

Organic foods in relation to nutrition and health: key facts

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This factsheet is a summary of an article published in “Coronary and Diabetic Care in the UK 2004” by the Association of Primary Care Groups and Trusts (UK). It was written by James Cleeton, Policy Projects Co-ordinator at the Soil Association.

The article concluded that a predominantly organic diet:

- reduces the amount of toxic chemicals ingested;
- totally avoids GMOs [genetically modified organisms];
- reduces the amount of food additives and colourings;
- increases the amount of beneficial vitamins, minerals, EFAs [essential fatty acids] and antioxidants consumed;
- appears to have the potential to lower the incidence of common conditions such as cancer, coronary heart disease, allergies and hyperactivity in children.

1) PESTICIDES

The routine use of synthetic pesticides is not allowed under organic standards. Currently, over 400 chemicals can be regularly used in conventional farming to kill weeds, insects and other pests that attack crops. For example, Cox’s apples can be sprayed up to 16 times with 36 different pesticides. ⁷ Only four chemicals are allowed in restricted circumstances under Soil Association standards.

“Organic food contains fewer residues of pesticides used in conventional agriculture, so buying organic is one way to reduce the chances that your food contains these pesticides” (Sir John Krebs, Chair, Food Standards Agency, Cheltenham Science Festival debate, 5th June 2003).

“Consumers who wish to minimise their dietary pesticide exposure can do so with confidence by buying organically grown food” (Baker et al 2002).

Organophosphates

The most dangerous chemicals used in farming such as organophosphates [pesticides] have been linked with a range of conditions such as cancer, decreasing male fertility, foetal abnormalities, chronic fatigue syndrome in children and Parkinson’s disease. ^{8,9} Pesticide residues have been ranked among the top three environmental cancer risks by the American Government. ¹⁰

Pesticide residues in food

In recent years, UK Government research has consistently found pesticide residues in a third of food, including residues of more than one chemical in apples, baby food, bread, cereal bars, fresh salmon, lemons, lettuces, peaches, nectarines, potatoes and strawberries. ¹¹ Not all foodstuffs are checked; instead a small number of different products is tested every 3 months and the results published by the Pesticide Safety Directorate (PSD).

Residues of multiple pesticides: the cocktail effect

After pressure from NGOs [non-governmental organisations] such as the Soil Association, the PSD has begun testing for multiple pesticide residues in its samples because evidence suggests that when acting in combination, harmful effects of pesticide residues may be increased. The Government has recognised that “...ignoring the cocktail effects during risk assessment will lead to significant under-estimations of risk”.¹²

Combinations of low-level insecticides, herbicides and nitrates have been shown to be toxic at levels that individual chemicals are not.^{13 - 16} It is clearly an enormous task to test all possible combinations of the 400 permitted pesticides currently in use. It is clear that not enough is known about how combinations of pesticides affect our health, and the Government’s Committee on Toxicity has expressed disquiet about the risks involved.¹⁷

Pesticides and cancer

Women with breast cancer are five to nine times more likely to have pesticide residues in their blood than those who do not.¹⁸ Previous studies have shown that those with occupational exposure to pesticides have higher rates of cancer.^{19 - 21} The apparent link between hormone dependent cancers, such as those of the breast and prostate, may be via endocrine disrupting chemicals [compounds that artificially affect the hormone system] such as 2,4D and Atrazine (both herbicides, now banned or about to be banned). The Royal Society [the UK’s main scientific organisation] recommends that human exposure to EDCs (especially during pregnancy) should be minimised on grounds of prudence.⁶³

Effects of pesticides on children

Children may be particularly susceptible to pesticide residues as they have a higher intake of food and water per unit of body weight than adults and their relatively immature organ systems may have limited ability to detoxify these substances.²²

In a study of children aged 2 –4 living in Seattle, concentrations of pesticide residues up to six times higher were found in children eating conventionally farmed fruit and vegetables compared with those eating organic food.²³ Whilst the presence of pesticide residues in children eating conventional food has been confirmed, the full effect of such pesticides are unknown.

2) FOOD ADDITIVES

Food colourings and additives can cause a range of health problems in adults and children. For example, tartrazine (the yellow food colouring E102) and other additives have been linked to allergic reactions, headaches, asthma, growth retardation and hyperactivity in children.^{24 – 27}

Although around 300 additives are permitted in conventional food only 30 are allowed under Soil Association standards. Some additives found in organic food are added for legal reasons including iron, thiamine (vitamin B) and nicotinic acid

(vitamin B3) in white flour, and various vitamins and minerals in different types of baby foods. All artificial colourings and artificial sweeteners are banned in organic food.

Specific ingredients and additives not allowed in organic food are monosodium glutamate, aspartame, phosphoric acid and hydrogenated fats. In each case their use has been banned because of evidence that they can be damaging to health. For example, hydrogenated fats (also known as trans fats) have been directly linked with increased rates of heart disease, cancer and skin disease. 28,29,30,31 The FSA [Food Standards Agency] acknowledges that they have no known nutritional benefits and increase the risk of coronary heart disease. The FSA website advises that people should try to cut down their consumption of hydrogenated fat. 32

3) GENETICALLY MODIFIED ORGANISMS

Genetically modified organisms are banned from organic food.

The potential health effects of GM foods are unknown. Michael Meacher the former Minister for the Environment recently stated that “We have had no systematic clinical or biochemical trials of the effects on human beings of eating GM food”.

