Effects of Different Severities of Short-Term Feed Restriction in Cattle

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Transition dairy cattle experience a dramatic reduction for dry matter intake (DMI) as parturition approaches followed by rapid increases after parturition. These changes for DMI are in addition to corresponding hormonal, social, and dietary change. Low DMI is a predisposing factor for a negative energy balance and may increase risk for ruminal acidosis. The objective of this study was to evaluate the effect of different levels of short-term feed restriction (FR) on rumen fermentation and post-restriction feed intake. Eighteen ruminally- cannulated heifers were blocked by body weight into 3 blocks and, within block, randomly assigned to 1 of 3 treatments. The treatments were imposed during a 5-d FR period. During this period heifers were offered 75, 50, or 25% of their voluntary DMI, relative to the previous 5 d. All heifers were fed ad libitum except during FR. Heifers were monitored for 3 wk following the 5-d FR period.

A treatment × period interaction was detected ($P < 0.01$) for DMI, where, DMI did not differ among treatments prior to FR but, as expected, DMI was lowest for the group receiving 25%, intermediate for 50% and highest for those receiving 75% of their voluntary intake during the FR period. During the 1st wk of recovery, DMI did not differ among treatments but numerically decreased with increasing severity of feed restriction. No differences for DMI were detected during the 2nd and 3rd wk of recovery. The duration that pH was below 5.5 (used as an indicator of acidosis) was lowest ($P < 0.01$) during FR, greatest during the 1st wk of recovery, and intermediate for the 2nd and 3rd wk of recovery. Plasma glucose was lower ($P = 0.02$) and β-hydroxybutyrate was higher ($P = 0.03$) during FR and the 1st wk of recovery when compared with the baseline and 3rd wk of recovery.

Implication: This study suggests that exposure to even a mild severity of feed restriction increases the risk for ruminal acidosis upon return to voluntary feed intake. For dairy cattle, this may partially explain why transition cows are at high risk for ruminal acidosis after calving.