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Title of the presentation

Prediction of key physiological milk biomarkers in dairy cows through MIR milk spectra

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Session: Milk Analysis – New developments in using MIR Spectra

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ABSTRACT

Several milk metabolites and enzymes were highlighted as key biomarkers for monitoring of physiological imbalance (free glucose, glucose-6-phosphate, citrate, isocitrate), ketosis (acetone and Beta-Hydroxybutyrate (BHB)), udder health (lactate dehydrogenase (LDH) and N-acetyl-β-D-glucosaminidase (NAGase)), and fertility (progesterone). Assessing those biomarkers through mid-infrared (MIR) analysis of milk would allow frequent and cheap information on individual status of dairy cows. For this purpose, data from 5 different research projects, conducted in 11 European countries and involving 40 organizations were collated. In each project, individual milk samples were collected to be analyzed for MIR spectra and all, or part, of biomarkers concentrations (or activities) through reference chemical analysis. Milk MIR spectra were standardized and associated with biomarkers of +/-1 day. All results were merged together to constitute a dataset of 9143 records from 752 herds, with 7822 cows of 6 different breeds. Different modelling methodologies were used to consider the specificities of each biomarkers such as PLS, SVM and Local regressions, as well as discriminant analysis such as PLS-DA and SVMc. An external validation was done by excluding randomly 20% of herds through all countries. Results show that MIR analysis of milk can provide quantitative information on some biomarkers and only qualitative information for others (i.e., being low or high). :

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