



American Dairy Science Association® Annual Meeting Journal of Dairy Science®

Effects of feeding controlled-energy and high-energy diets with rumen-protected lysine and methionine prepartum on performance of Holstein cows

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Sixty-two multiparous Holstein cows, blocked by parity, previous 305-d mature-equivalent milk production, and body condition score (BCS) during the far-off dry period were assigned to 1 of 3 dietary treatments. Prepartum (-21 d to expected calving), animals were fed a controlled-energy diet [1.45 net energy of lactation (NEL), Mcal/kg of DM] with rumen-protected lysine (RPL; Kemin Industries Inc., Des Moines, IA) and rumen-protected methionine (RPM; Kemin Industries Inc., Des Moines, IA) [CEAA; 0.15% RPL and 0.09% RPM of dry matter intake (DMI)], controlled-energy diet without RPL and RPM (control; CENAA), or high-energy diet (1.71 NEL, Mcal/kg of DM) with RPL and RPM (HEAA; RPL 0.22% and RPM 0.12% of DMI). Postpartum, cows received the same lactation TMR (1.73 NEL, Mcal/kg of DM) without RPL and RPM (CENAA, n=19) or with RPL and RPM [CEAA, n=21; and HEAA, n=21; 0.38% RPL and 0.15% RPM of DMI] until 70 days relative to calving (DRC). Body weight (BW) and BCS were recorded weekly; and DMI daily. Cows were milked twice daily. Milk samples were taken weekly and analyzed for components. Statistical analyses were performed using the MIXED procedure of SAS. Two treatment contrasts CENAA vs. CEAA and CEAA vs. HEAA were compared. During wk 5 to 10 cows in CENAA had ($P<0.02$) less DMI (22.94 ± 0.65 kg/d), less energy balance (-6.09 ± 0.81 Mcal/d), and more BCS change (-0.51 ± 0.12) than cows in CEAA (25.1 ± 0.65 kg/d, -3.18 ± 0.81 Mcal/d, -0.05 ± 0.12 ; respectively). Cows in HEAA tended to have greater ($P<0.08$) energy corrected milk (50.5 ± 1.77 kg/d) and higher fat yield (2.04 ± 0.09 kg/d) during wk 1 to 4 of lactation than cows in CEAA (45.7 ± 1.77 kg/d, 1.82 ± 0.09 kg/d; respectively). During wk 5 to 10 cows in CEAA had higher ($P<0.04$) milk protein proportion ($2.89\pm 0.05\%$) and milk urea N (9.84 ± 0.4 mg/dL) than cows in CENAA ($2.72\pm 0.05\%$ and 8.65 ± 0.4 mg/dL; respectively). In conclusion, feeding RPL and RPM in a controlled energy diet prepartum improved cows' performance.

KEYWORDS:

Methionine, Lysine, energy balance