A paper in Nutrition and Health 33 supports Mr Meacher’s position. The authors state that there have only been ten published studies of the health effects of GM food and that the quality of some of these was inadequate. Over half were done in collaboration with companies (fully or partially), and these found no negative effects on body organs. The others were done independently and looked more closely at the effects on the gut lining; in several, evidence of harmful effects were found which remain unexplained. 33

Similar effects on the gut lining were found in an unpublished animal feeding study on a GM tomato. In addition, a study by Newcastle University sponsored by the FSA found that the transgenes [genetically modified organisms] transfer into gut bacteria at detectable levels after only one GM meal. The health effects of these transgenes are unknown and until they have been properly tested people are, in our opinion, wise to avoid eating GM food.

4) ESSENTIAL VITAMINS AND MINERALS

UK and US government statistics indicate that levels of trace minerals in fruit and vegetables fell by up to 76% between 1940 and 1991. 34,35 In contrast there is growing evidence that organic fruit and vegetables generally contain more nutrients than non-organic food.

The Soil Association conducted a systematic review of the evidence comparing the vitamin and mineral content of organic and conventionally grown food. It was found that, on average, organic food contains higher levels of vitamin C and essential minerals such as calcium, magnesium, iron and chromium. 36

An independent review of the evidence found that organic crops had significantly higher levels of all 21 nutrients analysed compared with conventional produce including vitamin C (27% more), magnesium (29% more), iron (21% more) and phosphorous (14% more). Organic spinach, lettuce, cabbage and potatoes showed particularly high levels of minerals. 37

5) ANTIOXIDANTS

A high antioxidant intake has been shown to be associated with a reduced incidence of coronary heart disease and some cancers. Such antioxidants include certain vitamins (vitamin E and beta-carotene) and substances known as phenolics. Researchers have recognised the growing concern that levels of some phenolics may be lower than is optimal for human health in conventionally grown foods. 38 Phenolics are generated by a plant when attacked by pests.

Generally, organic crops are not protected by pesticides and research has shown that organically produced fruit contains higher levels of phenolic compounds than conventionally grown fruit. 38,39 Danish researchers have found that organic crops contain 10% to 50% more antioxidants than conventional crops. 40

6) ESSENTIAL FATTY ACIDS

The essential fatty acids (EFA), omega 3 and conjugated linoleic acid (CLA) play an essential role in metabolism [chemical changes which take place in our bodies to utilise food and eliminate waste materials] and especially in the prevention of coronary heart disease and high blood pressure 41,42,43. Omega 3s also reduce the risk of neurological disorders including depression 44,45,46 and ADHD (Attention Deficit Hyperactivity Disorder) in children 47,48,49,50, 51,52. Furthermore, CLA has been demonstrated to help prevent cancer and degenerative changes in the walls of the arteries 53,54 enhance growth promotion and reduce body fat 54, 55, 56.

Forage based diets [a diet based on fresh or dried food as opposed to processed feed] form the basis of organic livestock production systems and have the potential to decrease saturated fat concentrations and to increase the concentrations of omega-3 57, 58 and CLA 59,50,61 in beef. Milk taken from animals fed on a forage-based diet also display improved levels of EFAs, including CLA and omega 3. 61, 62

7) ALLERGIES

In a study of Swedish children, the prevalence of atopic disorders [allergies] from two different groups of children was measured. The study compared 295 children aged 5 – 13 years from two anthroposophic schools [schools with an alternative approach to education] with 380 children from two neighbouring state schools. The anthroposophical school children ate a predominantly organic diet, used antibiotics restrictively, had few vaccinations and their diet usually contained live lactobacilli [a friendly bacteria found in the upper intestinal tract of humans and in some yoghurts and in unpasteurised milk]. It was found that the anthroposophic way of life is associated with a lowered prevalence of atopy in children. 4

The reduced incidence of atopic disorders is likely to be the result of a combination of lifestyle differences between the two groups of children so that the contribution of organic food consumption is unclear. However, consumption of organic food is the single most common factor unifying the anthroposophic children.

8) FERTILITY

A steady deterioration in male reproductive health has been reported throughout Europe. Sperm concentrations have declined and abnormalities in sperm development have been recorded.

Danish research compared the sperm density of members of an organic farming association (OFA) with that of three different occupational groups and found that the former had significantly higher sperm counts². This research was corroborated in 1996 when members of another Danish OFA were compared with a control group of 797 healthy men. It was found that "...sperm concentration was higher among men eating organically produced food"³.

"A biological plausible hypothesis has suggested that man-made chemicals act as endocrine disrupters (EDC) resulting in altered development of the reproductive tract causing the observed effects"⁵. A number of pesticides regularly used in conventional agriculture are known to be EDCs. Therefore, if an individual's diet does not contain pesticide residues, it can be hypothesised that the above abnormalities of sperm would be less likely.

9) POSITION OF THE FOOD STANDARDS AGENCY AND THE GOVERNMENT

The Food Standards Agency responded to the Soil Association's report "Organic farming, food quality and human health" (2001) by stating that:

On the basis of current evidence, the Agency's assessment is that organic food is not significantly different in terms of food safety and nutrition from food produced conventionally.¹

The Government has taken a more open-minded view. At a meeting between members of the Government's Organic Action Plan and the FSA, the then Organic Farming Minister, Elliot Morley, suggested to the FSA that:

"...while the FSA is clear that all conventionally produced food is safe, the FSA could also recognise that some consumers want less pesticide residues, less use of veterinary medicines, no routine use of antibiotics, and no use of GM ingredients, and that in all these areas organic food delivers what the consumers want."

At that time, Sir John Krebs the Chair of the FSA, was unwilling to change its stance on organic food. However, in recent months Sir John has endorsed one of the organic sector's findings, namely that organic food contains less pesticide residues.

“Organic food contains fewer residues of pesticides used in conventional agriculture, so buying organic is one way to reduce the chances that your food contains these pesticides” (Sir John Krebs, Cheltenham Science Festival debate, 5th June 2003).

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