Immunoglobulins boost weaner performance

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ART FRIO, FELLIPE FREITAS BARBOSA and S. REGRAGUI MAZILI* present a trial in the Philippines that shows how natural immunoglobulins support the immune status of young piglets and are a promising solution to replace AGPs.

Post-weaning diarrhea – a serious problem

When weaned pigs are separated from the sow, moved into a new environment, mixed with other litters, and switch to a solid diet, they undergo considerable stress. Hence their feed intake will be significantly lower, which leads to an excess of non-digested protein building up in the gut. There the pathogenic pressure, particularly from enterotoxigenic *Escherichia coli* (ETEC), increases, leading to a high incidence of diarrhea.

Diarrhea may sound like a relatively innocuous condition, but it is one of the most serious problems for the swine industry worldwide. Water forms a large proportion of a young pig's body mass, hence the consequences of diarrhea range from severe dehydration to death. Mortality rates of up to 20-30%, growth retardation in the surviving pigs, as well as the costs for medical treatments put significant pressure on farm profitability. Diarrhea thus makes the post-weaning phase a stressful time for pig producers, too.

Antibiotics can no longer be the prevention of choice for post-weaning diarrhea

Until recently, antibiotics were prophylactically administered to control post-weaning diarrhea. However, we now know that the excessive use of antibiotics contributes to the development of antimicrobial resistance (AMR).

Colistin, one of the main antibiotics used to treat ETEC infections in pigs, is a case in point. Having been routinely used to prevent diarrhea, studies now show high rates of colistin-resistant *E. coli* in

infected pigs. This not only reduces therapy options for post-weaning diarrhea in pigs; colistin is considered a critical, last-resort antibiotic for treating infections with multidrug-resistant gram negative bacteria in humans. The possible loss of colistin effectiveness is a grave public health threat, hence the non-therapeutic use of colistin is already banned or in the process of being banned in many countries.

To minimize AMR, the use of antibiotics has to be strictly limited to necessary, therapeutic applications. Pig producers, therefore, need to look for new solutions to prevent diarrhea, always with a view to increase post-weaning performance.

Immunoglobulins from egg yolk are a promising solution

Sows supply their young pigs with antibodies via colostrum and milk. During weaning, pigs completely lose access to this source of antibodies, often before they have had time to acquire sufficient immunity of their own. On the other hand, hens transfer a foundational stock of antibodies against pathogens they encountered to the egg yolk (IgY). When a hen is exposed to gastro-intestinal pathogens, her immune system will produce relevant antibodies that are deposited in her eggs. These antibodies are effective even for diseases that do not actually affect chickens but are relevant for piglets, which then can benefit from this.

Studies have shown that certain egg antibodies can specifically support piglets after weaning and reduce the occurrence of diarrhea and mortality. They mainly act in the gut, where they bind to the pathogens and render them harmless. When delivered as a functional, standardized egg powder-based product, IgY can effectively support young pigs' intestinal health in critical and stressful situations.

Quantifying the effects of IgY on the performance of weaned pigs

A trial was conducted on a farm in the Philippines to evaluate the effect of different inclusion rates of an egg powder-based product (Globigen Jump Start, EW Nutrition GmbH – GJS) on the performance and health status of nursery pigs. Two hundred and seventy weaned mixed-sex PIC pigs averaging 7.35 ± 0.88 kg and 28 days of age were housed in an open-sided, naturally-ventilated nursery with plastic elevated slat floors. They were divided into 3 trial groups (Table 1) with 9 pens (replicates) and 10 animals per pen.

All animals were fed a standard two-phase feeding diet (28-42 and 43-70 days) based on vegetable ingredients (Table 2).

Table 1: Trial design.

	Phase 1 diet 28-42 days old	Phase 2 diet 43-70 days old
Control	No GJS	No GJS
Globigen Jump Start	1kg/t	1kg/t
Globigen Jump Start	2kg/t	2kg/t

Table 2: Diet formulation and analytical composition.

Ingredients (%)	Phase 1 diet	Phase 2 diet
Corn	36.8	30.5
Soybean meal 46%	17.5	21.5
Cassava meal	-	27.5
Cookie meal	15.0	-
Whey, sweet	8.0	6.0
Skimmed milk replacer	7.5	4.0
Palm oil	2.8	4.0
Yeast extract	2.2	1.2
Premix/ others	10.2	5.3
Medication		
Amoxicillin	0.1	0.1
Dimetridazole	0.05	-
Analysis		
CP %	20.0	18.5
ME, Mcal/kg	3.60	3.35
Dig Lys %	1.45	1.35
Calcium %	1.0	0.9
Av Phos %	0.5	0.45
Lactose %	7.0	5.0
Zinc ppm	3,100	750
Copper ppm	250	250
Acidifiers	Formic Citric Butyric	Formic Citric Butyric
Feed form	Mash	Mash

Trial results: performance, health, and economic considerations

It was observed that the inclusion of Globigen Jump Start in the nursery feed improved pig performance and health status in a dose-dependent manner. Compared to the control

group, the animals receiving GJS had an additional weight gain of 3 and 5kg, for the lower and higher inclusion rate, respectively (Figure 1).

Pigs receiving Globigen Jump Start also showed a 70 and 90g higher average daily gain (ADG) and improved feed conversion (0.3 to 0.5 points), with improvements again showing a dose-dependent effect. No difference in average daily feed intake (ADFI) was observed.

Mortality dropped significantly in both Globigen groups compared to the control (Figure 3): from 7.5% (control group) to 1.3%. This corresponds to a decrease of 83%. Numerically, the incidence of diarrhea also showed a large drop, from 11.1% (control group) to 6.7% for the GJS groups, amounting to a 40% decrease. These results confirm the positive impact of functional egg immunoglobulins on pigs' health status during the challenging post-weaning phase.

