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## Organic Food – Part 1

A few weeks ago, I commented on a study that compared the nutrient content of organic and conventionally grown foods (1). For the record, I wasn't agreeing with the study—I was pointing out what was wrong with it. But many of you are very passionate as well as very curious about organic foods, and let me know it. So I decided to examine the issue in greater detail. I'll review the article and address the comments that were raised since its publication.

### The Study

The basic question that the researchers in the United Kingdom had was this: there is a tremendous increase in public demand for organic foods in the UK (and the US as well). What does the research say about the differences in nutrient content between organically grown food and conventionally grown food? It's a valid question, and one I've had for many years. I've searched for the science, and there really isn't as much as you would think, given the prevailing thought that organic is better.

The researchers searched the scientific literature for studies that claimed to compare organic versus conventional crops. They had stringent criteria in order to include studies in their analyses. From over 52,000 articles in their original search, they ended up with just 55 studies that qualified. Maybe your first thought was that they rigged the search to get only studies that fit the answers they wanted to get. Well, maybe you don't think that way, but I do. They had five criteria, and in my opinion, they were all reasonable. Let's take just one: the study had to describe the exact type of organic methods used, including the name of the organic certifying agency. Just because people at your farmers market say they grow things organically doesn't mean that they comply with every rule. For research purposes, all the studies' methods had to be similar or comparing the results of the studies would be meaningless.

The researchers reported that the comparisons between organic and conventionally grown crops revealed no statistically significant difference in nutrient content for seven of nine nutrients. I have two problems with that. First, as I said three weeks ago, it's only nine major nutrients—there are many trace minerals that are just as important. Second, they reported the differences in percentages, and I hate that—let me see the raw numbers and decide for myself. For example, the vitamin C content of the vegetables might have been low in both crops, making the comparison meaningless for potential health benefits. Do you have a penny in your pocket or a nickel? Either way, you're not rich and you won't be buying much.

Of course, their conclusions caused a firestorm. Organic growers and consumer groups blasted the report. The Soil Association (SA) pointed out that the organic foods always had more nutrients than conventional and listed the percentages (2)—again, with the percentages! So I decided to see if that was meaningful. I used NutritionData.com and examined the nutrient content of broccoli. Why broccoli? It's one of the most commonly available vegetables to consumers and was sure to be included in at least one of the studies they examined. The SA reported that organic foods contained 7.1% more magnesium and 11.3% more zinc than conventional. What does that mean in real numbers? A 1-cup serving of raw broccoli has 19.1 mg magnesium, so theoretically, eating organic would raise that to 20.4 mg. There is 0.4 mg zinc, so that would raise it to 0.45 mg. Given that the adult Daily Reference Intake for magnesium is 400 mg and zinc is 11 mg, increases that small aren't meaningful in the real world. There might have been other types of foods that have higher contents of these nutrients, but picking carrots or tomatoes wouldn't have made any difference—they have similar amounts of those minerals.

## Is There Any Research to Support Organic Foods?

While sparse, I did find three studies that I thought did it about as well as could be expected. Here are the highlights.

### Broccoli

Researchers at Montclair State University examined the differences in vitamin C content between organic and conventionally grown broccoli (3). The interesting part was that they compared the content at different growing seasons and they obtained the broccoli from the grocery store, just the way you and I might. There were no differences in vitamin C content between organic and conventionally grown broccoli, but there was a big difference depending on the time of year. When local produce was in season, the vitamin C content was much higher in both organic and conventional. When the broccoli was out of season and therefore shipped long distances, the vitamin C content dropped considerably. That's the point I've always tried to make about organic foods: they very well may start out with more nutrients, but when it comes to water-soluble vitamins, if you don't eat the food within a few days, the vitamin content decreases to the point that it doesn't make sense to buy organic for that reason alone—of course, there are other reasons to buy organic, and we'll get to those next week.

### Grapefruit

Government researchers in Texas compared conventional and organically grown grapefruits (4). They tested crops from the same farms for three consecutive years and at three times during the growing season, and the fruit was all picked within hours of each other. This approach is important to standardize growing conditions because they can vary year to year. They found that the conventional crop was better colored, higher in lycopene, and the juice was less tart. A consumer taste group found it more appealing to eat or drink. The organically grown fruit had a thinner peel which consumers favor and was higher in vitamin C and sugar content. But one of the most important differences was the organically grown fruit had less furanocoumarins—say that five times fast. The reason that's important is that furanocoumarins are the substance that can affect the absorption of medications—that's why grapefruit is supposed to be avoided with certain meds. This is only one study, but perhaps organically grown grapefruit could be used by people taking statins and other medications in the future—but that hasn't been proven yet.

### Tomatoes

Of all the studies I read, this was the coolest. Researchers at the University of California, Davis, examined the phytonutrient content of organic and conventionally raised tomatoes (5). The samples were dried and stored after harvesting every year for 10 years. They found that two phytonutrients called quercetin and kaempferol were higher in organically grown crops compared to conventionally grown—79% and 97% higher respectively—and the amounts in mg were significant in the real world. The conventional tomatoes always contained about the same amount of phytonutrients, but the organically grown increased year to year. They suggest that's because the organic nutrients in the soil increase year to year, providing the right nutrients for plant growth and more nutrients in the fruit.

I love this study for two reasons. This establishes that organic farming practices really do improve the soil over time. Only one study, I know, but for all that organic growers talk about this issue, this is the first study I've seen that proves it. Second, this also establishes that tomato concentrates contain high amounts of phytonutrients. Eat fresh and eat organic if you can, but if you can't, taking a dietary supplement containing organically raised fruits and vegetables is a great alternative—because the nutrients will be there.

## The Bottom Line

The reason that this is such a big deal has to do with consumer perception and food cost. The perception is that organic is better, and there's no question that organic costs more. From the perspective of the research to support the nutrient benefits of organic, it's not sufficient. The three studies I used are about the only decent research I could find. But there's another important reason people want to eat organic foods: the perception is that they're safer for you to eat because they have fewer chemicals. Intuitively, that seems true, but is there research to support that position? Next week, I'll cover that issue in detail, along with other reasons to buy organic. Until then, enjoy your organic fruits and vegetables.

What are you prepared to do today?

**Dr. Chet**

#### References:

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