

# The fatty acid profile of the milk is measured on all cows in Denmark

Analysis of milk samples shows a large genetic variation, which opens up the possibility to change the fatty acid profile of the cow by genetic selection.

2017.01.13 | ALBERT BUITENHUIS, MORTEN KARGO AND ARNE MUNK



The GUDP financed project SOBcows has in collaboration with RYK (Registration and Milk recording) collected a detailed fatty acid profile on all the cows, which are in the Danish milk recording system. In the past 16 months during 2015 and 2016, we have collected approximately 3.5 million milk samples.

The samples were analyzed with the Foss application note 64, which registers 11 fatty acids or fatty acid groups. It is the first time that the milk fat from so many cows is registered in such detail. The data can be used to exploit the possibilities for genetic selection and feeding strategies to change the fatty acid profile in the milk into a desired direction.

The initial genetic analysis showed that the heritability across the lactation was between 0.25 and 0.44 depending on the breed and parity of the cow. During the lactation, the cow mobilizes fat especially in the first part of the lactation to fulfill the energy requirement to produce milk. This was reflected in the change of the genetic variation over the lactation. This implies that if you would like to change the fatty acid profile of the cows by genetic selection you need to divide lactation in at least two periods.

Additionally, the collected data showed that the feeding regime of cows had significant influence. Milk from organic farms shows a much larger variation in saturated fatty acids over the year compared to conventional farms. Especially when cows are going outside on fresh grass, the favorable unsaturated fatty acids increase, while the unfavorable fatty acid, like C16:0 decreases.

At the moment there is still an ongoing discussion on the effects of the different fatty acids on human health. With today's knowledge, one would like to have fat with a reduced saturated fatty acid content and increased unsaturated fatty acid content. However, it is more complicated because the chain length of the (unsaturated) fatty acids also has an influence on human health, where the short chain fatty acids lean towards a positive to neutral effect, the middle chain fatty acids, especially C16:0 lean towards the negative side. With regard to human nutrition it is most likely that changes in the fat composition would benefit those products with high fat content, like butter and cheese. As an example, on the English market a special milk with lower saturated fat content than the regular milk is sold.

In conclusion we showed that when there is a Danish market for milk products with special fatty acid profiles we will be able to change the milk fatty acid profile, both by genetics and feeding into the desired direction.

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## About SOBcows

*The project SOBcows is part of the Organic RDD 2 program, coordinated by ICROFS (International Centre for Research in Organic Food Systems). It has received grants from the Green Development and Demonstration Programme (GUDP) under the Environment and Food Ministry.*

## Visit the project website

Agriculture and food

Tags: SOBcows, fatty acid, milk samples

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REVISED 17.01.2017