

## Progres report

### The biological activity of phytoestrogens in organic and conventional milk

Name: Tina Skau Nielsen  
University: Faculty of LIFE Sciences, University of Copenhagen  
Department: Veterinary Pathobiology  
Supervisor: Nils Brüner (Dept. of Veterinay Pathology; Stig Purup, Faculty of Agricultural Sciences, Aarhus University  
Timescale: April 2006-March 2009  
E-mail/phone: [TinaS.Nielsen@agrsci.dk](mailto:TinaS.Nielsen@agrsci.dk) / 89991305  
Master's degree: Animal Science, December 2004  
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#### Background

Epidemiological studies and studies with animals and *in vitro* cell based model systems have shown that phytoestrogens (plant derived substances that mimic or modulate the actions of endogenous estrogens) possess potent and wide-ranging biological activities, and may improve human health by protecting against certain types of cancer, cardiovascular disease and osteoporosis, as well as hormone dependent conditions like menopausal symptoms.

Phytoestrogens are present in high concentrations in leguminous plants such as clover, lupine, horse beans and peas but also in soy products, which are widely used as feedstuffs for cows. Therefore these plants are potential sources of phytoestrogens in milk and in humans as consumers of milk and milk products. Results from a pilot study confirmed that both organic and conventional milk contained different phytoestrogens, and some in concentrations which are shown to be biological active when tested in different model systems. However, the concentrations of phytoestrogens in milk varied considerably between farms, and the variation is mainly believed to be associated with differences in composition and content of leguminous plants in the feed ration. However, the biological effects (e.g. the estrogenic potential) of phytoestrogens in cow's milk in relation to for example breast cancer are not known.

#### Objective

The objective is to gain knowledge on how composition of the feed ration and especially content of different legumes affect the content of specific phytoestrogens in milk, and to elucidate the biological activity of these compounds in milk by the use of *in vivo* and *in vitro* model systems.

## Progress – 2007

- Milk samples obtained from the FØJO III project ORMILKQUAL have been analyzed for phytoestrogens, an article on these results is in preparation.
- Experiment in a uterotrophic assay with 80 immature mice conducted at KU-LIFE, supplemented with *in vitro* studies of phytoestrogen extracts of milk samples – article in preparation
- Participation in SOAR Spring seminar and organizing of the SOAR autumn seminar in Foulum
- Ph.d. course in “Multivariate Analysis, level 1”
- Ph.d. course in “Food, Medicine and Philosophy”, KU-LIFE/Hong Kong/China
- Course in Presentation Techniques, The Research School FOOD

## Plans – 2008

- A stay in Leena Hilakivi-Clarkes laboratory at the Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington D.C. is planned from mid January to mid May 2008.
- Additional ph.d. course at Georgetown University
- Preparation of an article based on the work in Leena Hilakivi-Clarkes lab.
- Analysing data on milk phytoestrogen content linked to feed ration composition

## Publications

The publications should be copied from Organic Eprints. *A list of SOAR publications is available on the web-site <http://www.okoforsk.dk/funktion/udd/phd/index.html> under "Publikationer" under the individual PhD projects. From this list you select and copy your own publications. (NB: Your publications will only be on the list if you have uploaded them on Organic Eprints).*