Vitamin D Status and Supply in Organic Dairy Cows

Name:	Lone Hymøller
University:	University of Copenhagen, The Faculty of Life Sciences (LIFE) / University of Aarhus, The Faculty of Agricultural Sciences (AGRI)
Department:	Department of Basic Animal and Veterinary Sciences - Veterinary Physiology and Biochemistry (LIFE) / Depertment of Animal Health, Welfare and Nutrition (AGRI)
Supervisor:	Associate professor, Mette Olaf Nielsen (LIFE)
Co supervisor:	Senior scientist, Søren Krogh Jensen (AGRI)
Timescale:	01-04-2006 – 31-03-2009
E-mail/phone:	Lone.Hymoller@agrsci.dk / Tel.: +45 89 99 13 94
Master's degree:	M.Sc. Agricultural Science - Animal Science

Background

The main difficulty in handling vitamin D supply, compared to the supply of the other fat-soluble vitamins, is that there are two sources of vitamin D: vitamin D supplied in the feed and vitamin D endogenously produced in the skin of animals facilitated by irradiation by sunlight. The two sources supplement, but can also substitute, each other, which means that the need for supplemental vitamin D in the feed is low when production in the skin is high and vice versa (Harper, 1975). This supplementary action makes it difficult to get an overview of the actual need for providing vitamin D in the feed for dairy cows. The vitamin D status of dairy cows, as measured by vitamin D content in the produced milk, correlates closely with the amount of sunlight the cows are exposed to (Kurmann & Indyk, 1994) and even in Nordic countries it is likely that grassing animals will have their needs for vitamin D covered through their own production during exposure to summer sunshine (Hidirouglou et al. 1979). However, insecurity about the need for supplemental vitamin D during winter in Nordic countries still exists, since very little is known about the actual contents of vitamin D in plant material stored for winter use as feed, and cows ability to build up storages of vitamin D in liver and adipose tissue during exposure to sunlight.

References

Harper, H.A. (1975): *Review of physiological chemistry.* 15th edition. Lange Medical Publications, Los Altos, California. 570 pp

Hidiroglou, M.; Proulx, J.G. & Roubos, D. (1979): 25-hydroxyvitamin D in plasma of cattle. *Journal of Dairy Science,* 62: pp. 1076-1080

Kurmann, A. & Indyk, H. (1994): The endogenous vitamin D content of bovine milk: influence of season. *Food Chemistry*, 50: pp. 75-81

Objective

The objective of this Ph.D. project is to provide knowledge, which can form the basis for recommendations regarding vitamin D needs in ruminants under different production conditions.

Progress – 2007

- Blood samples analysed from an experiment where dairy cows were fed with or without artificial vitamin D provided in their feed during winter
- Co-supervision of three M.Sc. students during their master theseses in animal science

- Ph.D. course in Laboratory Animal Science at The Royal Veterinary and Agricultural University, Department of Veterinary Pathobiology (9 ECTS)
- Ph.D. course in statistics, Mixed Models for Agricultural Sciences using SAS®, The University of Aarhus, Depertment of Statistics and Decision Analysis (9 ECTS)
- Participastion in SOAR seminars

Plans – 2008

- Publish results from experiment with /without artificial vitamin D in winter feed for dairy cows
- Analyse blood samples and samples of rumen content and feed from experiment with the metabolism of vitamin D2 and D3 in dairy cows
- Publish results from experiment with vitamin D2 and D3 for dairy cows
- Participation in SOAR seminars
- Participation in SOAR summerschool 2008