

Low protein diets for sows reduce greenhouse gas production

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Greenhouse gases (GHG) are believed to contribute to global climate change. Our objective was to reduce the GHG production by sows by decreasing their protein intake using amino acid supplementation.

Four non-pregnant sows were fed conventional diets based on barley (B-HP) or corn (C-HP), and protein-reduced, amino acid supplemented diets (B-LP and C-LP). The protein contents were 14.6% (B-HP), 13.2% (C-HP), 11.8% (B-LP) and 9.7% (C-LP). Amino acid concentration exceeded the recommendations by NRC. CO₂, CH₄ and heat production and O₂ consumption were measured twice per sow and diet over a 4h period using an open-circuit respiration system. N-excretion was assessed using the urinary N:creatinine ratio.

CO₂ production was not different for barley vs. corn diets ($p > 0.3$) or protein level ($p > 0.1$). O₂ consumption and heat production were not influenced by barley vs. corn or protein level ($p > 0.6$). CH₄ production was lower by 60% for B-LP vs. B-HP ($p = 0.001$), but similar for both corn diets ($p > 0.1$). CH₄ production was lower for the corn-based than the barley-based diets. C-LP and B-LP had lower N-excretion ($p < 0.05$) than C-HP and B-HP. The reduced N-excretion will cause a proportional decrease in N₂O production. Being 23 and 310 times as powerful as CO₂, the reduced CH₄ and N₂O production lowers GHG production by sows, even though CO₂ production was not affected in this experiment.

Implications:

Pigs fed corn diets produce less CH₄ than pigs fed barley diets. Amino acid supplemented low protein diets based on barley reduce CH₄ production by 60%. Low protein diets also reduce nitrogen excretion and thus the production of N₂O from manure storage and handling.

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