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Agroscope Liebefeld-Posieux Research Station ALP

# 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.

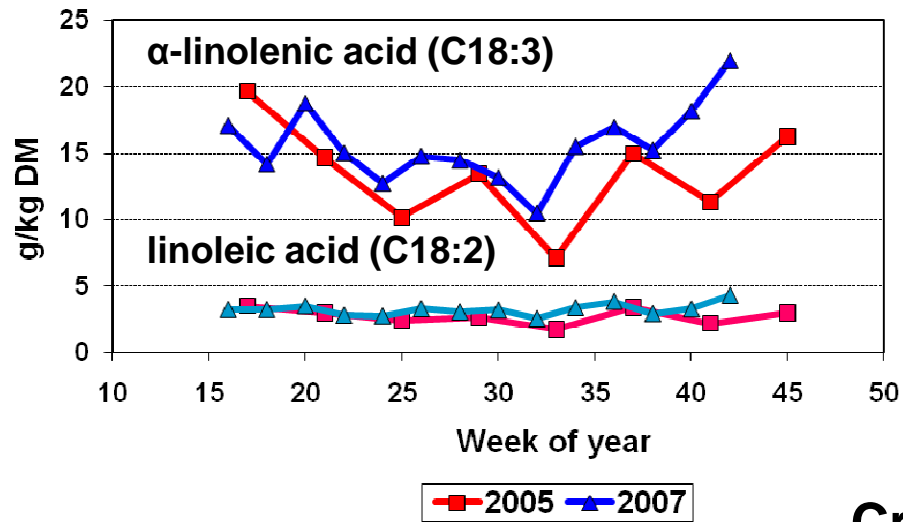
## **2007: 20 dairy cows**

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.

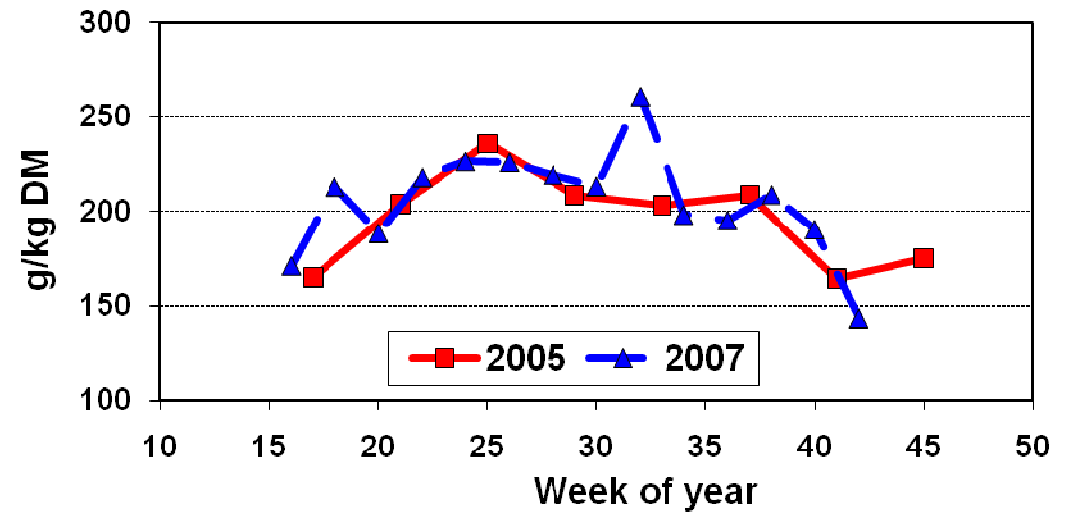
Every month, a milk sample of every cow was taken and the fatty acid composition in the milk fat was analysed.



