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ORGANIC FOOD: THE HIDDEN AGENDA.

In a recent news letter, David Atkinson¹ concluded that promotion of a food culture in which the consumption of organic foods was significant element would seem likely to enhance health. I disagree. The information provided below enables a different perspective.

Diets, health and taste. Organic associations seek to justify their claim that organic food is healthier by pointing to changes in certain constituents². Thus there are claims that some minerals, vitamin C (fruit and vegetables), lycopene³ (tomatoes) are slightly higher than conventional produce. No individual food provides every human nutritional requirement. Consequently it is only diets that can be healthy and those varied and balanced between cereals, conventional meat and plant produce, together with regular exercise, provide all the necessary constituents for excellent health. Organic associations claim to think holistically; in this respect they are remarkably reductionist. It is well known that different fruit and vegetable varieties vary enormously in vitamin and mineral content (the vitamin C content of apples differs by three fold-tomato, lycopene 2 fold) much greater than the trivial variations induced by organic cultivation. Growth conditions make huge differences in mineral content⁴. If the concern is vitamins, a multivitamin/mineral pill, cost about 5p, is a more reliable investment.

However intake is one thing, uptake another. Organic tomatoes with a higher vitamin C, β carotene and lycopene content than conventional tomatoes, have been fed to volunteers. No increase in the blood plasma content of any of the constituents was detected³. If the recommended two fruit and three vegetables a day are consumed, the vitamin C intake is 250mg/day. However the body will excrete 150mg of this by renal plasma clearance because the transporter that enables cells to take up vitamin C is saturated at 100mg/day⁵. Lycopene and β carotene uptake are dependent on concomitant fat consumption and compete for chylomicron sites with each other. Uptake is thus dependent on what else is in the diet. To determine the "health" of organic food, comparison must be made of the health and mortality statistics between matched human populations consuming only organic or conventional produce over many years. Organic claims are the reversal of normal scientific procedure since they were originally made without any evidence at all. Although there is rightly great concern about obesity this is as much the result of lack of exercise as unbalanced diet. Exercise reduces the risk of cancer and heart disease, potentiates the immune system and beneficially increases endorphin release in the brain, improving mental health. There are recurring reports that processed organic food is higher in fat and salt⁶.

The taste of organic produce compared to conventional produce has been examined numerous times². It is necessary to use the same varieties and similar growth conditions. In double blind taste tests no consistent pattern then emerges. Fresh produce can more easily be distinguished from stale. UK supermarkets can store produce for up to a year before sales. In my own experience in France, supermarket conventional produce, freshly purchased by law from local sources, contains all the taste required.

Synthetic chemicals and food price. The main reason the public give for buying organic food is because they suppose it free of dangerous, carcinogenic chemicals^{4,7}. Farmers, millers and foresters, occupationally exposed to much higher synthetic pesticide levels, actually have cancer rates substantially lower than the rest of the population⁸. Diets high in conventional fruit and vegetables (containing synthetic pesticide traces) reduce cancer rates by half⁹. These two facts provide a very different perspective on supposed dangerous pesticide traces in conventional produce. Once lung cancer rates due to smoking are removed from the statistics, overall UK cancer rates exhibit persistent declines over the last 50 years¹⁰. The deduction from that is that the origin of many cancers has nothing to do with present day lifestyle. Increased rates of breast cancer are thought due to increasing obesity and consequent increase in oestrogen producing tissues. Regulatory agencies issue guidelines on allowable pesticide trace levels that would not increase cancer rates by more than one cancer in 100,000. However so many worst-case assumptions are included in this assessment, that the safety level provides effectively zero risk⁸. The Food Standards Agency recently indicated that synthetic pesticide traces were the highest in a number of organic baby foods¹¹.

