

Open questions for the second FQH workshop in Odense, 29 May 2006

Urs Niggli and the FQH-board - 2006

1. What do consumers really expect and know about organic quality? And FQH?

At the FQH Scientific Conference in November 2005 in Frick, Manon Haccius pronounced upon consumers expectations that the “need of intensifying research to link parameters of food quality to animal/human health was not expressed by consumers, but from the research side and partly by the market.” (minutes of the Frick conference). It is well known that consumers perceive foods that are without pesticide and nitrate residues, as well as without the risk of GMO's, already as favourable for their health status. ‘Healthy food’ seems to be for many organic consumers in the first place the “absence of undesirable compounds” and only in the second place the “presence of health promoting compounds” or even “vital and well balanced living products”. It is therefore important to discuss in depth the concept of organic food quality we pursue in FQH. Do we follow the market, or do we foresee and contribute to (expected) future developments?

2. How well defined and controlled is the quality of organic foods?

Organic foods don't have clear quality standards and do vary in their quality tremendously. So far, analytical properties insufficiently differentiate organic and conventional products. Although, many desirable and undesirable compounds show slightly better results for organic foods, also the contrary can occur, e.g. more nitrate in organic than in conventional carrots when organic production is intensified. The same results come from holistic methods: organic products are not always “better”. But what is “better”? How is quality defined? Although definitions of product- and food quality are still vague, there is quite some shared experience about factors that influence quality, however it is defined.

Quality forming factors which could be better standardised (and are not!):

- Amount of N supply of crops (in practice big variation in all crops).
- Amounts of yield of crops.
- Pest and disease control (e.g. use or non use of copper fungicides in potatoes, use or non use of sulphur-containing fungicides in apple production).
- Diet of dairy cows (proportion of concentrates in diet, pasturing yes/no).
- Udder health, use of antibiotics in milk production.
- Post harvest treatment of products.
- Processing standards (e.g. with cereal muesli all mechanical treatments are used, even totally destructive ones).
- Choice of cultivar/breed has a big influence.

Even in bio-dynamic farming, where the preparations are a key factor to optimize food quality, the way how these preparations are made and the frequency they are

applied, is beyond standardization. It is even true that different 'schools' in bio-dynamic farming question the quality of the preparations among themselves.

Conclusions for further discussions:

- When we compare organic and conventional products, we compare insufficiently defined product qualities!
- From an analytical point of view, often only slight differences are found.
- Quality standards for each product are missing.
- Standards for production and processing do not have a clear orientation towards product quality.
- Product quality is not controlled.
- If product quality is not defined and controlled, health studies have no basis.

3. Additional and specific aspects of organic food quality

We claim organic food to have a specific quality but so far we have remained very imprecise about what we mean with that. How do we define the specific quality of organic food beyond ecological and ethical requirements in the production process, analytical properties and organo-leptic quality?

Terms and qualities that are used within FQH:

- Holistic quality: Do we mean more than the combination of product and process quality (latter as resource and nature conservation, animal welfare, social standards)?
- Naturalness: Is it only the ban of chemical pesticides and fertilizers?
- Living systems: What is life along the food chain from soil to processed food?
- Vital quality/vital force: Is such a qualitative evaluation of the pictures allowed?
- Inner quality: integration and balance between the life processes growth and differentiation, connected to analytical and holistic methods.
- Structure and light retention/emission.
- Self organisation: as a source for picture forming properties.

We have no precise idea what the added value in the quality of organic products is, why it should occur with organic production and processing methods and why it should be destroyed or diminished by conventional methods. Only our American and French colleagues have a clear language as they focus on pesticides residues in food and potential health risks thereof.

Conclusions for further discussions:

- Critical discussion is needed of the terms we use, their historical and philosophical background (context), their importance in the light of modern science and the steps needed to validate these concepts.
- Discussions of the different 'holistic' quality properties in the context of different farming and processing methods, in order to address key factors influencing them.
- State of the art of different alternative or holistic methods (reproducibility and robustness of methods, costs, validation). FQH should have a scientific opinion on the quality of the different methods and should not be open to scientific charlatany.

4. Impact of organic food on human or animal health status.

The underlying hypothesis behind the FQH network and behind part of quality research in organic farming is: **A diet with organic food is healthier for human beings (and animals) than the same diet in conventional quality.** This central hypothesis has never been tested nor proofed or rejected so far.

The reasons for that are manifold:

- Cost of a diet intervention study or a cohort study.
- Too many confounding (interdependent) factors (food quality/composition of diet/proportion of fresh, cooked or convenience food/different lifestyle factors/well being and intellectual status).
- A lack of clear biomarkers (physiological functions) to measure health effects.
- No economic importance so far.

As a model for human intervention studies, feeding studies with animals were chosen by several research groups. The most recent work was or is done with rats and is happening with chickens (see Charlotte Lauridsen et al. 2004¹ or Machteld Huber et al. 2005²). These animal models are very important in order to compare impacts of a diet with organic products with those of a diet with conventional products. It is also important to see which physiological, metabolic, immunological or allergic reactions appear and which organs are affected in the first order.