## Fatty acid concentrations of grass

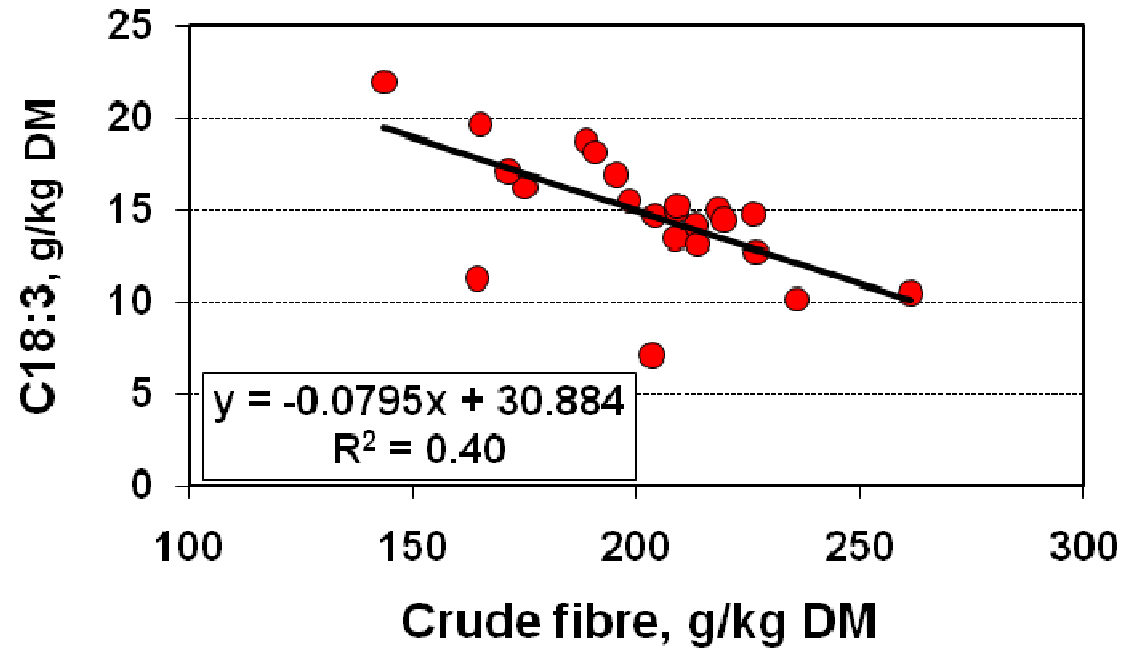


## Crude fibre content





## Relation between $\alpha$ -linolenic acid and crude fibre content



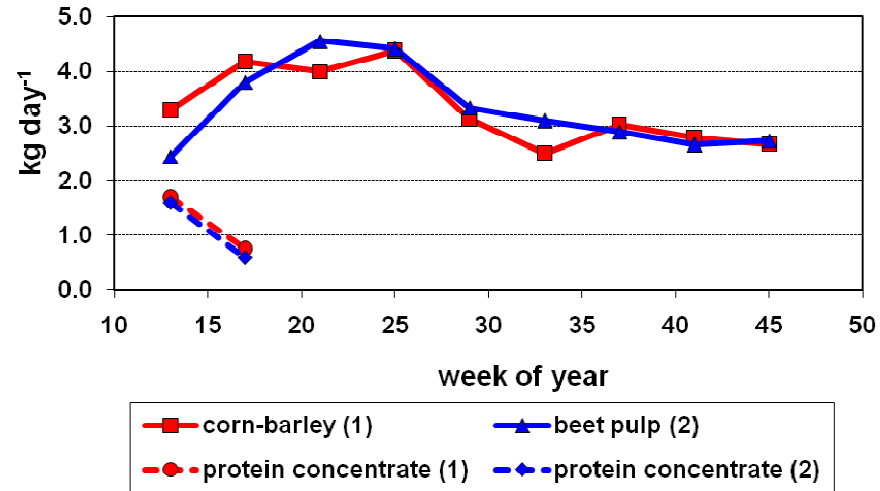
