Department of Food Science -Department of Animal Science
AARHUS UNIVERSITY

Poster no: 195
Contact: jerezbogota@food.au.dk

FEEDING ANTIBACTERIAL PLANT COMBINATIONS TO MITIGATE POST-WEANING DIARRHOEA IN ORGANIC PIGLETS CHALLENGED WITH ENTEROTOXIGENIC *ESCHERICHIA COLI* F18

Kevin Jerez-Bogota[1,2], Ole Højberg[2], Martin Jensen[1] and Nuria Canibe[2]*
[1]Dept. of Food Science and [2]Dept. of Animal Science, Aarhus University, Denmark

Introduction

Antibiotics and zinc oxide restrictions encourage the use of alternative antimicrobials to combat enterotoxigenic *Escherichia coli* (ETEC), a major cause of post-weaning diarrhoea (PWD). Some plant combinations have been shown to exhibit synergistic antibacterial actions against ETEC. The goal here was to evaluate infection indicators and growth of ETEC-challenged organic weaners fed diets supplemented with garlic (**G**) in combination with apple pomace (**A**) or black currants (**B**).

Conclusion

The findings suggest that feeding diets supplemented with garlic and apple pomace or black currants to organic (and possibly conventional) weaners during the post-weaning period has the potential to reduce PWD caused by ETEC.

Results

The PC piglets had lower ADG and Gain:Feed from day 1 to 7 (**Table 1**) than those on NC, GA, and GB (P<0.05).

Table 1. Effect of ETEC-F18 challenge and plant supplementation on growth performance.

	NC	PC	GA	GB	SEM	P-value
ADG 0-7 (g/d)	441.3[a]	234.8[b]	432.3[a]	395.3[a]	42.86	0.007
ADG 7-14 (g/d)	714.5[ab]	840.1[a]	675.9[b]	628.3[b]	33.93	0.012
ADG 14-21 (g/d)	823.5	841.7	781.8	692.6	55.74	0.486
ADFI 0-7 (g/d)	793.0	784.7	660.6	746.2	35.80	0.141
ADFI 7-14 (g/d)	1417.0	1429.5	1377.6	1245.9	87.61	0.303
ADFI 14-21 (g/d)	1742.0	1757.1	1560.3	1489.9	75.45	0.069
GF 0-7	0.56[b]	0.35[c]	0.72[a]	0.53[b]	0.03	<.001
GF 7-14	0.50	0.53	0.50	0.51	0.03	0.946
GF 14-21	0.47	0.48	0.50	0.46	0.03	0.809

[abc] Within a row, values with different superscripts differ (P <0.05).

During the study, NC piglets showed neither ETEC-F18 shedding nor signs of diarrhoea (**Fig.1 and 2A**). From day 3 to 11, PC piglets had a higher incidence of diarrhoea (**Fig. 2A**) and, from day 5 to 9, a lower F-DM than NC piglets (**Fig. 2B**) (P <0.05). The GA and GB piglets had lower faecal ETEC-F18 shedding (**Fig.1**), lower incidence of diarrhoea and higher F-DM (**Fig.2**) than PC piglets on days 5, 7, and 9 (P<0.05).

