Practical applications of fatty acid data for the improvement of dairy cattle production and prevention of health issues in transition cows

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Abstract

Delta Instruments[1], St. Albans Cooperative Creamery, Cornell University[2] and Miner Institute3 research collaboration on milk production efficiency has enabled the development of the first generation mid-FTIR Herd Management Tools. Following the findings of D. M. Dave Barbano[2] and his team, a set of partial least squares (PLS) chemometric predictive models fatty acids (FA) models were developed to provide farmers with early warnings on nutritional and health issues of dairy cows before these become severe.

The first tool consists of a set of milk FA models grouped according to their chain length and relation to biosynthetic origin within the cow: The de novo and a portion of the mixed origins FA are synthesized in the cow's udder using the end products of rumen fermentation of forage, while preformed FA come from the mobilization of body fat and fat in the consumed feed.

The second is a milk based blood non-esterified fatty acids (NEFA) prediction tool allows to monitor the energy balance: The mobilization body fat causes blood NEFA levels to rise, signalling that the body is in a severe negative energy status; when it becomes too severe it can lead to clinical or subclinical ketosis.

Since the development of the Herd Management Tools, farmers and nutritionist have been also provided fatty acid data. This has allowed them to successfully monitor and improve bulk tank milk composition (i.e., fat and protein percent), production volume of the herd, prevent milk fat depression, as well as prevent gastrointestinal diseases (displaced abomasum) of early transition cows.

This paper describes how to combine the fatty acid metrics from the Herd Management Tools, with the fat and protein test, milk urea nitrogen (MUN) and average milk produced by a cow to evaluate the impact of farm management practices and changes in feed both at the herd and individual transitioning cow.

Keywords: Herd Management Tools, fatty acid data, NEFA, practical examples, displaced abomasum, clinical and subclinical ketosis,