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Variation of fatty acid content in grass and milk during the grazing season

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Session 3.1 Forage conservation, feeding value and product quality

ALP is part of the ALP-Haras Unit



Introduction

The fatty acid composition depends on different factors such as plant species, development stage, temperature, and light intensity.

Grassland-based milk production systems do have positive impacts on the quality of milk and dairy products.

There is a market potential of the dairy products derived from pasture-based milk production systems.





Objective of this study

Comparison of feed and milk fatty acid profiles of cows over the grazing season in two different years.



Materials and methods

Full time grazing in a rotational system on a mixed sward 78% grasses (mainly ryegrass), 13% clover and 9% other herbs. In spring and autumn, supplementation in-barn with conserved forage. Fatty acid composition in the grass was analysed.

2005: 16 dairy cows

Two groups: Different concentrate supplements (corn-barley or beet pulp). At the end of the season, 7 of the 16 cows replaced by cows at the beginning of lactation.

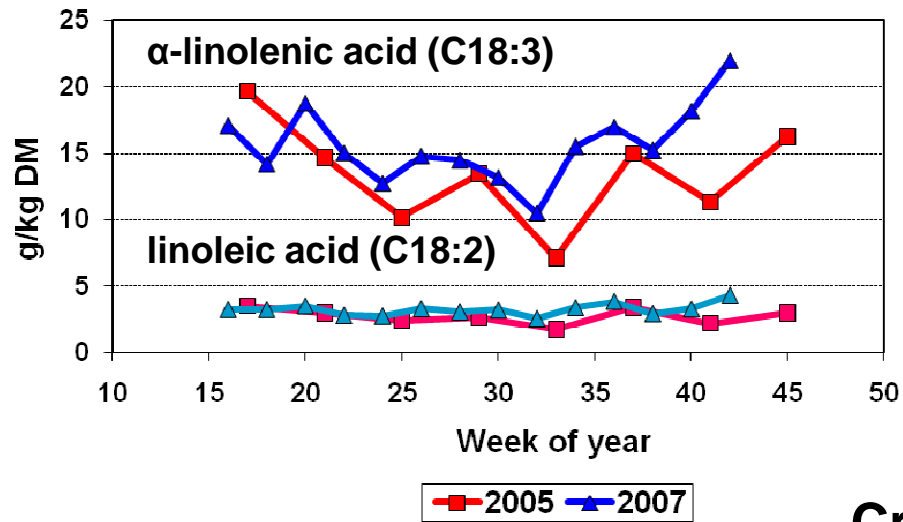
2007: 20 dairy cows

Two groups: One group concentrate (corn-barley) according to their actual milk production as in 2005. Other group the same concentrate but at a fixed amount of 3.5 kg per day during the first 150 days of lactation.

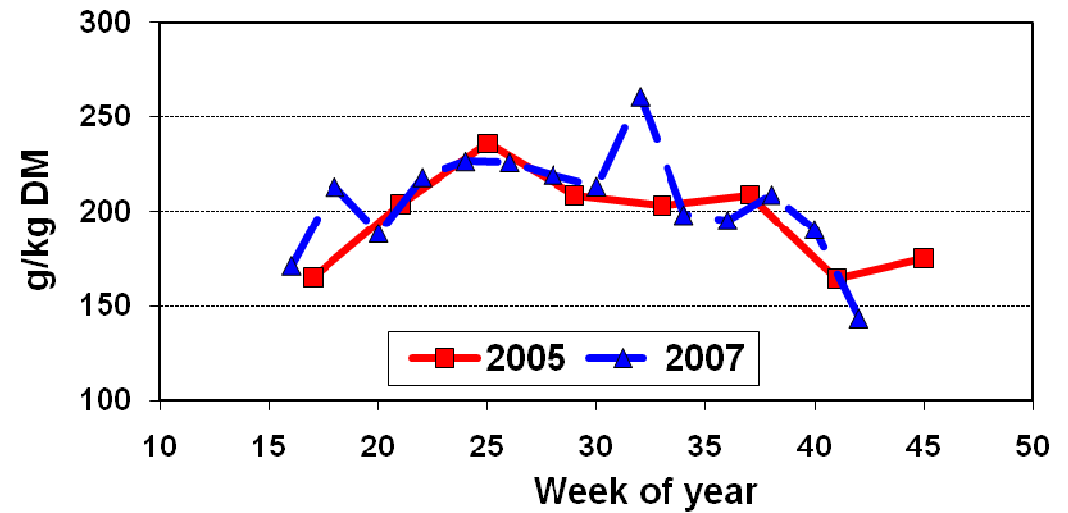
Every month, a milk sample of every cow was taken and the fatty acid composition in the milk fat was analysed.



