BWYPEX Program Daily methane emission predicted from milk MIR spectra: the time of model comparison

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Since 2011, the potential to estimate individual enteric methane (CH4) emissions based on the milk MIR spectrum of milk has been highlighted. Various methane prediction equations have been developed worldwide by different scientific teams. Most of these models rely on CH_4 reference data collected with the GreenFeed system (C-Lock Inc.) and are generally built using datasets generated within their own countries, often reflecting specific local conditions such as breeds, feeding systems, and management practices. In parallel, one international equation has also been developed through collaborative work aimed at merging reference data across countries; it is based on CH_4 measurements obtained using both the SF_6 tracer technique and respiration chambers, combined with standardized milk MIR spectra (European Milk Recording technique). This equation integrates reference data from seven countries.

In the framework of BWYPEX, it has been possible to meet different research teams measuring CH_4 emissions and having access to milk MIR spectra. These exchanges provided the opportunity to better understand how existing equations have been developed, how future equations are planned to be constructed, and how they are intended to be applied in practice. It became clear from these discussions that prediction equations have been developed using diverse methodological approaches, and that their final objectives and conditions of use vary considerably from country to country. After discussing with the various collaborators, interest has emerged in applying the different CH_4 prediction models available to a strictly identical spectral database. This database will consist of anonymized Holstein milk MIR spectra from different countries. The aim is to investigate the consistency of the predicted CH_4 values across equations, for example whether cows identified as high CH_4 emitters by one model are also classified as high emitters by the other models, and to evaluate the overall agreement and divergence among predictions.

This work is currently underway, and additional collaborators interested in sharing spectral data or in applying their own CH_4 prediction equations to this common database are warmly invited to participate.