

of production. The objective of this study is to describe herd size, rolling herd average, prefresh and fresh pen duration of stay, as well as prefresh and fresh pen bunk space per cow on Wisconsin dairies after stratification by TCI.

Materials and Methods

From a database of 203 dairy herds located in Wisconsin, 75 Holstein herds were randomly selected to participate in the current survey. Farm owners were called by the research team to solicit participation and agree to a herd visit. During the visit, the farm representative was asked a predetermined set of questions regarding the management of far-dry, prefresh, maternity, fresh, and sick cows. Housing type, bunk space, stall surface, bedding type, and cow numbers for each pen associated with transition were documented. DHI records, including TCI and rolling herd average (RHA), were also obtained. For the purposes of this analysis, herds were stratified into 3 groups after ranking TCI by quartiles (Group A, TCI \leq 1st quartile; Group B, TCI $>$ 1st quartile \leq 3rd quartile; Group C, TCI $>$ 3rd quartile). Herd size, RHA (pounds), prefresh and fresh pen duration of stay (days), as well as prefresh and fresh pen bunk space per cow (inches) are described by medians. Spearman correlation coefficients were used to assess correlations between continuous variables. Kruskal-Wallis and Wilcoxon Rank test were used to compare medians.

Results

Forty-four herds agreed to participate, resulting in a response rate of 59% (Group A, n=18; Group B, n=14; Group C, n=12). After stratification, median TCI values for Groups A, B, and C were -224, 457 and 1,843, respectively ($P < 0.001$). Overall, TCI values were associated with RHA ($r=0.73$; $P < 0.0001$). Median herd size did not differ between groups (A: 399, B: 549, C: 481; $P = 0.84$). Median prefresh bunk space per cow (A: 27, B: 36, C: 31 inches; $P = 0.41$) and median prefresh duration of stay (A: 21, B: 21, C: 21; $P = 0.39$) did not differ between groups. Median fresh bunk space per cow (A: 24, B: 30, C: 28 inches, $P = 0.19$) and median fresh pen stay (A: 14, B: 16, C: 19 days; $P = 0.59$) did not differ between groups.

Significance

Results suggest that higher TCI values are associated with greater RHA milk production, independent of herd size. The variation in TCI from herd to herd is not entirely the result of increased prefresh and postfresh bunk space or duration of stay in the prefresh pen. Additional evaluation of management practices outlined in this survey are underway and should help our understanding of the variation in TCI at the herd level.

Rumen protected branched amino acids supplementation during early lactation in dairy cows

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Introduction

The branched-chain amino acids (BCAA; leucine, isoleucine and valine) are 3 of the essential amino acids that cannot be synthesized by dairy cattle and therefore must be provided in the feed. BCAA nutraceutical properties have been reported in humans and rodents, such as glucose homeostasis, positive regulation of amino acids (AA), and protein metabolism (Lynch and Adams, 2014). Also, BCAA accounts for up to 50% of the essential amino acids present in dairy cattle milk protein (Mackle et al, 1999). During late pregnancy and early lactation in dairy cattle, AA demand increases to support fetal development and milk protein synthesis, and a large amount of AA is withdrawn from different tissues to support gluco-

neogenesis during negative energy balance (NEB) (Kuhla, Nurnberg et al, 2011). Hyperketonemia (HYK) is one of the most common metabolic disorders during early lactation in dairy cows. Johnson (1954) and Maplesden (1954) described propylene glycol (PG) as a treatment of hyperketonemia. PG is transformed into glucose by the liver and increases insulin concentrations in blood (Vaughn et al, 1993). PG as an oral drench of 300 mL has been shown to increase milk production, decrease clinical diseases, and reduce culling in HYK cows (McArt et al, 2012). The objective of this study was to test if supplementation of Rumen Protected Branched-Chain Amino Acids (RPBCAA) with or without PG oral supplementation improved milk protein yield as well as negative energy balance during the early postpartum period in dairy cows.

