

Effect of ESPORAFEED PLUS on performance of early weaned piglets

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SUMMARY – A total of 120 crossbred (Large White _ Landrace) male piglets weaned at 22 d, were randomly distributed in three groups: (A) control diet without growth promoter, (B) control diet with 50 ppm of CARBADOX, and (C) control diet with 0.1 g/kg of ESPORAFEED PLUS (equivalent to 1×10^9 CFU/kg). From 0 to 10 d of experiment, animals fed the diet supplemented with ESPORAFEED PLUS (treatment C) tended to grow faster (116 vs 151 g/d, $P = 0.11$) and convert feed into gain more efficiently (1.67 vs 1.40 g/g, $P = 0.09$) than animals fed the control diet. At 18 d of experiment, animals supplemented with CARBADOX or ESPORAFEED PLUS grew better and had lower FCR than control animals (198, 211, and 217 g/d for ADG and 1.62, 1.51, and 1.40 g/g for FCR for treatments A, B, and C, respectively). Animals fed treatment C had lower FCR than controls ($P = 0.07$). From 18 to 28 d, animals fed diet B showed a higher growth than animals fed any of the other remaining diets, but the differences were not significant (487, 515, and 477 g/d for treatments A, B and C, respectively). We conclude that under our experimental conditions: (i) the addition of ESPORAFEED PLUS to early weaned piglet diets at 10^9 CFU/kg tended to increase growth for the first 10 d ($P = 0.11$) and to decrease feed conversion ratio for the first 18 d after weaning with respect to control animals; (ii) animals fed diets supplemented with CARBADOX had better growth and lower feed conversion ratio than control animals; and (iii) there were no significant differences between CARBADOX and ESPORAFEED PLUS.

Key words: Probiotics, *Bacillus*, performance, intestinal flora.

RESUME – "Effet d'ESPORAFEED PLUS sur les performances de porcelets à sevrage précoce". Un total de 120 porcelets mâles croisés (Large White _ Landrace) sevrés à 22 jours ont été distribués au hasard dans trois groupes : (A) régime témoin sans promoteur de croissance, (B) régime témoin avec 50 ppm de CARBADOX, et (C) régime témoin avec 0,1 g/kg d'ESPORAFEED PLUS (équivalent à 1×10^9 CFU/kg). De 0 à 10 jours de l'expérience, les animaux recevant le régime supplémenté avec ESPORAFEED PLUS (traitement C) avaient tendance à se développer plus rapidement (116 vs 151 g/j, $P = 0,11$) et à transformer plus efficacement l'aliment en gain de poids (1,67 vs 1,40 g/g, $P = 0,09$) que les animaux recevant le régime témoin. A 18 jours de l'expérience, les animaux supplémentés avec CARBADOX ou ESPORAFEED PLUS se développaient mieux et avaient un ITA moins élevé que les animaux témoins (198, 211 et 217 g/j pour GMQ ; et 1,62, 1,51 et 1,40 g/g pour ITA dans les traitements A, B et C respectivement. Les animaux recevant le traitement C avaient un ITA moins élevé que les témoins ($P = 0,07$). De 18 à 28 jours, les animaux recevant le régime B montraient une croissance plus élevée que les animaux recevant les autres régimes, mais les différences n'étaient pas significatives (487, 515, et 477 g/j pour les traitements A, B et C, respectivement). On peut conclure que dans nos conditions expérimentales : (i) l'addition d'ESPORAFEED PLUS aux régimes de porcelets à sevrage précoce à 10^9 CFU/kg avait tendance à augmenter la croissance pendant les 10 premiers jours ($P = 0,11$) et à diminuer l'indice de transformation alimentaire dans les 18 premiers jours après sevrage en comparaison avec les animaux témoins ; (ii) les animaux recevant des régimes supplémentés avec CARBADOX avaient une croissance meilleure et un indice de transformation alimentaire inférieur aux animaux témoins ; et (iii) il n'y avait pas des différences significatives entre CARBADOX et ESPORAFEED PLUS.

Mots-clés : Probiotiques, *Bacillus*, performances, flore intestinale.

Introduction

The use of bacteria from the intestinal flora as growth enhancers begun in the 60s. The recent prohibition of the antibiotic growth promoters has increased the attention on substitute products, such as probiotics. Nowadays, *Bacillus cereus*, as it is sporulated and so, resistant to environmental and pelleting conditions, is the one most widely used and also the main ingredient of ESPORAFEED PLUS. This trial evaluates the efficiency of this product on the performance of early weaned piglets and its capability to substitute antibiotics growth promoters.

The objectives of the work are: (i) to evaluate the addition of ESPORAFEED PLUS to the diet on the performance of early weaned piglets; and (ii) to compare CARBADOX and ESPORAFEED PLUS as performance enhancers in diets for early weaned piglets.

Materials and methods

A total of one hundred and twenty crossbred (Large White _ Landrace) male piglets weaned at 22 d and weighing 6.1 ± 0.3 kg as average, blocked by litter and initial body weight, were used. All animals were ear-tagged prior to the initiation of the trial.

The trial was carried out at the experimental facilities of the Department of Animal Production, Campos de Prácticas of ETSI Agrónomos, Senda del Rey s/n, 28040 Madrid (Spain).