In both the UK and the USA, only some 20% of the population actually eat sufficient fruit and vegetables for cancer protection⁴. Price is a strong determinant of consumption⁴. Organic produce is more expensive, often greatly so. A nationwide programme to sell only organic produce would thus reduce fruit and vegetable consumption and serious future health consequences could be anticipated. An increased price would not persuade those that eat insufficient at present, to change eating patterns; particularly in the poorest sections of the community where basic food costs 30% of the weekly salary. Heavy fat consumption accompanied by smoking are both high risk factors for cancer and are strongly associated with poor education and low salary. Vigorously reducing the price of fruit and vegetables is more likely to increase consumption.

World food prices have dropped by half in the last 50 years the result of efficient conventional farming; the poorest have benefited most¹². Organic is notably inefficient in its use of land particularly for wheat and attempts to drive the world in an organic direction would necessitate ploughing up vast tracts of tropical forest, the only useable soil in the world left uncultivated. Global warming consequences would be severe as would effects on world health from an elevated food price.

The real chemicals in food. The major chemical exposures of every human being are natural chemicals. For every chemical some amount is toxic. Fruit and vegetables contain an estimated 100,000 natural pesticides synthesized by plants that efficiently kill insects

(and many other herbivores) on consumption¹³⁻¹⁵. Pest damage and attack can increase accumulation by up to 100 fold. Aeons of evolution have honed their toxicity. Every day we consume several thousand in number and in gram quantities; synthetic pesticides are consumed in conventional diets in micrograms⁸.

An average daily diet consumes the following:

Carcinogens. 60% of natural pesticides tested are rodent carcinogens, the same proportion as synthetic chemicals. Examples: quercetin in apples, limonene in citrus, caffeic acid in carrots, coffee, lettuce, potato, celery, etc. Although much is sometimes made of quercetin as a soluble antioxidant, the primary soluble antioxidants in the diet are vitamin C and glutathione. It sufficient vitamin C is present in the diet other soluble antioxidants are superfluous.

Teratogens. (chemicals that damage the growing foetus). Examples: chaconine and solanidine in potato. Solanidine accumulates in the liver and kidneys, has a body half-life of several months and is thought released during pregnancy where it acts teratogenically.

Oestrogen mimics. Flavanoids and isoflavones in most fruit and vegetables and genestein in soy, increase the circulating oestrogen mimic content of the non-menopausal female by 4%. What they do in men is under investigation. Current dibutylphthalate exposure, a synthetic chemical in plastic about which considerable environmental agitation has been made for its supposed “gender bending” activities, would increase female oestrogen mimic content by 0.0006% and dioxin by 0.000001%¹⁶.

Sterility inducers. Theobromine (2% dry weight of chocolate) and gossypol (human exposure from animals fed cotton seed cake or oil) induce sterility and testicular atrophy in test animals. Gossypol has been tried with some success to reversibly control human male fertility.

Chromosome breakers (clastogens). 40% of natural pesticides will induce breakage of chromosomes in cultured cells and at concentrations similar to or well below normal consumption. Allyl isothiocyanate will break chromosomes at concentrations about 1/50,000th the concentration of of sinigrin, its precursor, in onions of various kinds. Chlorogenic acid will do so at 1/100th its concentration in coffee.

Nerve toxins. Examples: Tomatine,(tomato), solanine, (potato), curcubitacin, (courgettes, cucumber), carototoxin, (carrots).

Blood disorders. Examples: Coumarins, (anticoagulants in many leafy vegetables), oxalate (iron sequestering in many Brassicas). 40gm spinach will induce symptoms in susceptible human individuals.

Goitrogens. Glucosinilates in cabbage and related plants.

Skin damage. Psoralen, a photoactivated blistering agent, in, for example, celery, figs and parsnip. Known to cause skin blistering during hand harvesting of fruit and vegetables.

Table 1 includes more specific and known effects of natural pesticides on humans¹⁵.

We are not adapted to these chemicals despite daily consumption. Most food is of very recent origin and new ones continue to become available⁸.