Fatty acid concentrations of grass

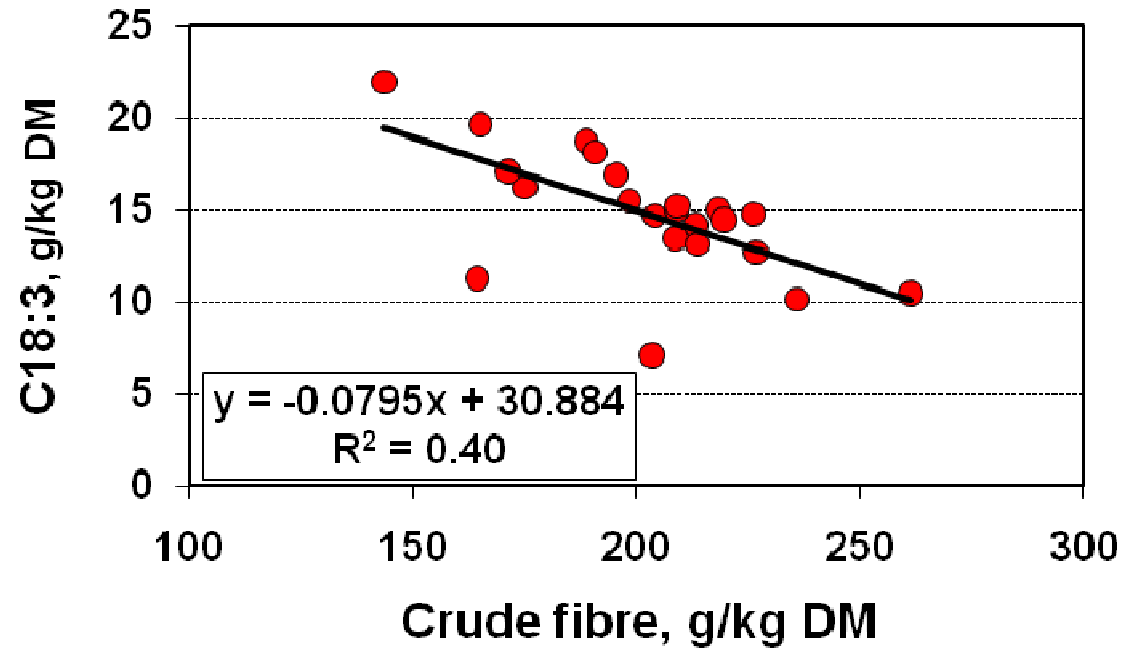


Crude fibre content





Relation between α -linolenic acid and crude fibre content



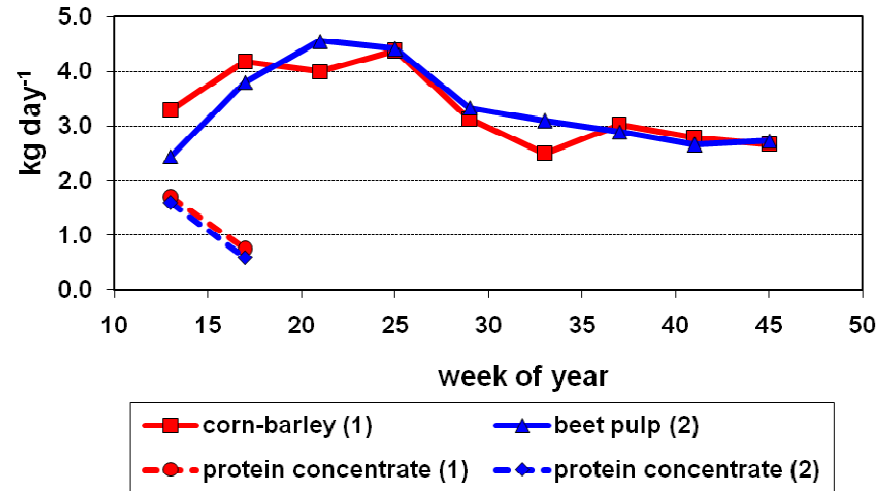
