

## Hyper-egg

Pradip K. Maiti, Ph.D. Efficacy of piglet milk with HYPER-EGG K-88 antibodies  
From the desk of:

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### **Effect of Supplementation milk replacer containing HYPER-EGG K-88 antibodies for Improvement of Growth Performance and Reduction of Mortality in newborn piglets - a Study Report**

#### **1. Background**

The innovation is applicable to improve profitability through maximizing pig production by increasing the number of piglet's weaned, average weaning weight, and total litter gain by improving piglet's health for overall growth performance, and by reducing pre-weaning mortality, with supplementation of X-Cel milk replacer that contains HYPER-EGG K-88 antibodies (4kg/Ton milk).

It has been reported in the literature that the weight of piglet at weaning has significant effect on their subsequent growth performance. Lighter piglets at weaning had lower growth rates after weaning and required more days to reach a common slaughter weight, compare to the heavier piglets at weaning. High variation in growth of piglets within a group can lead to increased variability in number of days that the pigs take to reach market weight, which in turn, can affect productivity of commercial pig production systems where all-in all-out animal management is practiced. In addition, it has been shown that small birth-weight pigs comprise approximately 12-13% of the litter, and they present special challenges to health and profitability in commercial systems. The small pigs are considered to be most disease-susceptible, and their growth rate from birth to slaughter is relatively low, which results in reduced market weight with significantly less revenue compared to the healthier pigs.

Thus, to achieve better performance, it is important that piglets have an access to adequate amount of sow's milk during lactation period. The average litter size has, however, increased dramatically during the recent years, resulting in poor accessibility of some of the new-born piglets to sow's milk. Therefore, limited supply of sow's milk and poor accessibility of sow's milk not only reduces the growth performance of piglets, but also negatively affects on uniformity of their growth within the group.

The intake of sow's colostrums has proven to play an important role for piglet's health, since protective immunity is not transferred from sows to piglets pre-natal. However, protection through colostrums is not always complete, so piglets usually suffer from diarrhea/scours. Therefore, to provide adequate protective immunity, it is strongly recommended that newborn piglets should be fed with milk supplementation, which contains specific antibodies to E. coli K-88.

Furthermore, Zijlstra et al., (J. Anim. Sci. 74: 2948 - 2959, 1996), have shown that at 46 days of age, pigs fed liquid milk replacer accreted more protein (10%), fat (17%) than sow-suckled pigs. They have also reported 74% longer villi in the proximal small intestine. Thus, the increased accretion may come from two sources: sows milk and milk replacer.

Deen has demonstrated that the impact of small birth-weight pigs on profit (Pork Magazine, March 2003). He estimated that for a 120Kg market-weight target, farmers will lose \$34 per pig, if the market-weight of a cull pig is less than 108kg. He also demonstrated that small birth-weight pigs are naturally more susceptible to disease and are able to spread disease among other piglets quickly and delay their growth performance.

Enterotoxigenic *E. coli* (ETEC) strains that express K-88 are a major cause of diarrhea and death in neonatal and newly weaned pigs. It has been estimated that K-88-mediated ETEC are responsible for 50% of the 10 million piglets that die each year.

In our previous studies, we have demonstrated that feeding of HYPER-EGG K-88 antibodies-specific to *E. coli* K-88, prevents diarrhea that lead to improve their gut health and enhance growth performance in post-weaning piglets (US patent approved in 2010 # 7, 713, 527).

## 2. Hypothesis

Therefore, we hypothesized that if the piglets are fed with our avian egg antibodies-specific to *E. coli* K-88, their gut health will be improved, which may lead to enhance growth performance of the piglets particularly of the small birth-weight piglets, since most of the pre-weaned and post-weaning piglets suffer with ETEC infection at sub-clinical and/or clinical level.

## 3. Application of the Innovation – X-Cel milk replacer

For that reason, we formulated the milk supplemented with HYPER-EGG K-88 antibodies at 4kg/Ton of milk, ***since the current problem is that milk replacers available in the marketplace lacks *E. coli* K-88-specific antibodies which are needed to protect piglets from scours and diarrhea.***

Therefore, we thought that by providing piglets with superior milk replacer (X-Cel) supplemented with adequate amount of *E. coli* K-88-specific antibodies in a cost-effective manner, can increase weaning weights of lighter piglets, reduce the variations in piglet weights within a group, accelerate overall improvement on weaning weight, increase production of healthier pigs and reduce mortality led to enhance profitability in pig production.

