

## XYLANASE SUPPLEMENTATION IMPROVES PERFORMANCE AND ALTERS THE MICROBIOME OF LACTATING SOWS AND THEIR PIGLETS FED LOW OR HIGH FIBRE DIETS

K. Vermeulen<sup>†</sup>, G.A. Papadopoulos<sup>‡</sup>, A.L. Wealleans<sup>‡</sup>, V. van Hoeck<sup>‡</sup>, I. Giannenas<sup>‡</sup>, S. Lioliopoulou<sup>‡</sup>, P. Tassis<sup>‡</sup>, and K. Papageorgiou<sup>‡</sup> and P. Fotomaris<sup>‡</sup>

<sup>†</sup> Kemin Europa N.V., Animal Nutrition and Health EMENA, Toekomstlaan 42, Herentals 2200, Belgium

<sup>‡</sup> Laboratory of Animal Husbandry, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece

<sup>‡</sup> Laboratory of Animal Nutrition, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece

<sup>‡</sup> Farm Animals Clinic, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece

<sup>‡</sup> Laboratory of Microbiology and Infectious Diseases, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece

High fibre diets for lactating sows can reduce costs and increase gut fill and satiety, but also reduce nutrient digestibility and performance. The present study aimed to assess the impact of a new xylanase from *Thermopolyspora flexuosa* and expressed in *Pichia pastoris*, on the performance and fecal microbiome of lactating sows and their litters. At transfer to the farrowing crates (d108 of gestation), 48 sows were assigned to four groups in a 2x2 design: a low fibre control diet (LF), LF supplemented with 45,000 U/kg xylanase, a high fibre control diet (HF), and HF supplemented with 45,000 U/kg xylanase. Diets were commercially relevant and fed *ad libitum*. Sow BW was recorded at transfer, at d0, d14 and d28 of lactation (weaning). P2 backfat thickness was recorded at transfer, d14 and d28. For piglets, litter size, individual and litter weight was recorded at d0 and d28. Fecal samples were collected from all sows and litters at d7 and 14. DNA was extracted and sent for 16s rRNA (V3/V4) amplicon sequencing. Across the study, HF and xylanase-supplemented sows consumed significantly more feed ( $P=0.003$  and  $P=0.002$ , respectively). Sow weight loss was significantly higher in unsupplemented sows ( $P=0.001$ ); more specifically, the percentage of weight loss was significantly higher in unsupplemented sows ( $P=0.002$ ) and tended to be higher in the LF than in the HF group ( $P=0.056$ ). Xylanase supplemented sows lost less backfat during lactation compared to control sows ( $P=0.030$ ), driven by changes between d14 and d28. No significant performance response was seen in pre-weaning piglets. The fecal microbiome of sows receiving HF diet + xylanase showed a higher  $\alpha$ -diversity compared to sows on LF diets + xylanase ( $P=0.031$ ). The effects of diet type and xylanase on the fecal microbiome of piglets was more subtle. In conclusion, supplementation with xylanase improved performance in lactating sows, and influenced the microbiome of sows and their piglets.