

COVER SHEET

1 **Accuracy and advantage of milk fatty acid estimation with diffuse reflectance near-**  
2 **infrared spectroscopy**

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4 Andreas Melfsen<sup>1</sup>, Max Holstermann<sup>2</sup>, Angelika Haeussermann<sup>1\*</sup>, Joachim Molkentin<sup>3</sup>,  
5 Andreas Susenbeth<sup>2</sup>, and Eberhard Hartung<sup>1</sup>

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7 <sup>1</sup>Institute of Agricultural Engineering, Christian-Albrechts-University Kiel, 24098 Kiel,  
8 Germany

9 <sup>2</sup>Institute of Animal Nutrition and Physiology, Christian-Albrechts-University Kiel, 24098  
10 Kiel, Germany

11 <sup>3</sup>Department of Safety and Quality of Milk and Fish Products, Max Rubner- Institute, 24103  
12 Kiel, Germany

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14 Short title: Milk fatty acid prediction by NIRS

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16 \*Corresponding author: Angelika Haeussermann, Christian-Albrechts-University Kiel,

17 Max-Eyth-Str. 6, 24118 Kiel, Germany, Phone: +49 431 880 1544, Fax: +49 431 880 4283,

18 Email: [a\\_haeussermann@ilv.uni-kiel.de](mailto:a_haeussermann@ilv.uni-kiel.de)

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Near infrared spectroscopy (NIRS) has the potential to estimate contents of single fatty acids (FA) or groups of FA (LCFA, SMCFA, SFA, USFA) in milk and in milk fat frequently at-farm or during daily milking routine. In this study, a total of 738 raw milk spectra collected from 33 Holstein cows over a period of 30 weeks were recorded. Reference data on FA composition in milk and in milk fat were analysed in laboratory. Calibration models were calculated for single FA and groups of FA in milk and in milk fat. Validation resulted in sufficient RPD values for some single FA and in good RPD values for the four groups of FA when concentrations of FA in milk were predicted. Since the concentrations of most FA in milk are highly correlated with milk fat content, the prediction of FA contents in milk fat is more meaningful when independent predictions are intended. The accuracy of predicting single FA concentrations in milk fat is rather poor for most FA but still comparable to alternative analysing methods such as MIR analysis. The estimation of different groups of FA in milk fat resulted in a suitable accuracy, which was sufficient to mirror the development in the different lactation phases. The course of cow individual LCFA concentration in the early lactation stage can be an indicator for body fat mobilization. The accurate estimation of the extent and duration of body fat mobilization in cow individuals was rather difficult with NIR predicted LCFA concentrations and would require a higher measuring frequency than applied in this study.