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Title of the presentation

Within day variation in milk and blood metrics for hyperketonemic and non-hypoketonemic dairy cows.

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ABSTRACT

Dairy cows often enter a state of energy deficit in early lactation, leading to an increase in plasma concentrations of non-esterified fatty acids (NEFA) and beta-hydroxybutyrate (BHB). Currently, diagnosis of excessive energy deficit is done on farms using handheld blood BHB meters. However, this process is laborious and can become costly when used as a whole-herd screening method. Several studies have investigated the use of Fourier transform mid-infrared (FTIR) estimates to predict excessive energy deficit, but these studies relied on a single, test-day DHIA milk sample with no knowledge of actual blood NEFA or BHB concentrations. We determined the diurnal variation in plasma NEFA and BHB as well as FTIR estimates of milk BHB, milk predicted blood NEFA, and milk fatty acids with particular focus on differences between groups of cows that were hyperketonemic or non-hyperketonemic. We collected blood samples every 2 h for 5 consecutive days from 28 multiparous Holstein cows that were between 3 and 9 days in milk. Cows were housed in a tie-stall facility and offered free choice access to water and a TMR that was delivered once a day at 0900 h. Blood samples were analyzed for BHB and NEFA concentrations, and cows were classified into hyperketonemia groups based on their average daily BHB concentration. If a cow's average daily BHB was ≥1.2 mmol/L for ≥3 study days, she was assigned to the hyperketonemia group (n=13). Alternatively, if her average daily BHB was ≥1.2 mmol/L for ≤2 study days, she was assigned to the non-hyperketonemia group (n=15). We found clear and consistent diurnal patterns in plasma BHB and NEFA as well as FTIR estimates of milk BHB, milk predicted blood NEFA, and milk fatty acids. Interestingly, these diurnal differences were much more predictable when analyzing milk, with a greater ability to separate hyperketonemic from non-hyperketonemic cows. Our results support the use of FTIR estimates of milk BHB and milk predicted blood NEFA as a tool in diagnosing HYK, however time relative to feeding should be considered when analyzing results. Milk fatty acid metrics on a relative basis may also be useful to separate hyperketonemic from non-hyperketonemic cows. In particular, these results support the use of high frequency milk monitoring and measurement to detect alterations in early lactation health of dairy cows. :

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