

## Separate and combined effects of oligofructose and inulin on post-weaning colibacillosis and weight gain: a preliminary study

D. Halás\*, C.F. Hansen\*, D.J. Hampson\*, J.C. Kim\*\*, B.P. Mullan\*\*, J. Callesen\*\*\*, R.H. Wilson\*\*\*\* and J.R. Pluske\*

\*School of Veterinary and Biomedical Sciences, Murdoch University, Murdoch WA 6150. \*\*Department of Agriculture and Food, South Perth WA 6151. \*\*\*Danish Pig Production, Axeltorv 3, 1609 Copenhagen V, Denmark. \*\*\*\*Wandalup Farms, Mandurah WA 6210.

Trends for a reduction in the use of dietary antibiotic growth promoters have caused increased interest in the use of alternative feed additives to maintain 'gut health' after weaning. Oligofructose and inulin are 'prebiotic' fructan-containing carbohydrates purported to enhance 'gut health' in newly-weaned pigs by altering microbial diversity (Konstantinov, *et al.*, 2003). However, their effects using a challenge model of post-weaning colibacillosis (PWC) have never been examined. The aim of the present study was to compare the separate and combined effects of oligofructose and inulin supplementation on the occurrence of diarrhoea and the weight performance in piglets experimentally challenged with enterotoxigenic *E. coli* (ETEC).

A total of 28 piglets ( $7.0 \pm 0.23$  kg; mean  $\pm$  SEM) weaned at 21 days of age were used in a completely randomized design with five treatments: 1) positive control (PC); 2) negative control (NC); 3) oligofructose (OF) at 40 g/kg of diet; 4) inulin (IN) at 40 g/kg of diet and 5) oligofructose and inulin combined (OF+IN) at 20 g/kg of diet each. The control diets (PC and NC) were identical wheat-based diets, with the experimental diets formulated from the control diets by substituting wheat with the appropriate amount of the prebiotic(s). All pigs, except PC, were inoculated with a  $\beta$ -haemolytic strain of *E. coli* (O149, K91, K88) on days 3, 4, 5 and 6 after weaning. Faecal consistency was assessed daily as dry (1), moist (2) or diarrhoea (3). ETEC shedding was expressed as a percentage of the total *E. coli* population grown on 5% sheep blood agar plates. The final weight was measured on day 21. Treatment effects were evaluated using the GLM procedure in SPSS (SAS Inc v14.0) using treatment as the fixed variable and weaning weight as a covariate. Faecal consistency was analyzed as repeated measures analysis of variance.

The faeces of piglets fed OF were more ( $P < 0.05$ ) liquid than those of the PC, IN and OF+IN pigs (Figure 1). Pigs fed inulin had the lowest incidence of PWC ( $P = 0.008$ ) on day four, the day after inoculation started. Pigs fed OF showed a tendency ( $P = 0.061$ ) to have the lowest weight at the end of the trial (day 21). Furthermore, there was a negative correlation between total *E. coli* shedding and total weight gain ( $r = -0.58$ ,  $P = 0.001$ ) (data not shown). Based on this preliminary study, inulin has been selected for further investigations evaluating its effects specifically on PWC under experimental challenge conditions, but also on growth performance and diversity of the microbiota.

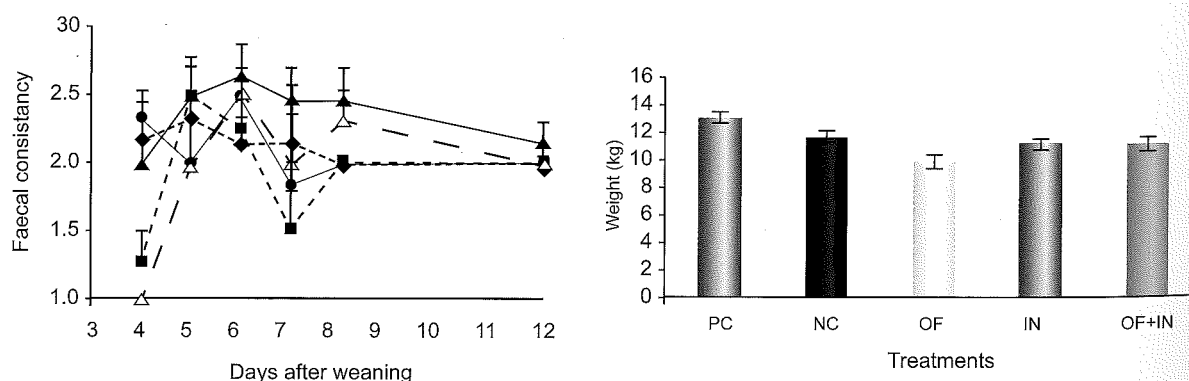


Figure 1. Effects of oligofructose, inulin, and oligofructose + inulin on faecal consistency and pig weight at 42 days of age

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### References

KONSTANTINOV, S.R., ZHU, W.Y., WILLIAMS, B.A., TAMMINGA, S., DE VOS, W.M. and AKKERMANS, A.D.L. (2003). *FEMS Microbiology Ecology* 43:225-235.