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Use of egg-yolk antibodies to prevent diarrhoea in weanling pigs

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SUMMARY – A trial was conducted with 24 21-day-old piglets to study the effect of supplementation of their weaning diet with egg-yolk antibodies. The antibodies had been obtained from hens immunised against some pathogenic strains of *E. coli* (K88, K99 and 987P). The animals were distributed in eight pens of three animals, and two experimental diets were tested: T-1 (control diet) and T-2 (control diet + egg yolk antibodies) for twenty one days. Before starting the trial, the facilities were not cleaned in order to increase the possibility of exposure of the piglets to pathogenic strains of *E. coli*. Despite the "dirty" environment, no diarrhoea symptoms appeared during the trial for any of the treatments. No statistically significant differences were observed between treatments, although piglets offered egg-yolk antibody diets grew and converted feed slightly better than the control group. It can be concluded that egg-yolk antibodies increased only very slightly the performance of the pigs. In presence of pathological problems however, this effect may have been more evident.

Key words: Weaning, piglets, egg-yolk antibodies, diarrhoea, *Escherichia coli*.

RESUME – "Utilisation des anticorps du jaune d'oeuf pour prévenir la diarrhée chez les porcelets en sevrage". Un essai a été mené sur 24 porcelets de 21 jours d'âge pour étudier l'effet de la supplémentation de leur régime de sevrage avec des anticorps de jaune d'oeuf. Les anticorps avaient été obtenus à partir de poules immunisées contre certaines souches pathogènes de *E. coli* (K88, K99 et 987P). Les animaux étaient distribués en huit cases de trois animaux, et deux régimes expérimentaux ont été testés : T-1 (régime témoin) et T-2 (régime témoin + anticorps de jaune d'oeuf) pendant 21 jours. Avant de commencer l'essai, les installations n'ont pas été nettoyées afin d'augmenter les possibilités d'exposition des porcelets aux souches pathogènes de *E. coli*. Malgré ce milieu "sale", aucun symptôme de diarrhée n'est apparu pendant l'essai pour aucun des régimes. On n'a pas observé de différences statistiquement significatives entre les traitements, bien que les porcelets recevant un régime avec des anticorps de jaune d'oeuf ont eu une croissance et une conversion alimentaire légèrement meilleures que le groupe témoin. On peut en conclure que les anticorps du jaune d'oeuf n'augmentent que très légèrement les performances des porcelets. Cependant en présence de problèmes pathologiques, cet effet aurait peut-être été plus évident.

Mots-clés : Sevrage, porcelets, anticorps du jaune d'oeuf, diarrhée, *Escherichia coli*.

Introduction

Diarrhoeic problems are one of the principal causes of mortality in weanling pigs, and in particular enterotoxigenic *Escherichia coli* is the most common pathogenic microorganism. The preventive use of antibiotics has been banned in animal feeding due to the risk of transmission of antibiotic resistance to other bacteria potentially harmful to consumers. A wide range of alternatives to antibiotics have emerged as a result of the ban (organic acids, probiotics, herb extracts, etc.); amongst them, passive immunisation with antibodies is an approach with high potential due to its high specificity.

The aim of the present work was to study the effect of egg-yolk antibody supplementation on the diets of 21 day old weaning pigs.

Material and methods

Animals

Twenty four 21-day-old piglets (*Landrace*) weighing 6.6 kg were used. They were housed in a

room of the weaning unit of IRTA's Department of Animal Nutrition, that had not been previously cleaned in order to expose the animals to a "dirty" environment. The animals were distributed by initial body weight into 8 pens of three animals each.

Diets

A pre-starter diet was offered to the piglets during the three weeks of trial. There were two experimental treatments: T-1 (control diet) and T-2 (control diet + 1 kg/Tm of egg-yolk antibodies). The egg-yolk antibodies were obtained from the University of Manitoba (in cooperation with Nutratch, Inc, Winnipeg MB, Canada) and contained antibodies specific against the pathogenic strains of *E. coli* K88, K99 and 987P. The procedures for the obtention of egg-yolk antibodies are summarised in Fig. 1. The diets were presented in mash form and its ingredient and nutrient composition are presented in Table 1.