In order to demonstrate the benefit of supplementation of X-Cel milk replacer to piglets, we have performed a comprehensive study in a Manitoba sow barn. In the study, 12 crates were used for the test group and the other 12 crates used for the control group. The piglets were fed X-Cel milk replacer during the entire lactation period, starting from day 0.

It is evident from the results that the average growth performance of the milk fed piglets was improved by 1.0Kg at weaning, the mortality rate was reduced by 11% over the control, when 34 extra pigs were weaned from 12 sows, and 231 Kg of extra live weight was gained at weaning from 12 sows, while each piglet consumed about 225g of X-Cel milk.

**Table -1**

**Benefit of X-Cel milk supplement on Improvement of Growth Performance and Reduction on Mortality**

<b>Study parameters</b>	<b>Control Group</b>	<b>Test group With supplementation of X-Cel Milk</b>	<b>Improvement of the Test Group over Control</b>
Number of piglets placed on day 0		144	144
Number of piglets died at pre-weaning	20	4	11.1%
Number of piglets weaned on day 20		124	140
Average number of pig weaned per litter		10.3	11.6
<b>Net gain of pigs weaned per litter</b>		<b>0</b>	<b>1.3</b>
Number of piglets moved to nursery		103	137
Number of piglets held as cull pigs		21	3
<b>Net Gain on Number of pigs to Nursery</b>	<b>0</b>	<b>34</b>	<b>34 Extra pigs /12 sows</b>
Average Initial body weight (kg)		1.61	1.45
Average Weaning body weight (kg)		5.40	6.42
<b>Average Net Live Weight Gain per piglet over the control</b>			<b>1.02 Kg</b>
Total Weight of piglets at weaning		667.03	898.8
<b>Net Gain in Extra Live Weight (Kg) at Weaning</b>		<b>231.77</b>	<b>231 Kg of Extra body weight at weaning/12 sows</b>
Average weight (Kg) of pigs weaned per sow/crate	55.60	74.9	<b>Increase of extra weight by 19.3 Kg per sow basis at weaning</b>

#### 4. Estimated Cost/benefit analysis of the innovation:

It has been demonstrated that piglets fed with X-Cel milk replacer/supplement improved growth performance of large and small piglets, increased number piglets at weaning and reduced mortality to produce healthier piglets at weaning leading to reach finisher stage earlier over the control.

As healthy piglets in starter stage is an indicator of better performer at the grower-finisher stage, it can easily be calculated the cost- benefit of the treatment, since 1Kg weight gain at weaning can be translated to 5-10 kg gain at finishing and about 8-10 days earlier to reach the target weight of 125Kg at finisher stage. This is an enormous savings in the feed cost and barn efficiency.

Therefore, the immediate economic impact on cost-savings for supplementation of X-Cel milk (innovation) on improved pork production can be calculated as follows:

- For an example, in a 1200 sow operation, with 24 piglets/sow/year, 28,800 piglets are produced in each year. If 34 extra piglets are produced from 12 sows at weaning, a total of 8,160 extra pigs can be produced at weaning each year. Assuming the cost of each weaned pigs at \$45.00, the potential of total saving is \$376,200.00 per year.
- In addition, about 1.0 Kg extra live weight gained per piglet, so for a 1200 sow operation, an estimated gain on Live Weight would be 28,800Kg per year. Assuming that the cost \$0.65 /Kg of live weight, the potential savings estimated to be \$18,720 per year.
- When pigs reaches 10 days earlier to the finisher stage, a savings of \$2.00 per pig, so the total savings would be  $28,800 \times \$2.00 = \$57,600.00$ .
- When 1.0Kg weaning weight gain is translated to 5-10 Kg gain at finishing, there would be a potential for savings of  $28,800 \times 10\text{Kg} \times \$0.65/\text{Kg}$  of live weight = \$187,200.00, when the cost of milk is \$1.50 per piglet, so the total cost for 28,800 piglets would be \$43,200.00.
- Also, there will be substantial cost saving on medication.

Therefore, by switching to X-Cel milk replacer/supplement; there will be a substantial benefit for pork production.