

**Metabolism of dairy cows as affected by dietary starch level and supplementation with monensin during early lactation.** M. M. McCarthy<sup>\*1</sup>, T. Yasui<sup>1</sup>, C. M. Ryan<sup>1</sup>, S. H. Pelton<sup>1</sup>, G. D. Mechor<sup>2</sup> and T. R. Overton<sup>1</sup>, <sup>1</sup>*Cornell University, Department of Animal Science, Ithaca, NY*, <sup>2</sup>*Elanco Animal Health, Greenfield, IN*

The objective of this study was to evaluate the impact of dietary starch level and monensin (M) on metabolism of dairy cows during early lactation. Primiparous ( $n = 21$ ) and multiparous ( $n = 49$ ) Holstein cows were fed high starch (HS; 26.2% starch, 34.3% NDF, 22.7% ADF, 15.5% CP) or low starch (LS; 21.5% starch, 36.9% NDF, 25.2% ADF, 15.4% CP) TMR beginning at parturition until 21 DIM with a topdress pellet containing 0 or 450 mg/d M in a completely randomized design with a  $2 \times 2$  factorial arrangement of treatments. Prior to parturition all cows were fed a common controlled energy diet with daily topdress of either 0 or 400 mg/d M consistent with postpartum treatment. Postpartum blood samples were collected  $3 \times$  per wk and liver biopsies were taken on  $d 7 \pm 4$ . Cows fed HS had higher plasma glucose (57.5 vs. 53.9 mg/dL;  $P = 0.003$ ) and insulin (0.26 vs. 0.19 ng/mL;  $P = 0.008$ ), and lower NEFA (533.1 vs. 696.6  $\mu$ Eq/L;  $P = 0.002$ ) than cows fed LS. Cows fed LS had elevated BHBA during 11 to 21 DIM compared to cows fed HS (starch  $\times$  d;  $P = 0.04$ ). There was no effect of M on postpartum plasma NEFA. Cows fed M had higher plasma glucose compared to controls (58.1 vs. 53.3 mg/dL;  $P < 0.001$ ) which was driven by a M  $\times$  parity interaction in which heifers fed M had greater plasma glucose concentrations than controls (62.0 vs. 54.2 mg/dL;  $P = 0.008$ ). Cows fed M had lower plasma BHBA compared to controls (10.08 vs. 12.66 mg/dL) which was contributed to by a M  $\times$  parity interaction in which heifers fed M had lower BHBA concentrations than controls (10.11 vs. 13.99 mg/dL;  $P = 0.03$ ). There was no effect of starch treatment on overall liver triglyceride content. Heifers fed M had increased liver triglyceride content compared to control heifers and cows fed M had decreased liver triglyceride content compared to control cows (M  $\times$  parity;  $P = 0.05$ ). Cows fed LS with M had higher liver glycogen content than cows fed the LS without M, with no effect of M treatment for cows fed HS (starch  $\times$  M;  $P = 0.008$ ). Overall, animals fed HS postpartum and M throughout the transition period exhibited improvements in energy metabolism during early lactation.

**Key Words:** starch, monensin, metabolism