

Session 10: Brian Wickham Young Persons Exchange Program (BWYPEX) "Beef on Dairy, Sensors in Welfare Monitoring; ExtraMir, Sustainability Traits"

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THE STATE OF THE ART ABOUT THE DEVELOPMENT OF MID-INFRARED BASED FATTY ACIDS PREDICTIONS AND THEIR APPLICATIONS ALONG THE DAIRY FOOD CHAIN.

Michael Whittaker¹, Silvia Orlandini², Christian Baumgartner², Steve Holroyd³, Gavin Scott³, Paul Jamieson³, Débora Santschi⁴, Mazen Bahadi⁴, Bevin Harris⁵, Kathryn Sanders⁵, Hélène Soyeurt⁶.

¹The Cattle Information Service, Telford, United Kingdom; ²ICAR, Utrecht, Netherlands; ³Fonterra Co-Operative Group limited, Ruakura, New Zealand; ⁴Lactanet, Quebec, Canada; ⁵Livestock Improvement Corporation, Newstead, New Zealand; ⁶University of Liège, Gembloux, Belgium.

The Brian Wickham Young Person Exchange Program (BWYPEX) - ExtraMIR

Milk mid-Infrared (MIR) spectrometry has been used since the 1980s to analyse milk components. Today advanced analytical techniques and powerful data processing tools allow additional value to be derived from this spectral information. For instance, milk MIR spectra can be used to quantify the fatty acid (FA) composition in dairy milk. The research into milk FA prediction is ever expanding and is of significant importance to the dairy chain for both the nutritional value of milk and also the management benefits to the farmer. The applications in the agricultural industry at an on-farm level are much further behind the applications of the research. The ExtraMIR project would like to reduce that gap and support the dairy chain in future market needs. The aim of the research is to investigate the variability and reliability of reference data sets for statistical FA modelling to predict the milk FA composition from MIR spectra. The study will look into various published FA models from 8 different countries (Belgium, USA, Netherlands, Italy, Australia, Canada, France and China) and analyse the application potential based on the R square value using the mean-centred cross validation ranking method published in the literature and the reference sample size. The variations in accuracy of the Fatty Acid prediction models specifically for the individual FA C12:0 range from 0.92 in the best examples and 0.71 in the poorest examples. Using the published ranking method this places the application of the models from quantitative screening to highly imprecise and only for the use of detecting extreme values. This will be combined with the various practical applications of ExtraMIR analysis in the field, where FA data is fed back into the agricultural industry to aid and benefit farmers in on-farm management and future proofing milk production. Typically, the main constraint between application of FA models across different countries arises from the variability within the farming systems, whether by breed of cow, by the rations fed to the cattle or down to the growing conditions of the climate. With research visits to Belgium, New Zealand and Canada not only were these constraints clear to witness but also the demands within the agricultural markets were different. These differences in demand generated research focuses specific to the needs of the national agricultural industries which further deviated from the aspirations of the international agricultural focus areas. This differing of objectives can also give rise to innovation within research areas and dairy consultancy organisations. Given that the benefits of milk FAs can be used as an indicator of ration quality of cattle feed, animal health and welfare concerns, environmental footprint of milk production and the technological properties of milk. This will contribute to closing the gap between the existing extensive research and the application in the field from advisory service providers.