

Organic Foods

Jamie I. Baum, PhD
Assistant Professor -
Nutrition

Amanda McWhirt, PhD
Assistant Professor -
Horticulture

João Pedro Marinho
Guimarães
Undergraduate Student,
Food Science

Ênela Rabelo Silva
Undergraduate Student,
Food Science

Sales of organic food products in the United States have grown from \$3.6 billion in 1997 to more than \$43.3 billion in 2015. Organic fruits and vegetables make up the biggest part of worldwide organic sales. Despite large growth, organic foods only account for less than 4 percent of the total U.S. food market. Continued growth in this area is driven by consumers' perception of organic produce as being healthier to eat and better for the environment than conventional produce. However, many consumers have limited understanding of what the organic label actually means. This fact sheet will help to explain what it means for a food to be organically certified, how organically certified foods are produced and what rules are in place to regulate them.

What Is an Organic Food [1, 2]?

Organic foods are produced following principles that direct crops and animals be raised in a way that protects natural resources, conserves biodiversity and uses only approved substances often of natural origin [8]. In order to standardize these principles across the United States, the USDA Organic Label was created in October 2002 that set standards for the production and labeling of food produced under organic principles. Farms that certify their products under the organic label must undergo a yearly third-party audit of their practices and farms in accordance with these rules. Examples of organic farming practices include using manure or compost-based fertilizers,

using crop rotation or organic mulches to manage weeds and using biologically based methods of pest control. In order for a crop to be organic, it must be raised without the use of prohibited pesticides, petroleum-based fertilizers and without sewage sludge-based fertilizers. In addition, soil conservation practices must be a component of the farm management plan.

A common misconception about organic produce is that no pesticides are used. However, certain pesticides are allowed in organic production and are generally derived from plant-, animal- or mineral-based compounds, while conventional pesticides are largely synthetically derived. Examples of organic pesticides approved for use are copper, sulfur and neem oil. While products that are approved for use in organic production differ in their origin from conventional pesticides, they can be just as toxic to humans as conventional pesticides.

Use of genetically modified organisms (GMOs) is prohibited in organic production. Animals raised on organic farms must be fed organic feed, be given access to the outdoors and may not be given antibiotics or growth hormones.

As a part of these rules, USDA created a certified organic seal [7] that food manufacturers can use to indicate to consumers that a food product was produced using organic standards. To use the organic seal, raw products (e.g., fruit, vegetables, meats) must be 100 percent organic, while processed foods are only required to have 95 percent of their

*Arkansas Is
Our Campus*

Visit our web site at:
<https://www.uaex.uada.edu>

ingredients produced according to organic standards. If a product contains between 70 to 95 percent organic contents, the label can read “product made with organic ingredients.”



The Organic Seal [7]

Foods that have more than one ingredient, such as breakfast cereal, can use the USDA organic seal plus the following wording, depending on the number of organic ingredients:

- **100 percent organic.** To use this phrase, products must be either completely organic or made of all organic ingredients.
- **Organic.** Products must be at least 95 percent organic to use this term.

What Are the Advantages and Disadvantages of Organic Foods [1, 2]?

Due to standards on organic farms that require systems of soil conservation and biologically based systems of pest management, organic farms may have beneficial impacts on the environment through improvements in soil fertility, crop diversity, pollinator conservation and water conservation. However, similar conservation efforts may also be implemented on conventional farms. Organic farms' inability to use many traditional pesticides, particularly for weed control, result in higher labor and production costs. Higher production costs and costs associated with the organic certification process are why organic foods tend to be more expensive. Organic products may also vary in size and color compared to conventionally grown foods and may contain more blemishes due to limited pesticide use.

Is It Better to Purchase Organic Versus Conventionally Raised Foods?

Consumers increasingly take into consideration non-sensory attributes of food when making purchasing decisions [3, 4]. For example, many consumers may now consider whether or not the food contains additives, preservatives or pesticide residues; the

nutritional value of the food; and how the food was produced. One common reason consumers prefer to purchase an organic food versus a conventionally produced food is they think organic is a healthier choice. However, research has shown mixed results with regard to significant differences in nutritional value between organic and conventionally produced foods. According to the *Journal of the Science of Food and Agriculture* in 2001, only minimal nutritional differences were found between organic and conventional products regarding mineral and vitamin content [5]. However, a recent study published in 2016 compared 343 studies and found on average organic crops contained 18 to 69 percent higher concentrations of antioxidants [10]. A study in 2014 found 50 percent more omega-3 fatty acids in organic milk and meat as compared to conventional products [11]. To date research on how differences in nutritional content and long-term consumption of organic foods might lead to direct improvements in human health have not been carried out. Most nutritionists agree the more pressing health concern for most Americans is a failure to meet the daily fruit and vegetable intake recommendations, not how the fruits and vegetables are produced.

What Concerns Do Consumers Have About Pesticides?

Due to restricted pesticide use regulations under organic production standards, consumers often assume organic produce is safer than conventional produce. However, recent data from USDA's Pesticide Data Program showed that 41 percent of all the produce tested had no detectable pesticide residue and more than 99 percent of all food products tested did not exceed government safety thresholds for pesticide residues. Data from the most recent Pesticide Data Program report in 2014 revealed that only 38 of the 10,619 samples tested or 0.3 percent had pesticide residue levels exceeding the tolerance levels set by the U.S. Environmental Protection Agency [6]. These results indicate there is very little risk of pesticide exposure in our conventionally produced food supply.

