



## Effects of nutrition on digestion efficiency and gaseous emissions from slurry in growing-finishing pigs. I. Influence of the inclusion of two levels of orange pulp and carob meal in isofibrous diets

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### ARTICLE INFO

#### Article history:

Received 20 January 2015

Received in revised form 6 July 2015

Accepted 10 July 2015

#### Keywords:

Ammonia emissions

Carob meal

Digestion efficiency

Growing-finishing pigs

Methane emissions

Orange pulp

### ABSTRACT

An experiment was conducted to investigate the effects of increasing the level of two sources of fibrous by-products, orange pulp (OP) and carob meal (CM), in iso-NDF growing-finishing pig diets on nutrient balance, slurry composition and potential ammonia (NH<sub>3</sub>) and methane (CH<sub>4</sub>) emissions. Thirty pigs (85.4 ± 12.3 kg) were fed five iso-nutritive diets: a commercial control wheat/barley (C) and four experimental diets including two sources of fibrous by-products (OP and CM) and two dietary levels (75 and 150 g/kg) in a 2 × 2 factorial arrangement. After a 14-day adaptation period, faeces and urine were collected separately for 7 days to measure nutrient digestibility and the excretory patterns of N from pigs (6 replicates per diet) housed individually in metabolic pens. For each animal, the derived NH<sub>3</sub> and CH<sub>4</sub> emissions were measured in samples of slurry over an 11- and 100-day storage periods, respectively. Source and level of the fibrous by-products affected digestion efficiency in a different way as the coefficients of total tract apparent digestibility (CTTAD) for dry matter (DM), organic matter (OM), fibre fractions and gross energy increased with OP but decreased with CM (*P* < 0.05). Crude protein CTTAD decreased with the inclusion of both sources of fibre, being lower at the highest dietary level. Faecal concentration of fibre fractions increased (*P* < 0.05) with the level of inclusion of CM but decreased with that of OP (*P* < 0.01). High dietary level for both sources of fibre increased (*P* < 0.02) CP faecal content but urine N content decreased (from 205 to 168 g/kg DM, *P* < 0.05) in all the fibre-supplemented compared to C diet. Additionally, the proportions of undigested dietary, water soluble, and bacterial and endogenous debris of faecal N excretion were not affected by treatments. The initial slurry characteristics did not differ among different fibre sources

**Abbreviations:** ADFom, acid detergent fibre without residual ash; ADL, acid detergent lignin; AOAC, Association of Official Analytical Chemists; BEDN, bacterial and endogenous debris nitrogen; *B*<sub>0</sub>, biochemical methane potential; CH<sub>4</sub>, methane; CM, carob meal; CTTAD, coefficient of total tract apparent digestibility; DM, dry matter; CP, crude protein; DE, digestible energy; aNDFom, neutral detergent fibre; NDICP, neutral detergent insoluble crude protein; NH<sub>3</sub>, ammonia; OP, orange pulp; OM, organic matter; SEM, standard error of means; SF, soluble fibre; TAN, total ammonia nitrogen; TDF, total dietary fibre; TKN, total Kjeldahl nitrogen; UDN, undigested dietary nitrogen; WSN, water soluble nitrogen.

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