STSM: Prediction of methane emissions from milk MIR spectra

COST action: FA 1302 – METHAGENE

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Host institutions: Walloon Agricultural Research Centre - Valorisation of Agricultural Products and Université de Liège – Gembloux Agro-Bio Tech; Belgium

STSM period: 13 to 18 December 2015

Scientific report after STSM

Purpose of the STSM

The purpose of this STSM within the COST Action FA1302 "METHAGENE" at the Department Valorisation of Agricultural Products (Walloon Agricultural Research Centre) and the Animal Science Unit (Université de Liège – Gembloux Agro-Bio Tech) was to establish further collaboration to predict methane emissions from dairy cattle milk MIR spectra. The involved institutions will collaborate in the future to further improve the methane prediction equation by including more spectra and corresponding methane measurements. Qualitas will also routinely apply further developed prediction equations on milk samples from routine milk recording in Switzerland. The primary goal of the STSM was to train the work with spectral data and to collect information on how to establish the collaboration on a routine base.

Activities and results during the STSM

During the STSM, spectral data sets from cows of which methane measurements were available and from Swiss routine milk recording were analysed. The methane measurement method for the first data set was GreenFeed, and the methane data were aggregated to a daily average for each cow from all measurements in the week of the milk recording. The correlation between these aggregated measurements and the predicted methane from the milk MIR spectra was low. Further analyses are

needed to improve the use of GreenFeed data to be helpful for further developing the MIR spectra prediction equation for methane.

Methane production were predicted by applying the existing prediction equation on routinely collected spectral data from Swiss Holstein cows. Spectral data from three months of routine milk recording were used for the prediction. The results looked very promising and showed patterns as expected. However, given the shortness of the stay, only a smaller data set than planned could be analysed, as the data preparation turned out to be more time consuming than expected. The STSM was still successful with respect to the further application of the methane prediction on Swiss routine data. More in-depth analyses will be conducted with more data and also with new prediction equations containing Swiss methane data in the calibration data set for deriving the equation. Additionally, further information from herd book databases will be included in the analyses to investigate predicted methane emissions across the entire Swiss dairy cattle herd book population.

Future activities

There will be no publication directly from the results obtained during this STSM. However, the involved institutions will further collaborate in the future. There will be further analyses on the results produced so far. Additionally, new methane reference data from respiration chamber measurements and corresponding spectra will be used to derive improved prediction equations. Also, a national COST project has been granted in Switzerland, during which both methane predictions from the analysis of the entire dairy cattle population will be used and new methane phenotypes will be generated that will contribute to further improve the prediction equation. Additionally, the involved institutions plan to further expand their collaboration to other traits than methane.

Zug, 4 January 2016