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Effects of Optigen® on fermentation, digestion, and N partitioning in rumen-simulating fermenters fed diets with distillers dried grains.

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The effects of Optigen® (blended, controlled-release urea) on ruminal fermentation, digestion, and N flow in diets with and without distillers dried grains (DDG) were investigated in single-flow rumen-simulating fermenter cultures. Data from 5 experiments (44 cultures) were included in this meta-analysis. Cultures were fed 50% forage diets (corn silage and alfalfa hay), DDG at 0 (DDG0) or 20% (DDG20), and 2 levels of Optigen (0 and 0.55% DM). NPN from Optigen replaced 7.6% of dietary N. Cultures were fed 12.5 g as fed of experimental diets twice daily for 6 days. Target dilution rate was 0.045 h-1. Samples were collected from cultures prior to morning feeding during the last 3 d of experiments for fermentation analysis. Effluent weights were recorded each day and a composite sample for each fermenter used for DM, OM, and NDF disappearance determination. Nitrogen flow measures were estimated by using purine to N ratios for effluent DM and bacteria. Data were analyzed using the PROC MIXED Model of SAS. Least-square means were compared using Scheffe's test for simultaneous inference. Culture fluid pH, ammonia, and digestion were similar between all-natural protein and Optigen cultures ($P>0.10$). Cultures receiving Optigen had greater protein degradability (64.0 vs. 67.6, $P<0.01$) than all-natural protein cultures. Bacterial N yields (0.352 vs. 0.359 g, $P>0.10$) were not affected by protein source. Cultures fed DDG20 diets had lower ammonia concentrations (5.25 vs. 3.29 mg/dl, $P<0.01$) and lower true DM digestibility (63.4 vs. 61.1%, $P<0.01$). DDG20 cultures degraded less protein (68.8 vs. 62.8% of CP, $P<0.01$) and produced less bacterial N (0.362 vs. 0.349 g/d, $P<0.05$), but were more efficient (35.1 vs. 36.9 g bacterial N/kg fermentable carbohydrate, $P<0.01$) than DDG0 cultures. Negative effects of 20% DDG dietary inclusion on N flow in rumen-simulating fermenters were partially negated by addition of Optigen.

Key Words: Non-Protein Nitrogen, Optigen, Distillers Dried Grains