To such animal models, in depth studies with a variation of single factors such as pesticide residues, plant metabolites, macro nutrient concentrations etc. should ideally be added. Once these animal models are well investigated and their sensitiveness is well known, they can also be used to investigate correlations with the results of holistic methods.

On the basis of animal models, human intervention and human cohort studies can be designed.

Conclusions for further discussions:

- Older experiments with animal models (rabbits, rats etc.) should be analysed in order to have information about their reliability.
- Experiences from recent experiments with animal models (Alberta Velimirow, Charlotte Lauridson, Machteld Huber) must be exploited in depth. Problems like the supplementation of the different diets, the origin and the quality of the food, numbers of replications and the overall relationships between the nutritional quality and biomarkers of health should be discussed (see paper of Charlotte Lauridson).
- The factors measured for assessing the health status of animals should be discussed.
- Special problems of multi-generation experiments should be discussed.

¹ Lauridson, Ch., Jorgensen, H., Halekoh, U. and Christensen, L.P. (2004) Organic food and health – status and future perspectives. ISOFAR: Proceedings of the Conference “Researching Sustainable Systems”, Adelaide 2005, 184-187.

² Huber, M. and Adriaansen, R. (2005) Organic, More healthy? Research on biomarkers for potential health effects of organic food, investigated in a chicken model. Proceedings of the 1st scientific FQH conference, Frick, 2005. http://www.organicfqh.org/downloads/proceedings_1st_fqh_conference.pdf chicken), 81.

- Interactions between the quality of feed stuff and well-being of caged animals on health status should be discussed.
- Experiences from the German study with polyphenol contents and its in-vivo impact on human health should be discussed (as a model for single component analyses).
- Animal and human well being (intellectual performance) and/or consumption behaviour with natural vs. designed food should be assessed objectively.
- Experiences from human intervention and human cohort studies should be analysed in order to develop ideas for such studies with organic food and diets.

5. Further Thoughts from Kirsten Brandt

→ Why is it important if organic food is better for health than the same type of conventional food?

Answer a: If this is proven, then it will be easier to sell it (the market argument)

Answer b: If we know which factors are important to create this difference, then we can make targeted efforts to secure or improve this aspect further in the continued development of organic food production/processing. For example, if a "poison effect" of synthetic pesticides is the most important factor, then there is no reason to limit the trend of increasing the N-input from organic fertilisers, as long as someone invents other ways to protect the crop. But if the N-input is more important, then the strategy should be to limit the N-use, and then just enjoy the benefits of a low-N-fertilised crop being less attractive to the pests (probably the less profitable option).

Clearly, from a legislative point of view (health claims), a is not possible without b, since it can only be marketed as particularly good for health if it can be guaranteed that it is particularly good for health every time. In contrast, it can be marketed directly on production method claims (produced without synthetic pesticides), at least if this is a true claim (no copper salts).

→ Should we focus on each food item on its own (compare an organically grown potato with a conventionally grown potato) or on the entire diet (an organic diet should be expected to have more sugar and more fresh food, because of the absence of food items that can only be made using artificial sweeteners and preservatives)?

→ The best food and health scientist are still discussing if they have really proven many of the basic assumptions on food and health, for example: is nitrate good or bad, are antioxidants good or bad or have no impact, which types of fat are good or bad or have no impact, do we get too little or enough or too much of almost every vitamin and mineral etc. etc.

These questions are being tested more or less intensely using state of the art methods, and we still have very few definitive answers.

So the question is how much effort it is worthwhile to put into research objectives directly targeted the distant goal of health claims for organic food, when the presently existing methods are not recognised as being

sufficiently sensitive and accurate to show a difference that everyone agrees is real. This applies equally to mainstream methods and alternative methods!

One possible strategy would be to focus on participating and supporting more generic research to develop more sensitive and targeted ways to measure effects of food on health, and then come back to the issue of organic versus conventional food later, when the methods have been tested and validated and generally accepted as being able to distinguish real tangible health effects. This would include impacts on intellectual performance, resistance to diseases and many other health aspects, where we do not today have much evidence of a link with diet, simply because it has not been investigated.

→ A particular issue in this context which is relevant for the perception of organic food and health (although it does not directly change it), is the question of real and imagined food safety risks. At present organic farming profits from a very high awareness of the potential safety risks of pesticides, and it suffers from possibly inflated awareness of risks from natural bacterial communities in food as well as natural toxins.

Everything being equal, I think it would benefit organic food more than the conventional if the true risks became better understood, even though one of the likely outcomes is that in Europe pesticides in conventional food is not as big a problem as most people believe. The main arguments are that the serious damages to the environment and accidentally exposed people such as farm workers, which are unquestionable, will not be affected, while small scale producers will benefit from less strict regulations on microbes and natural toxins. I believe that the surveys showing that people only care about their own health would have got completely different results if the questions had been formulated differently.