

The effect of feeding ruminally protected lysine (RPL) on production performance and plasma amino acid profile of early lactation dairy cattle

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Thirty-six lactating Holstein cows were used to examine the effects of ruminally protected lysine (RPL) supplementation and dosage on production performance and plasma amino acid profile of high-producing dairy cows. Multiparous cows were balanced across treatments based on their four week of lactation average milk production as follows: Control, 75, 150, 225g/d of RPL. These treatments were designed to deliver 0, 12, 24 and 36 g/cow/d of supplemental intestinally available lysine, respectively. Cows started the experimental period on the fifth week post-calving and remained on treatment for 4 weeks. Prior to treatment administration, all cows received the control diet for one week, which contained 75% of forage from corn silage. Control diet was fed to all cows throughout the experimental period, however, in addition, cows received 500g/d of corn meal premix top dressed once daily to deliver 0, 75, 150 or 225g/d of RPL. Blood samples were taken for each cow prior to daily feeding on day 0 and 28 of the study for amino acid analysis. Dry matter intake was not affected by RPL dose when expressed as a percentage of body weight. Mean milk yield was highest ($P<.03$) for cows receiving 150g RPL than Control or 225g RPL, with 75g RPL not being different than others (47.7, 43.2, 42.7 and 44.6kg, respectively). FCM was highest ($P<.05$) for cows receiving 75g RPL compared to control. Fat % was highest ($P<.05$) for 75g and 225g RPL compared to Control and 150g RPL, whereas protein %, lactose, MUN, and SCC were not affected by RPL dose. Protein yields, however, were highest ($P<.01$) for 150g RPL and lowest for 225g RPL. At 28d, plasma lysine showed a numeric tendency to be lowest for 150g and highest for 225g RPL, with 225g RPL having a 17.6% increase ($P=.12$) from day 0 to 28. Under the conditions of this study, 75g or 150g RPL provided the most efficient and consistent response in production performance of early lactation dairy cows.

Key words: ruminally protected lysine, milk production, plasma AA