457 Rumen-protected methionine improves uterine immunometabolic status of dairy cows.

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Methionine is one of the most limiting amino acids in the diet of dairy cows. We hypothesize that feeding rumen-protected methionine (RPM, SmartamineM, Adisseo, Alpharetta, GA, USA) peripartum and early lactation would decrease the susceptibility to reproductive tract inflammatory diseases through a modulation of the uterine immune defense mechanisms. Twenty multiparous Holstein cows were assigned to one of 2 dietary treatments. Treatments were fed 21 ± 1 d before calving until 73 ± 1 d in milk (DIM) and consisted of a TMR top-dressed with RPM (MET; RPM at a rate of 0.08% of DM: Lys:Met = 2.8:1; n = 11) or without (CON; Lys:Met = 3.5:1; n = 9). Uterine cytology smears and endometrial biopsy samples were collected at 15, 30, and 73 DIM and analyzed for mRNA expression of genes related to metabolism and inflammation. Data collected was analyzed using the MIXED procedure in SAS, modeling the fixed effects of treatment, time, and their interaction. Regarding cytological smear samples, cows in MET tended to increase ($P = 0.07$) the expression of MAT1A and increased ($P < 0.01$) the expression of FGF7. Additionally, cows in MET had decreased ($P = 0.05$) expression of genes involved in inflammatory processes (IL1β, IL6, IL8, PTGES3, MUC1 and SOD1) and in metabolism (GLUT4 and TSPO). With the exception of MAT1A, there was an effect of time ($P = 0.05$) for all the transcripts, which decreased expression over time. For endometrial samples, cows in MET tended to have increased ($P = 0.08$) expression of LCAT and increased ($P = 0.03$) expression of APOL3, genes involved in cholesterol metabolism. Additionally, cows in MET had increased ($P = 0.04$) expression of SAHH, which encodes the enzyme of Met cycle S-adenosyl-L-homocysteine hydrolase; as well as increased ($P = 0.05$) expression of genes involved in tissue metabolism (FGF7, GLUT4). There was a tendency ($P = 0.09$) for cows in MET to have decreased expression of IL1β. In conclusion, feeding RPM to dairy cows during peripartum and early lactation improved the expression of genes involved in uterine metabolism and immune defense mechanisms in early lactation.

Key Words: gene expression, immune function, amino acid