

## Workshop on organic milk and meat quality funded by PNRF 20.11.2009

Havard Steinshamn was elected as the chairman. He decided to divide the discussion into five parts:

1. ideas for common proposals
2. resources of participants' research units
3. available funding
4. publications resulting from the workshop
5. general conclusions

### 1. Ideas

What are the quality parameters in organic farming and what should be the methodology? What is impact of the farming system on the end product? What is the mechanism by which the products of organic farming have different fatty acid or polyphenole content?  
**The relationship between organic management and product quality.**

What is the influence of plant metabolites and secondary plant compounds?  
The climatic and environmental conditions which differentiate the quality of produced feeds.

Inappropriate feeding may negatively impact the health of cows: bad management can result in mastitis. Natural feed, use of selected plants can increase disease resistance of animals. Animals can select plants to boost their immunity, a process facilitated through the application of diverse feeds and the promotion of plant biodiversity. For example buckweed, which is rich in polyphenols, intensified the transport of alpha-linoleic acid (ALA). Seaweed can also stimulate health. Echinacea extract can increase lactoferrin production (important for mastitis prevention and treatment). Additionally, in vitro experiments indicate that daisies can reduce methane excretion. The question is what strategy to choose: **more diverse feed or to feed specific plants?**

Another issue is the quality of protein feeds. Only 2% of soya feeds are produced in Europe. We do not know the content of genetically modified organisms in such feeds, and the problems of controlling them. Production strategies for protein rich plants should be developed. Rapeseed, linseed and legumes may replace soya.

Improper nitrogen and phosphorus cycling is partly due to unbalanced feeding ratios. This problem should be solved immediately because of EU regulations. Methane emission can be measured under different feeding regimes. **Methane gas emission reduction for organic farms in climate protection.**

The economics of organic pig production: how to reduce costs and improve the taste of meat (quality and sensory traits) and consumer perception of organic pork?

The ban on the castration of male pigs: what about the taste of boar meat? What strategies should be applied to reduce the smell of hormones? How does slaughtering at a younger age impact profits?

How to create strategy of organic milk and meat production? How to profitably manage a farm under organic rules? The economics of organic milk and meat production: tools to link scientific knowledge with marketing issues. Cost-benefit analysis.

The socio-economic aspects of organic farming, landscape improvement and conservation (i.e. with sheep).

## **2. Experimental facilities**

**BIOFORSK, Norway:** field experiments; buy facilities on Norwegian University of Life Sciences, analytics at Aarhus University, Folum Denmark, crops (agronomy) and environment, no animals.

**Institute of Genetics and Animal Breeding, Polish Academy of Sciences, Poland:** no organic research unit, but plans to convert a farm owned by the Polish Academy of Sciences to organic (now it is rather extensively managed), two old native breeds (Polish red and lowland black and white, can be used as dual-purpose), high biodiversity agricultural land and forests, good analytical facilities, milk and meat quality laboratories, feeds laboratory, control feeding for cattle, dairy cattle herd (200 units), goats, sheep, rabbits, laying hens (none of the animals are under organic rules). Molecular biology laboratory, gene polymorphism, expression.

**Institute of Economy of Agricultural and Food Economics, Warsaw, Poland:** cost of production, database, European methodology FADN, Agrocost system, comparison of the profitability of different kinds of production.

**Institute of Organic Farming Trenthorst Germany:** dairy cows (hf and german red and white), dairy goats, pigs, piglets (in two year fattening), feeding trials, weighing, udder health and milk quality in goats, behaviour, laboratory-basic analysis, PCR, NIR.

**Agricultural Research and Education Centre, Raumberg-Gumpenstein, Austria:** Two farms. Organic: 30 cows, 100 pigs, organic grassland management. Conventional: cows, goats, 20 beef cattle. Analytical laboratory: feeds analysis, fatty acids in meat, standard meat quality.

**Laboratory for Animal Nutrition and Animal Product Quality, University of Ghent, Belgium:** models for in vitro fermentation, in vitro digestion system for monogastrics, feed analysis, metabolites, methane measurements, fatty acids, vitamins, gut health and microbiology, quite well equipped laboratory, metabolic experiments, in vitro experiments, co-operation with Institute of Sustainable Management Systems, Fermentation and lipolysis.

**Institute of Animal Science, Department of Agricultural and Food Sciences, Science and Technology University ETH, Zurich, Switzerland:** two different in vitro systems, analysis on gas and HPLC (liquid) chromatography, research farm with 70 dairy cows and 35 sucklers. Three different levels of altitude, various types of pastures. Metabolic, feeding, respiration trials.

**Animal and Aquacultural Sciences, Norwegian University of Life Sciences, As, Norway:** plan to convert farm to organic, cows, pigs, chicken, goats, trained staff. Metabolic stall, experiments with methane emission. Buy analytics from other departments. Goats and cows milk quality, molecular biology. Good contact with dairy

industry. Milk quality, from calf to milking cow, healthy milk cows with economic benefits.

**Institute of Animal Science, Prague, Czech Republic:** conventional farm with 300 cows, laboratories, cattle fattening, control gates, feeding stations, feeding trails for dairy cows, 25 beef cattle cows on pasture. Metabolic tests with castrated animals. Slaughter house. Various laboratories: gas chromatography for fatty acids, meat features, physical properties, sensory analysis. Molecular biology laboratory but do not have microarrays. Facility for trials with extensively managed suckling cows.

### 3. Funding

- EU Frameworks
- CORE Organic
- Norwegian Research Fund
- Marie Curie Fund

### 4. Dissemination

- ✓ minutes and presentations will be published on the IGAB website, lecturers agreed to publish them
- ✓ willingness to cooperate on specified fields will be indicated
- ✓ publications will be published in the IGAB journal *Animal Science Papers and Reports* with statement “Presented at a workshop organized thanks to PNRF funding” at the end of each paper.

### 5. Summary and conclusions

Focusing on one aspect is not wise; product quality is being monitored in many projects now. At first, product quality indicators should be specified. Second, animal species should be chosen.

One idea is to examine the influence of different diets (diverse plants, specific plants) on animal health, how the plants metabolism, plant metabolites, ratio composition can influence animal health status, **feed for health**.

Climate protection can be another call from CORE Organic, so **feeding strategies for organic farming to reduce gasses emission** were seen as a good idea.

Another concern indicated was that of methane emission in “suckling beef” production.

**Milk and meat quality from different points of view: botanic diversity of feeds, animal health, high quality feeds. Improving the profitability of organic farming by increasing the diversity of the human diet and the end value of organic products.**

**Protein quality:** from feed to product, protein sources.

Different conditions in different countries: a **comparison of managements**.

- ✓ participants should stay in contact and communicate with each other about possibilities, research ideas, funding, calls for proposals.

## **6. Other**

- ✓ Letter of intent for cooperation will be formed by Tomasz Sakowski, then sent to Havard Steinshamn, to be signed by directors of research units in the future.
- ✓ The potential for exchange of PhD students and young scientists was discussed, allowing them to attend courses and gain laboratory experience, funding is available from Marie Curie Scholarship.
- ✓ Ludek Barton invited participants to visit his institute.