Some research has shown lower pesticide levels on average in organic produce, but research has also shown that organic produce carries the same risk of exceeding maximum allowable limits for pesticide residues as conventional produce [9, 10]. In fact a small amount (4 percent) of certified organic foods may still contain some pesticide residue that is in violation of both the U.S. Environmental Protection Agency's tolerances and the USDA organic regulations. This is likely due to cross-contamination from nearby conventionally sprayed fields or mislabeling of conventional products.

Do “Organic” and “Natural” Mean the Same Thing [2]?

The answer is no. **Natural** and **organic** are not interchangeable terms. You may see “**natural**” and other terms such as “**all natural**,” “**free-range**” or “**hormone-free**” on food labels. These descriptions are not backed up by any system of regulation and can be used by any manufacturer without the product undergoing any certification process and, therefore, do not give any factual indication of how the product was produced. However, the FDA is considering this issue and had an open comment period in 2016 [12]. Currently, only foods that are grown and processed according to USDA organic standards can be labeled organic.

References

1. Boyle, M. *Personal Nutrition*, Chapter 13. 2016. Cengage Learning.
2. Mayo Clinic. Retrieved from <http://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/organic-food/art-20043880?pg=2>. Accessed May 3, 2016.
3. Magnusson, M. K. et al. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour [electronic resource]. *Appetite* 40(2):109-117.
4. Honkanen, P., B. Verplanken and S. O. Olsen. (2006). Ethical values and motives driving organic food choice. *Journal of Consumer Behaviour* 5(5):420-430. doi:10.1002/cb.190.
5. Brandt, K., and J. P. Molgaard. (2001). Organic agriculture: does it enhance or reduce the nutritional value of plant foods? *Journal of the Science of Food and Agriculture* 81:924-931. doi:10.1002/jsfa.903.
6. Agricultural Marketing Service. (2016). Pesticide Data Program – Annual Summary, Calendar Year 2014. <https://www.ams.usda.gov/sites/default/files/media/2014%20PDP%20Annual%20Summary.pdf>. Accessed July 15, 2016.
7. USDA. The Organic Seal. USDA. The organic seal. <https://www.ams.usda.gov/rules-regulations/organic/organic-seal> (February 14, 2017).
8. <https://www.ams.usda.gov/grades-standards/organic-standards>
9. Crystal Smith-Spangler, MD, MS; Margaret L. Brandeau, PhD; Grace E. Hunter, BA; J. Clay Bavinger, BA; Maren Pearson, BS; Paul J. Eschbach; Vandana Sundaram, MPH; Hau Liu, MD, MS, MBA, MPH; Patricia Schirmer, MD; Christopher Steve, MLS; Ingram Olkin, PhD; and Dena M. Bravata, MD, MS. 2012. Are Organic Foods Safer or Healthier Than Conventional Alternatives?: A Systematic Review. *Annals of Internal Medicine* 157:348-366.
10. Barański, M., D. Srednicka-Tober, N. Volakakis, C. Seal, R. Sanderson, G. B. Stewart, C. Benbrook, B. Biavati, E. Markellou, C. Giotis, J. Gromadzka-Ostrowska, E. Rembiałkowska, K. Skwarło-Sońta, R. Tahvonen, D. Janovská, U. Niggli, P. Nicot and C. Leifert. 2014. Higher antioxidant and lower cadmium concentrations and lower incidence of pesticide residues in organically grown crops: a systematic literature review and meta-analyses. *British Journal of Nutrition* 112(5):794-811.
11. Średnicka-Tober, D., M. Barański, C. J. Seal, R. Sanderson, C. Benbrook, H. Steinshamn, J. Gromadzka-Ostrowska, E. Rembiałkowska, K. Skwarło-Sońta, M. Eyre, G. Cozzi, M. K. Larsen, T. Jordon, U. Niggli, T. Sakowski, P. C. Calder, G. C. Burdge, S. Sotiraki, A. Stefanakis, S. Stergiadis, H. Yolcu, E. Chatzidimitriou, G. Butler, G. Stewart and C. Leifert. 2016. Higher PUFA and n-3 PUFA, conjugated linoleic acid, α-tocopherol and iron, but lower iodine and selenium concentrations in organic milk: a systematic literature review and meta- and redundancy analyses. *British Journal of Nutrition* 115(6):1043-1060.
12. <https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm456090.htm>

DR. JAMIE I. BAUM is assistant professor - nutrition and **JOÃO PEDRO MARINHO GUIMARÃES** and **ÊNELA RABELO SILVA** are undergraduate students in the Food Science Department of the University of Arkansas System Division of Agriculture in Fayetteville. **DR. AMANDA McWHIRT** is assistant professor - horticulture with the University of Arkansas System Division of Agriculture in Little Rock.

Pursuant to 7 CFR § 15.3, the University of Arkansas System Division of Agriculture offers all its Extension and Research programs and services (including employment) without regard to race, color, sex, national origin, religion, age, disability, marital or veteran status, genetic information, sexual preference, pregnancy or any other legally protected status, and is an equal opportunity institution.