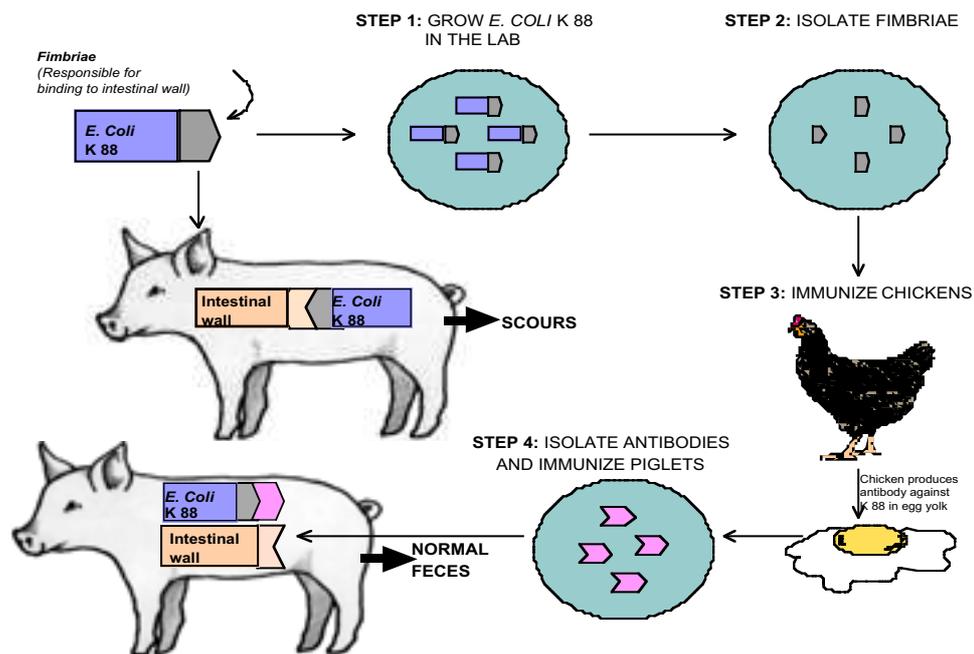


Fig. 1. Obtention and utilisation of egg-yolk antibodies to prevent scours in piglets.

Measurements

Feed and pigs were weighed at the start and at the end of the experiment (21 days). Average daily gain, average feed intake and feed to gain ratio were measured for each treatment and compared statistically.

Results and discussion

Despite the "dirty" environment, no diarrhoea problems appeared during the trial. The productive results of the trial are presented in Table 2. No statistically significant differences were observed between the two treatments. This could be due in part to the small number of animals used, but also to the absence of pathological problems. Nevertheless, there was a tendency for better growth and feed conversion when egg-yolk was added to the diet.

Table 1. Composition of the diet

Ingredients	(%)	Estimated nutrient content	
Wheat	25.00	Crude protein (%)	21.66
Barley	19.56	Crude fibre (%)	2.81
Saccharose	1.00	Fat (%)	8.79
Lard	4.09	Ash (%)	5.93
Extruded soybean	16.00	Energy (kcal ME)	3375
Soybean meal 48	10.00	Calcium (%)	0.80
Sweet whey	15.20	Total phosphorous (%)	0.70
Fish meal	6.73	Inorganic phosphorous (%)	0.49
DL-Methionine	0.162	Chlorine (%)	0.36
L-Lysine-HCl	0.255	Sodium (%)	0.18
L-Threonine	0.122	Methionine (%)	0.55
L-Tryptophan	0.014	Methionine + Cystine (%)	0.90
Ca Carbonate	0.523	Lysine (%)	1.50
Bi-Ca Phosphate	0.939	Tryptophan (%)	0.27
Vit-Min supplement	0.400	Threonine (%)	0.98
		Leucine (%)	1.66
		Isoleucine (%)	0.96
		Valine (%)	1.02
		Histidine (%)	0.56
		Phenylalanine + Tyrosine (%)	1.70

Table 2. Weight gain, feed intake and feed to gain ratio of 21 day-old weaning pigs fed on diets with or without egg-yolk antibodies

	Control	Egg-yolk antibodies
Weight day 0 (kg)	6.6	6.5
Weight day 21 (kg)	11.6	11.8
ADG (g/d)	236	252
ADFI (g/d)	421	424
Feed:Gain	1.79	1.69

Conclusions

It can be concluded that egg-yolk antibodies tended to slightly increase the performance of the pigs although the absence of pathological problems caused by *E.coli* may have prevented the expression of its full potential.

Additional research should be conducted, especially in presence of pathologic challenge to further investigate the utilisation of egg-yolk antibodies in diets for weaning pigs.