Natural pesticides and crop breeding. There is trade off between herbivore defense and yield. Defense chemicals are usually 1-5% dry weight. In breeding for yield in at least 14 crops (and probably all), natural pesticide content has been reduced by 2-10 fold making them much safer for human consumption but changing flavour^{14,17}. Conventional high-yielding varieties therefore need a supplement of synthetic pesticides to protect them from herbivores and disease. But in breeding pest resistant lines, this desirable situation has been reversed. Only three cases have been examined and in each the natural pesticide level had been returned to wild type levels^{14,15}. Pest-resistant cultivars are the primary choice of organic farmers because organic regulations forbid synthetic pesticides. But untested natural pesticides like rotenone (recently associated with Parkinsons disease⁷) and cucurbitacin, (which accumulated in organic courgettes sufficient to cause an outbreak of sickness in New Zealand¹⁸), can be used.

The human population varies substantially in its sensitivity to natural pesticides and limited consumption can reduce the effects of the high level in wild crops. But individuals allergically sensitive to natural chemicals in fruits, such as tomatoes or kiwifruit, are well-documented. Anaphylactic shock resulting from inadvertent consumption continues to produce fatalities. Pest resistant cultivars increase the risk to such people. Wild yams are notoriously toxic, killing some of those forced to eat by lack of food, pest-resistant Lathyrus (chickpea) causes neurolathyrism and inappropriate treatment of cassava to eliminate cyanide-producing enzymes kills an estimated 100 Africans a year. TAN is a disease caused by over-consumption of cyanogenic glucosides. A 4-5 fold unanticipated accumulation of solanine in conventional potatoes has caused at least 30 published fatalities and 2000 cases of poisoning¹⁹. Many crop natural pesticide contents hover only just below toxic levels. Organic associations are full of people who assume that because it is natural, it is naturally good for you!

The hidden chemical agenda. Organic crops act as though they are short of soil N. The C/N ratio is increased²⁰, a condition known to shorten the life cycle of fruit and vegetables. Metabolism responds by channeling the excess carbon into carbon rich compounds like cell wall, starch (increasing dry weight) and secondary products such as many natural pesticides. Protein content is reduced and since soluble proteins are heavily hydrated, there is a reduction in cellular water content. Use of pest resistant crops and alterations in C/N conspire to increase the natural pesticide content of organic food. Sections of the population are therefore at higher risk and since most tinned baby food is now organic it is this section of the population that will bear the major brunt of any potential future problems.

There are no regulations concerning natural pesticide contents in produce except recommendations for solanine in potato cultivars. There is little or no human toxicology on natural pesticides despite their potential damage. The assumption that organic food is safe to eat derives solely from people's experience with conventional food. We have no statistics on the effects on human health of long-term consumption of organic food, only conventional food. At the moment organic food is simply higher price for higher risk.

Environmental organic benefits? Although organic is commonly regarded as environmentally better, once poor management is removed from the comparison, integrated farm management and conventional stands as equally good⁴. Nitrate run off between matched organic and conventional farms is similar over a five-year period. Insect biodiversity measurements indicate the value is higher on conventional farms⁴. No-till or min-till is currently practiced by enterprising farmers throughout the UK using herbicides. On current published measurements no-till is superior to organic in all environmental criteria⁴. Thus no-till global warming carbon dioxide release is one quarter an organic farm. The quality of the soil and the creatures that live in it benefit enormously from the lack of the damaging plough.

Produce sold off-farm contains minerals which must be replaced or the soil is mined. Current sources for organic farms are either to purchase conventional manure, or use non-renewable mined sources (like conventional fertilisers) or to use the uncertain vagaries of rock weathering, much like depleted African soils. A sustainable agriculture?

Conclusion. Those who wish to eat or farm organically are entitled to do so. But organic acolytes need to recognize the limitations and problems of organic agriculture. Idealizing what can never be perfect will in due course only rebound. The supposed vitalistic qualities to organic food, included by Atkinson¹, derives directly from Steiner's mysticism. Like cows horns, stags bladders and fermenting rock, all part of the biodynamic agricultural mystique, it has no place in any scientific discussion.

Anthony Trewavas. FRS.
ICMB,
University of Edinburgh.

Trewavas@ed.ac.uk

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