

Rumen-protected methionine supplementation improves oxidative status and lactation performance during a subclinical mastitis challenge in lactating dairy cows.

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The objective of this study was to evaluate the effects of rumen-protected methionine (Smartamine M, Adisseo Inc., France) on lactation performance and liver glutathione of lactating dairy cows during a subclinical mastitis challenge (SMC). Thirty-two Holstein dairy cows (145 ± 51 DIM) were enrolled in a randomized complete block design. At -21 d relative to SMC, cows were assigned to dietary treatments, and data were collected from 0 to 3 d relative to SMC. Cows were blocked according to parity, DIM, and milk yield. Cows received a basal diet (17.4% CP; Lys 7.01% MP and Met 2.14% MP) supplemented with 100 g/d of ground corn (CON; n = 16) or Smartamine M (SM, 0.09% DM; n = 16). At 0 d, mammary gland rear right quarter was infused with 500,000 cfu of *Strep. uberis* (O140J). Milk yield was recorded twice daily from 0 until 3 d relative to SMC. Milk samples were collected from 0 to 3 d relative to SMC for analysis of fat, protein, and SCC. Blood samples were collected at 0, 6, 12, 24, 48, and 72 h relative to SMC for biomarkers metabolism and oxidative stress, while liver biopsies were performed at -10 d and 24 h for measurement of total glutathione. Data were analyzed using the MIXED procedure of SAS. Significance was declared at $P \leq 0.05$ and trends at $P \leq 0.10$. There was a trend ($P = 0.07$) for greater milk yield (+ 0.9 kg) after SMC in SM cows than CON. No differences ($P > 0.10$) were observed in energy metabolites or DMI; however, reactive oxygen metabolites (ROM) were lower ($P < 0.01$) in SM cows than CON. Milk somatic cell linear score was not affected by trt, and a score >4 at 24 h confirmed a subclinical mastitis. **SM cows had greater ($P < 0.01$) milk fat at 24 and 36 h post SMC, resulting in overall greater ($P = 0.04$) milk fat.** Milk protein tended ($P = 0.07$) to be greater in SM cows than CON. We observed greater ($P = 0.05$) liver glutathione in SM cows than CON. Overall, our results show that methionine supplementation during a SMC may positively affect milk performance and lower the risk of oxidative stress by increasing liver glutathione in lactating dairy cows.

Keywords: rumen-protected methionine, subclinical mastitis, *Streptococcus uberis*.