correlations

	C16:0	C18:0	C18:1	C18:2	C18:3
crude fibre	-0.49	-0.05	-0.10	-0.43	-0.63

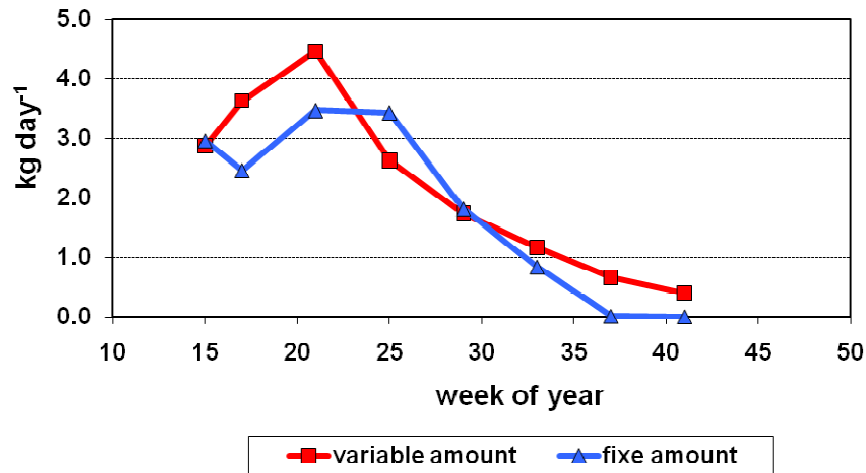


Concentrate

Trial 2005

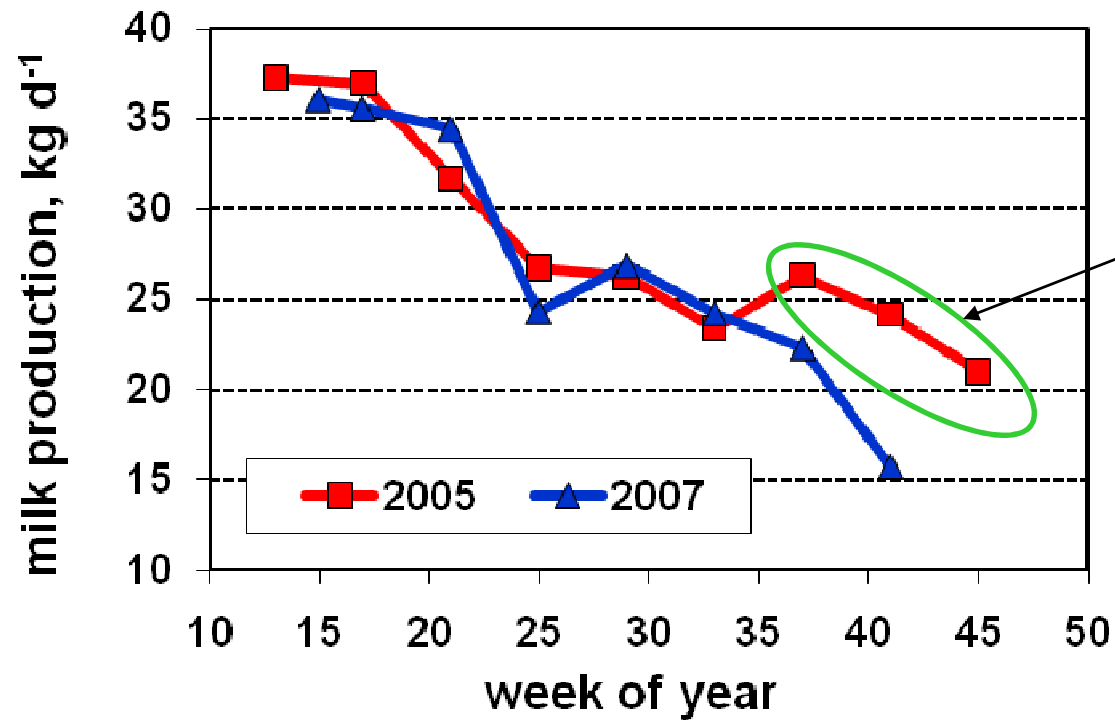


