Tuesday, March 5, 2024

Abstract Submission Form

Title (Mr./Mrs/Dr./Prof.) Ms

Presenting author Sarah-Joe Burn

Institute

Institute/company: University of Natural Resources and Life Sciences, Vienna

Adress: Gregor-Mendel-Str. 33

ZIP/Postal code: 1180 City: Vienna

Country: Austria

Insert all authors and institutions

Burn S.-J. (1)*, Gruber S. (1)*, Fuerst-Waltl B. (1), Egger-Danner C. (2), Terler G. (3), Steinwidder A. (3), Sölkner J. (1), Zollitsch W. (1)

(1) University of Natural Resources and Life Sciences, Vienna, Department of Sustainable Agricultural Systems, Gregor-Mendel-Str. 33, 1180 Vienna, Austria
(2) ZuchtData EDV-Dienstleistungen GmbH, Dresdner Str. 89, 1200 Vienna, Austria
(3) Federal Agricultural Research and Education Centre Raumberg-Gumpenstein, Altirdning 11, 8952 Irdning-Donnersbachtal, Austria

* These authors contributed equally to this work.

Preferred presentation Oral

Preferred session Session 2: SC Milk Analysis – New tools to extend the horizon of milk mid-infrared spectrometry

Email of corresponding author sarah.burn@boku.ac.at

Title of your paper Prediction of residual energy intake in Fleckvieh cows using mid-infrared spectroscopy

Insert ABSTRACT text

Breeding for feed efficiency has several benefits, including reduced feed costs and environmental impact (e.g., greenhouse gases). The implementation of feed efficiency into existing breeding programmes requires reliable phenotypes of defined direct or indirect traits. Recording of direct efficiency traits, like residual energy intake (REI), has the disadvantage that measuring energy intake is labour-intensive, expensive and thus not feasible on a large scale. Indirect traits, which correlate with direct traits, are a possible alternative. Mid-infrared (MIR) spectroscopy is routinely applied to determine major milk components (i.e., fat and protein) and can also be used to predict traits related to energy efficiency. The aim of this study was to develop prediction equations for REI in Fleckvieh cows (dual-purpose Simmental)

based on routinely available MIR spectra and test-day variables (e.g., milk yield, milk components). Additionally, the predictive accuracies of the different REI models used to describe feed efficiency were compared. Performance data of 19 Fleckvieh cows with a total of 68 lactations from the research farm of the Federal Agricultural Research Centre in Raumberg-Gumpenstein were available from 2013 to 2021. The MIR prediction models were developed with the partial least squares regression method. Final prediction models were performed based on 212 selected first derivative MIR spectra variables in combination with information from test-day variables and REI as dependent trait. The predictive ability of the developed prediction models for REI was moderate. By including certain test-day variables, the accuracy of REI prediction could be improved. Differences between the chosen REI models were observed in terms of correlation between recorded and MIR-predicted phenotypes for REI. Even though the prediction accuracy was only moderate, there is potential to use MIR-predicted REI as an indirect efficiency trait for breeding. The routine recording of MIR spectra compensates for the lack of accuracy and provides novel phenotypes on a large scale. Larger data sets are however needed for external validation of the developed model.

Enter keywords dairy cattle, feed efficiency, breeding, mid-infrared spectroscopy