

Effect of Increasing Amounts of Corn Dried Distillers' Grains with Solubles in Dairy Cow Diets on Enteric Methane Emissions, Digestibility, and Milk Production

C. Benchaar*¹, F. Hassanat², R. Gervais², P. Y. Chouinard², D. I. Massé¹

¹Agriculture and Agri-Food Canada, Sherbrooke, QC, J1M 0C8

²Université Laval, Québec, QC, G1V 0A6

Email: chaouki.benchaar@agr.gc.ca

Twelve lactating Holstein cows (Days in milk (DIM) = 99 ± 18; body weight (BW) = 645 ± 49kg) were used in a triplicated 4 × 4 Latin square (35-d periods, 14-d adaptation) to examine the effect of including increasing amounts (0, 10, 20 and 30%, dry matter (DM) basis) of corn dried distillers grains with solubles (DDGS) in the diet on enteric CH₄ emissions, digestibility, and milk production. Diets were isonitrogenous (crude protein (CP) = 16.9%) and isocaloric (net energy of lactation (NE_L) = 1.64 Mcal/ kg) and fed for ad libitum intake. Production of CH₄ was measured (3 consecutive days) using respiration chambers. Digestibility and milk performance were determined over 6 consecutive days. Linear and quadratic contrasts (Proc MIXED; SAS) were used to determine effects of dietary DDGS levels on variable responses. Significance was declared at $P \leq 0.05$. DM intake increased linearly as DDGS proportion increased in the diet (23.4, 24.4, 24.8 and 25.2 kg/d for 0 to 30% DDGS, respectively). Digestibility of DM (70.7, 70.2, 69.6, and 68.1% for 0 to 30% DDGS, respectively), and energy (69.6, 69.2, 68.7, and 67.6% for 0 to 30% DDGS, respectively) declined linearly as DDGS level in the diet increased. Milk yield increased linearly (up to + 4 kg/d) with increasing levels of DDGS in the diet. Milk fat (3.93 to 3.47% for 0 to 30% DDGS, respectively) and milk protein (3.49 to 3.31% for 0 to 30% DDGS, respectively) contents decreased linearly with the addition of DDGS in the diet. There was a tendency ($P = 0.10$) for a quadratic increase in energy corrected milk (ECM) as the proportion of DDGS in the diet increased. Methane production decreased linearly with increasing levels of DDGS in the diet (495, 490, 477 and 475 g/d for 0 to 30% DDGS). When adjusted for gross energy intake, CH₄ losses also decreased linearly as DDGS proportion increased in the diet (6.09, 5.80, 5.61, 5.23% for 0 to 30% DDGS, respectively). When expressed relative to ECM, CH₄ production declined linearly as the amount of DDGS increased in the diet.

Implications: Results from this study show that feeding DDGS to dairy cows can help to mitigate enteric CH₄ emissions without negatively affecting intake and milk production.