### correlations

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

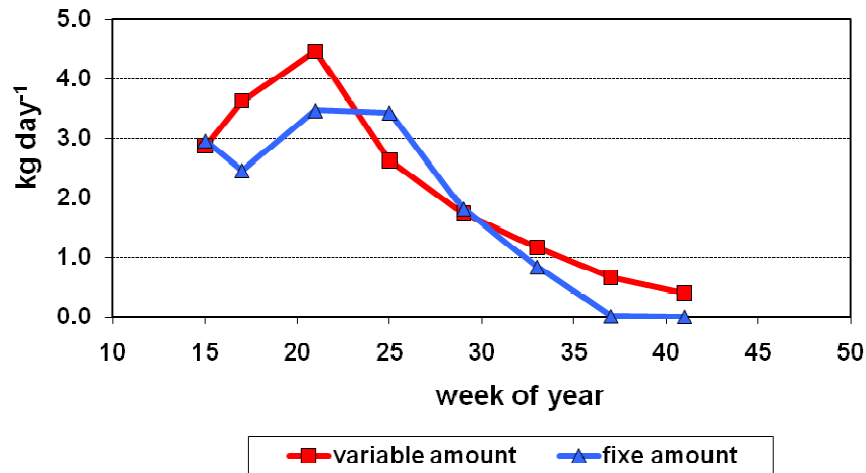


# Concentrate

## Trial 2005

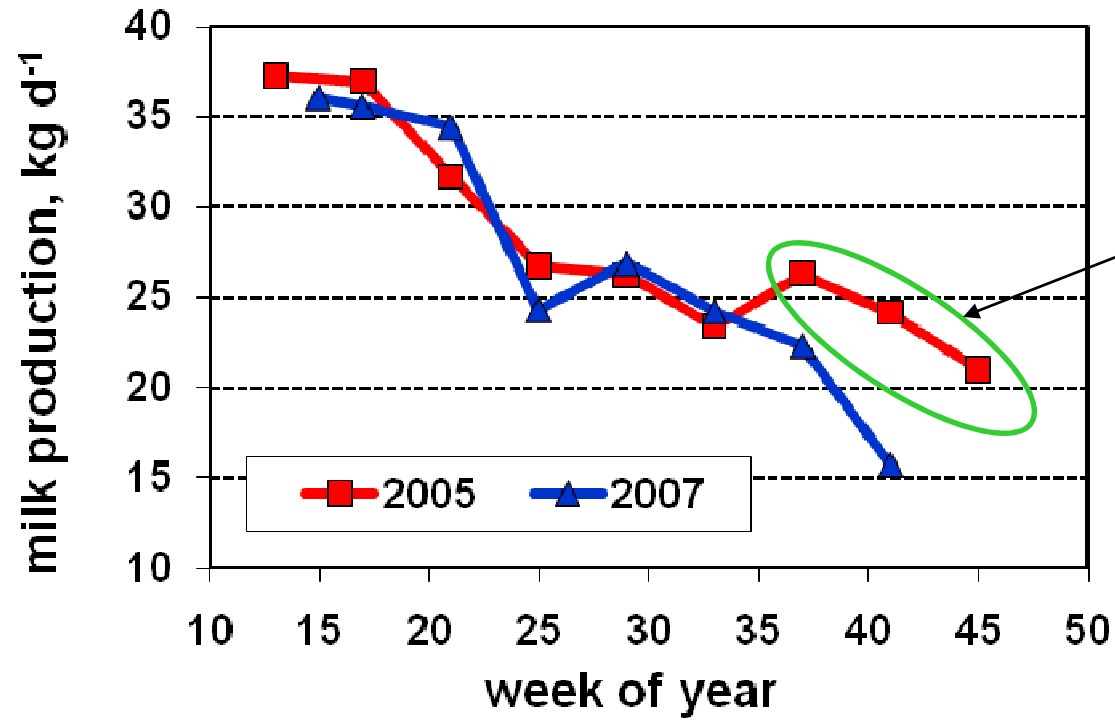


