Organic Milk of High Quality

– based on dairy cows fed with large quantities of grass and gentle treatment and handling of the milk

The objective of the project is to create a background for the production of organic high quality milk and highly processed organic dairy products with a well-described history and a composition that differs from conventionally produced milk. There will also be focus on the fact that the organic milk is gently treated during the whole process from milking to the subsequent processing.

The results will demonstrate how different types of pasture affect quality of milk and how treatment of organic milk influence functionality and flavour of milk and dairy products.
Development of new types of milk

Development of new milk types takes place on the basis of special producers of milk with use of large quantities of legumes and herbs in the feeding ration to examine the transfer of precursors for aroma components or direct transfer of flavour components. Moreover, farm studies will be carried out on the use of a balanced ratios of legumes and minimum quantities of maize-based products in the feeding ration for hereby to develop a feeding concept to enable the organic milk producer to produce milk with a composition, nutritional properties and flavour that differ from conventionally produced milk. Development of this product will take place considering the productivity, animal welfare and economy in the production. It will also be examined whether the cows have preferences as regards the choice of different legumes and herbs.

The research effort in the project will be holistic and based on
1. use of large quantities of grazing/grass-field products in the feeding of the milking cow,
2. use of a gentle handling and pumping of the milk in connection with milking, and
3. introduction of novel gentle pasteurisation technologies which can retain the original properties of the milk.

The specific Ormilkqual-objectives are:

To establish a basic understanding of

i) how feeding with high levels of grass and legumes influence the overall quality of organic milk and dairy products and document how a sustainable, intensive and economic sound dairy production can be obtained together with a high quality organic milk with a composition and flavour different from conventionally produced milk,

ii) milking strategies for sustainable milk production based on feeding with high levels of grass and legumes,

iii) how novel and gentle pasteurisation processes can improve flavour of milk, retain the native enzymes and milk proteins. Also how it can improve the functionality of the milk for processing, and hereby exploit the necessary knowledge to set up different production concepts covering the chain from production of pasture to consumer perception and willingness to pay for high quality products. This can ensure production of economical sustainable organic milk and dairy products of differentiated and high quality.

Milk-handling

A main cause to quality deterioration of organic milk is the pumping which takes place on the farm in connection to milking which causes a destruction of the milk fat globules. This results in an increased level of free fatty acids in the milk. In organic unhomogenised milk products deterioration of the milk fat globules will give an increased risk for formation of creaming in the products during storage. Examination of the formation of creaming will take place...
in relation to denaturation of the agglutinins of the milk which may prevent aggregation of fat in the milk carton.

The introduction of AMS (automatic milking systems) has caused huge quality deteriorations in relation to increased lipolysis and destruction of the milk fat globules and if you only use milk from AMS-systems it is expected that one would be able to taste that this milk is rancid. At the same time mobile AMS systems are one of the future milking technologies, which can secure grazing in large herds.

New gentle pasteurisation methods

One of the treatments, which influence the milk attributes is the pasteurisation. New methods for pasteurisation of milk have been developed. These are based on a quick heating of the milk to very high temperatures but for a very short time (infusion pasteurisation). Studies have shown, that this method is more gentle to the milk than traditional low pasteurising, as only a moderate denaturation of the milk proteins takes place, but that the method at the same time has a high killing effect on bacteria and spores. Most important is that studies have shown that this type of pasteurisation may secure a milk production with a freshness that is superior to conventional low-pasteurised milk. The effort aims at establishment of a gentle pasteurisation of organic milk in consideration of flavour and shelf-life, but also to examine how these new methods influence the functional properties in relation to processing.

Knowledge obtained by this project will be disseminated nationally and internationally and will form the basis for recommendations for both the primary production and the processing industry.

In the programme there will be focus on grazing of different types of pasture with grass and legumes including pasture with high content of:

- White clover
- Red clover
- Lucerne
- And white clover with herbs like chicory

Milk quality will be evaluated both for Holstein Friesian cows as well as Jersey cows.

The results will demonstrate how different types of pasture affect quality of milk and how treatment of organic milk influence functionality and flavour of milk and dairy products.
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Publications


Links

Project homepage: www.ormilkqual.elr.dk/uk

About ICROFS

The International Centre for Research in Organic Food Systems (ICROFS) is a “centre without walls” where the research is performed in interdisciplinary collaboration between research groups in different institutions. The centre is an expansion of the former research centre DARCOF, which the Danish Government in 2008 decided to give an international mandate and an international board.

The main purpose of ICROFS is to coordinate and monitor international research in organic food and farming systems in order to achieve optimum benefit from the allocated resources. Further, the aim of ICROFS is to initiate research and create impact of the research results through support and dissemination of high quality research of international standard.

More information at www.icrofs.org