

PSVI-17 Effect of Post-Ruminal Amino Acid Supply on Organ Mass and Small Intestinal Length in Holstein Bull Calves fed a Starch-Based Milk Replacer.

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Abstract: Forty Holstein bull calves were fed 1 of 3 starch-based milk replacers for either 10 or 35 days to determine responses in organ mass and small intestinal length. Calves (87.2 ± 7.7 kg) were bottle-fed a cornstarch-based milk replacer (727 g of cornstarch daily) alone, milk replacer with added casein (154.7 g/d) or milk replacer with added glutamate (45.5 g/d) for 10 or 35 d. Prior to receiving treatments calves were fed a commercial milk replacer for either 12 or 15 weeks so that measures of organ mass and small intestinal length were collected at the same day of age. Measures of organ mass were achieved after calves were euthanized and digesta was removed. Duodenum was defined as the first 1-m caudal to the pyloric sphincter. Jejunum and ileum were defined as the cranial and caudal halves of the remaining small intestines. Data were analyzed using the MIXED procedure of SAS. Average daily gain was 68% greater ($P = 0.02$) for calves fed casein compared to control, but glutamate did not differ from casein or control. Mass of the omasum, abomasum, jejunum, ileum, heart, or kidney and length of the jejunum or ileum were not affected by treatment ($P \geq 0.18$); however, additions of casein increased ($P \leq 0.05$) mass of the rumen, duodenum, large intestine, liver, and spleen. Greater duration of treatment increased rumen, abomasum, duodenum, jejunum, large intestine, heart, liver, and spleen mass ($P \leq 0.05$), but there was treatment by duration interaction ($P \geq 0.18$). Interestingly, there was an interaction ($P < 0.01$) for jejunal and ileal length in response to treatment and duration. Length of each segment increased with duration of treatment for calves fed casein or glutamate but lengths decreased in calves fed control for greater amounts of time.

Keywords: amino acids, cattle, starch

PSVI-6 Predicting Fecal Composition Using Near Infrared Spectroscopy (Nirs): Expanding the Calibration to Include Grazing Beef

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Abstract: A near-infrared spectroscopy (NIRS) calibration was previously developed to predict fecal composition using samples from beef heifers fed high forage diets ($> 95\%$ forage dry matter basis) during total collection digestibility studies. The objective of the current study was to expand the fecal composition calibration with samples from grazing beef cattle. Fecal samples were collected from beef steers grazing two annual and two perennial forage mixtures over 2 growing seasons. Individual samples ($n = 12$ /paddock) were composited by paddock resulting in 30 samples from year 1, and 24 from year two. Fecal samples were oven dried at 55°C for 48 hours and ground through a 1.0 mm screen prior to scanning on a FOSS DS2500 scanning monochromator (FOSS, Eden Prairie, MN). The grazing fecal spectra ($n = 54$) was added to the existing library and then mathematically treated for scatter correction. Modified partial least squares (MPLS) regression was performed to develop equations to predict fecal composition [organic matter (OM), nitrogen (N), neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), undigestible NDF (uNDF), calcium (Ca), and phosphorus (P)]. The calibrations for fecal OM, N, NDF, ADF, ADL, uNDF, Ca, P resulted in R^2_{CV} between 0.86 and 0.96 and SECV of 1.73, 0.07, 1.65, 1.20, 0.63, 1.91, 0.21, and 0.07, respectively. This study confirms the potential of NIRS to predict fecal chemical composition of beef cattle fed high forage or grazing forage diets. Future steps include expansion and further validation of the calibration equations to include digestibility and intake predictions by estimating the internal markers lignin and uNDF.

Keywords: beef, fecal composition, near-infrared spectroscopy