Usage of RT-qPCR and sequencing to check the efficacy of piglet vaccination with a PRRSV1 MLV in a coinfected PRRSV1 and PRRSV2 farm in Korea

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Introduction

PRRS is a swine disease with a very important economic impact on the swine industry (1). Minimization of the impact of the disease is a primary objective and vaccination with MLV vaccines has been reported to achieve farm stabilization more quickly than other methods (2), a farm with stable PRRSV status is the key to achieving better productive 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 (3). The purpose of this trial was to check if the stability of a site 2 in Korea coinfected with PRRSV1 and PRRSV2 was improved by switching from a PRRSV2 vaccine to a PRRSV1 vaccine.

Materials and methods

The trial was conducted at a site 2 and 3 in South Korea where 70-days-old animals from a negative site 1 were introduced monthly and vaccinated with a PRRSV2 MLV (VR2332, 2 ml, IM). Site 3 was endemic to a field PRRSV2 (similarity with the PRRSV2 MLV VR2332 and with UNISTRAIN® PRRS in ORF5: 83.6% and 64% respectively). In April 2021 it suffered a severe outbreak of PRRSV1 (similarity with UNISTRAIN® PRRS in ORF5: 85%) causing high mortality in pigs (more than 20%) so in October the decision was to change the vaccine to UNISTRAIN® PRRS ID (PPRRSV1 vaccine, VP-046 BIS strain, 0.2 ml, ID, HIPRA) with an intradermal needle-free device (Hipradermic®, HIPRA). 15 blood samples were collected at 16 weeks of age (woa), 20 woa and 24 woa to perform PCR (pools of 5) and Sequencing (if the virus concentration was enough) before the use of UNISTRAIN® PRRS (UP), 1 month after UP, 2 months after UP and 4 months after UP.

Results

Before the use of UNISTRAIN® PRRS there was co-circulation of PRRS Type 1 and Type 2 field strains. 2 months after the use of UNISTRAIN® PRRS it was only detected vaccines strains (Table 1)

Discussion and conclusion

Based on the results of this trial, after vaccination with UNISTRAIN® PRRS in a site 2 and 3 coinfected with PRRSV1 and PRRSV2 field strains stabilization was achieved on the farm since it was not possible to detect Type 1 field virus and Type 2 field virus. This conclusion could be made thanks to differenciating vaccine strains from field strains. Not only PCR assay, but also sequencing should be performed to check the efficacy of the vaccine.

References

1. Holtkamp et al., 2013. J. Swine Heal. Prod. 21, 72–84.
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3. Torrents et al. 2021. Porcine Health Management, 7:21

Table 1. PCR and Sequencing in site 3

Age of animals	Vaccine type & PCR result	Before Unistrain			1 month after Unistrain			2 months after Unistrain			4 months after Unistrain		
16 woa (right after entering)	Vaccine	VR2332			Unistrain (EU)			Unistrain (EU)			Unistrain (EU)		
	PCR result	NA	-	-	NA	NA	NA	EU+NA	EU+NA	EU	EU	EU	
20 woa (4 wks after entering)	Vaccine	VR2332			Unistrain (EU)			Unistrain (EU)			Unistrain (EU)		
	PCR result	EU+NA	UE+NA	EU	-	-	-	NA	NA	-	EU	EU+NA	
24 woa (8 wks after entering)	Vaccine	VR2332			VR2332			Unistrain (EU)			Unistrain (EU)		
	PCR result	EU	-	-	-	-	-	-	-	-	-	-	
Similarity by comparing ORFS (Detected wild strains vs Vaccine strains)	NA strain	VR2332		83.6%	Low amount of antigen (Sequencing was not possible)			***VR2332***		***99.2%***	Low amount of antigen (Sequencing was not possible)		
		Vaccine A		84.6%				Vaccine A		90.5%			
		Vaccine B		84.7%				Vaccine B		91.9%			
		Vaccine C		65.5%				Vaccine C		65.3%			
		VP046		64.0%				VP046		64.8%			
	EU strain	Lelystad		86.2%				Lelystad		94.9%	Lelystad		94.6%
		Vaccine A		63.3%				Vaccine A		63.2%	Vaccine A		63.1%
		Vaccine B		63.2%				Vaccine B		63.3%	Vaccine B		63.3%
		Vaccine C		85.2%				Vaccine C		93.6%	Vaccine C		93.1%
		VP046		85.0%				***VP046***		***99.2%***	***VP046***		***98.8%***