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Effects of increasing levels of corn distillers dried grains with solubles to steers offered moderate-quality forage

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Abstarc :

Supplementation of forage-fed livestock has been studied for decades; however, as by-products become available research is needed to determine optimal feeding rates for increased efficiency. Five ruminally and duodenally cannulated beef steers (446 ± 42 kg of initial BW) were used in a 5 × 5 Latin square to evaluate effects of increasing level of supplemental corn distillers dried grains with solubles (DDGS; 25.4% CP, 9.8% fat, DM basis) on DMI, rate and site of digestion, ruminal fermentation, and microbial efficiency. Diets consisted of ad libitum quantities of moderate-quality smooth brome hay (10.6% CP; DM basis), free access to water and trace mineral salt block, and 1 of 5 levels of DDGS (0, 0.3, 0.6, 0.9, and 1.2% of BW daily of DDGS; DM basis). Diets were formulated to meet or exceed the estimated rumen degradable protein requirements (assumed microbial yield = 10.5%). All supplements were fed at 0600 h before forage was fed. Steers were adapted to diets for 14 d followed by a 7-d collection period. Hay OM intake decreased (linear; P < 0.001), whereas total OM intake increased (linear; P < 0.001) with increasing DDGS level. Total CP intake, duodenal OM and CP flows, and total tract OM and NDF digestibilities increased (linear; P ? 0.01) with increasing level of DDGS. Apparent ruminal and true ruminal CP digestibilities increased linearly (P ? 0.007), and total-tract CP digestibility increased quadratically (P = 0.02) with increasing DDGS level. Average ruminal pH was not different (P = 0.89) among treatments. Ammonia concentration increased (quadratic; P = 0.02) with increasing DDGS. Acetate proportions (molar %) decreased linearly (P < 0.001), whereas butyrate (molar %) increased linearly (P = 0.007), and propionate (molar %) increased quadratically (P = 0.04) with increasing DDGS. Ruminal DM fill decreased quadratically (P = 0.03), whereas fluid dilution rate tended to increase cubically (P = 0.08) with increasing DDGS. In situ rate of hay and DDGS DM disappearance responded cubically (P ? 0.03) with greatest disappearance occurring with the 0.9% treatment. In situ rate of ruminal CP degradation of hay and DDGS increased (linear; P ? 0.003) with increasing DDGS. Feeding 0.3% up to 1.2% of BW daily of DDGS as a supplement to forage-based diets resulted in no adverse effects on forage digestion or fermentation and resulted in increased nutrient supply in steers fed moderate-quality smooth brome hay.

Key Word :
digestion, distillers dried grains with solubles, fermentation, moderate-quality forage, steer, supplementation

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