Diet Formulation Strategies for Dairy Cattle in Automated Milking Systems (AMS)

Menajovsky, S.B.[1], C.E. Walpole[1], T.J. DeVries[2], K.S. Schwartzkopf-Genswein[3], M.E. Walpole[4], and G.B. Penner[1]

[1]University of Saskatchewan, Saskatoon, S7N 5A8, [2]University of Guelph, ON, N1G 2W1, [3]Agriculture and Agri-Food Canada, Lethbridge, AB T1J 4B1, [4]DairySmart Nutrition Group,70122 Parr Line, Crediton N0m1m0
Email: greg.penner@usask.ca

Adoption of AMS has increased yet there are few studies that have evaluated feeding management. This study evaluated the effect of the amount of concentrate offered in the AMS and the energy density in the partial mixed ration (PMR) on DMI, milk and milk component yield, and ruminal fermentation. Eight ruminally cannulated Holstein cows (replicated 4 × 4 Latin square) housed in a guided-traffic flow barn were fed a PMR containing either low (54:46; **L-FOR**) or high (63:37; **H-FOR**) forage-to-concentrate ratio. Within each PMR, cows were provided enough concentrate to achieve a low (2 kg/d; **L-AMS**) or high (6 kg/d; **H-AMS**) concentrate allocation in the AMS (DM basis; 2 × 2 factorial treatment arrangement). There were no interactions between the allowance of concentrate and type of PMR, and DMI did not differ among treatments (27.3 kg/d). However, PMR intake was reduced (P < 0.01) for H-AMS compared to L-AMS treatments (21.4 vs. 24.9 kg/d). By design, AMS concentrate intake was greater for H-AMS than L-AMS (6.2 vs. 2.0 kg/d; P < 0.01), but the standard deviation for concentrate intake was also greater for H-AMS than L-AMS (0.83 vs. 0.22 kg/d; P < 0.01). The number of voluntary visits was greater for cows fed H-AMS (3.7 vs 3.5; P = 0.02) compared to L-AMS and this translated into a tendency for greater milk yield (39.2 vs 38.0 kg/d; P = 0.10). The PMR treatments did not affect voluntary visits, but feeding L-FOR tended to increase milk yield compared to H-FOR (39.3 vs. 37.9 kg/d; P = 0.10). Milk fat tended to be reduced with H-AMS compared to L-AMS (3.51 vs. 3.64%; P = 0.09) but was not affected by the PMR. Milk protein was greater for cows fed the H-AMS than L-AMS (3.25 vs 3.20%; P = 0.04). Minimum ruminal pH tended (P = 0.09) to be lower and the area pH was < 5.8 tended to be greater (P = 0.07) for cows fed a L-FOR than H-FOR PMR.

Implications: These data indicate that increasing the amount of concentrate offered in the AMS will decrease PMR intake, but may increase milking frequency and milk yield. The PMR energy density has little effect on performance outcomes.