

Combination of attenuated and killed PRRSV vaccines to enhance immunity and pig performance

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Introduction

Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) is a global viral pathogen in pigs that causes economic losses in every country where it is present¹. Currently, a first good immunization is achieved using a modified live vaccine (MLV) to control the PRRS. In the field, Thai veterinarians recommend the use of a killed vaccine (KV) in the gestation phase to boost the immunity of sows previously vaccinated with a MLV.

The combination of MLV and KV has several benefits, namely an increase in neutralizing antibodies and cell-mediated immunity responses² and a remarkable improvement in the PRRSV status in breeding herds. For several reasons, as part of the immunization strategy to generate more profit in sow herds, KV in combination with MLV has been commercially available for a long time in Thailand. However, there are limited data available regarding the impact of a KV in combination with a MLV on sows in a PRRSV-infected herd.

In this study, the combination of a MLV and a KV (SUIPRAVAC[®] PRRS, HIPRA) to maintain a high level of immunity against PRRSV in sows and to keep producing quality piglets was studied in Thai piggeries.

Material & methods

A smallholder contract farm (480-sow farrow-to-finish unit) in Nakhon Si Thammarat province (Thailand) was enrolled in the trial during 2021. This farm had a vaccination programme against US and EU PRRSV coinfection that consisted of routine mass vaccination with a MLV (MLV group)³. Since 2021, all pregnant sows had been routinely mass vaccinated with a MLV and additionally they were vaccinated at 4 weeks before farrowing with SUIPRAVAC[®] PRRS (2 ml dose, IM) (MLV+ KV group).

A safety assessment of gestating sows was carried out after vaccination to check for local reactions. Colostrum (volume 1 mL) was collected from the first front teats of sows in the MLV group ($n=5$) and the MLV+KV group ($n=5$) within 1 hour after farrowing. All samples were sent to the Kamphaengsaen Veterinary Diagnostic Center (KVDC, Kasetsart University, Thailand) for evaluation of neutralizing antibodies against EU and US field isolates of PRRSV. The production performance of the piglets was statistically compared between groups by t-test (paired two sample for means) using the SPSS statistical program (version 22.0).

Results

No serious long-lasting side effects were observed in any gestating sows after MLV+KV vaccination. The MLV+KV group had significantly higher antibody titres against both EU and US PRRSV in the colostrum compared to the MLV group (Table 1). Piglets born from the MLV+KV group had a significantly better production performance than the MLV group (Table 2, $p<0.05$).

Table 1. Colostrum neutralizing antibody titres in sows against EU and US PRRSV.

EU		US	
MLV+KV*	MLV	MLV+KV*	MLV
1:160	1:160	1:640	1:80
1:160	1:80	1:320	1:40
1:320	1:80	1:80	1:80
1:320	1:160	1:160	1:80
1:160	1:80	1:80	1:40

*Significantly higher titres of neutralizing antibodies against EU and US PRRSV in the MLV+KV group (p -value 0,04)

Table 2. Performance of piglets born from treated sows.

Production parameter	MLV + KV	MLV	Diff (%)	p-value ^{ab}
No. of piglets (n)	539	559	-	0.57
Mortality (%)	1.11 ^a	3.22 ^b	-65.53	<0.001
Culling rate (%)	1.48 ^a	5.72 ^b	-74.13	<0.001
Weaning weight (kg)	7.39 ^a	6.96 ^b	+6.18	0.047
Age of piglets at weaning (d)	22 ^a	25 ^b	-12	<0.001

^{ab} $P<0.05$ indicated statistical differences between group.

Discussion & Conclusion

This preliminary study demonstrates that SUIPRAVAC[®] PRRS is safe in gestating sows. Additionally, it is accepted that the highest immune responses against PRRSV were achieved after the combination of MLV and KV. This suggests that SUIPRAVAC[®] PRRS helps to reach higher levels of neutralizing antibodies in the colostrum after a booster dose before farrowing, leading to the achievement of better production data in piglets from these sows.

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