

Project title

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Timescale: February 2003 – June 2008
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Background

Future regulations for organic production of milk stipulate that all feed must be organically produced, and that the cow can only be fed natural vitamins and antioxidants. This leads to feeding changes of such importance that it must be presumed to influence the antioxidative capacity and thus the shelf life of the milk. The project aims at elucidating the nature of the consequences that these new regulations will have on the antioxidative capacity of the milk. New studies show that uric acid in milk is an important antioxidant of significance for the oxidative stability of milk. During the project, it is the aim to increase the supply of selenium and the development of endogenous antioxidants (uric acid and glutathione peroxidase) in order to produce oxidatively stable milk and dairy products.

Objective

To elucidate the effect of introducing new rules for organic feeding and use of natural vitamins and antioxidants on the antioxidative capacity of the milk from cows producing milk under organic conditions. Furthermore to increase the selenium supply and the formation of endogenous antioxidants (uric acid and glutathione peroxidase) of the cow in order to produce oxidatively stable milk and dairy products.

Progress – 2006

Tina Slots are on maternity leave from 21st of March 2006 and until 26th of February 2007.

Survey of composition of conventional and organic milk (Continued)

Data has been evaluated at the Journal, and is about to be published in the near future.

Survey of milk composition in relation shelf life in Danish milk (Continued)

Data has been treated and is going to be published in the near future.

Plans - 2007

Oxidation in milk with supplement of natural α -tocopherol to the feed (Continued)

The data is going to be further treated and then published in the near future.

Survey of composition of conventional and organic milk (Continued)

Data is about to be published in the near future.

Survey of milk composition in relation shelf life in Danish milk (Continued)

Data is going to be published in the near future.

Metal catalysed- and photooxidation in milk (Continued)

There is need for more research on this area, and this will be done as a part of the model experiment described below.

Model experiment with vitamin E incorporated into the fat globule membrane of milk

There is a need for understanding the mechanism of α -tocopherol's antioxidative effect in the milk, and therefore a model of the milk fat globule with α -tocopherol incorporated, will be created. The model system will be exposed to different stress factors such as for example light or copper and the degradation of α -tocopherol will be followed by LC/MS or other relevant analyses.

Publications

Lund-Nielsen, Tina; Mejer, Helena; Gunnarsson, Carina; Hansen, Preben Klarskov and Grigalaviciene, Ilona (2003) [How is ideologies related to actions?](#). Report, Unit for Learning and Interdisciplinary Methods, Royal Veterinary and Agricultural University.

Lund-Nielsen, Tina; Nielsen, Jacob H.; Skibsted, Leif and Nielsen, Ivan (2004) [The effect of \$\alpha\$ -tocopherol supplementation to the feed of dairy cows on the oxidative stability of milk.](#) *International Dairy Journal*.*

Nielsen, Jacob Holm; Lund-Nielsen, Tina and Skibsted, Leif [Higher antioxidant content in organic milk than in conventional milk due to feeding strategy](#). Online at <http://www.darcof.dk/enews/sep04/milk.html>. Newsletter *

Østdal, Henrik; Weisbjerg, Martin; Skibsted, Leif and Nielsen, Jacob H. (2004) [Antioxidative capacity of milk with a high urate content](#). Working Paper.*

Slots, Tina; Leifert, Carlo; Butler, Gillian; Kristensen, Troels and Nielsen, Jacob Holm (2006) [Effect of dairy management on quality characteristics of milk](#). Paper presented at Joint Organic Congress, Odense, Denmark, May 30-31, 2006..

Stagsted, J. (2005) [Absence of both glutathione peroxidase activity and glutathione in bovine milk.](#) *International Dairy Journal*.*

Stagsted, Jan and Nielsen, Jacob H. (2004) [Purification of glutathione-binding proteins from bovine milk and identification of glutathione S-transferase](#). [preprint]*