EFFECTIVENESS AND RETURN ON INVESTMENT ANALYSIS OF SUISENG® IN NEONATAL PIGS WITH PROLONGED DIARRHEA AND LOW PRODUCTIVITY EFFECTS IN THAI SWINE HERD

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INTRODUCTION

Enterotoxigenic *E.coli* (ETEC) infection in piglets has been underestimated, causing significant economic losses. Generally, mixed infections are prevalent in pigs and may alter one or more parts of the organism involved, which is consistent with induction of persistence and stress response.[1] Mixed infections with porcine epidemic diarrhea virus (PEDV) and *E. coli* may results in simultaneously intestinal malabsorption and hypersecretion, and are directly linked to worsening of the disease.[2] To date, it is accepted that investing in an *E. coli* vaccination program for sows is expected to result in a >120% return on investment (ROI).[3]

The purpose of this study was to emphasize access to ROI and field efficacy of SUISENG® to improve the survival rate of pigs with diarrhea as a cause of prolonged infection associated with *E. coli* and PEDV.

MATERIALS AND METHODS

This study was implemented in 2017, in a 400-sow farrow-to-wean farm located in Nakhon Pathom Province, Thailand. Mixed infections with PEDV and *E. coli* were scrutinized using molecular tests and clinical features (Fig. 1). Forty-four sows were randomly divided into two groups. Group A (n = 22) was intramuscularly vaccinated with 2 ml of SUISENG® at 6 and 3 weeks before farrowing. Group B (n=22) received two 2 ml of NSS (Normal Saline Solution) as control. Adverse events were recorded daily until two days after vaccination. Field efficacy was evaluated primarily through piglet production results, so different sows parities could be analyzed separately. ROI was measured based on an average cost of piglet production and the cost of the vaccine during this experimental period.

Figure 1. Suckling piglets severely affected by PEDV; one piglet had watery diarrhea and dehydration.

RESULTS

Monitoring results showed absence of adverse reactions in all vaccinated sows (Table 1). The improvement was significant, as seen in Table 2, with an increase of 1.61 total pigs weaned per litter, and an additional average increase of weight gain and an average daily gain of up to 2.27 kg and 81.07 g per day, respectively. Vaccination with SUISENG® improved the herd's performance and results in ROI in 11.66%.

Table 1. Analysis of SUISENG® safety after vaccination.

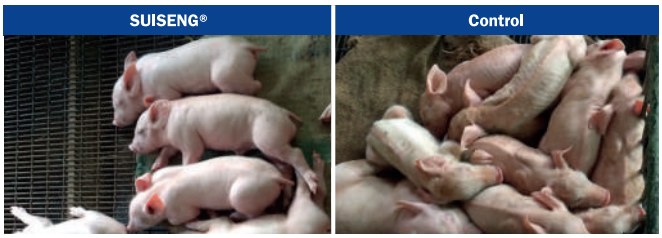
Clinical features	SUISENG®	Control
Numbers of sows (*n*)	22	22
Local reactions (%)	0	0
Pyrexia (%)	0	0
Abdominal breathing (%)	0	0
Vomiting (%)	0	0
Mortality rate (%)	0	0
Average feed intake during the clinical inspection (kg)	2.14±0.23^{a}	2.12±0.25^{a}

Note: Different superscript letters (a, b) indicated significant difference (P >0.05).

Table 2. Estimated effect on production parameters of piglets vaccinated with SUISENG® vs. the control group.

Production parameters	SUISENG®				Control			
	P0-P1	P2-P3	P4+	Avg	P0-P1	P2-P3	P4+	Avg
Averange pig born alive/litter	10-25^{ac}	11.50^{ac}	10.29^{ac}	10.68	9.25^{ac}	12^{c}	10.57^{ac}	10.61
Averange pigs weaned/litter	10^{a}	11.25^{a}	9.88^{a}	10.37	7.75^{c}	9.25^{ac}	9.29^{a}	8.78
Averange piglets birth weight (kg)	1.22^{a}	1.22^{a}	1.27^{a}	1.24	1.29^{a}	1.12^{a}	1.17^{a}	1.19
Average weight gain at 28d (kg)*	8.33^{a}	8.38^{a}	8.17^{a}	8.29	5.03^{a}	4.94^{a}	8.09^{a}	6.02
Average ADG (%)	297.50^{a}	299.29^{a}	291.79^{a}	296.19	179.64^{a}	176.43^{a}	288.93^{a}	215
Piglet with diarrhea (%)	0^{a}	8.7^{b}	8.7^{a}	8.7	77.14^{a}	27.45^{b}	18.38^{a}	40.99
Mortality linked *E. coli* infection (%)**	0^{a}	0^{a}	0^{a}	0	11.43^{b}	3.92^{c}	4.41^{cd}	6.59

Note: *Pig weaned at 28 days of age **Consecutive values for a parameter with different superscripts differ significantly (P >0.05).



DISCUSSION AND CONCLUSIONS

To the author's knowledge, SUISENG® appears to be a relatively safe vaccine, which can improve herd performance, reflecting a general enhancement in pigs' well-being. Our findings indicate that SUISENG® is a new strategy to mitigate economic losses under a long-term, unsuccessful combination therapy of antibiotics and PED vaccines.

ACKNOWLEDGMENT

The authors are grateful to the HIPRA THAILAND fund for their financiall support and would like to thank the swine farm for providing samples.

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2018-0183