Effect of exogenous polysaccharide-degrading enzyme preparations on ruminal fermentation and total tract digestibility of nutrients in lactating dairy cows

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The objective of this study was to evaluate the effect of three exogenous polysaccharide-degrading enzyme preparations (EPDE) on ruminal fermentation and total tract apparent digestion of nutrients in lactating dairy cows. Four late-lactation, ruminally cannulated Holstein cows were allocated to dietary treatments in a 4 × 4 Latin square design. The basal diet fed to the cows contained 40% alfalfa and grass hays, 44% corn and barley grains, 8% whole cottonseed, and 8% protein and mineral/vitamin supplements. The EPDE preparations, a blank, a predominantly amylase, a predominantly xylanase, and an amylase/xylanase combination were dosed into the rumen through the cannula daily, during the morning feeding (0600) at 10 g/cow. Treatments did not affect ruminal pH (P = 0.97), ammonia concentration (P = 0.96), protozoal counts (P = 0.97), total and individual VFA concentration (P = 0.42 to 0.99), acetate:propionate ratio (P = 0.57), and solid ruminal digesta passage rate (P = 0.35). Carboxymethylcellulase, xylanase, and amylase activities of whole ruminal contents at 2, 4, and 6 h following EPDE dosing were also not affected (P = 0.20 to 0.99) by the treatments. Intake of DM and nutrients and total tract apparent digestibility of starch, NDF, and ADF did not differ (P = 0.24 to 0.28) among treatments. Digestibilities of DM, OM, and N were reduced (P = 0.06 to 0.07) by the amylase/xylanase combination compared with the amylase or xylanase EPDE. Given the conditions of this experiment, EPDE dosed intraruminally at 10 g/head/d did not affect ruminal fermentation, did not increase the polysaccharide-degrading activities of ruminal contents, and did not affect total tract apparent digestion of nutrients compared to the control.