

The Dirt on Organics: Nitty-gritty

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I've heard reports about a Stanford School of Medicine study that found that organic food isn't any healthier than conventionally grown food. If that's the case, is it worth paying the premium price? —*Anonymous*

Continually stumped by her patients' questions about the benefits of organic food, Dr. Dena Bravata of Stanford Medical School grew curious herself. So she and a team of researchers set out to investigate the **health and safety differences** between organic and conventional fruits, vegetables, eggs, grains, dairy and meat.

Using meta-analysis, Bravata's team pooled together 237 peer-reviewed studies addressing the nutritional benefits of organic and conventionally grown foods. Their sample of publications was diverse, including studies of varying designs, samples and time scales. Of these, however, only 17 explicitly addressed the health benefits of organics for humans.

The researchers found few differences in the nutritional content of organic and conventional foods. But they did find that organic plant crops have lower levels of certain chemical pesticides and herbicides, and that organic animal products have lower residues from added antibiotics and hormones—all of which are potentially harmful besting sufficient concentrations, and are particularly dangerous for pregnant women, infants, those with AIDS, and other vulnerable populations. The authors concluded that while organic foods may not be more nutrient-dense, they are likely the safer choice.

That said, the verdict is not final on the nutritional differences between organic and conventional foods. Another **meta-analysis** conducted by researchers at Newcastle University in 2011, which received scant media attention, found some organic foods had modest nutritional benefits.

Why did the Stanford study inspire such controversy after other studies received little attention? To start, the media largely missed the boat on the study's findings—while many consumers choose organic foods for

reasons such as the absence of pesticides and milder environmental impacts, the mainstream media focused on the lack of nutritional advantages in organic produce compared to conventional foods. Most reports on the study missed or downplayed the study's findings regarding higher levels of pesticides, added hormones and antibiotic-resistant bacteria in conventionally produced food.

The media's take on the Stanford study (including headlines like **“Study Finds Organic Food is No Better on Vitamins, Nutrients”** and **“Stanford Scientists Cast Doubt on Advantages of Organic Meat and Produce”**) **sparked backlash** from organic producers and associations, who felt that their work was being undermined both by the study's authors and the mainstream media. Consumers, meanwhile, were left wondering why organics were touted in the first place.

It's easy to come away thinking that all conventional agriculture is bad, or that organic food isn't worth the extra money it usually costs. (See this **previous SAGE answer** about the high cost of organic food.) But the reality is that both options have some benefits. The synthetic pesticides and fertilizer used in conventional agriculture mean higher yields and crops that survive through difficult growing conditions. Similarly, many genetically modified organisms (GMOs), which are prohibited in organic agriculture, **can reduce water, land and pesticide requirements**. These efficiencies are palpable in the low prices and great abundance of conventional foods in supermarkets.

Organics, on the other hand, provide a number of advantages for both human and environmental health. That includes lower levels of pesticides and other harmful substances on fresh fruits and vegetables. For some shoppers, though, the decision to pay organics' premium price is less about personal health and more about the wellbeing of rural communities and the environment. This is because the health effects of the synthetic pesticides and fertilizers used in conventional agriculture are more strongly felt by farm workers and their families—as well as bees, fish and native plants—than by consumers. These effects are called negative externalities: costs that are inflicted upon society that are not reflected on the price tag.

The negative health externalities of agricultural chemicals can sometimes only be detected by epidemiological studies of people exposed to them. The authors of a **2004 meta-analysis** of such studies found clear causal links between pesticide exposure and neurological problems. Many pesticides are also **suspected or known to cause cancers**.

It can take decades to accumulate enough scientific evidence to ban a dangerous pesticide, and even then its use may continue for years before the ban is fully implemented. For example, Endosulfan (used on crops to control pests but later found to also impact beneficial insects) was used for 60 years before the U.S. Environmental Protection Agency moved to phase it out in 2010. The phase-out is scheduled for

completion in 2016.

Synthetic fertilizers, like pesticides, can have adverse effects on the environment when used in excess. **As is especially the case in developing countries like Kenya and China**, the over-application of high-solubility, synthetic, nitrogen-based fertilizers leads to high nitrate levels in water that drains from a field after rain or irrigation, and ultimately in groundwater. According to the **U.S. Geological Survey**, the United States faces groundwater nitrate contamination across large swaths of the country, which make the people who drink the water sick.

In surface water, fertilizer contamination **causes ecosystem imbalances** like toxic algae blooms and zones of depleted oxygen, which harm ecosystems and the humans who depend on them for seafood, whether for their livelihood or recreation. While organic food is typically more expensive than conventional, it is associated with fewer of these hidden costs to society and the planet.

Given the copious—and often conflicting—information with which we are inundated, how can we make sound decisions about our food purchases? Let's first use a human health lens: the Environmental Working Group puts out a **"Dirty Dozen"** list each year that highlights the produce contaminated with the most insecticides, pesticides, and herbicides. You can substantially reduce your intake of harmful chemicals by buying these foods organic, or avoiding them all together. Most importantly, if you are pregnant or have young children, it makes

sense to limit your intake of foods potentially contaminated with pesticides, due to lower thresholds of exposure.

When it comes to the planet, organic agriculture entails lower chemical inputs, and that means less risk that farm chemicals will harm surrounding ecosystems. However, when considering the environmental implications of your food purchases, it is also important to consider the food's origin. Locally cultivated foods often have reduced packaging and have traveled fewer miles, so their carbon footprint can be lower.

(Wondering whether local is more important than organic? That's a whole new question, but **you can ask SAGE here!**) There is no silver bullet for finding the local, organic farm most favorable to the environment, but community farmer's markets are a great place to start. If some of your local farmers do not offer certified organic produce, strike up a conversation—farmers sometimes avoid the certification to cut down on costs or bureaucracy, not because of their land management strategies. You'll often find pesticide-free food without the cost (or guarantees) of certification.

Finally, look beyond the produce section. Even though it gets most of the attention, each item you purchase is a vote with your dollar. No matter where you choose to cast your vote, consider the implications for both your personal health and the health of the environment.

Nutrient content aside, the Stanford study should remind us of the many

other reasons to choose organic food. Ultimately, it's up to us as consumers to be informed about our impact and the choices that shape our health and our environment.

*This SAGE question was researched and answered by **Isabella Akker**, '13, **Chad La Tourette**, '13, and graduate students **Priya Fielding-Singh**, **Anna Hallingstad**, '12, and **Lindley Mease**, '12.*

A horizontal banner for Stanford Summer Session. On the left, a red box contains the text "Stanford Summer Session" in white. To the right is a photograph of a long, brightly lit hallway with high ceilings and columns. A person is walking in the distance. On the right side of the photo, a teal box contains the text "Share the Tradition" in white. To the right of the photo, white text reads "Visiting Students Earn Credit While Experiencing Life on The Farm" and "Programs for High School, Undergraduate, and Graduate Students. Apply Today!"

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