PROJECT 2013-2018

IMPROVING COW HEALTH AND THE NUTRACEUTICAL VALUE OF MILK WITH INFRA-RED TECHNOLOGY

Principal Investigator:
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COLLABORATORS:
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Number of students trained (MSc, PhD, Post-Doc):	**4**
TOTAL BUDGET	**$543,506**

INVESTMENT PARTNERS

Agriculture and Agri-Food Canada

Réseau laitier canadien
Canadian Dairy Network

OBJECTIVES:

The overall objectives were to study the phenotypic and genetic variability of milk spectral data in order to improve cow robustness, nutritional quality of milk for human consumption, and to develop a series of calibration equations for several new milk components.

KEY OUTCOMES:

- Calibration equations were developed to predict all of the analyzed milk components using mid-infrared (MIR) spectroscopy. Future use and application of these equations is limited to groups of major fatty acids, lactoferrin, and milk fat globule (MFG) size due to low accuracies of all others. The calibration equations can be used to predict the various milk components, which could be used for research purposes, in milk processing, or genetic selection.
- Protocols were developed to support the extraction and saving of the individual MIR spectra of milk samples from FOSS machines used in DHI milk recording labs. As well, protocols were produced to then transfer these spectra into a database at the Canadian Dairy Network (CDN). The acquisition and organization of the MIR spectral data enables researchers and industry to better utilize this valuable information source.
- Predicted milk β- hydroxybutyrate (BHB) was examined during the current activity to get a better understanding of the trait and the regions of the genome and biological processes influencing metabolic disease in dairy cattle. This trait is now used in genetic evaluations in the Canadian industry since December 2016 and the knowledge gained for milk BHB through this work has led to a better sense of the trait.

BENEFITS TO THE DAIRY INDUSTRY

Milk samples are collected routinely daily across Canadian herds for milk analysis at DHI labs. This activity has developed a new data pipeline to output and store milk mid-infrared spectral data which can now be used to predict milk fatty acid content, milk lactoferrin and milk fat globule size of all milk recorded cows in Canada. Additionally, this data will serve as new phenotypes to predict novel traits like individual cow energy balance, methane emissions and other economically important novel traits, like cheese transformation and milk technical properties.