To feed fibre or not to feed fibre; a holistic nutritional approach to raising piglets without therapeutic levels of zinc

P.R.T. Bonekamp, A. Calderon, A. Smith, A.K. Kies, D.J. Langhout; DSM Nutritional Products EMEA

Background and Objectives

There is continuing pressure from the EU and national authorities to reduce antibiotic use in pig production. This, together with a recent decision to withdraw zinc oxide at therapeutic levels, is causing concern amongst pig producers. Considerable research has been conducted, evaluating alternatives for both antibiotics and zinc oxide, but, so far, no silver bullet has emerged. A multi-faceted approach, including nutrition and management, may be a more appropriate strategy to assure sustainable pig production for the future. One aspect of feed, which is not often considered when looking for an alternative to high zinc inclusion, is dietary fibre (DF). It is a poorly defined material, containing substances resistant to digestive enzymes. Given this lack of definition, precise analysis can be difficult to conduct and interpret. However, a simple split into soluble and insoluble DF, is already beneficial. Flis *et a*l (2017) demonstrated that DF addition could improve technical performance and beneficially change the intestinal tract of piglets. Insoluble DF was also shown to improve faecal consistency and reduce incidence of post-weaning diarrhoea. The objective of the current study was to compare the performance of piglets with low body weight, (BW) fed diets containing different ratios of soluble: insoluble DF in the absence of therapeutic zinc oxide. A soluble and insoluble DF database for ingredients compiled by DSM was used to create diets new nutrients and specific DF diets.

Materials and Methods

In the study 680 piglets (PIC 337 x Danbred, mean BW 4.4 kg) were allocated to 40 pens (split sexes, 17 piglets/pen) in a semi commercial facility. BW was stratified between treatments and within a pen. The piglets were fed a 3-phase feeding program post weaning: creep feed (4 days), pre-starter (14 days), and starter (24 days). They had ad libitum access to feed and water during the experimental period. In the pre-starter and starter phase, each pen of piglets was allocated to one of four dietary treatments (TRT). The diets were formulated to differ in the ratio of soluble:insoluble DF. TRT 1 was a control diet with industry typical levels of DF, TRT 2 was a diet formulated to have a higher amount of insoluble DF (using wheat bran and oat hulls), TRT 3 was a diet formulated to have a higher amount of soluble DF (using inulin and beet pulp) and TRT 4 comprised a combination of diets of TRT 2 and 3. All diets were low in zinc oxide, free of medication, and contained similar energy and amino acid levels. Animals were weighed by pen at each feed change and feed intake and fecal scores were recorded for each pen.

Results

Performance did not differ ($p>0.05$) between TRT in the creep feeding phase. In the pre-starter phase, piglets receiving high insoluble DF diets showed an impaired performance (lower ADFI and ADG, higher FCR), compared to those receiving the control or high soluble DF diets ($P<0.001$). In the starter period, no differences were observed between TRT. Over the entire period, the high soluble DF TRT outperformed all other TRT ($p<0.05$). All TRT diets showed lower mortality than the control (-2%)

Discussion and Conclusion

Performance differences across TRT for the entire period were highly influenced by the effect of the dietary TRT in the pre-starter period. In this experiment, the diet with a higher soluble DF content was the best approach for improving performance of low body weight piglets. This contrasts with previous studies claiming that piglets benefited from a diet containing more insoluble DF directly after weaning. This study shows that strategic formulation with DF has potential to help producers cope with low dietary zinc levels. However, how to formulate effectively with DF, and how it affects gut health of piglets, is not yet fully clear.

Reference

Flis, M., W. Sobotka and Z. Antoszkiewicz (2017). Fibre substrates in the nutrition of weaned piglets – a review. Ann. Anim. Sci., Vol. 17, No. 3 (2017) 627–643.