

162. Early life fibre-enriched diets affect gut functionality of piglets challenged with enterotoxigenic *Escherichia coli* after weaning

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INTRODUCTION



Early-life nutrition has shown to be critical for pre-weaning piglet gut functionality, but effects after weaning have not yet been elucidated. We aimed to investigate the effects of fibre-enriched diets fed to sows around farrowing (transition diet) and to suckling piglets before weaning (creep feed) on post-weaning gut health of piglets challenged with enterotoxigenic *Escherichia coli* (ETEC).

MATERIAL AND METHODS



Seventy 26-day-old piglets were selected at weaning (Figure 1). Piglets were from sows fed a low-fibre (CTL; 173 g NSP/kg DM) or one of three high-fibre transition diets containing alfalfa (ALF-14%; 242 g NSP/kg DM), sugar beet pulp (SBP-17.9%; 256g NSP/kg DM), or a combination thereof (COM-8.9% SBP + 7.0% ALF; 249 g NSP/kg DM). In addition, piglets were fed either a low-fibre (LF, 115 g NSP/kg DM) or a high-fibre (HF, 144g NSP/kg DM) creep diet containing alfalfa. All piglets were fed the same weaner diet and received an oral dose of a porcine strain of ETEC at D4 PW. At D9 PW a blood sample was collected to determine cytokine and acute phase protein concentrations. Moreover, piglets were sacrificed to collect ileum and colon digesta, and to determine their pH and volatile fatty acid (VFA) concentrations (mmol/kg). Either univariate or multivariate statistical analyses were performed.

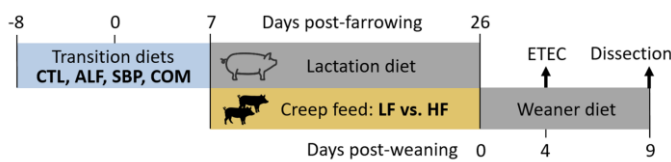


Figure 1. Experimental design.

RESULTS



Early life nutrition did not affect intestinal digesta pH of weaned piglets (Table 1).

Table 1. Digesta pH of piglets at day 9 post-weaning (n=10).

	Diet description			Ileum	Colon
1	CTL	LF	Eater + AB ¹	7.1	6.0
2	CTL	LF	Eater	7.1	6.2
3	ALF	LF	Eater	7.0	5.8
4	ALF	HF	Eater	7.0	5.9
5	ALF	HF	Non-eaters	7.1	6.0
6	SBP	LF	Eater	6.9	6.0
7	COM	LF	Eater	7.2	5.9
	SEM			0.1	0.1
	P-value			0.84	0.20

¹AB = Antibiotic via drinking water after weaning.

RESULTS



Piglets from SBP sows produced more acetic acid in the ileum compared to piglets from CTL sows, despite they were fed the same creep feed and weaner diet. Piglets from ALF sows and fed with HF creep feed produced more acetic acid in their ileum and colon versus piglets from CTL sows and fed LF creep feed (Table 2).

Table 2. Acetic acid concentration (mmol/kg) in digesta of piglets at day 9 post-weaning (n=10). Treatment groups with different superscripts differ significantly within intestinal segment (P<0.05).

	Diet description			Ileum	Colon
1	CTL	LF	Eaters + AB ¹	5.6 ± 0.9 ^a	37.7 ± 2.8
2	CTL	LF	Eaters	5.1 ± 0.8 ^a	35.5 ± 3.4 ^a
3	ALF	LF	Eaters	5.1 ± 0.7	36.7 ± 1.4
4	ALF	HF	Eaters	7.1 ± 0.7 ^b	40.3 ± 2.7 ^b
5	ALF	HF	Non-eaters	6.4 ± 0.9	40.3 ± 2.7
6	SBP	LF	Eaters	7.3 ± 2.0 ^b	31.8 ± 3.3
7	COM	LF	Eaters	5.6 ± 1.2	36.4 ± 3.6

Early-life nutrition did not affect concentrations of cytokines and acute phase proteins in serum of piglets at day 9 post-weaning (Figure 2).

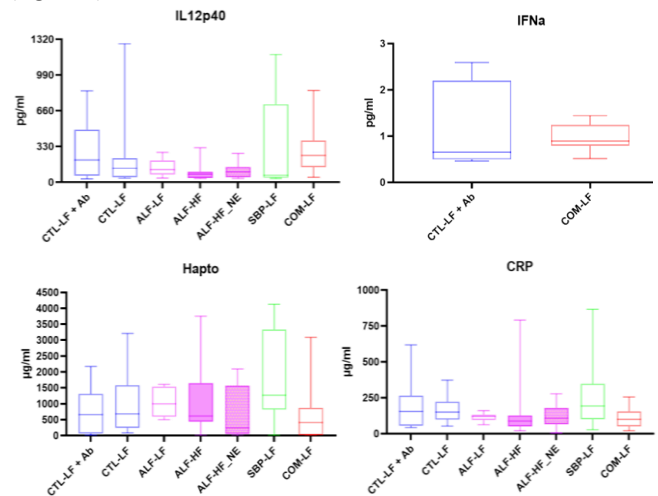


Figure 2. Box plots of mean concentrations of a subset of measured cytokines and acute phase proteins in serum of weaned piglets (n=10). Concentrations did not differ among treatments (P<0.05).

CONCLUSION



Early-life dietary fibre supplementation via the transition diet of sows and creep diet of piglets can affect later-life intestinal volatile fatty acid concentrations, specifically acetic acid, without affecting intestinal digesta pH. However, early life fibre-enriched diets did not significantly affect systemic levels of cytokines and acute phase proteins in weaned piglets after an ETEC challenge.