

Mid-infrared predictions of fatty acids in bovine milk: final results of the RobustMilk project

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The development of mid-infrared equations to predict the milk fatty acid (FA) content of milk allows prompt analysis of large numbers of samples and was one of the aims of the RobustMilk project. Data on MIR spectra and FA from multiple countries, production systems, and breeds were used to develop equations to predict milk FA. The calibration set contained 1,776 spectrally different English, Irish, and Belgian milk samples collected for over 6 years. FA were quantified by gas chromatography (GC). Equations were built using partial least squares regression after a first derivative pretreatment applied to the spectral data. The robustness of the developed equations was assessed by cross-validation (CV) using 50 groups from the calibration set. The coefficient of determination (R^2) obtained after CV ranged between 0.7101 for the total content of C18:2 and 0.9993 for the saturated FA group. The standard error of CV ranged between 0.0028 and 0.0998 g/dl of milk. Generally, the group or individual FA having the highest content in milk had the highest R^2_{cv} . The results obtained in this study confirmed the usefulness of MIR spectra to robustly quantify the FA content of milk permitting the use of these equations by milk laboratories in UK, Belgium or Ireland. Therefore, these equations could be used to develop selection or management tools for dairy farmers in order to improve the nutritional and environmental quality of milk based on the knowledge of the FA composition of their milk.