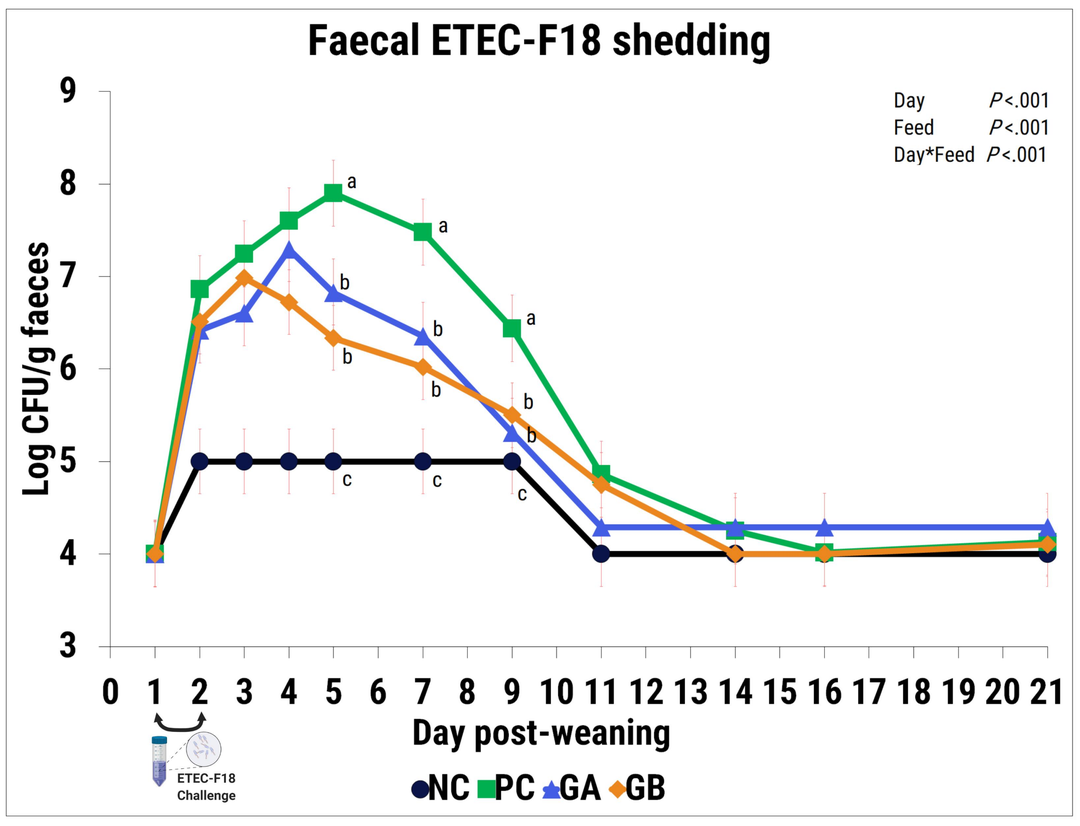

Figure 1. Effect of ETEC-F18 challenge and plant supplementation on faecal ETEC-F18 shedding count. [abc]Within a day, values with different superscripts differ (P<0.05).

