## Conventional vs. organic farming

Mayo Clinic

The word "organic" refers to the way farmers grow and process agricultural products, such as fruits, vegetables, grains, dairy products and meat. Organic farming practices are designed to encourage soil and water conservation and reduce pollution. Farmers who grow organic produce and meat don't use conventional methods to fertilize, control weeds or prevent livestock disease. For example, rather than using chemical weedkillers, organic farmers may conduct more sophisticated crop rotations and spread mulch or manure to keep weeds at bay.

Here are some key differences between conventional farming and organic farming:

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| **Conventional** | **Organic** |
| Apply chemical fertilizers to promote plant growth. | Apply natural fertilizers, such as manure or compost, to feed soil and plants. |
| Spray insecticides to reduce pests and disease. | Use beneficial insects and birds, mating disruption or traps to reduce pests and disease. |
| Use herbicides to manage weeds. | Rotate crops, till, hand weed or mulch to manage weeds. |
| Give animals antibiotics, growth hormones and medications to prevent disease and spur growth. | Give animals organic feed and allow them access to the outdoors. Use preventive measures — such as rotational grazing, a balanced diet and clean housing — to help minimize disease. |

**The Organic Debate: Healthier or not?**

*By* [*Linda Ciampa*](http://www.cnn.com/CNN/anchors_reporters/ciampa.linda.html)

(CNN) -- Growth hormones in cows, pesticides on produce and antibiotics in poultry -- these are among the reasons many Americans are turning to organic foods. In fact, sales of organics have surged more than 20 percent each year in the past decade. According to the Food Marketing Institute, more than half of Americans now buy organic food at least once a month.

But whether organic chicken or pesticide-free lettuce represent "healthier" alternatives has long been a subject for debate.

Proponents, such as Katherine DiMatteo, executive director of the Organic Trade Association, cite the fact that organics are grown under strict standards of purity based on the elimination of toxic agricultural chemicals.

DiMatteo says even the soil is better: "The soil that organic is grown in is healthier. This comes from the fact that the soil has nutrient value. Healthy soil, healthy plants."

But any suggestion organic food is somehow superior doesn't sit well with Alex Avery, director of research at The Hudson Institute Center for Global Food Issues.

"Organic foods have never been shown to be healthier, more nutritious or more safe than conventional foods," said Avery, "despite dozens of scientific studies. There is no weight that organic is better or healthier for you."

Avery's institute is funded in part by companies that profit from the sale of pesticides, such as Monsanto, DowElanco and Ag-Chem Equipment Company.

Avery said some organics can make you sicker than conventional food.

"Because organic foods use pathogen-laden manure as their primary fertilizer, organic foods may pose a higher risk of foodborne-illness than conventional foods," he said, adding that damage from pests is likely to be greater, as well, and that could translate to more fungal growth, or colonization by molds. Some of these organisms produce toxins. One of them, aflatoxin, is considered highly carcinogenic.

**Carefully wash all produce**

DiMatteo said manure is used -- but that restrictions and procedures are used in handling it. Plus, it's only part of the overall soil plan.

"The organic system for soil fertilization includes crop rotation, cover crops, composted vegetable matter and manure," she told CNN.Com.

That's fine, according to the United Fresh Fruit and Vegetable Association, provided the manure is properly composted.

"Uncomposted or improperly composted manure that enters surface waters many contain pathogens and subsequently contaminate produce," the association warned.

Food safety experts say organic or not, consumers have to observe the same rules if they want to avoid getting sick. Thoroughly wash -- even scrub -- all produce. And, if the skin won't come clean, peel it off.

Organic livestock may have had the run of the farm and eaten pesticide-free grain, but that doesn't mean they won't come to slaughter loaded with bacteria. Just like conventional chickens, organic birds can harbor salmonella, E. coli and campylobacter. These can cause anything from a mild intestinal illness to a life-threatening infection. To avoid that, organic chickens (or any organic meat) should be handled the same as a regular product -- observing cleanliness rules in the kitchen and making sure they are cooked to the proper temperature: 180 degrees for poultry, 160 degrees for beef.

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**What about genetically modified foods?**

The other major argument around organic food is whether or not it is more nutritious. Even DiMatteo hedges on this controversial point, telling CNN.Com that there is no difference in nutrient value with regular foods.

If, in fact, organics have nothing much to offer beyond a higher price -- they often cost more than conventional items -- why bother with them at all? Taste is one reason. Some insist that organic products are more flavorful than other foods.

DiMatteo said there are broader reasons to go organic: "Environmental pollution does have an impact on the health of humans. We can definitely see a connection between chemical pest control and the potential for disease."