The experimental animals were housed in two clean-disinfected rooms, provided with 24 boxes (1 m²) each.

It was a totally randomised block design with three treatments: (A) control diet without growth promoter; (B) control diet plus 50 ppm of CARBADOX; and (C) control diet plus 1×10^9 CFU/kg of ESPORAFEED PLUS.

Feeds were offered *ad libitum* and presented as mash. The experimental unit was formed by five piglets caged together. Animals were blocked by litter and initial body weight and six replicates per treatment were used.

Average Feed Intake (AFI), Average Daily Gain (ADG) and Feed Conversion Ratio (FCR) were controlled by replicate at 10, 18, and 28 d after weaning. Diarrhoea incidence and mortality were controlled daily.

Data was analysed by GLM procedures of SAS (1990) for completely randomized block designs.

Results and discussion

The influence of diet on ADG (g), AFI (g) and FCR (g/g) is shown in Tables 1 and 2. The weight of animals throughout the trial is shown in Table 3. Dietary treatment did not influence ADG, AFI or FCR in any of the periods studied. At 10 d of experiment, animals fed with the diet supplemented with ESPORAFEED PLUS (treatment C) tended to grow faster (116 vs 151 g/d, $P = 0.11$) and to convert feed into gain more efficiently (1.67 vs 1.40 g/g, $P = 0.09$) than animals fed the control diet. At 18 d of experiment, animals supplemented with CARBADOX or ESPORAFEED PLUS had greater growth and lower FCR than controls, but differences were not significant (198, 211 and 217 g/d for ADG and 1.62, 1.51, and 1.40 g/g for FCR for treatments A, B, and C, respectively). Animals fed treatment C tended to had lower FCR than controls ($P = 0.07$). From 18 to 28 d, animals fed diet B showed the highest growth, but the differences with respect to the other diets were not significant (487, 515 and 477 g/d for treatments A, B and C, respectively). At the end of the trial, animals of all treatments performed similarly ($P > 0.10$).

The effect of dietary treatment on mortality and diarrhoea incidence is shown in Table 3. No effect of treatment on incidence of diarrhoea or mortality was found.

Table 1. Effect of addition of ESPORAFEED PLUS and CARBADOX on average daily gain (ADG, g), average daily feed intake (AFI, g), and feed conversion ratio (FCR, g/g) of early weaned piglets from 0 to 18 d after weaning

Treatment	ESPORAFEED PLUS (CFU/kg)	CARBADOX (ppm)	0-10d			10-18 d			0-18d		
			ADG (g)	AFI (g)	FCR (g/g)	ADG (g)	AFI (g)	FCR (g/g)	ADG (g)	AFI (g)	FCR (g/g)
A	–	–	116	190	1.67	302	473	1.60	198	316	1.62
B	–	50	127	193	1.55	316	468	1.49	211	315	1.51
C	1×10^9	–	151	206	1.40	298	412	1.40	217	298	1.40
SEM (N=6)			15	21	0.11	21	35	0.11	14	18	0.08
Main effects	Control vs others		0.32	0.70	0.26	0.82	0.47	0.27	0.46	0.70	0.15
	CARBADOX vs ESPORAFEED PLUS		0.59	0.75	0.78	0.63	0.43	0.72	0.98	0.63	0.63

Table 2. Effect of addition of ESPORAFEED PLUS and CARBADOX on average daily gain (ADG, g), average daily feed intake (AFI, g), and feed conversion ratio (FCR, g/g) of early weaned piglets from 18 to 28 d and at the end of the trial (0-28 d)

Treatment	ESPORAFEED PLUS (CFU/kg)	CARBADOX (ppm)	18-28 d			0-28d		
			ADG (g)	AFI (g)	FCR (g/g)	ADG (g)	AFI (g)	FCR (g/g)
A	–	–	487	837	1.82	302	502	1.69
B	–	50	515	911	1.82	319	528	1.67
D	1x10 ⁹	–	477	830	1.77	310	488	1.60
SEM (N=6)			35	47	0.13	14	21	0.07
Main effects	Control vs others		0.90	0.46	0.96	0.57	0.69	0.73
	CARBADOX vs ESPORAFEED PLUS		0.47	0.43	0.94	0.53	0.37	0.87

Table 3. Effect of addition of ESPORAFEED PLUS and CARBADOX on mortality and diarrhoea incidence throughout the experiment

Treatment	ESPORAFEED PLUS (CFU/kg)	CARBADOX (ppm)	Mortality (%)	Diarrhoea (%)
A	–	–	6.6	26.7
B	–	50	3.3	23.0
D	1x10 ⁹	–	3.3	20.0
Main effects	Control vs others		0.65	0.62
	CARBADOX vs ESPORAFEED PLUS		0.78	0.79

Conclusions

We conclude that under our experimental conditions: (i) the addition of ESPORAFEED PLUS and CARBADOX to early weaned piglet diets improved significantly the average daily gain and feed conversion rate compared to control diet; (ii) there were no significant differences between ESPORAFEED PLUS and CARBADOX; and (iii) so, ESPORAFEED PLUS is an effective biological solution for the performance increasing.

Further reading

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