

7. Digesta retention time and nutrient digestibility of pig diets varying in fibre level and particle size.

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Dietary fibres modulate digesta flow behaviour, consequently may affect nutrient digestibility and, finally, the nutritional value of diets. We studied the effects of dietary concentration and particle size (PS) of indigestible fibres on digesta mean retention time (MRT) in the proximal gastrointestinal tract (mouth-distal ileum) and apparent ileal digestibility (AID) of nutrients. Six ileum-cannulated pigs (26.8±2.08kg) were assigned to three dietary treatments in a 3x3 replicated Latin-square design. Fine (<1mm) or coarse (intact) oat hulls (OH) and soybean hulls (SBH) were added (50:50; w/w) to a maize-soybean-wheat based diet at 50 (low) or 250 g/kg (high) to obtain a low-fine fibre (LF), high-fine fibre (HF), and high-coarse fibre (HC) diet. Markers to follow liquids (Co-EDTA), solids (Y₃O₂), or fibrous particles (Yb-mordanted OH and Cr-mordanted SBH), were given as a single pulse and subsequently measured hourly in digesta for 13 h after administration. TiO₂ (4 g/kg diet) was used to calculate AID. PS neither affected MRT of liquid nor solid digesta phases (P=0.9034). Only MRT of SBH-particles was longer for coarse vs fine PS (96 min, P<0.05). Separation between solid and liquid digesta phases was observed for all diets (P<0.0001), although the extent of separation was greater for LF compared with HF and HC (P=0.0165). Moreover, PS did not affect AID (P>0.15). HF diet reduced DM AID by 10%-units (P=0.0072) compared with LF and increased NSP AID by 24%-units (P=0.0257). In conclusion, digesta MRT and AID were influenced by the dietary concentration but not PS of indigestible fibres.