Abstract #318

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Rumen-protected methyl donors during late pregnancy: 1. Maternal Smartamine M and its association with neonatal Holstein calf blood immunometabolic biomarkers.

Carolina Bespalhok Jacometo[*1], Zheng Zhou[2], Erminio Trevisi[3], Daniel Luchini[4], Marcio Nunes Corrêa[1], Juan J. Loor[2],[1]*Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul, Brazil,* [2]*University of Illinois, Urbana, IL,* [3]*Università Cattolica del Sacro Cuore, Piacenza, Italy,* [4]*Adisseo NA, Alpharetta, GA.*

The aim was to evaluate the effect of supplementing pregnant cows with rumen-protected methionine (MET) on growth and blood biomarkers of hepatic and energy metabolism, inflammation and oxidative stress. Forty Holstein calves born to cows receiving during the last ~4 wk of pregnancy MET (Smartamine M, Adisseo NA.; ~2.9:1 Lys:Met; n = 20) or control (CON, ~3.35:1 Lys:Met, n = 20) were used. Immediately after birth calves were separated from the dam, fed first colostrum (3.8 L with minimum IgG concentration of 50 g/L), housed individually and fed a common milk replacer (25% CP, 17% fat) twice daily. Calves were bled at birth (before colostrum), 24 h after first colostrum, at 14, 28 and 50 (~1 wk post-weaning) d of age. Data were analyzed as repeated measures using the MIXED procedure of SAS. No maternal diet effect ($P > 0.05$) was observed in calf growth (body weight and withers height) from birth through weaning. MET calves had lower glucose at birth (4.05 vs. 4.73 mmol/L, $P > 0.01$), but there was no overall maternal diet effect ($P = 0.18$). Regardless of maternal diet, glucose, AST and GGT increased markedly ($P < 0.01$) from birth to 24 h after colostrum intake, then decreased ($P < 0.01$) at 14 d and remained unchanged until 50 d. NEFA and creatinine concentrations had a sharp decrease after birth ($P < 0.01$) while BHBA concentrations increased ($P < 0.01$) over time. Paraoxonase, albumin and ceruloplasmin concentration increased ($P < 0.01$) over time. MET calves had lower albumin (30.1 vs. 30.9 g/L, $P = 0.09$) and ceruloplasmin tended to be lower (1.58 vs. 1.85 µmol/L, $P = 0.11$). IL1-B and IL-6 had a marked decrease ($P < 0.01$) from birth to 24 h after colostrum intake. Tocopherol (1.31 vs. 2.19 µg/mL), myeloperoxidase (466 vs. 544 U/L) and ROMt (12.4 vs. 15.5 mg H_2O_2/100 mL) were lower ($P < 0.05$) in MET calves at 14 d of age. Retinol increased over time ($P < 0.01$). Overall, data suggest that maternal supplementation with MET during the last ~4 wk of gestation affected some biomarkers of metabolism and oxidative stress, hence, seemed to elicit a beneficial effect on the neonatal calf.

Key Words: dairy cattle, fetal programming, nutrition