

Xylanase supplementation in feed reduces incretin and PYY levels in piglets

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Xylanase is a commercially available exogenous enzyme used in non-ruminant feeds. It is known to result in improved feed efficiency and previous studies showed that supplementation of xylanase into poultry feed increased serum PYY levels⁽¹⁾. The objective of the current study was to investigate the effects of xylanase supplementation on gut hormone production in newly weaned piglets.

Experiment 1: 32 female Camb12 weaned piglets were randomly assigned to 1 of 2 diet groups in period 1 (0–2weeks post-weaning; P1), a control diet (Co) or the same diet supplemented with xylanase (XS). During period 2 (2–6weeks post-weaning; P2) half the pigs were kept on their original diet whilst the rest were swapped onto the other diet, resulting in four groups as demonstrated in figure 1. At the end of P2 the pigs were culled. Blood samples were collected using EDTA coated tubes and a plasma aliquot obtained and stored at –80 °C for further analysis. A Human Metabolic Hormone Milliplex HMMHAG-34 K kit (Merck Millipore) was used to assess the concentrations of peptide-YY (PYY), pancreatic polypeptide (PP), insulin, c-peptide and gastric inhibitory polypeptide (GIP) in the plasma. The assay was carried out according to the manufacturer’s instructions and the internal controls were all within range. **Experiment 2:** 16 female Camb12 weaned piglets were assigned to the same two diet groups as in experiment 1 (Co and XS). After P1 the pigs were culled and blood samples taken as in experiment 1, however protease inhibitors were added to the collection tubes so extra gut hormones could be analysed (amylin, ghrelin and glucagon-like peptide-1 (GLP-1)).

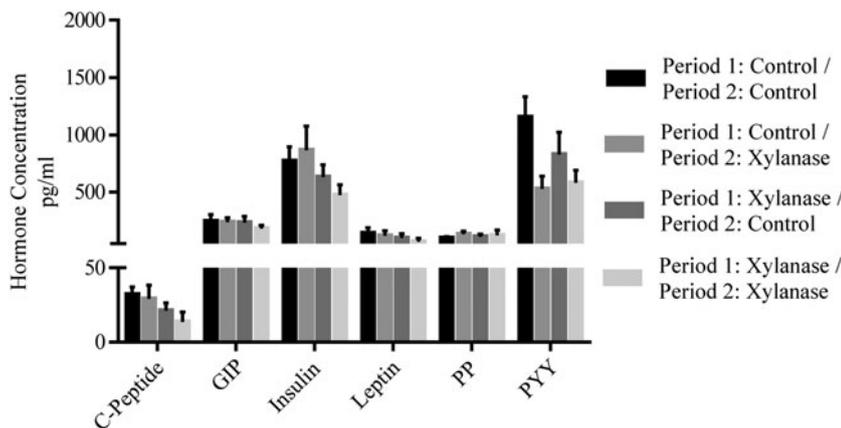


Fig. 1. Concentrations of metabolic hormones from experiment 1 (end of P2).

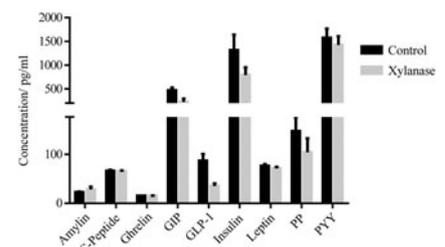


Fig. 2. Concentrations of metabolic hormones from experiment 2 (end of P1).

The data were tested for normality and analysed with the appropriate parametric or non-parametric test (One/Two-Way ANOVA or Kruskal-Wallis), significance was accepted at $P < 0.05$. In experiment 1, XS in P2 significantly decreased plasma PYY concentrations ($P = 0.008$). In experiment 2, XS significantly decreased plasma GIP ($P = 0.013$) and GLP-1 ($P < 0.001$) concentrations in P1.

In conclusion, an XS diet affects the production of certain gut hormones in newly weaned piglets. The effect was dependent upon the timing of supplementation as different hormones were affected between P1 and P2. GIP and GLP-1 are known as incretin hormones which effect pancreatic function and PYY is a satiety signalling hormone. Further trials are needed to investigate whether there are longer term effects when the piglets are grown to a commercial slaughter weight.

1. Singh A, Masey O’Neill HV, Ghosh TK *et al.* (2012) *Anim Feed Sci Technol* 177, 194–203.