## Disappearance of dietary fibre in the small intestine, large intestine, and total tract of growing pigs fed corn- or wheat-based diets without or with microbial xylanase

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**Application** Microbial xylanase supplementation may improve disappearance of energy in corn-based diets and may improve disappearance of energy and dietary fibre in wheat-based diets. This indicates differences in fibre structure in wheat compared with corn and that microbial xylanase may improve energy utilization in growing pigs.

**Introduction** Disappearance of dietary fibre along the intestinal tract is influenced by the structure and physical characteristics of fibre (Bach Knudsen, 2001). The objective of the experiment was to test the null hypothesis that there is no difference in the disappearance of nutrients and dietary fibre in the small intestine, large intestine, and total tract of pigs fed diets based on corn and soybean meal (SBM), corn, SBM, and corn distillers dried grains with solubles (DDGS), wheat and SBM, or wheat, SBM, and wheat middlings without or with microbial xylanase.

**Material and methods** Diets based on corn and SBM; or corn, SBM, and 30% DDGS; wheat and SBM; or wheat, SBM and 30% wheat middlings were formulated without xylanase, with Xylanase A, or with Xylanase B for a total of 12 diets. Diets were randomly allotted to 24 barrows (initial BW:  $28.51 \pm 1.86$  kg) following a  $24 \times 4$  Youden square design with 12 diets and four 18-d periods, for a total of 8 replicate pigs per diet. Pigs had a T-cannula installed in the duodenum and a second T-cannula was placed in the ileum. Each period lasted 18 d. The initial 7 d was an adaptation period to the diets. Faeces and urine were collected from the feed provided from d 8 to 13. Ileal digesta were collected on d 15 and 16, and duodenal digesta were collected on d 17 and 18 (González-Vega *et al.*, 2014). Diets, duodenal and ileal digesta, and faeces samples were analyzed for nutrients, energy, insoluble dietary fibre, and soluble dietary fibre. Urine samples were analyzed for energy and disappearance of nutrients, energy, and total dietary fibre (TDF) was calculated. Data were analyzed following a  $2 \times 2 \times 3$  design with 2 types of diets (corn-based or wheat-based), 2 levels of fibre (low or high), and 3 microbial xylanase treatments (none, Xylanase A, or Xylanase B) using the MIXED procedure (SAS Institute Inc., Cary, NC, USA) with pig as the experimental unit.

**Results** Disappearance of gross energy (GE) in the small intestine and large intestine of pigs was 12.88 and 3.20 MJ/kg DMI, respectively, and disappearance of TDF in the small intestine and large intestine was 32 and 72 g/kg DMI, respectively. Disappearance of GE in the small intestine was improved (P < 0.05) with inclusion of Xylanase B in corn-SBM diets (14.50 vs. 12.89 MJ/kg DMI). Disappearance of GE and TDF from the wheat-SBM-wheat middlings diet in the large intestine was improved (P < 0.05) if Xylanase B was included (4.13 vs. 3.47 MJ/kg DMI and 96 vs. 76 g/kg DMI). Total tract disappearance of GE and TDF was improved (P < 0.05) in the wheat-SBM diet if Xylanase A was used (17.18 vs. 16.87 MJ/kg and 121 vs. 114 g/kg DMI) and in wheat-SBM-wheat middlings diets if Xylanase A or B was used (16.29 or 16.23 MJ/kg vs. 15.92 and 182 or 184 vs. 173 g/kg DMI). Total tract disappearance of TDF in wheat-based diets was reduced (P < 0.05) compared with corn-based diets (149 vs. 116 g/kg DMI).

**Conclusion** Disappearance of energy in corn- and wheat-based diets occurs mainly in the small intestine and disappearance of dietary fibre occurs mainly in the large intestine of pigs. Disappearance of energy in the small intestine in corn-based diets may be improved if microbial xylanase is supplemented, but this was not the case for disappearance of dietary fibre. Disappearance of energy and dietary fibre in the large intestine and total tract may be improved if microbial xylanase B appears to be more efficient than Xylanase A in improving disappearance of energy and dietary fibre both in corn- and wheat-based diets indicating variation among xylanase sources. Differences in the total tract disappearance of dietary fibre in corn- vs. wheat-based diets may indicate differences in fibre structure in corn and wheat grains.

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## References

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