Better performance and health status generated impressive economic returns. Based on the feed costs per pig and the achievable live weight price per kg applicable to the Philippines at the time of the trial, the return on investment at an inclusion rate of 2kg of Globigen Jump Start per tonne of feed was estimated to be 4:1. Net income per pig, after costs for GJS, amounted to 300 to 400 Philippine Peso, which at the prevailing exchange equalled 5 to 7 Euros or almost 6 to 8 US Dollars.

Outlook: Less stress during post-weaning phase

In times of antimicrobial resistance, antibiotic efficacy for human and veterinary purposes is threatened by a proliferation of resistant bacterial strains. Hence, the use of antibiotics – and particularly last-resort antibiotics such as colistin – has to be strictly limited to necessary, therapeutic applications. However, this does not leave pig producers without performance-enhancing options.

Conclusions

The trial results clearly show that the selected egg antibodies contained in Globigen Jump Start effectively support weaned pigs' gastrointestinal health, resulting in strong performance improvements. For farm profitability, it is crucial that such improvements come at reasonable cost though and the results are indeed outstanding: the return on investment at an inclusion rate of 2kg per ton of feed was estimated to be 4:1, while net income per pig lies at 5 to 7 Euros or almost 6 to 8 US Dollars. This indicates that Globigen Jump Start delivers its performance-enhancing results in an exceptionally cost-effective manner, helping farmers to sustainably raise healthier and heavier pigs. AP

Figure 1: Weight performance (kg)

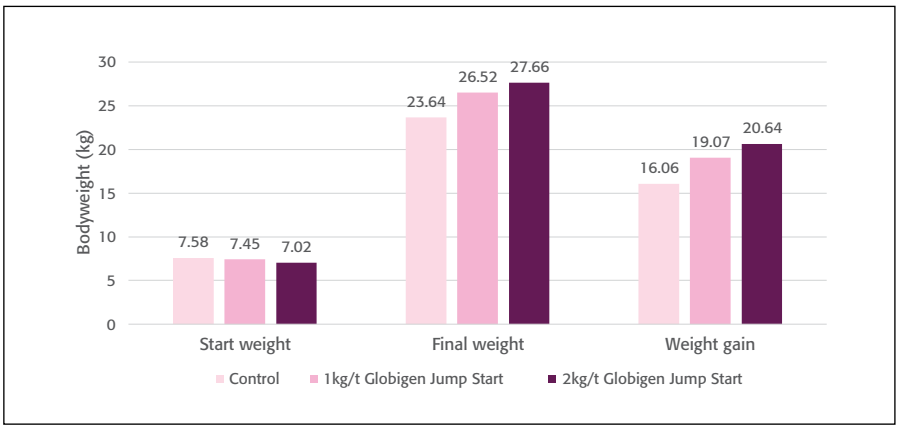


Figure 2: Performance indicators ADFI, ADG and FCR.

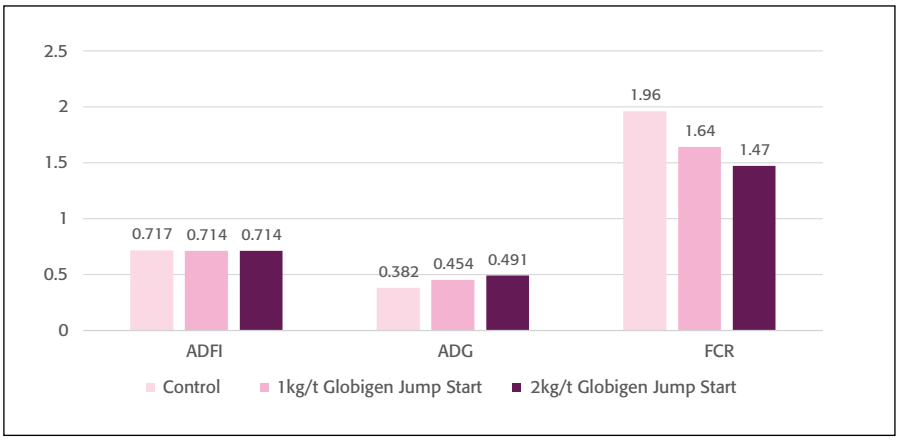
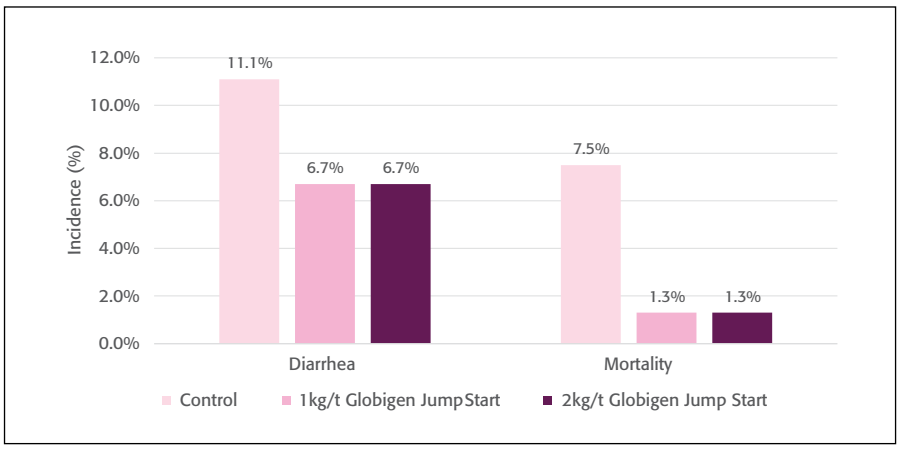


Figure 3: Incidence of diarrhea and mortality.



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