

Effects of dietary protein reduction on greenhouse gas emission from pigs

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Greenhouse gas (GHG) emissions are believed to contribute to global climate change. The GHG emissions from swine production are the sum of emissions from the animals per se, from barns, manure storage and field application. We hypothesized that, feeding pigs a reduced protein, amino acid supplemented diets would reduce GHG emissions from both the animal and manure sources.

Sows and finishing pigs were fed conventional (HP) or reduced protein, amino acid supplemented (LP) diets, formulated based on wheat-barley-canola (WBC) or corn-soybean (CS). Indirect calorimetry (open-circuit) was used to measure CO₂ and CH₄ emission.

The CO₂-equivalents emitted by finishing pigs were 1255 and 1076 kg/pig and year (WBC) and 1209 and 1120 kg/pig and year (CS) HP and LP diets, respectively. Emissions from sows were 2016 and 1682 kg/pig and year, respectively. The CO₂-e emitted by finisher pigs and sows fed WBC diets were reduced by 14.3% to 16.5% when feeding the LP diets, and were similar for finishing pigs and sows. The reduction was only by 7.5% when feeding the CS LP diet. The animals per se caused 71% to 74% of total emissions (pig plus manure) at low conversion rates (see abstract #31 following). At high conversion rates, CO₂-e emitted by finishing pigs per se were 28% to 32% of total emissions. Reducing dietary protein contents decreased the total GHG emissions to similar degree when applying low or high rates of transformation in manure. The total reduction in GHG emissions was 10% per 10% relative dietary protein reduction.

Implication: The CO₂-e were reduced regardless of the degree of conversion of nutrients in manure or weight or physiological state of the pigs. Reducing dietary protein contents is a tool to reduce GHG emissions independent of handling or technological manipulation of manure.

Supported by Alberta Pork, Alberta Agricultural Research Institute, Climate Change Funding Initiative – CARC, Degussa AG