## Trial 2007





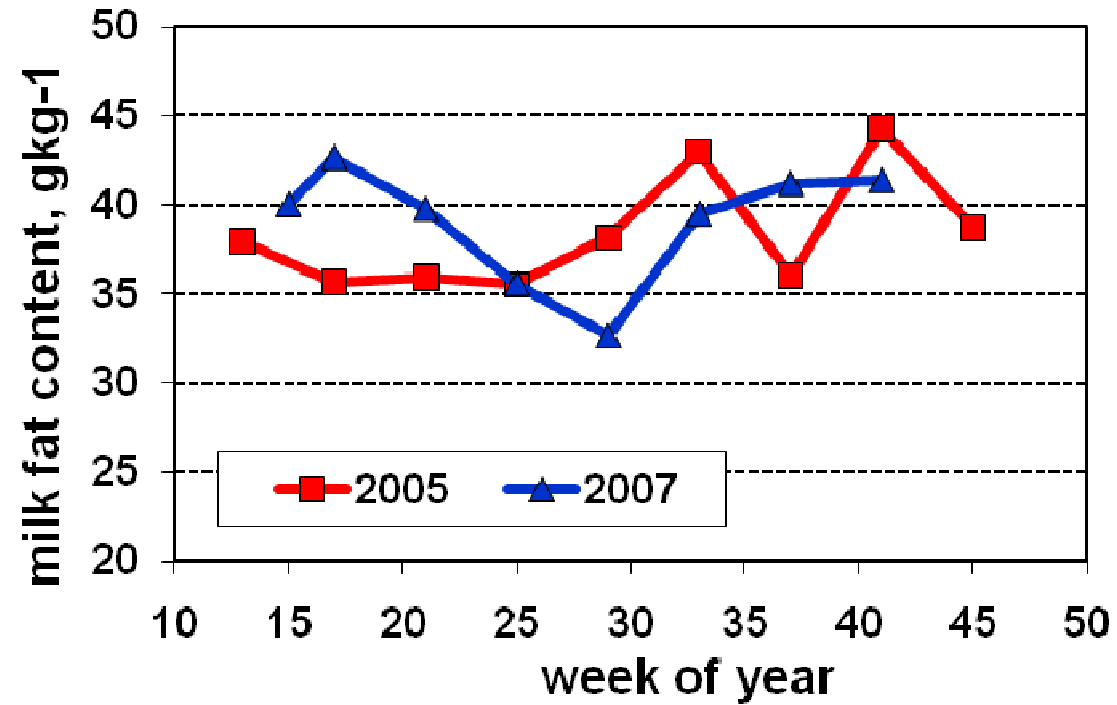
## Milk production



Average:  
2005: 28.2 kg day<sup>-1</sup>  
2007: 27.4 kg day<sup>-1</sup>



## Milk fat content



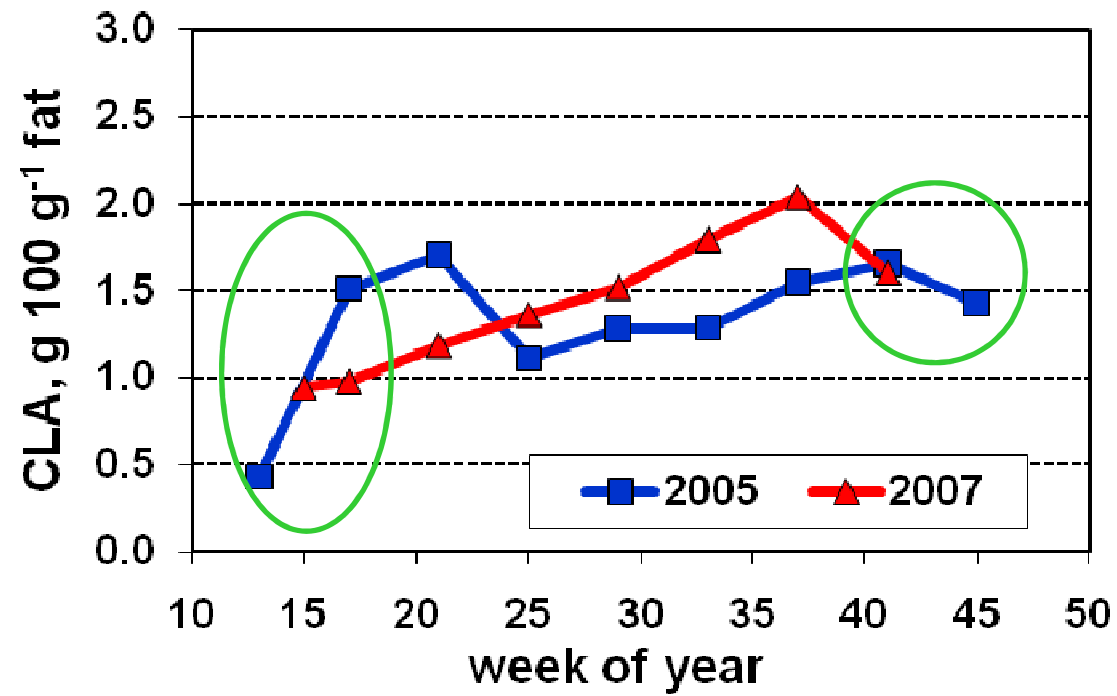
Average:

2005: 38 g kg<sup>-1</sup>

2007: 39 g kg<sup>-1</sup>



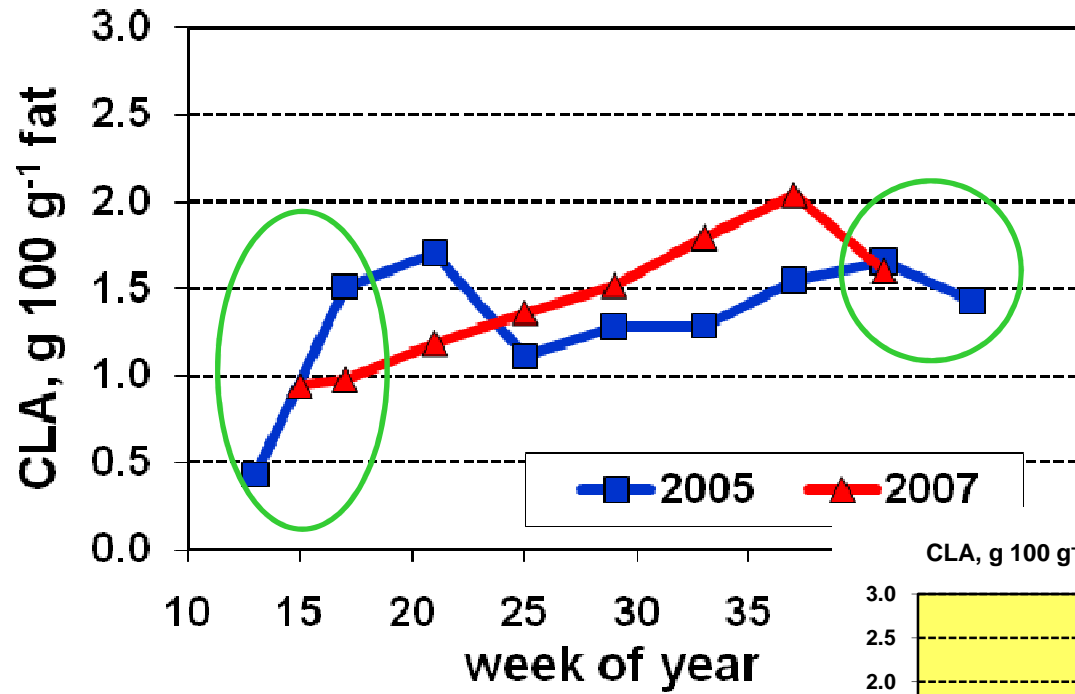
## Fatty acids in the milk



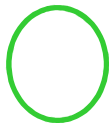
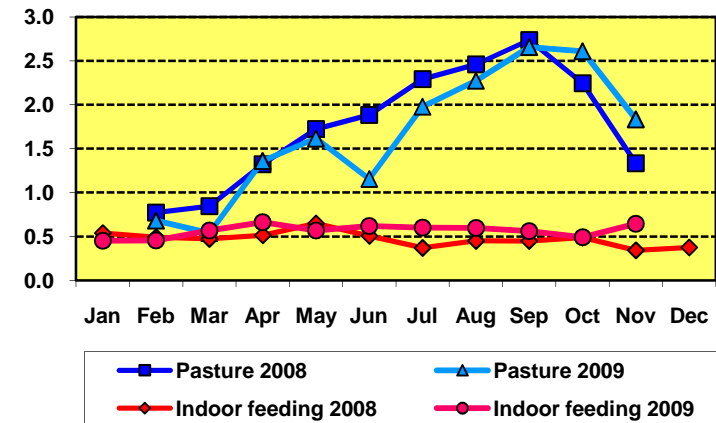