Trial 2007





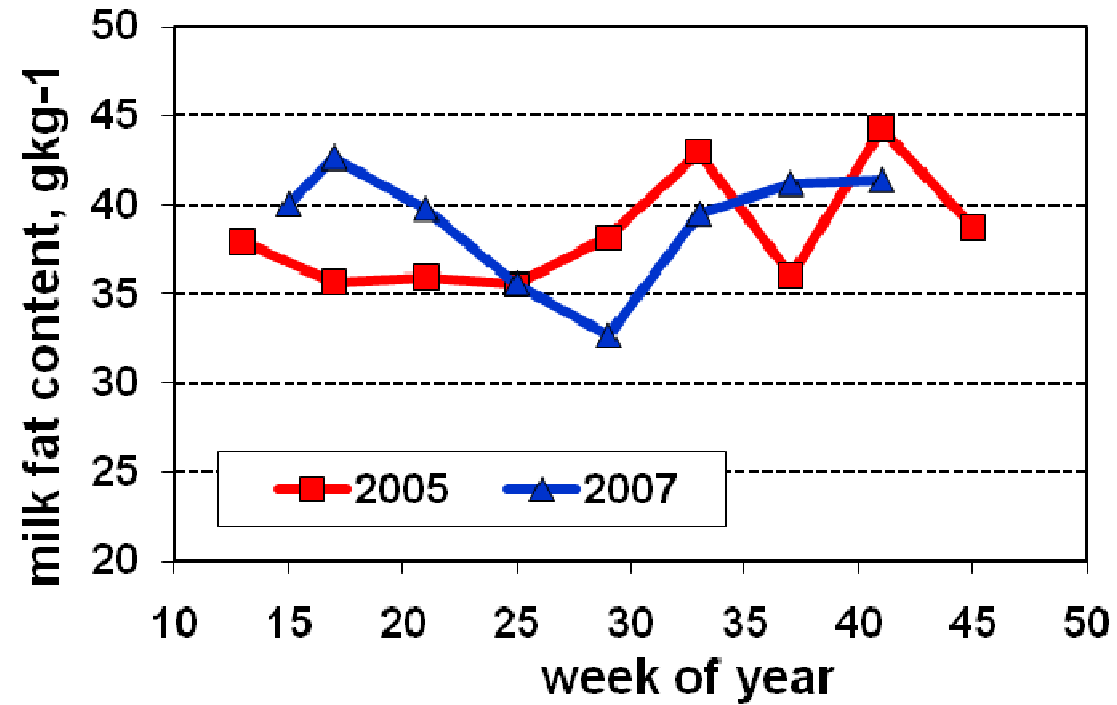
Milk production



Average:
2005: 28.2 kg day⁻¹
2007: 27.4 kg day⁻¹



Milk fat content



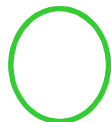
