New parameters to aid in the diagnosis of disease in post-partum dairy cows

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INTRODUCTION

Disease in fresh cows is probably the factor with the most devastating effects on milk production and reproductive performance. Currently, veterinarians and farmers need to mostly rely on clinical signs to diagnose disease in fresh cows.

The objective of this study was to evaluate parameters that can be easily measured on a farm to determine their ability to detect subclinical disease in fresh cows.

MATERIALS AND METHODS

This is an observational study based on daily monitoring of cows at the teaching herd at Oregon State University. An automated system monitors lactating cows twice daily collecting data on milk production, fat %, protein %, lactose %, conductivity and body weight (walk-through scale). Variation of these parameters was studied in relationship to metabolic parameters measured in blood (CBC and chemistry panel) each day for the first 7 days after calving to determine the presence of subclinical disease in dairy cows. In total, 53 cows were enrolled in the study; 24 Holstein and 29 Jersey. Distribution of lactation numbers was similar in both breeds (approx. 60% 1st lactation, 10% 2nd lactation, and 30% 3+ lactations).

RESULTS

Of the 53 cows enrolled in the study, 6 were diagnosed with clinical metabolic disease (3 had hypocalcemia, and 3 had ketosis/LDA) and 8 were diagnosed with reproductive disease (5 retained placenta, and 3 metritis only).

On average, fat percentage in milk increased in cows with metabolic disease (β=0.289) but decreased in normal cows (β =-0.023) (Figure 1). Given that protein changes were similar in both groups, the butterfat protein ratio of the milk produced by cows with metabolic disease was significantly higher than that of normal cows (Figure 2).

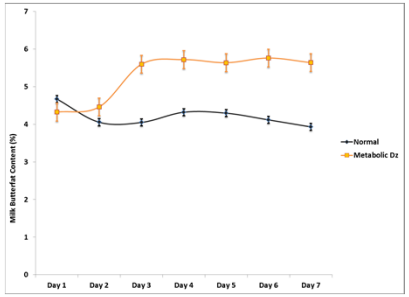

Figure 1. Comparison of butterfat content in milk (± SE) in normal cows (N=47) and cows diagnosed with metabolic disease (N=6).

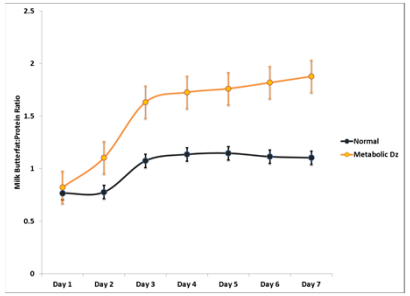

Figure 2. Comparison of BF:P ratio in cows with metabolic disease (N=6) and normal cows (N=47).

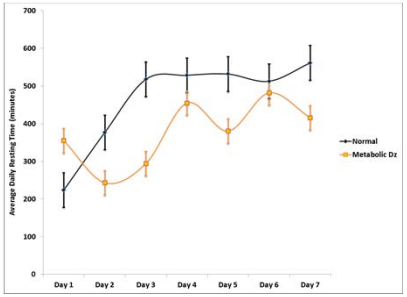

Figure 3. Comparison of average daily resting time in cows with metabolic disease (N=6) and normal cows (N=47).

Other parameters that differed between cows with metabolic disease and normal cows were longer daily resting time (Figure 3) and higher milk production. Most of these changes were not evident in cows diagnosed with metritis but were present in cows with retained placenta (Figure 4).

A greater than 20% increase in fat and lactose percentage in milk preceded diagnosis of clinical metabolic disease by at least 3 days (Figure 5).

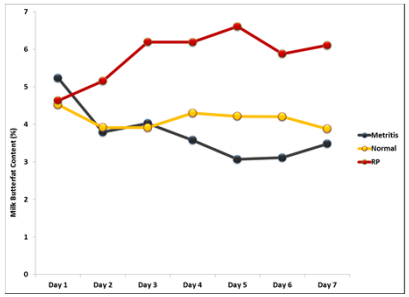

Figure 4. Comparison of milk butterfat content of cows with reproductive postpartum disease (N=8) and normal cows (N=45).

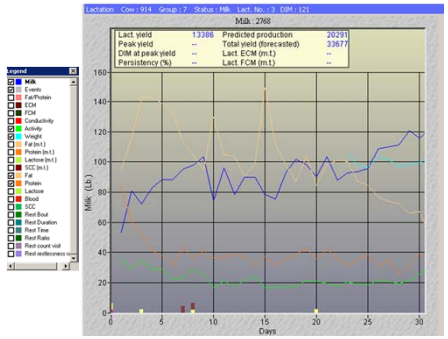

Figure 4. Lactation graph of a cow diagnosed with ketosis on day 7. Notice the increase butterfat content on day 3, while the first event of clinical disease is on day 7 (brown square).

CONCLUSIONS

Results of this study show how daily monitoring of milk components can help identify fresh cow disease before clinical signs appear. It is expected that earlier diagnosis of metabolic disease that is still in subclinical conditions will help reduce the length of treatment and improve recovery of dairy cows, although more studies on this need to be conducted..

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