Additional feeding of conserved forage



## Fatty acids in the milk



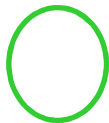
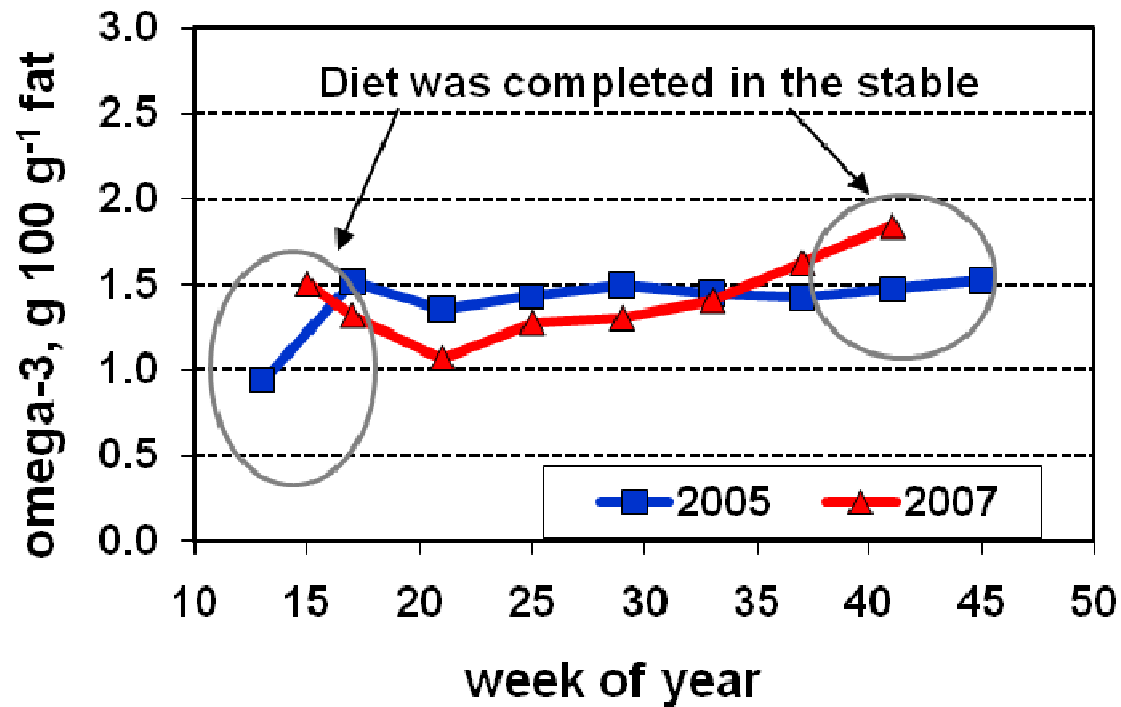
CLA, g 100 g<sup>-1</sup> fat



