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Title of the presentation

Challenges and opportunities in the use of milk mid-infrared (MIR) spectra: the experiences learned from the OptiMIR and HappyMoo projects and beyond

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Session: Milk Analysis – New developments in using MIR Spectra

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ABSTRACT

Milk mid-infrared (MIR) spectral data is a rich source of information. Even if the technology has been known for decades, exploring its capacities beyond the estimation of major milk components is rather new. Experiences have shown the necessity to develop high levels of cooperation between industry and science but also across countries. The former North-West Europe INTERREG project OptiMIR created an innovative European network of Milk Recording Organizations (MROs) that shared existing tools and approaches to services for farmers, harmonized the way to record key data and allowed the access to the latest technology in getting information out of milk analysis. The tools developed by OptiMIR also allowed MROs easier development of implementations of MIR-based predictions and tools. One major achievement was the development of a method allowing the standardization of different MIR spectrometers across laboratories, and brands of apparatus. This standardization is now available to industry through an association of European MROs called European Milk Recording (EMR). Amongst the most important current issues in dairy herd improvement is the research of technologies for health and welfare monitoring. The current North-West Europe INTERREG project HappyMoo develops novel strategies, methods, and tools to address this, taking up the linked challenges but also feeding on opportunities in the use of MIR spectra. Amongst the five freedoms of animal welfare, we are addressing especially three, the absence of disease, hunger and stress. The ongoing research shows the importance of clear final objectives, precise trait definitions and collaborative work of industry and science. Among the topics that will be exemplified are the difficulties to combine reference data across systems (scales x implementation) for lameness, the problems to use sensor data provided in the field for BCS, the issue of synchronising reference and MIR data and the design of experiences to generate the needed reference data. Access to correct, variable, and validated reference data is one of the major challenges. Particularly increased considerations of the biological background, but also concepts like deep phenotyping and molecular phenotypes will play certainly also a role in the future. Moreover, MIR-based phenotypes are always linked to the availability of the, at the most monthly, MIR data and innovative ideas are needed to go beyond this limitation. Advances in computational strategies will be

needed as the use of pre-defined calibrations should be replaced by more advanced cloud-based learning and decision-making algorithms integrating sensors or other on-farm technologies. :

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