

## Nonruminant Nutrition: DDGS

**M200 Amino acids and energy utilization in zero tannin faba bean and co-fermented wheat and corn distillers dried grains with solubles (DDGS) fed to growing pigs.** E. Kiarie\*<sup>1</sup>, R. K. Kahindi<sup>1</sup>, P. Lopez<sup>2</sup>, C. Furedi<sup>2</sup>, and C. M. Nyachoti<sup>1</sup>, <sup>1</sup>University of Manitoba, Winnipeg, MB, Canada, <sup>2</sup>The Puratone Corporation, Niverville, MB, Canada.

Nutritional characterization of locally available feedstuffs may stimulate their inclusion in swine diets and contribute to whole farm nutrient management programs. We determined the nutritive value of Manitoba grown zero-tannin fava beans (ZTFB, < 1% tannin) and co-fermented wheat and corn DDGS (wcDDGS) from a local ethanol plant. Corn DDGS (cDDGS) was also included for comparison. In Exp. 1, 6 ileal-cannulated barrows (BW = 29.3 kg) were fed 3 diets in a replicated 3 × 3 Latin square design to determine the apparent (AID) and standardized (SID) ileal digestibility of AA. The 3 diets contained either ZTFB or wcDDGS or cDDGS as the sole source of AA. The SID was calculated using values of basal endogenous AA losses from our previous studies. In Exp. 2, 12 intact barrows (BW = 22.5 kg) were fed 4 diets in a 2 15-d period crossover design to determine DE and ME contents of the test ingredients by difference method. The diets were a basal corn-based diet or the basal diet with corn replaced by 46% ZTFB or wcDDGS or cDDGS. The concentrations (DM basis) of GE (kcal/kg), CP (%) and Lys (%) in ZTFB were 4,136, 27 and 1.6, respectively; corresponding values for wcDDGS were 5,175, 31.5 and 0.85. The ZTFB had higher ( $P < 0.05$ ) SID of Lys (83.2%) compared with wcDDGS (72.1%) and cDDGS (67.8%); as a result the SID content (g/kg DM) of Lys in ZTFB (13.5) was greater ( $P < 0.05$ ) than that of either wcDDGS (6.03) or cDDGS (6.68). The DDGS samples had higher ( $P < 0.05$ ) SID and contents of sulfur AA (Met and Cys) compared with ZTFB. The ME content (kcal/kg DM) of ZTFB (3,548) was lower ( $P < 0.05$ ) than that of cDDGS (3,851) whereas the ME content of wcDDGS (3,669) was similar ( $P > 0.05$ ) to that of ZTFB or cDDGS. The results show that ZTFB has higher digestible Lys whereas wcDDGS has higher digestible sulfur AA but both ingredients have comparable ME content. Thus, a blend of these 2 ingredients can serve as excellent source of AA and energy for swine.

**Key words:** energy and nutrient utilization in swine, zero tannin faba beans, co-fermented wheat and corn DDGS

**M201 Glucanase, xylanase and microbial inoculants improve feeding value of DDGS for liquid-fed finishing pigs.** C. L. Zhu\*, M. Rudar, D. Wey, and C. F. M. de Lange, University of Guelph, Guelph, ON, Canada.

Fiber degrading enzymes and microbial inoculants are likely more effective in improving the feeding value of DDGS in liquid feeding than in conventional dry feeding systems. A study was conducted to determine the impact of feeding corn DDGS steeped with exogenous enzymes (xylanase and glucanase) or microbial inoculants (*Pediococcus* in Exp. 1 and *Enterococcus* plus *Bacillus* in Exp. 2) on growth performance, nutrient digestibility, and carcass and meat quality in finishing pigs. A total of 384 Yorkshire pigs (192 in each Exp; initial BW 66 kg; 4 gilts and 4 barrows per pen; equal number of pens per treatment) were liquid-fed corn and soybean meal based diets containing 30% DDGS (DM basis) using a computerized liquid feeding system. The DDGS was mixed with water (17% DM basis) and steeped in one of 4 fermentation tanks, representing 4 treatments: (1)

control, DDGS only, (2) DDGS+enzymes, (3) DDGS+inoculants, (4) DDGS+enzymes+inoculants. Samples of supernatants were taken after at least 48 h of steeping for analysis. Fecal samples were collected at 90 kg BW for determining apparent nutrient digestibility, using titanium as an indigestible marker. At the final BW (110 kg) carcass quality was evaluated according to the Canadian grading scheme. Responses to treatments were similar in Exp. 1 and 2 ( $P > 0.05$ ). Steeping DDGS with enzymes, inoculants and enzymes plus inoculants increased ( $P < 0.05$ ) lactic acid content in the supernatants (for all responses treatments 1 to 4, respectively: 1.69, 1.94, 1.98, and 2.37%; SE 0.10). Steeping DDGS with enzymes, inoculants or enzymes plus inoculants increased ( $P < 0.05$ ) ADG (1.04, 1.15, 1.16, and 1.22, kg/d; SE 0.02) and ADFI (2.50, 2.73, 2.78, and 2.87, kg/d; SE 0.05). A numerical increase ( $P = 0.07$ ) in digestibility of N was observed (82.0, 83.7, 84.0 and 84.2%; SE 0.60). Hot carcass weight, back fat depth, loin depth and estimated carcass lean yield did not differ among treatments ( $P > 0.05$ ). Through steeping and using fiber degrading enzymes or microbial inoculants the feeding value of DDGS for liquid fed finishing pigs was improved.

**Key words:** pigs, liquid feeding, DDGS fermentation

**M202 Determination of dry matter content in feces of pigs fed three different sources of DDGS.** K. Kock\* and C. Hostetler, South Dakota State University, Brookings.

An experiment was conducted to determine the differences in dry matter output between 3 different sources of DDGS. A total of 72 crossbred barrows were placed in metabolism crates at an average initial body weight of 55.2 kg. Dietary treatments were either a corn-based basal diet with no DDGS (Control; n = 9) or the basal diet with 30% DDGS from one of 3 commercially available sources (Diets A, B and C; n = 21 respectively). Pigs were fed their respective diets at 3% of BW for 9 d before a 4 d collection period. During the 4 d collection period, pigs were fed half their ration twice daily and all feces were collected once per day at the morning feeding. Feces were weighed, pooled within pig and frozen until analysis of dry matter content. Dry matter content was determined by drying approximately 1 kg of the pooled sample in a forced air oven at 70°C for 48 h. There was no difference between treatments in total dry matter intake over the entire 4 d collection period (5.89, 5.94, 5.98 and 6.00 kg for Control, A, B and C respectively;  $P > 0.1$ ). There was a significant difference between treatments for total manure output (0.99 vs. 1.94, 1.73 and 1.95 kg for Control vs. A, B and C respectively;  $P < 0.01$ ), resulting in approximately 1.5 to 2 times the amount of manure from pigs fed diets containing DDGS compared with the corn only diet. Additionally, there were differences due to treatment in manure %DM (53.6 vs. 44.6, 46.7 and 45.5 for Control vs. A, B and C respectively;  $P = 0.04$ ) and total DM output (531 vs. 847, 798 and 872 kg for Control vs. A, B and C respectively;  $P < 0.01$ ) which is an increase of approximately 50% in DM output compared with corn only diets. However, there was no difference between sources of DDGS in total manure output, manure %DM or total DM output. These data indicate that diets containing DDGS add a significant amount of volume to manure output; therefore, manure storage facilities may reach capacity more quickly when feeding a high level of DDGS in swine diets.

**Key words:** swine, DDGS, dry matter