Materials and Methods

Holstein dairy cows (n=21) entering second or greater parity were enrolled in blocks of 3 during the dry period (28 days before expected calving date) and randomly assigned to 1 of 2 treatments or a control group: the BCCA group (n=7) received 384 g per day of RPBCAA (BALCHEM™) mixed with 200g of dry molasses top dressed in feed from calving to 35 days-in-milk (DIM); the BCAA plus PG (BCCAPG) group (n=7) received 384 g per day of RPBCAA mixed with 200g of dry molasses top dressed in their feed from calving to 35 DIM plus 300 ml of PG from calving until 7 DIM; the control group (n=7) received 200g of dry molasses top dressed from calving to 35 DIM. Cows were kept in tie stalls to measure daily intake and refusals. Postpartum, cows were milked 3 times a day and milk weights were recorded at each milking. Milk samples were collected from 3 consecutive milkings once a week and analyzed for fat and true protein. Blood was sampled 3 times per week 21 days before expected calving until 21 DIM. Beta-hydroxybutyric acid (BHBA) was measured cow side using a TaiDoc ketone meter (Pharmadoc, Lüdersdorf, Germany). Repeated measures ANOVA was conducted for the outcomes of BHBA, true protein as a percentage of total solids in milk, and total milk production until 35 DIM.

Results

Beta-hydroxybutyric acid concentration (mmol/L) in least squares means (LSM) were 0.78 ± 0.12 , 0.92 ± 0.12 and 0.92 ± 0.12 for the BCAA, BCAAPG, and control groups, respectively. However, there was a difference in BHBA concentration (mmol/L) within the groups at 12 DIM with LSM of 0.56 ± 0.17 , 1.26 ± 0.17 and 0.93 ± 0.17 for BCAA, BCAAPG, and control groups, respectively (P=0.02). There was a difference between the groups true protein in milk LSM for 5.24 ± 0.25 , 4.17 ± 0.25 and 4.45 ± 0.25 for BCAA, BCAAPG, and control groups, respectively (P=0.01). There was no difference among the treatments for total milk production over 35 DIM.

Significance

Branched-chain amino acid supplementation during early lactation in dairy cows may be a feasible option for effective alteration of milk yield, milk protein yield and improvement of negative energy balance in dairy cows due to its nutraceutical properties. Diets with high concentrations of BCAA have shown beneficial effect on body weight, glucose concentrations in blood and increased muscle synthesis in other species. For these reasons, supplementation of BCAA for dairy cattle could be advantageous for the industry.

Inter- and intra-cow variability and the effect of teat-end shape on average milk flow rate, milk harvested in the first two minutes, and seconds below 2.2 lb per minute

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Introduction

Data from electronic milk meters that measure milking characteristics such as average flow rate (AFR), amount of milk harvested in the first 2 minutes (2MIN), and seconds below 2.2 lb (1 kg) per minute flow rate (LOW) have been used as indicators of milking efficiency among cows. While these milking characteristics are valuable metrics to optimize efficiency of dairy production systems, the variability in them has not been rigorously investigated. The primary objective of this study was to describe the variability of the milking characteristics AFR (lb/min), 2MIN (lb), and LOW (sec.), both within and between cows. Our secondary objective was to investigate the influence of the explanatory variables milk yield, stage of lactation (DIM), parity, milking

time, farm, manual control mode, and teat-end shape on the aforementioned milking characteristics.

Materials and Methods

Individual cow milking characteristics from 3,225 cow observations were recorded over a period of 30 days from 2 different dairy farms with automatic milk meters (MM27, DeLaval, Sweden). Cows were milked 3 times daily in a rotary parlor (Farm 1) or a 2 by 10 parallel parlor (Farm 2). A linear mixed-effects model was fitted to evaluate the effect of milk yield, DIM, parity, milking time, farm, and manual control mode on the outcome variables AFR, 2MIN, and LOW. To determine inter- and intra-cow variance components, variance estimates of the random effects of the null model were