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Wednesday June 28th: Ruminant Nutrition: Protein and Amino Acids 3

Effect of rumen-protected methionine supplementation in a low starch diet with or without supplemental sugar on the productive performance of dairy cows.

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The main objective of this study was to evaluate the effect of rumen-protected methionine (RPM) supplementation in a low-starch diet, with or without an extra source of sugar, on the productive performance of mid-lactation dairy cows, fed with isoproteic diets based on corn and ryegrass silage, dry ground corn and soybean meal. Eighty multiparous Holstein cows with 2.4 ± 0.6 lactations, 36.5 ± 4.5 kg/d, and 160 ± 68 DIM, were randomly distributed in a 2 x 2 factorial arrangement. Cows were blocked by parity, milk yield, and DIM, and allocated in 4 treatments: CON (control diet with 23% starch (%DM) without sugar supplementation or RPM); MET (control diet with RPM supplementation; 14 g of Smartamine M[®], Adisseo); SUG (control diet with 1.7% DM of crystal sugar); and MET+SUG (the inclusion of both treatments). The total experimental period was 28 d, with the first 3 d used for data collection as covariates. A TMR was provided, and treatments were top-dressed once a day. Milk yield and composition were recorded weekly and in the last 9 milkings. Data were analyzed using the MIXED procedure of SAS containing the fixed effects of MET, SUG, parity, time, and their interactions, and the random effects of block and cow. Multiple treatment comparisons were made among treatments and corrected using a Tukey adjustment. The inclusion of both sugar treatments (SUG and MET+SUG) increased milk yield and the inclusion of both RPM treatments (MET and MET+SUG) increased milk protein content.

Table 1. Effects of methionine and sugar supplementation on productive performance.

Variables	CON	MET	SUG	MET+ SUG	SEM	MET	SUG	MET* SUG
Met (%MP)	2.10	2.40	2.10	2.40				
Lys:Met	3.06	2.68	3.06	2.70				
Met:ME	0.91	1.04	0.91	1.04				
Milk yield, kg/d	34.20 ^b	32.70 ^c	35.40 ^a	35.10 ^a	0.28	0.33	<0.01	0.03
ECM, kg/d	35.00	33.90	36.20	36.00	0.29	0.69	<0.01	0.06
Fat, %	3.55	3.89	3.76	3.77	0.04	0.03	0.03	1.00
Total protein, %	3.35 ^b	3.46 ^a	3.39 ^b	3.43 ^a	0.02	<0.01	0.68	0.02
Lactose, %	4.56	4.51	4.65	4.51	0.02	<0.01	0.22	0.49
Fat, kg/d	1.23	1.25	1.32	1.31	0.01	0.57	0.08	0.34
Total protein, kg/d	1.16	1.12	1.19	1.19	0.01	0.83	0.01	0.06
Lactose, kg/d	1.56	1.48	1.65	1.59	0.02	0.03	<0.01	0.15
MUN, mg/dL	22.55	23.56	23.99	22.09	0.29	0.55	0.48	0.78

Key Words: amino acid, energy, sugar

Adisseo Message:

The results from this trial suggest that despite the basal diet being supplemented with enough Smartamine M to closely meet the recommended grams of metabolizable Met:ME ratio, the total energy, of the diet may have not been sufficient to elicit a milk volume response with the added methionine coming from Smartamine M. Although total milk protein was not increased, it is noteworthy that milk protein percentage increased with added methionine.

The added sugar did elicit a milk volume response, therefore, supporting the assessment that the basal diet was energy limiting. In agreement with previous reports (Boderick et al., 2008), adding crystal sugar did not lower the MUN.

Before adding Smartamine M to diets that are known to be deficient in methionine, the end user needs to assure that the basal diet carries enough ME to capture the benefits of the additional methionine.

