

# The Perspectives in Organic Farming in Relation to Human Health

*Jens Peter Mølgaard*

*Danish Research Centre for Organic Farming (DARCOF)/  
Danish Institute of Agricultural Sciences,  
Research Centre Foulum, PO. Box 50, 8830 Tjele, Denmark.  
e-mail: jensp.molgaard[a]agrsci.dk*

Organic plant production is characterised by a relatively low level of nutrient supply. Compared to conventional farming this leads to an earlier completion of vegetative growth and an earlier onset of maturity processes. Therefore, in general organic plant products are more mature than conventionally produced plant products. Organic animal production is based on the use of roughage, outdoor production and a lower growth rate compared to conventional farming.

As an effect of these production system differences a number of differences in food quality is predictable and some of these have been documented in the literature.

The review is based on existing literature and ongoing projects comparing nutrients, secondary metabolites and foreign compounds in organically and conventionally produced foods, respectively. Effects of well-known differences between the production systems are also included in the discussion, such as nutrient supply, feeding systems and varieties/breeds used.

The organic production system is believed to influence the nutritional quality of foods. As a result of maturity organic plant products tend to have a higher content of dry matter and vitamin C and a lower concentration of nitrate. This has been documented in several studies, although a number of exceptions have also been found (Woese *et al.*, 1997). Some of the exceptions may be a result of not comparing the same variety. In other cases the explanation might be attacks of pests or diseases causing premature growth termination in the organic production system. When comparing the same wheat variety in the two production systems the protein content of organic wheat is reduced (e.g. Haglund *et al.*, 1998). When a variety suitable for organic production is selected, however, the baking quality is guaranteed (Woese *et al.*, 1997). This demonstrates some of the difficulties, we face when comparing the nutritional effect of the production systems.

Secondary metabolites are often synthesised primarily during the maturation of plant products. So, we expect to find a higher content of these compounds in organic foods and usually do (Brandt & Mølgaard, 2001). But again the variety used may play a larger role than the farming system. The nutritional and anti-nutritional effects of secondary metabolites will be further elucidated and discussed in relation to human health perspectives.

The use of foreign compounds (e.g. pesticides, prophylactic medicine and synthetic additives) is significantly different in the farming systems causing direct and indirect differences in food composition. The nutritional and health effects of this will be discussed.

The farm animals have increased access to out-door areas in the organic production system. This exposes animals to dioxin and infections with f. ex. Salmonella and Campylobacter. However, in the out-door production system the density of farm animals is

low, reducing the pressure of infection. Restricted use of antibiotics in organic farms decreases the problems of resistant bacteria attacking humans.

The discussion will also include the possible, psychological effects of actively choosing food you believe is healthy for you (O'Doherty Jensen *et al.*, 2001).

### **Conclusions**

There are a number of documented and expected tendencies towards an improved quality of organic foods in relation to human health.

### **References**

Brandt, K. & Mølgaard, J.P. (2001). Organic agriculture: Does it enhance or reduce the nutritional value of plant foods? *Journal of the Science of Food and Agriculture* 81: 924-931

Haglund, Å., Johansson, L. and Dahlstedt, L. (1998). Sensory evaluation of wholemeal bread from ecologically and conventionally grown wheat. *Journal of Cereal Science* 27, 199-207.

O'Doherty Jensen, K., Larsen, H.N., Mølgaard, J.P., Andersen, J.-O., Tingstad, A., Marckmann, P. & Astrup, A., 2001. Organic foods and human health. Proceedings of the European conference: Organic Food and Farming. Towards Partnership and Action in Europe. Danish Ministry of Food, Agriculture and Fisheries, Copenhagen 10-11 May 2001, 172-177

Woese, K., Lange, D., Boess, C. and Bögl, K.W. (1997). A comparison of organically and conventionally grown foods – results of a review of the relevant literature. *Journal of the Science of Food and Agriculture* 74, 281-293.