Additional feeding of conserved forage



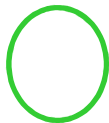
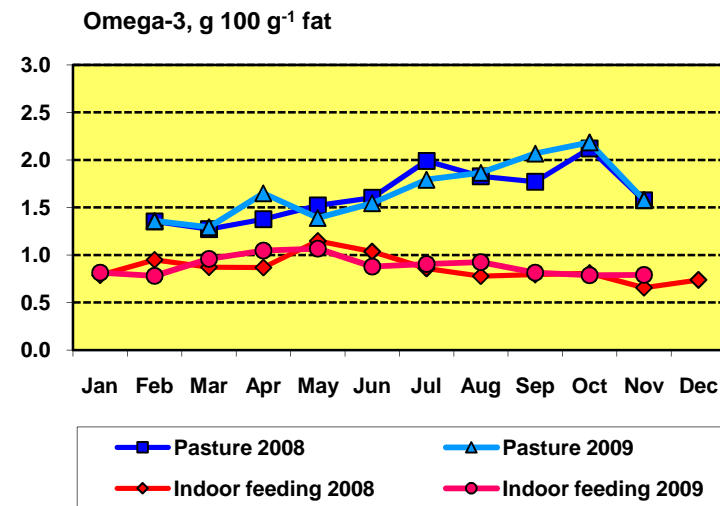
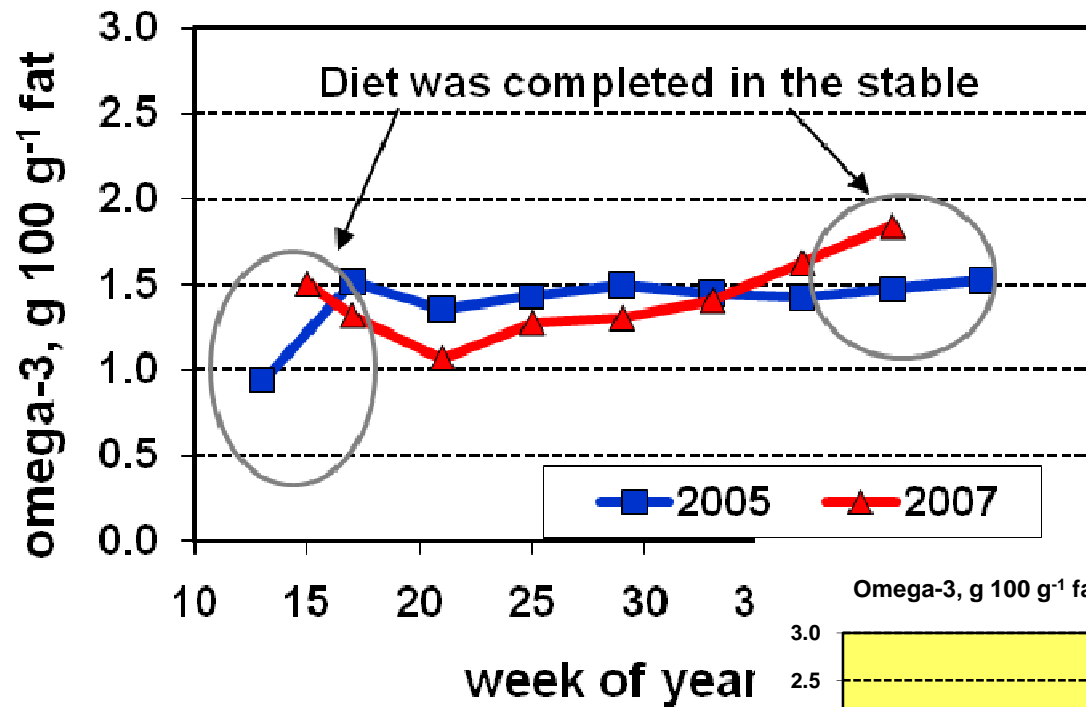
## Fatty acids in the milk



Additional feeding of conserved forage



## Fatty acids in the milk



Additional feeding of conserved forage



# Conclusions

- **The fatty acid concentration in grass, especially the  $\alpha$ -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