THE GLOBAL STANDARD FOR LIVESTOCK DATA

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TITLE OF THE PRESENTATION

Improving taste and flavor in dairy product through milk analysis of free fatty by Mid-infrared (MIR) spectrometry.

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Improving taste and flavor in dairy product through milk analysis of free fatty by Mid-infrared (MIR) spectrometry.

ABSTRACT

For several years, the dairy sector deals with a recurrent issue: a defect of taste appearing due to degradation of fat, commonly called lipolysis. Lipolysis mainly happens after the milking, through the physical shocks induced by freezing, pumping, transfer and storage of the milk. Physical break of fat globules makes triglycerides accessible to enzymes and causes a degradation into free fatty acids (FFA). Among them, the increase in volatile short chain FFA concentration leads to organoleptic issues through undesired taste.

Currently, an easy quantification of these individual short chain FFA, responsible of impaired taste, is very difficult. On the other hand, the analysis of a wide range of FFA is possible by Gas Chromatography coupled with triple quadrupole mass spectrometer (GC-MS/MS). However, the analysis with this equipment is time consuming and expensive and does not allow to provide routine results on a larger scale. In order to bring a new way of preventive and corrective action for dairies and farmers, the main objective of this project is to develop predictive models based on milk mid Infrared spectroscopy (FT-MIR) to quantify FFA.

For this purpose, milk samples from four different countries (Belgium, France, Germany and Luxembourg) were collected and analyzed in MIR spectroscopy as well as in GC-MS/MS. Models linking spectral data and GC-MS/MS data were performed using partial least square regressions

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and assessed in a 10-folds cross-validation. The PLS model provided moderate RPD for long-chain FFA and relatively low RPD for short-chain FFA. Indeed, most of short-chain FFA were under the limit of quantification. The lack of short-chain FFA concentration will be solved with a mechanical induction of lipolysis without interfering with the MIR spectrum.

At this stage, the poor performances of the models indicates that FFA concentrations are difficult to predict accurately by MIR spectrometry. However, this is a preliminary study and the accuracy of models would be improved through the addition of samples in the dataset. More researche is ongoing.

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