more nutritious foods. CSPI's work is supported by *Nutrition Action Healthletter* subscribers and foundation grants. CSPI accepts no government or industry funding. *Nutrition Action Healthletter*, first published in 1974, accepts no advertising.

Nutrition Action Healthletter

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RIGHT STUFF

FOOD PORN



EARTH POWER



"Powerfully Delicious, Complete & Ready-to-Eat," says the label of **Earthbound Farm Organic Tomatillo Black Bean Protein Energy PowerMeal**.

Okay. So you won't feel more energetic or powerful than you would after eating any other salad. And the protein (8 grams) is low for a meal. But it's more than you'd get in many packaged salads.

Earthbound starts with organic baby lettuces (like red and green romaine, oak leaf, red leaf, lollo rosa, and tango), and adds organic corn, black beans, bell peppers, onion, and spices. Then come the five-seed corn strips and sunflower seeds. Imagine the crunch!

Without the dressing, it's got 240 calories, 210 milligrams of sodium, and less than 2 grams of saturated fat. Then there's the 6 grams of fiber, 150 percent of a day's vitamin A, 30 percent of a day's vitamin C and iron, and 10 percent of a day's calcium. The dressing kicks the sodium up to 550 mg, but use just a third of the packet and it drops to 320 mg.

Earthbound's **Blueberry Quinoa Protein Balance PowerMeal**—baby spinach, quinoa, roasted sunflower kernels, dried wild blueberries, and balsamic dressing—has similar Nutrition Facts. The **Cranberry Wheat Protein Boost PowerMeal**, which mixes baby lettuces with wheat berries, bulgur, garbanzo beans, dried cranberries, and red wine vinaigrette, has less protein (5 grams), but also less sodium (310 mg with the whole packet of dressing).

Did we mention that they're delish? Or-organic? Convenient? And powered by plants?

Earthbound Farm: (800) 690-3200

CINN-FULL

Ho-hum. Apparently, that's what many **IHOP** diners think of the chain's Original French Toast.

After all, its "six fluffy triangle-shaped slices topped with whipped butter and powdered sugar" have a mere 1,120 calories, 13 grams of saturated fat, and 13 teaspoons of added sugar (if you use the usual four tablespoons of syrup).



Maybe that's why the chain came up with **CINN-A-STACK French Toast**—"A stack of three slices of thick-cut French toast layered with a luscious cinnamon roll filling, then drizzled with rich cream cheese icing and topped with whipped topping."

Now you're talking. What's French toast without filling *and* icing *and* whipped cream? With the syrup, the CINN-A-STACK delivers 16 grams of sat fat and the calories (1,340) and added sugar (20½ teaspoons) of 1½ Cinnabon Classic Rolls. Urp!

Still bored? Get your CINN-A-STACK as part of IHOP's **Create Your Own Viva La French Toast Combo**, which adds two eggs, hash browns, and two bacon strips or pork sausage links to a French toast two-stack. Pick sausage and use the syrup, and you leave the table with 1,700 calories and more than a day's sat fat (26 grams), sodium (1,900 mg), and added sugar (18 teaspoons).

IHOP does offer a **SIMPLE & FIT Whole Wheat French Toast Combo**, which comes with sliced banana (so you can skip the syrup), scrambled egg substitute, and turkey bacon. It's still too high in sodium (930 mg), but with 490 calories and only 4 grams of sat fat, it's IHOP's version of diet food.

IHOP: (866) 444-5144

dish OF THE MONTH

Lemon-Parsley Pesto

Combine 2 Tbs. each of extra-virgin olive oil, lemon juice, and water with ¼ cup of Parmesan cheese, ½ cup of flat-leaf parsley, ¼ cup of walnuts, ¼ tsp. of salt, and a few grinds of black pepper in a food processor. Pulse until smooth. Mix with white beans, pasta, bulgur, or steamed broccoli or other vegetables.