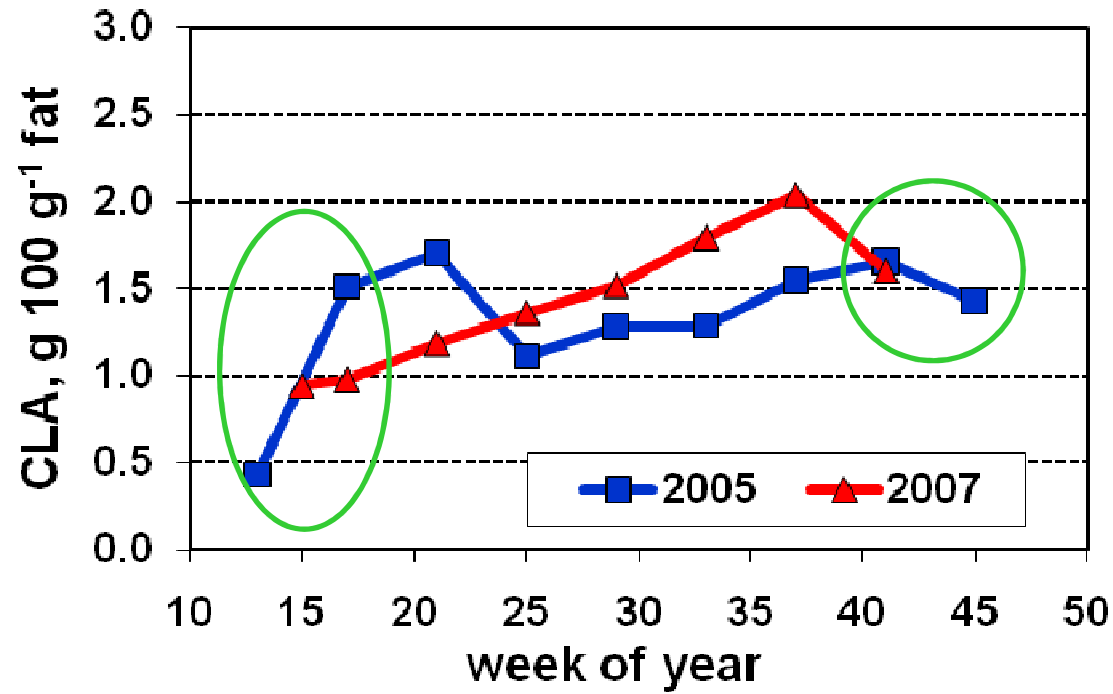
Average:

2005: 38 g kg⁻¹

2007: 39 g kg⁻¹



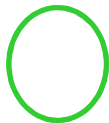
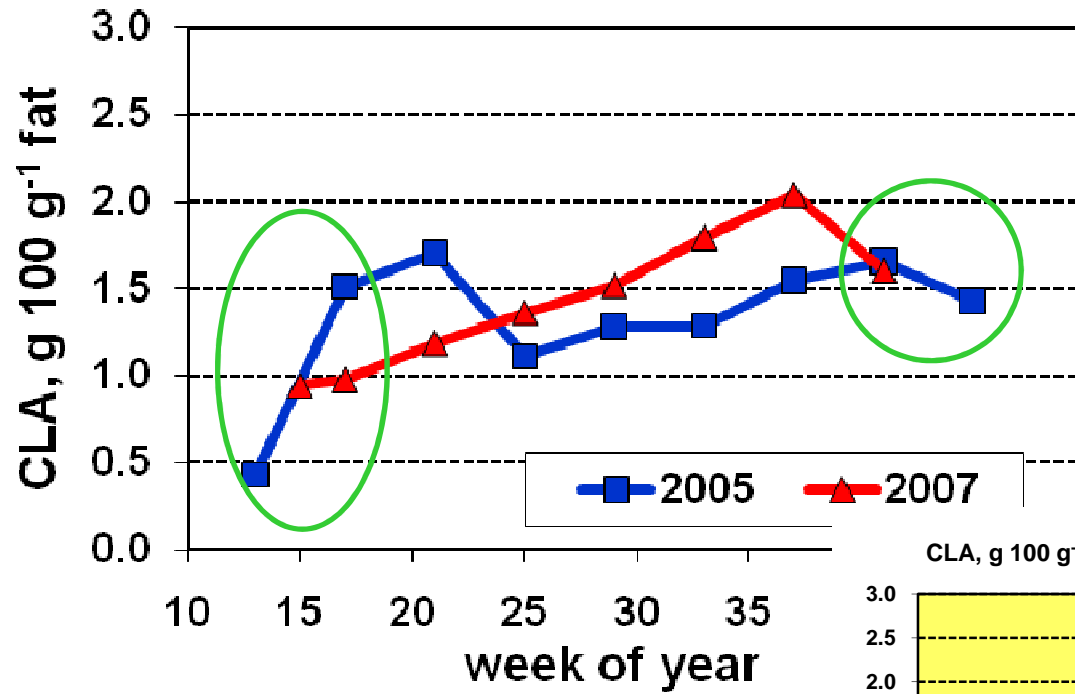
Fatty acids in the milk



