The Health and Wellness Effects of Organic diets

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What is ‘Organic’?

The National Standard for Organic and Bio-Dynamic Produce 2009 (The Standard) defines organic as:

“the application of practices that emphasise the:

- use of renewable resources; and
- conservation of energy, soil and water; and
- recognition of livestock welfare needs; and
- environmental maintenance and enhancement

while producing optimum quantities of produce without the use of artificial fertiliser or synthetic chemicals.”
65% of households purchased some organic
14% spend >50% on organics
85-95% believe in the benefits of organics (especially chemical-free benefits)

Conflicting reviews

“There is no good evidence that increased dietary intake, of the nutrients identified in this review to be present in larger amounts in organically than in conventionally produced crops and livestock products, would be of benefit to individuals consuming a normal varied diet, and it is therefore unlikely that these differences in nutrient content are relevant to consumer health.” (FSA Report 2009)[1]

“organic plant products contain more dry matter and minerals (Fe, Mg); and contain more anti-oxidant micronutrients such as phenols and salicylic acid...organic animal products contain more polyunsaturated fatty acids” [2]

“in organic produce the content of secondary metabolites is 12% higher than in corresponding conventional samples (P < 0.0001).” [3]

“Studies were heterogeneous and limited in number, and publication bias may be present. The published literature lacks strong evidence that organic foods are significantly more nutritious than conventional foods.” (Stanford University review) [4]

1. Dangour, AD et al. (2009). Comparison of composition (nutrients and other substances) of organically and conventionally produced foodstuffs: a systematic review of the available literature: Food Standards Agency (U.K.)
Health Effects of Organic Diets

- ↓ risk of infantile eczema (>90% organic dairy products) [1]
- ↓ rhinoconjunctivitis, atopic eczema, and atopic sensitisation among Steiner school children (anthroposophic lifestyle including organic food) [2,3]
- ↓ fat mass; improved lean body mass in CKD participants (14 days organic vs. conventional Mediterranean diet) [4]
- ? ↑ risk Campylobacter jejuni infection (organic meat in winter) [5]
- Animal studies - differences in reproductive performance, developmental rate and immune responses for animals (organic compared to conventional feed) [6,7]

Self-reported Health

- The Netherlands (Survey, 566 organic consumers) [1]
  - More energy, better resistance to illness, positive effects on mental wellbeing, improved gastrointestinal function, improved condition of skin, hair and/or nails, fewer allergic complaints and improved satiety

- Poland (Survey, 200 females, >25% organic vs. conventional diet) [2]
  - Less infectious disease and headache; fewer digestive, circulatory and skin complaints; less hospitalisations and cancers

- Germany (17 nuns, 59-80 years, 4-week biodynamic diet vs. 4-week conventional diet)
  - Biodynamic (organic) phase - improved concentration, fewer headaches/ migraines, lower blood pressure; improved appetite, sleep, stress resistance and immunity (fewer T-helper cells, more natural killer cells)

Wellness factors reported to have improved since moving to organic food

“How much of this is a placebo affect I could not say, but there is something psychologically benefiting from eating organic and feeling good about that, and this seems to transfer to physical wellbeing.” (OHWS Participant)
What motivates consumers to eat organic food?

Organic consumers believe organic food is healthier due to the lack of pesticides.

Organic food is healthier to eat than conventionally grown food because it generally contains no pesticide residues.

Beliefs that influence purchasing behaviour:

- 89.3% believe organic food is produced without pesticides.
- 58.1% believe organic food contains more nutrients.

Results from: Organic Consumption Survey and Organic Health & Wellness Survey.
Pesticide exposure

- Pesticide health effects - neurological, reproductive, respiratory, metabolic and mental health effects, as well as cancer [1,2]

- Animal studies - effects on weight control mechanisms, insulin resistance, sleep & immune function [3]

- Acute poisoning - 3 million accidental or intentional pesticide poisonings occur each year (~260,000 deaths) mostly in developing countries [4-6]

- These figures do not account for
  - chronic or cumulative health effects
  - effects from exposure during critical periods of development

Exposure during critical developmental periods

- Sons of women occupationally exposed to pesticides have
  - a statistically significant decrease in penile length
  - a trend towards reduced testicular volume and serum concentrations of testosterone
  - This is despite specific safeguards to protect pregnant farm workers

Exposure to organophosphates (OPs)

- Long-term occupational exposure to low levels of OPs impairs neurobehavioral function including:
  - psychomotor speed
  - executive function
  - visuospatial ability
  - working and visual memory

- Prenatal OP exposure has been associated with:
  - poorer intellectual development
  - increased prevalence of ADHD
  - shortened gestation & reduced birth-weight

Do organic diets reduce pesticide exposure?

Children (USA) ¹

- organic fruits, vegetables and juice → ↓ non-specific urinary OP metabolites (DAPs)

Children’s Pesticide Exposure Study (USA) ²,³

- 5 days of mostly organic food → specific OP residues reduced to non-detectable / close to non-detectable levels
- 50% reduction in pyrethroid insecticide exposure

BMT Preliminary Results

- No detections for DMP in organic phase
- Only 3 quantifiable detections for dimethyl DAPs in organic phase
- Statistically significant difference for DMP and DMTP
- Trend for DMDTP
- No statistically significant differences for any diethyl DAPs
- Total DAPs & Total Dimethyl DAPs significantly higher in conventional cf. organic phase
- Mean Total DAP results - 89% reduction in organic phase cf. conventional phase
- Mean Total Dimethyl DAP results - 96% reduction in organic phase
- Mean Total Diethyl DAP results - 49% reduction in organic phase (NS)
Comparison with other studies

- Previous study comparing DAPs in children consuming organic or conventional food also reported a significant difference for Total Dimethyl but not Total Diethyl DAPs [1]

- Mean DAP levels in conventional phase substantially lower than recent Australian study in children [2]

Limitations

- Small sample
- Food estimation methods may not be precise
- Regional differences in pesticide use and food availability
- Biomonitoring methods may be flawed
- DAPs only reflect OP exposure
- DAP presence does not necessarily infer harm
- More research required to confirm effects
Research on the health effects of organic diets is limited.
Consumers appear more interested in avoiding pesticides than added nutrients.
Consuming an organic diet for one week reduced OP exposure in Australian adults (~90%).
Future large scale studies in varying locations required to confirm results and determine clinical relevance.
Future research should incorporate a wholistic approach to fully capture the potential of organic diets to positively impact health.
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