

# Performance and greenhouse gas emission in finisher pigs fed very low protein diet

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Dietary protein reduction by 2 to 3% can reduce environmental impact of pig production without impairing pig performance. There is little information on the metabolic consequences of feeding diets with protein reductions greater than 5%. Feeding finisher pigs with very low protein (VLP) diet to maintain performance; reduce the production of CO<sub>2</sub>, CH<sub>4</sub> and heat. In the current study twelve gilts (80 kg) were fed *ad libitum* on either a control (HP) diet based on wheat, barley, canola and soybean meal, or a VLP diet containing only barley (94% of the diet), supplemented with synthetic lysine, methionine, threonine, tryptophan, isoleucine and valine, in a cross-over design. The diets were isoenergetic, containing 16.8% (HP) and 11.2% (VLP) crude protein. Gas exchange (O<sub>2</sub>, CO<sub>2</sub> and CH<sub>4</sub>) was measured for 4 h using indirect calorimetry. Data were analyzed by Proc Mixed of SAS. Mean body weight was 80.5 kg, SE 2.7, daily gain (819 g, VLP vs. 828 g, HP, SEM 24), daily feed intake (2287 g, VLP vs. 2278 g, HP, SEM 79) and gain to feed (0.374, VLP vs. 0.362, HP, SEM 0.009) were not affected by dietary protein level. O<sub>2</sub> consumption (0.85 L, VLP vs. 0.86 L, HP, SEM 0.02) was lower for pigs fed the VLP diet ( $P = 0.02$ ). CH<sub>4</sub> production tended to be lower ( $P = 0.06$ ) for the VLP group. Heat production was lower in the VLP compared to HP diet (18.4 kJ/min vs 21.2 kJ/min, SE 0.9). The greenhouse gas (GHG) production by pigs, in CO<sub>2</sub>-equivalent, tended ( $P = 0.057$ ) to be lower for the VLP at 3020 g/d (SE 229) than for the HP at 3334 g/d (SE 229).

## Implications:

Feeding VLP diets, based on barley and amino acids, to finisher pigs will maintain performance. The VLP diet reduced CO<sub>2</sub> and, as a tendency, CH<sub>4</sub> production, and consequently GHG emissions by the pigs. Reduced heat production indicates improved nutrient utilization in pigs receiving the VLP diet.

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