Additional feeding of conserved forage

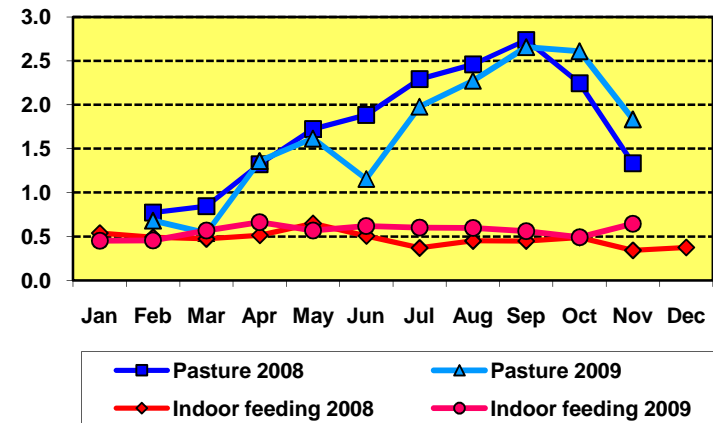


Fatty acids in the milk



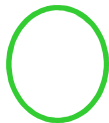
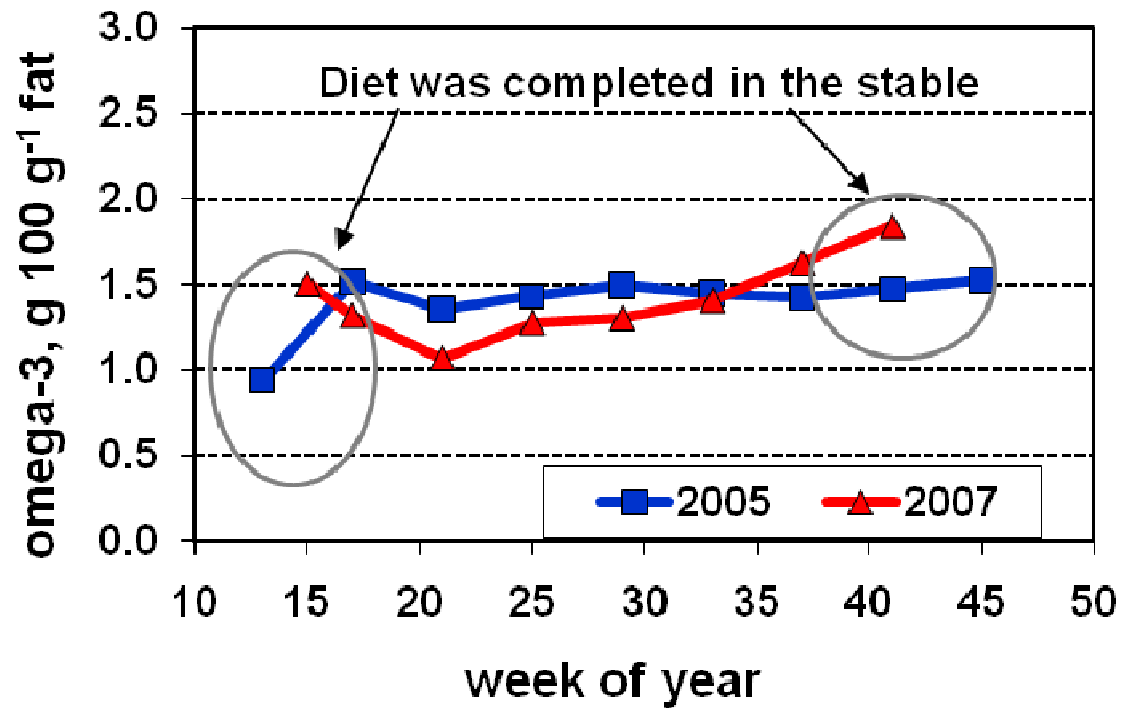
Additional feeding of conserved forage

