

Effects of Dietary Glycerin on Rumen Metabolism of Beef Cattle Fed 50% Dried Distillers Grains with Solubles

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Major: Animal Sciences

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Glycerin improves ADG, efficiency, and marbling scores in beef cattle; however, its ruminal effects are unknown. We hypothesized increasing dietary glycerin would increase ruminal pH, ruminal propionate concentration (Pr), and in situ fiber disappearance, but decrease ruminal hydrogen sulfide gas concentrations (H₂S) in cattle fed dried distillers grains with solubles (DDGS)-based diets. Six cannulated steers were used in a replicated 3×3 Latin square design. Steers were fed 1 of 3 dietary treatments: (1) 0% glycerin, (2) 8% glycerin, or (3) 16% glycerin (DM basis). The remainder of the diet contained 50% DDGS, 20% silage, 10% supplement, and corn, to replace glycerin in the diet. Steers had a 14d dietary adaptation at the start of each feeding period. Rumen fluid samples were collected for pH, H₂S, and VFA on d 15 of each period. On d 16, a 24h in situ incubation was conducted. As glycerin inclusion increased, DMI tended (linear; $P = 0.06$) to decrease. Glycerin inclusion did not affect ($P \geq 0.38$) in situ DM and NDF disappearance. A time×glycerin interaction ($P < 0.01$) occurred for ruminal pH; however, mean ruminal pH did not differ ($P = 0.88$) with increasing glycerin (6.06, 6.08, and 6.11, respectively). There was time×glycerin interaction ($P = 0.05$) for acetate concentration (Ac). At 0h post-feeding there was no effect on Ac; however, at 3 and 6h post-feeding, Ac was reduced with increasing glycerin inclusion. Mean Pr increased (linear; $P = 0.01$) with increasing dietary glycerin inclusion. As glycerin inclusion increased, mean H₂S decreased (linear; $P = 0.05$). Mean ruminal H₂S at 0, 8, and 16% glycerin inclusion were 658, 515, and 477 mg H₂S/L, respectively. Contrary to our hypothesis, fiber digestion was not increased in steers fed increasing glycerin; however, ruminal Pr was increased, implying increased Pr may be responsible for improved marbling scores.