

Effects of Diet and Time of Feeding on Productivity, Rumen pH, and Blood Metabolites of Lactating Dairy Cows

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Providing fresh total mixed ration (TMR) has been shown to stimulate eating. Hence, time of feeding could affect the timing of meals and, as a result, the variation in rumen pH and blood metabolites throughout the day. These variations could impact feed intake and milk production. The effects of feeding a lower concentrate (forage:concentrate ratio of 49:51) TMR or a higher concentrate (forage:concentrate ratio of 38:62) TMR at morning (9 am) or at evening (9 pm) on productivity, rumen pH, and blood metabolites were studied in eight Holstein cows. Cows averaged 82 days in milk, had an average milk yield of 37.1 kg/d and did not suffer from heat stress during any time of the day. Blood samples were collected every two hours, and rumen fluid was sampled at 1 am and 1 pm using an oral probe. Time of feeding did not affect feed intake, average rumen pH, milk yield, and milk protein across diets. Changing feeding time from morning to evening increased body weight change from -0.32 to 0.26 kg/d and resulted in a trend towards increased milk fat. Feeding higher concentrate as compared to lower concentrate diet increased average plasma glucose and decreased β -hydroxybutyrate (BHB). All blood metabolites, cholesterol, and rumen pH showed variation throughout the day. Plasma glucose declined before feeding and rose after feeding in evening-fed cows, but not in morning-fed cows. In evening-fed cows, the rise in BHB immediately after feeding was higher than in morning-fed cows. The decrease in NEFA after a meal was greater in morning-fed heifers compared to evening-fed heifers. The prefeeding rise in NEFA was higher in morning-fed heifers than in morning-fed adult cows. Older cows showed less variation in plasma NEFA compared to heifers.

Take Home Message: Changing the feeding time of TMR from morning to evening increased milk fat and prevented weight loss, but did not affect feed intake, milk yield, and milk protein. This suggests that evening feeding instead of morning feeding improved feed utilization. The change in the diurnal variation of blood metabolites and rumen pH due to the change in feeding time could have contributed to the improved feed utilization.