



Unilever Health & Wellbeing Series

The Nutritional Quality of Natural or Organic Produce Compared to Conventional Produce

There is an increasing consumer interest in foods and ingredients from 'natural' sources, with 'organic produce' being perceived as the ultimate 'natural food'. Important drivers of this consumer trend are the perceived links with sustainability and health, which are rooted in the desire for food lacking manipulation or human interference. With respect to health, consumers believe that natural and organic foods are nutritionally superior compared to their conventionally produced counterparts.

We have evaluated the scientific evidence regarding the nutritional quality of organic foods, as the most extreme form of natural foods, focussing primarily on a comparison between organically and conventionally grown crops. This is because the bulk of the research conducted is on fruits and vegetables, with limited investigation into other products, such as food from animal origin. The effect of processing and food preparation on the nutritional value of these crops was excluded due to lack of published data and also because no principle differences are expected.

This Scientific Review provides our position on the popular assumption that natural produce, including organic produce, is nutritionally superior and 'healthier' compared to conventional produce.

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Scientific review

While most authorities seem reluctant to define 'natural', the Food Standards Agency (FSA) in the United Kingdom (UK) have defined it as follows (1):

"Natural" means essentially that the product is comprised of natural ingredients, e.g. ingredients produced by nature, not the work of man or interfered with by man. It is misleading to use the term to describe foods or ingredients that employ chemicals to change their composition or comprise the products of new technologies, including additives and flavourings that are the product of the chemical industry or extracted by chemical processes.

One term often mentioned in relation to "natural" is *organic*. Organic is defined by the Codex Alimentarius as follows (2):

Organic agriculture is a holistic production management system which promotes and enhances agro ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, cultural, biological and

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mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system.

The definitions of “natural” and “organic” are overlapping. They both prohibit the use of chemicals or synthetic materials and express the overall need to have as little “human” input into the growing of the crop as possible. Furthermore, organic production emphasises crop rotation as a measure of taking advantage of natural fertilisers and preserving soil life. Consumers perceive organic foods as more “natural” and less processed than conventional foods (3). From a legal, regulatory and nutrition science perspective, however, the distinction between natural, organic and conventional is less clear.

While a definition of organic production exists (i.e. for regulatory and legal reasons regarding labelling), conventional production is less clearly defined. What can be deduced from the definition of organic is that conventional production methods are those which use or are “allowed” to use artificial fertilisers and pesticides, thus relying less on crop rotation as a means of keeping the soil fertile. The health effect of consumption of organic produce on humans is not addressed by the definition of organic, which could be due to various reasons. Firstly, researchers have not found consistent differences in nutrient levels between organic and conventional produce, with the possible exception of vitamin C (3-9). Secondly, only a few foods have been studied making it impossible to extrapolate findings to the total diet. Lastly, only a few studies (with inconsistent results on e.g. sperm density and quality) compared the potential benefit of organic and conventional produce in humans (4).

Evidence is lacking to support the statement that, *in general*, organic produce is nutritionally superior to conventional produce. This is due to a variety of confounding factors in field experiments, such as environmental conditions or plant genetics. A possible exception may be vitamin C and nitrate, which have shown trends of being higher and lower (respectively) in organic produce (7;8;10-12). For other nutrients, no significant difference between organic and conventional produce has been found. A possible explanation for lower nutrient levels in conventional produce may be their higher water content, causing nutrient dilution (8). Nitrates are found to be lower in organic produce because of lower amounts or less available sources of nitrogen (e.g. from composts or fertilisers) (4;8).

There are few intervention studies looking at the health effects of consumption of either organic or conventional diet, as well as some observational studies comparing the health profiles of organic and conventional farmers. However, these studies are subject to a variety of limitations: e.g. lack of relevant dietary data, heterogeneity in the study population, other lifestyle factors), making it difficult to draw conclusions (7). Thus, on the whole we cannot state/substantiate that organic food is “healthier” in terms of physical health benefits for the consumer and we cannot state/substantiate unequivocally that organic food is higher in beneficial nutrients than food from conventional sources.

While scientific evidence is lacking for a link between organic production and better health or higher nutrient content there is a place for them on the supermarket shelf, as these products may improve consumer well being, i.e. it makes consumers feel good to consume these products (13;14). However, care must be taken not to make inferences that organic or natural products are nutritionally superior compared to their conventionally produced counterparts.

Conclusion

The popular assumption that natural produce, including organic produce, is nutritionally superior and ‘healthier’ compared to conventional produce cannot be substantiated with consistent scientific evidence.

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