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# POST WEANING DIARRHOEA SUSCEPTIBILITY IN PIGLETS IN RELATION TO SUPPLEMENTARY CREEP FEEDING AND THE PRO-INFLAMMATORY TNF- $\alpha$ RESPONSE

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## Introduction and Objectives

Post weaning diarrhoea is a disease causing substantial economical and animal welfare problems worldwide, especially in the intensive pig production. The disease is caused by enterotoxigenic *Escherichia coli* (ETEC) bacteria. The abrupt nutritional change from milk to creep feed may contribute to the morphological and physiological changes in the small intestinal tract at weaning, thus enhancing the colonization of ingested or resident pathogenic bacteria (1, 2).

Probably the disease susceptibility is also influenced by the piglets' own immune responsiveness, because the maternally derived serum immunoglobulins are waning at weeks of age simultaneously with the withdrawal of the milk and its locally protective elements (3).

Supplementary creep feeding during the suckling period has been suggested to reduce the risk of diarrhoea after weaning by stabilizing the gut morphology and physiology and preventing the colonization of ETEC. As orally ingested antigens are found to stimulate the local and systemic immunological development, supplementary creep feeding is furthermore hypothesised to affect the immune function around weaning.

## Materials and Methods

Half of the suckling piglets in 12 litters were offered creep feed from 2 weeks of age until weaning at 4 weeks of age. During the suckling period, individual recordings of creep feed contact were carried out by direct observations (instantaneous sampling according to Lehner (4)), presuming a positive relation between the feed contact and feed intake. Clinical signs of spontaneous diarrhoea and faecal shedding of haemolytic *E. coli* were recorded during the suckling period and 5 days after weaning. Furthermore, the piglets' responsiveness in TNF- $\alpha$  was measured on days 1 and 2 before weaning as well as days 1 and 2 after weaning, using an ex vivo whole blood endotoxin stimulation test. The ex vivo whole blood stimulations were performed with 0  $\mu$ g or 50  $\mu$ g LPS per ml sodium heparin stabilized whole blood and processed for 3 hours. A commercial enzyme linked immunosorbent assay (ELISA) was used for quantification of plasma TNF- $\alpha$  (pig ELISA TNF- $\alpha$ , Pierce Endogen).

## Results and Discussion

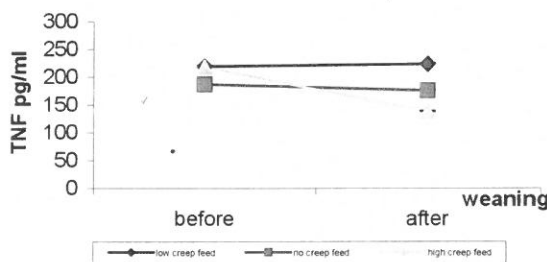
Diarrhoea occurred in 34% of the piglets after weaning and was associated with faecal shedding of haemolytic *E. coli* bacteria, specifically *E. coli* O149 (table 1).

The occurrence of faecal shedding of haemolytic *E. coli* bacteria and spontaneous diarrhoea during the first 5 days after weaning was not influenced by whether piglets were creep fed or not. However, the creep feed contact pattern during the suckling period influenced the faecal *E. coli* O149 shedding. Piglets with a low creep feed contact (less than the median) less often shed *E. coli* O149 compared to piglets with a high creep feed contact (more than the median) and piglets not offered creep feed (table 1).

Table 1

		N (%)	Diarrhoea	<i>E. coli</i> O149
Diarrhoea	Yes	31 (34%)		15 (48%)
	No	59 (66%)		7 (12%)
Creep feeding	Yes	46 (51%)	13 (28%)	8 (17%)
	No	44 (49%)	18 (41%)	14 (32%)
Creep feed contact	None	44 (49%)	18 (41%)	14 (32%)
	Low	24 (27%)	3 (13%)	2 (8%)
	High	22 (24%)	10 (45%)	6 (27%)

Figure 1



Piglets with low creep feed contact during the suckling period furthermore had higher responsiveness in TNF- $\alpha$ , compared to non-creep fed piglets and piglets with high creep feed contact (figure 1).

Low faecal shedding of *E. coli* O149 and high responsiveness in TNF- $\alpha$  2 days after weaning were associated with low diarrhoea occurrence. It is suggested that intestinal morphological, immunological and digestive conditions associated with a voluntary low creep feed contact during the suckling period may limit the small intestinal proliferation of *E. coli* O149. This may lead to lower susceptibility to post weaning diarrhoea.

## References

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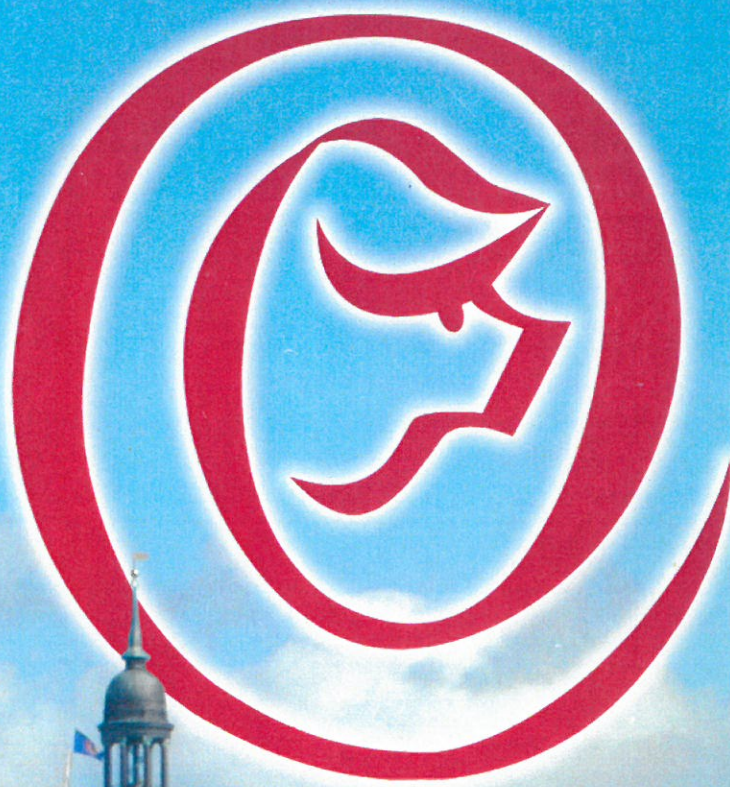


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