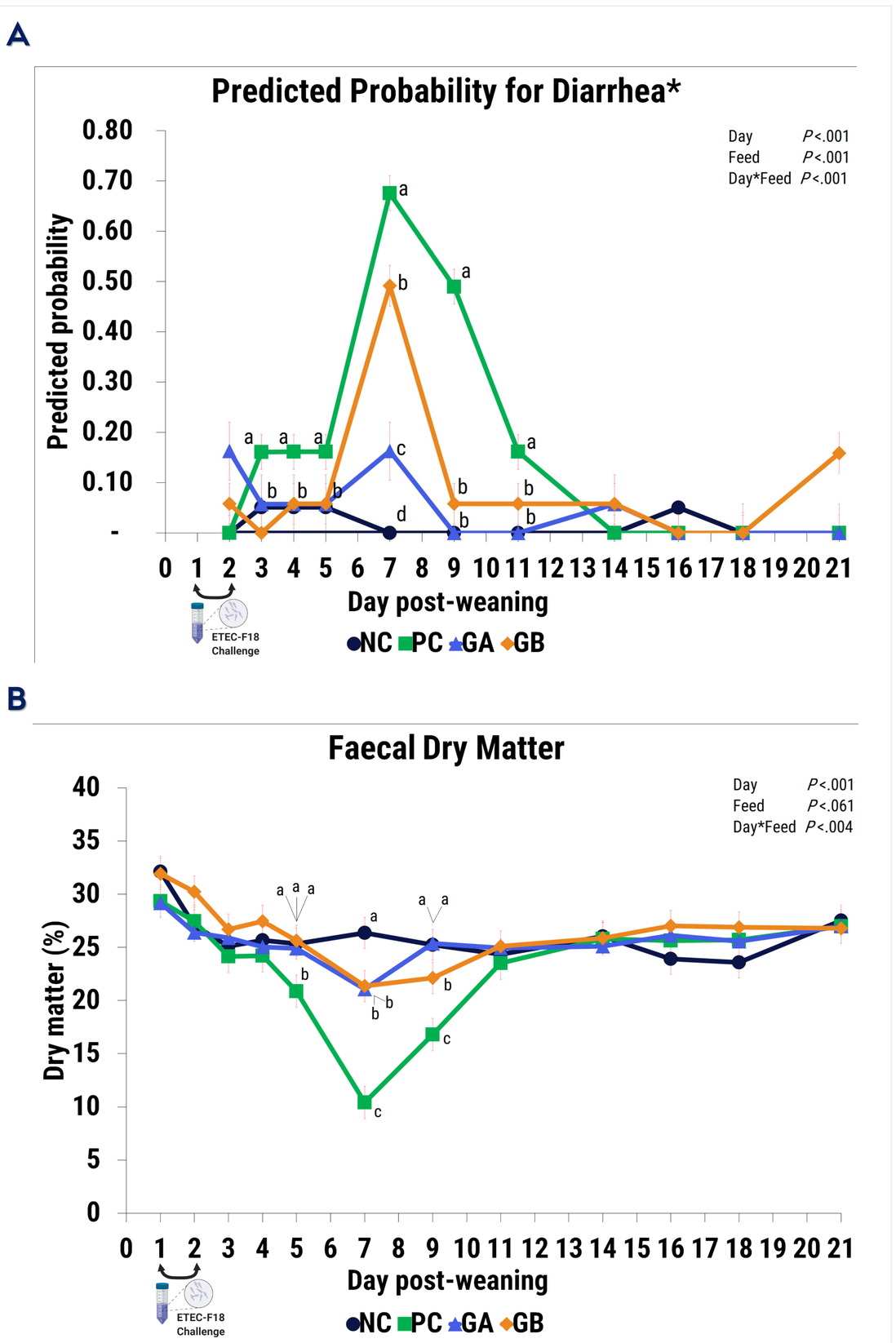

Figure 2. Effect of ETEC-F18 challenge and plants supplementation on diarrhea onset (**A**; *Based on a 7-point scale for faecal consistency with scores 4-7 indicating diarrhoea) and faecal dry matter (**B**). [abc]Within a day, values with different superscripts differ (P<0.05).

Materials and methods

For 21 days, 32 organic weaners (7-weeks) from ETEC-F18-receptor homozygote sows were randomly assigned to one of four treatments: non-challenge, standard diet (Negative Control; **NC**); challenge, standard diet (Positive Control; **PC**); challenge, garlic + apple pomace (3%+3%) supplementation (**GA**); challenge, garlic + blackcurrant (3%+3%) supplementation (**GB**). Challenged piglets were given 8ml of ETEC-F18 (10^9cfu/ml) on days 1 and 2 after weaning. Feed intake was measured daily and individual BW weekly. To assess diarrhoea incidence, ETEC-F18 shedding (plate counts), faecal dry matter (**F-DM**) and scores, faecal samples were collected daily the first week, and every other day thereafter. Data were analysed using PROC-GLIMMIX (SAS-9.4); treatment was a fixed effect, pen and sow were random effects, multiple comparisons were adjusted according to the Holm–Bonferroni method.

Project partners

ICROFS International Centre for Research in Organic Food Systems

Ministeriet for Fødevarer, Landbrug og Fiskeri
gudp

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monogutthealth
Optimal gut function in monogastric livestock

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