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Topic: Foodborne pathogen epidemiology and control strategies or public health issues and risk assessment

Feed size and texture influence propionic and butyric acid concentrations and *E. coli* populations in the pig gastrointestinal tract

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Natural approaches are now being considered to replace antimicrobials to reduce the risk of antimicrobial resistance development. This has put new emphasis on using diet to control bacterial infections in pigs, some of which having recently demonstrated a zoonotic disease potential. Moreover, dietary modifications can lead to a modulation of the bioregulation of volatile fatty acids (VFA). Our objective was to assess the effect of feed size and texture on intestinal VFA profiles and concentrations, *E. coli* populations, and on growth performance. Fattening pigs (n=840) received one of six different diets (mash feed 500, 750 and 1250 µm and pellet feed 500, 750 and 1250 µm). Weight gain of pigs was monitored for each diet formulation over the fattening period. At the slaughterhouse, caecal and colon contents from 165 pigs were sampled for enumeration of *E. coli* by quantitative PCR (qPCR) and for VFA quantification. Acetic, propionic, and butyric acids were quantified by capillary gas chromatography. The *yccT* gene was used to enumerate total *E. coli*. A decrease in feed conversion associated with pellet texture and/or 500 µm particle size was observed for each diet formulation (p<0,05). In addition, caecal (p=0,0271) and colon (p=0,0012) propionic acid concentrations were lower for pigs receiving pellet rather than mash feed. Similarly, caecal (p=0,0167) and colon (p=0,0008) butyric acid concentrations were also lower for pigs receiving pellet rather than mash feed. Moreover, caecal (p=0,0208) and colon (p=0,0006) butyric acid concentrations were higher for pigs receiving

a feed with a 1250 μm rather than 500 μm particle size. For total *E. coli* enumeration, caecal ($p=0,01$) and colon ($p=0,04$) *yccT* gene copies were higher for pigs receiving pellet rather than mash feed. Taken together, results showed that mash feed is associated with favourable intestinal changes (VFA levels) and with a reduction of *E.coli* in the pig.

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