

Resource 3: Conventional and organically produced foods

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The United States has two major regulations that define and stipulate the criteria for producing, processing, handling, and marketing organic foods. Those regulations, initiated in the 1990s as part of the US Farm Bill, resulted in an Organic Rule according to the National Organic Standard Board and implementation of the National Organic Program (NOP) in 2002 under the jurisdiction of the USDA. According to this program, all but the smallest organic farmers and processors must be certified by a State or private agency accredited under national standards.

According to the Organic Rule, organic foods are those produced without use of genetic engineering, ionizing radiation, and sewage sludge, and only by using tillage, cultivation practices such as crop rotation, cover crop, and fertilization with properly treated crop and animal wastes.

Organic foods are labeled using three fundamental categories. Foods in the first two categories are permitted to display the USDA Organic seal (see Figure 1):

- Organic foods with a “100% Organic” declaration contain all organic produced ingredients.
- Food products labeled “organic” must contain at least 95 percent organic ingredients (see Table 1). The other 5 percent of ingredients may be from the approved list of substances for organic foods stipulated in the Code of Federal Regulations (7CFR 205.605, 7CFR 205.606).
- The third category is “made with Organic,” which refers to food products that contain at least 70 percent organic ingredients.

Figure 1. USDA Organic Seal



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Organic refers to a food production management process. Organic labeling does not imply that the food products are healthier or safer than those provided through conventional means. Four major review articles on this topic (Woese, 1997; Worthington, 2001; Bourn 2002; Dangour, 2009) provided inconsistent findings. The apparent inconsistencies may reflect cultivar choices, innate nutritional qualities, application of fertilizer types, post-harvest handling practices, climate and soil plant stresses. The traditional nutritional contributions of organic foods may not be significantly different from non-organic foods typically consumed. Several small recent studies compared non-traditional composition of organic and conventional produced wheat, strawberries, carrots, peaches, tomatoes, lettuce and apples. These studies, summarized in Table 1 assessed the concentration of organic acids and polyphenolics, many of which may present potential health effects (Winter, 2006). Findings from these limited studies were inconsistent relative to nutritional quantitative and qualitative differences between organic and conventionally produced food products. This evidence suggests that it is premature to conclude that the nutritional value and purported health benefits of organic foods are better than those produced through conventional agricultural practices.

Table 1. Summary of Select Studies on Nutrient Content of Organic Compared to Non-organic Produce

Foods	Substances Studied	Results	Reference
Wheat	Polyphenols	Climate greater influence than production method	Stracke BA et al., J Agric Food Chem 2009;57:10116-21
Apples	Polyphenols	No significant differences in bioavailability of polyphenols	Stracke BA et al., Eur J Nutr 2009; Dec 22 Epub
	Phenolics	Phenolics higher in organic apple pulp than in conventional apple pulp; no differences in phenolic content of apple peels	Veberic R et al., J Sci Food Agric 2005;85:1687-94
Tomatoes	Vitamin C, carotenoids, polyphenols	Fresh organic tomatoes had higher levels of vitamin C, carotenoids, and polyphenols than fresh conventional tomatoes	Caris-Veyrat C et al., J Agric Food Chem 2004;52:6503-9
Carrots	Carotenoids	No differences in carotenoid bioavailability or carotenoid content	Stracke BA et al., Br J Nutr 2009;101:1664-72
Peach, Pear	Total phenolics	Organic fruit had higher phenolic content	Carbonaro M et al., J Agric Food Chem 2002;50:5458-62
Lettuce	Total phenolics	No differences	Young JE et al., Mol Nutr Food Res 2005;49:1136-42

Implications

Our current understanding of conventionally and organically produced foods indicate that their nutritional values and contributions to human health are similar. Agricultural practices and conditions have markedly changed over the past decade. Thus, the consumer's exposure to PCBs

and POPs has decreased to levels well below those advised by the EPA, and levels that are consistent with safe food standards. The emerging consumer interests in and investigational efforts on possible healthful substances in the food supply, such as the array of phytochemicals (carotenoids, phenolics, alkaloids, and organosulfur compounds) were not evaluated. Several research studies suggest that increased consumption of some of these substances may not be consistent with improved health, regardless if the food were produced consistent with conventional or organic practices.

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