



Using Mid-Infrared analysis to investigate milk fat composition of dairy cattle breeds

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Conclusions

- The predictive ability of calibration equations appears to be breed specific for some fatty acids (FA).
- Predictability of (Holstein Friesian (HF) based) calibration equations is better for saturated fatty acids (SFA) than for unsaturated fatty acids (UFA) across different breeds.
- C6:0, C16:0, SFA, and UFA are generally for all breeds well predictable using HF based calibration equations.

Objective

Validation of HF based calibration equations to predict milk fat composition in other breeds.

Introduction

- There is an increasing interest in possibilities to modify milk fat composition by means of genetic selection.
- An important question is to what extent different cattle breeds add to the genetic variation in milk fat composition.
- MIR is a relative cheap and quick analyzing method which allows to assess genetic variation of bovine milk fat composition.
- MIR could be used to analyse the milk fat composition of dairy cattle breeds.

Material

In total 203 milk samples of five different dairy cattle breeds were analysed using MIR and Gas-Chromatography (GC). Of each breed samples were collected on three different farms, except of Montbéliarde of which all samples came from the same farm. Calibration equations were used to predict the fat composition from MIR profiles of milk samples from dairy cows of different breeds.

Calibration equations developed within the Milk Genomics Project by Rutten *et al.* based on a dataset of 3700 HF milk samples were used to predict the fat composition in different breeds.

The GC outputs were used as golden standard.

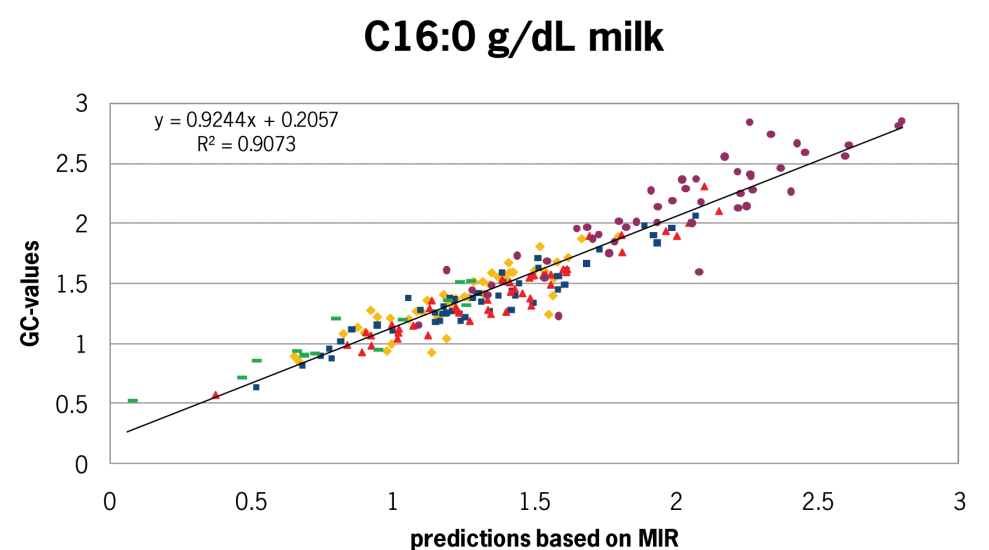
Predictive ability of the calibration equations for different breeds is quantified by R^2 .

Acknowledgements:

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Results



Breeds:

♦ Groningen White Headed ■ Meuse-Rhine-Yssel ▲ Dutch Friesian ● Jersey ■ Montbéliarde

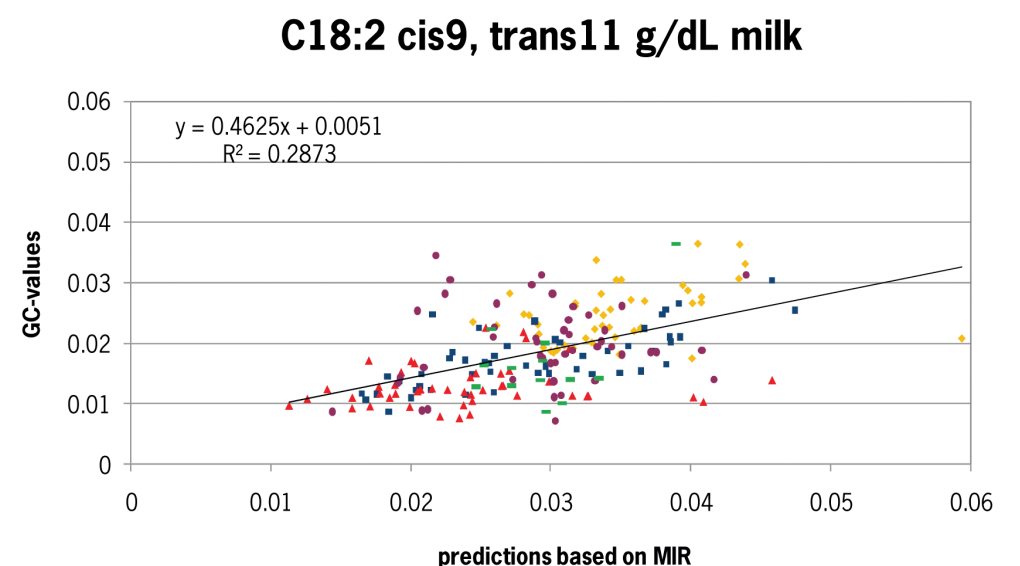


Table 1. The R^2 of prediction of five FA's and of the groups of saturated FA's (SFA) and unsaturated FA's (UFA) for the dairy cattle breeds Groningen White Headed (G), Meuse-Rhine-Yssel (MRY), Dutch Friesian (FH), Jersey (Jer), and Montbéliarde (Mon).

Fatty acid	R ²					
	G	FH	MRY	Mont	Jer	Overall
No. of samples	45	47	52	13	46	203
C6:0 (milk)	0.910	0.944	0.931	0.967	0.871	0.945
C16:0 (milk)	0.758	0.930	0.912	0.890	0.807	0.907
C16:1 <i>cis</i> 9 (milk)	0.383	0.224	0.373	0.841	0.545	0.623
C18:0 (milk)	0.659	0.704	0.720	0.430	0.443	0.697
C18:2 <i>cis</i> 9, <i>trans</i> 11 CLA (milk)	0.103	0.025	0.517	0.279	0.020	0.287
Saturated fatty acids (SFA)	0.98	0.967	0.982	0.978	0.954	0.981
Unsaturated fatty acids (UFA)	0.874	0.808	0.914	0.793	0.526	0.822

range 1 - 0.700
range 0.699 - 0.300
range 0.299 - 0



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