Plus, those who fear bio-engineered foods may be able to put their minds at ease by buying organic -- not that there's necessarily anything to fear in the first place say proponents of genetically modified foods. However, the Organic Trade Association supports a moratorium on genetically modified foods, known in the trade as GMOs.

The OTA fears that interspecies movement of DNA might one day lead to unwarranted effects on the environment and/or human health. But that is far from the intent.

"Food (might) be modified to provide enriched vitamins, nutrients, improve food quality, make food last longer and eventually decrease the cost of food," said plant biotechnologist Sivramiah Shantharam, with the International Food Policy Research Institute.

Some examples of bioengineering: increasing the protein content of potatoes, making oils healthier and increasing nutrient levels in rice. Shantharam says the benefits don't end with food: "In China, cotton fields are sown with seeds that are genetically implanted with a bacterium that is toxic to bollworms, the larval stage of boll weevils. Without these seeds, the crop would be wiped out."

Organic producers have waged a vigorous fight to keep bio-engineered foods from being included in the government's new organic standards. Some GMOs were included the first time the government proposed those standards, in 1997. They were withdrawn after criticism they included non-organic components-such as food irradiation and the use of sewage sludge fertilizer.

Until the USDA announced its standards, 'certified organic' labels meant a food had been recognized as such under a particular program or law. For example, the California Organic Foods Act has been in place since 1990.

"Sometimes it will be certified by a private program and sometimes by a state program," said DiMatteo.

But no matter how the product is labeled, Avery said the message should be clear: "The label does not imply organic food is healthier, safer or better for you in any way. It's purely a marketing label."

**Is “Organic Worth It?”**

**Mens Fitness Maganzine**

Foods Worth Buying Organic:

**Spinach and Lettuce**   
Most people already spring for expensive bagged salads—so why not pay a little more (around a dollar a bag) for the organic version?

**Bell Peppers**   
One of the Environmental Working Group's so-called "dirty dozen"—12 types of produce that have the highest level of pesticide residue. Their company includes celery, peaches, nectarines, and cherries.

**Apples**   
Ninety-two percent of the apples tested by the EWG were positive for pesticide residues—and 72% of those had more than one type of bug-killer on their peel.

**Peanut Butter**   
Chemicals tend to concentrate in oils—one reason residues from up to 28 different pest-killers have been found in p.b.

**Strawberries**   
Bugs love supersweet fruits, so it's no wonder that random F.D.A. tests found trace amounts of 38 different kinds of pesticides on these luscious, soft-skinned treats.

**Microwave Popcorn**   
It's the oils that are to blame for the pesky contaminants in popcorn. Newman's Own organic brand costs only a few cents more per bag than Orville Redenbacher's.

Foods Not Worth Buying Organic:

**Milk**   
Any residue from cattle feed ends up in milk fat, which gets removed if you drink low-fat or skim. And, contrary to popular belief, all milk—organic or not—is free of antibiotics.

**Chicken and Fish**   
The USDA hasn't created official guidelines for what constitutes "organic" fish. Also, meats in general don't have as many residues as produce.

**Olive Oil**   
Fewer synthetic chemicals are used in the production of olives than in other conventional   
crops to begin with—so you're not getting that much bang for your buck if you buy organic.

**Yogurt**   
Like milk, any trace amounts of residue in yogurt would come from the fruit mixed in, not the yogurt itself.

**Questions**:

1. The Mayo Clinic article mentions using natural fertilizer. According to your notes, what are the three main ingredients in fertilizer, and what are they there for?
2. The Mayo Clinic article mentions crop rotation as a primary strategy used in organic farming. Why is crop rotation important, and why is using a legume in the crop rotation (beans, soy, peas, etc) important?
3. Draw a simplified version of the Nitrogen cycle, including the nitrogen forms and the names of the processes. Give one reason why the nitrogen cycle is good and one reason why the nitrogen cycle could be harmful.
4. What has DiMatteo said is good about growing things organically? How have organic foods compared to regular foods in terms of nutritional value?
5. Why does DiMatteo say it is important to carefully wash all organic-bought foods, like produce or livestock?
6. How is cotton genetically modified in China? What is the point of doing this? Give two other examples of genetically modified foods mentioned in the second article and what is being modified about them.
7. From reading the articles, list four major requirements that are needed to for a food to be considered organic by the USDA.
8. What is the “dirty dozen?” What does this term represent? Give some examples of foods that fall into this category.
9. Why is it better to buy produce like apples and strawberries organic, but not dairy products like milk or yogurt?
10. Are organic foods something you buy/eat at home? Why do you/do not chose to eat organically? Has this article changed your opinions on organic food? Why or why not?