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The use of a killed PRRS vaccine as a complement to a modified live vaccine to achieve a stable PRRS virus status on farms

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Introduction

On farms that are endemically infected with the PRRS virus, modified live vaccines (MLV) are the first choice for immunological stimulation of animals, so any vaccination programme must include them. PRRS killed vaccines (KV) represent a booster of immunity against the PRRSv and are used as a complement to a previous vaccination with a MLV. This combination of vaccines could have various benefits, namely an increase in neutralizing antibodies and CMI responses[1]. On the other hand, a farm with stable PRRSv status is the key to achieving better reproductive parameters, being able to achieve an increase of 1.28 weaned piglets per sow per year if PRRSv stability is maintained for a one-year period[2].

The objective of this study was to assess the use of a KV in a combined protocol together with a MLV, evaluating the concentration of neutralizing antibodies in colostrum from sows and the stabilization of the piglets' PRRSv status on PRRS endemic farms.

Material & methods

2 PRRSv2-positive farrow-to-finish farms of 1200 sows each were enrolled in a trial in Thailand. On both farms, piglets were RT-qPCR-positive at weaning, which means that the PRRSv status of both farms was unstable (3). On both farms, the routine vaccination programme for sows was mass vaccination with a PRRS MLV every 4 months. On each farm, the sows were divided into 2 groups: MLV group (vaccination with a MLV every 4 months) and MLV+KV group (vaccination with a MLV every 4 months and a booster dose with a KV (SUIPRAVAC® PRRS, KV, HIPRA, 2 ml dose) 4 weeks before farrowing). Colostrum samples were taken (volume 1 mL from the first front teats of sows) within 1 hour after farrowing from the MLV groups (Farm 1 *n*=5, Farm 2 *n*=8) and MLV+KV groups (Farm 1 *n*=5, Farm 2 *n*=8) to evaluate neutralizing antibodies against EU and US field PRRSv strains in accordance with the guidelines of the Kamphaengsaen Veterinary Diagnostic Center (Kasetsart university, Thailand).

Blood and umbilical cords were collected to evaluate the stability of the PRRS in both groups. 80 samples were pooled and a total of 16 pools from 5 animals each (blood + umbilical cords) were analyzed by Rt-qPCR.

Results

The MLV+KV groups had significantly higher titres of neutralizing antibodies against EU field PRRSv than the MLV groups (Table 1).

Additionally, RT-qPCR pools after vaccination of sows with SUIPRAVAC® PRRS on both farms were negative in all the samples that were taken (Table 2).

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

	EU		US	
	MLV+KV*	MLV	MLV+KV	MLV
FARM 1	1:40	<1:20	<1:20	1:80
	1:80	1:40	1:80	1:80
	1:320	1:160	1:160	1:640
	1:640	1:40	1:640	1:80
	1:160	<1:20	<1:20	<1:20
FARM 2	1:80	1:40	1:40	1:20
	1:20	<1:20	1:20	1:40
	1:320	1:40	1:80	1:20
	1:320	1:80	1:40	1:40
	1:640	<1:20	1:80	1:20
	1:160	1:160	1:80	<1:20
	1:640	1:80	1:160	1:40
	1:320	1:80	1:80	1:80

*Significantly higher titres of neutralizing antibodies against EU field PRRSv in the MLV+KV group *(p-value 0.003)*

Table 2. Number of Rt-qPCR-positive pools per group.

	TYPE OF SAMPLE	DAY	MLV	MLV + KV
FARM 1	Umbilical cords	0 days after farrowing	0/1	0/5
	Blood	3 weeks of age	1/1 (+) *US strain	0/1
	Blood	7 weeks of age	-	0/1
FARM 2	Umbilical cords	0 days after farrowing	0/1	0/2
	Blood	3 weeks of age	1/1 (+) *US strain	0/2
	Blood	6 weeks of age	1/1 (++) **US strain	-

*Ct value: 30-35
**Ct value: 25-30

Discussion & Conclusion

Vaccination protocols that include a MLV every 4 months and a KV at 4 weeks before farrowing raise the concentration of neutralizing antibodies in colostrum and achieve PRRSv stabilization by producing RT-qPCR-negative piglets at weaning.

References

1. Diaz I *et al.* 2013. The Veterinary Journal 197: 438–444.
2. Torrents *et al.* 2021. Porcine Health Management, 7:21
3. Holtkamp *et al.* 2021. Journal of Swine Health and Production, volume 29, num 5