UNDERGRADUATE STUDENT POSTER COMPETITION

PSI-10 Relationships Between Fecal Characteristics, Rumen pH, and Intake During an Acidosis Challenge. Tyler Angus[1], Haley Linder[2], Zachary Buessing[1], Joshua C. McCann[1], *[1]University of Illinois at Urbana-Champaign, [2]University of Nebraska*

Abstract: The objectives were to: 1) determine the relationship of fecal particle size with rumen pH, fecal pH, dry matter intake (DMI) and 2) determine the ability of fecal characteristics to predict rumen pH and DMI. Decreased ruminal pH during an acidotic bout may reduce fiber digestion and increase subsequent washed fecal particle size. Data were collected in a metabolism experiment using18 ruminally cannulated steers. The study was a completely randomized design evaluating the effect of a lactate adaption before an acidosis challenge. Ruminal pH, DMI, and fecal characteristics (fecal pH and washed fecal particle size) were measured for 4 d after the acidosis challenge. Fecal particle size was measured with 7 sieves with diameters ranging from 4,750 to 600 µm. Average rumen pH over 4 d was associated (r = 0.60; $P < 0.01$) with mean fecal particle size. However, rumen pH was not correlated with fecal pH ($P > 0.1$). Fecal pH was not correlated with mean fecal particle size ($P > 0.1$). Mean fecal particle size was correlated with days after the acidosis challenge (r = 0.36; $P < 0.01$). Multiple regressions were performed with the GLMSELECT procedure of SAS 9.4 using stepwise selection. Rumen pH was best predicted ($r^2 = 0.22$) by fecal particle size between 1,700 and 1,400 µm, 1,180 and 850 µm, and less than 600 µm. Dry matter intake was best predicted ($r^2 = 0.17$) by fecal particle size between 2,360 and 1,700 µm, 1,400 and 1,180 µm, and 850 and 600 µm. Overall, results indicated mean fecal particle size was correlated with rumen pH and days after the acidosis challenge. Additional data are needed for fecal characteristics to accurately predict ruminal pH and DMI.

Keywords: acidosis, fecal particle size, rumen pH

PSI-1 Depletion and Repletion Dynamics of Individual and Regional Bone-Mineral Reserves in Replacement Gilts Fed Different Levels of Dietary Phosphorus and Calcium. Piterson Floradin[1], Candido Pomar[2], Marie-Pierre Létourneau-Montminy[1], Patrick Schlegel[3], *[1]Laval University, [2]Agriculture and Agri-Food Canada, [3]Agroscope*

Abstract: The aim of this study was to evaluate the ability of replacement gilts to compensate (repletion), before their insemination, bone-mineralization deficit in individual bones or bone regions that resulted from low dietary phosphorus (P) and calcium (Ca) supply during the growing period (depletion). A total of 24 gilts were fed according to a 2-phase feeding program (60-95 and 95-140 kg BW, respectively). During the depletion period, the gilts were fed ad libitum a finisher diet providing either 100% or 60% of the estimated P requirement (D100 with 2.1 g and D60 with 1.2 g digestible P/kg, respectively). During the repletion period, one-half of the gilts from each finisher diet were randomly assigned to either a restrictively fed control or a high-P diet (R100 with 2.1 g and R160 with 3.5 g digestible P/kg, respectively) according to a 2 × 2 factorial design, resulting in 4 treatments: D60-R100, D60-R160, D100-R100 and D100-R160. Bone mineral content (BMC) in the entire body, individual bones (femur and spine lumbar L2-L4), and bone regions (front legs and hind legs) were measured in each gilt at 2-week intervals using dual-energy X-ray absorptiometry (DXA). At 95 kg, gilts fed D60 had less BMC in the entire body, all individual bones and bone regions than those fed D100 ($P < 0.001$). The spine lumbar L2-L4 lost more BMC (-17%; $P < 0.001$) than the other sites, which decreased by 7% in the hind legs ($P = 0.001$), 9% in the femur ($P = 0.002$) and 10% in the head and trunk ($P = 0.043$ and $P = 0.006$). At 140 kg, all sites studied had similar BMC. In D60 gilts, recovery was reached 2 ($P < 0.001$) and 4 weeks ($P < 0.001$) after the depletion period when fed the R160 and R100 diets, respectively. These results show that replacement gilts can regain mineral deficits in all individual bones and bone regions.

Keywords: bone regions, dual-energy X-ray absorptiometry (DXA), individual bones