CLA, g 100 g⁻¹ fat





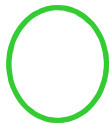
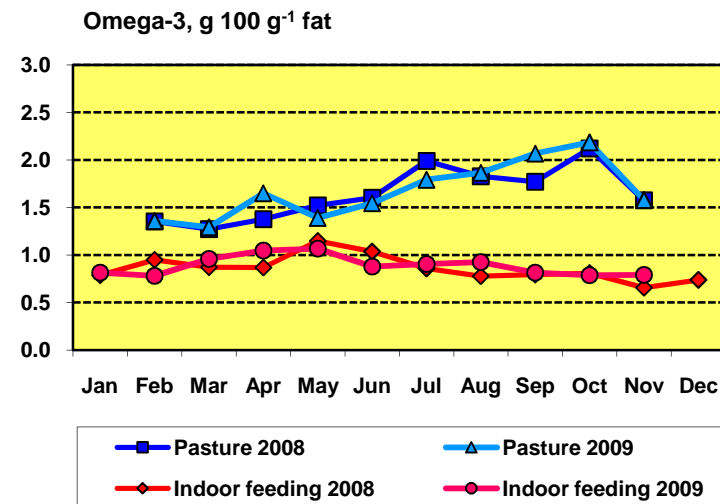
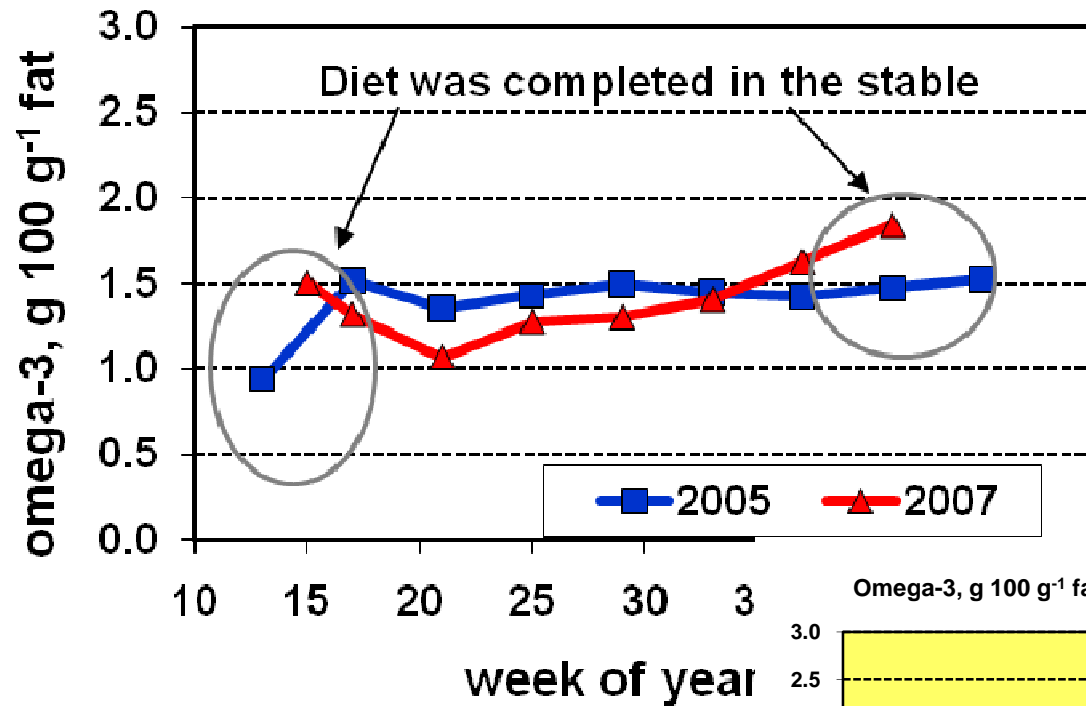
Fatty acids in the milk



Additional feeding of conserved forage



Fatty acids in the milk



Additional feeding of conserved forage



Conclusions

- **The fatty acid concentration in grass, especially the α -linolenic acid, varies during the grazing season. In young grass (lower crude fibre content), the fatty acid content is higher in comparison to older grass.**
- **Milk from the pasture has high amounts of CLA and Omega-3 fatty acids.**
- **CLA and partly omega-3 fatty acids vary during the grazing season. This can be partly explained by the variations of the fatty acid contents of the forage.**



Thank you for your attention