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The acquisition of passive immunity (IgG) in the newborn piglets from parity sows in contract farm, Takeo province, Cambodia

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ABSTRACT

This study was to analyze specific antibodies of the PRRS virus (PRRSV) in porcine sera and breast milk samples in three parity sows vaccinated with UNISTRAIN® PRRS HIPRA at twenty-five weeks of age and maternal-derived antibodies that were detected in piglets from a contract farm located in Takeo province, Cambodia. Total of 12 parity sows were selected from the 1st, 3rd and 5th parity sows. The blood and breast milk samples were collected from these parity sows at 0hr, 6hr, 12hr and 24hr after delivery the newborn piglets. Total of 36 newborn piglets were selected for blood samples at 0hr, 6hr, 12hr and 24hr, respectively. All samples were collected and analysed repeatedly at week 1, 2, 3 and 4. The submitted samples were tested for PRRSV using Ingenasa ELISA kit at O.D (450nm). The O.D data was calculated for S/P ratio equaling to subtract sample O.D and average NC O.D divided by subtract average PC O.D and average NC O.D. The results show that all parity sows can transfer maternal antibodies to piglets through breast milk two times more than across placenta after delivery (/week1/parity/0hr/6hr/12hr/24hr). All parity sows decline IgG transfer of maternal antibodies to piglets through either breast milk or across placenta in week 2, 3 and 4. The piglets receive a high increase in immunity of the average of IgG/hr in week 1 at 0.30, 1.71, 2.00, 2.19 from 0hr, 6hr, 12hr to 24hr, while there is a decrease of the average of IgG/hr in week 2 at 1.36, 1.45, 1.43, 1.50; week 3 at 0.18, 0.14, 0.70, 0.73, and week 4 at 0.52, 0.50, 0.58, 0.47. In addition, from week 4 onwards, the maternal-derived antibodies are declined in piglets quickly after weaning. This study provides a fundamental data of antibody titer-IgG in sows and newborn piglets from parity sows that is a primary site for PRRSV gilt vaccination program at twenty-five weeks of age and herd health status management as a scenario tree for Cambodian swine producers and Cambodia Livestock Raisers Association (CLRA), and contribute to raise CLRA's awareness to be well prepared for screening test antibody titer-IgG 30% of gilt replacement.

Key words: PRRS virus, IgG, parity sows, breast milk, serum

INTRODUCTION

Porcine reproductive and respiratory syndrome (PRRS) was first cases in Cambodia in August 2010, causing serious problems on affected farms, although antibody titer-IgG in sows and newborn piglets from parity sows that is a primary site for PRRSV gilt vaccination program at twenty-five weeks of age and herd health status management for Cambodian swine producers has not been well defined (Dietze et al., 2011). The vaccination program from M's Pig a contract farm is shown in figure 1.

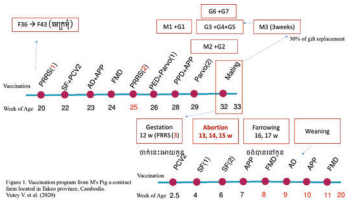

Fig 1: Vaccination program (Vutey V. et al., 2020)

OBJECTIVE

Thorough literature search revealed no available study on antibodies of the PRRS virus (PRRSV) in Cambodia, there is a strong need to study passive immunity (IgG) in porcine. This study was to analyze specific antibodies of the PRRS virus (PRRSV) in porcine sera and breast milk samples in three parity sows vaccinated with UNISTRAIN® PRRS HIPRA at twenty-five weeks twenty-five weeks of age (Fig. 1) and maternal-derived antibodies that were detected in piglets from a contract farm located in Takeo province, Cambodia.

METHODOLOGY

Total of 12 parity sows were selected from the 1st, 3rd and 5th parity sows. The blood and breast milk samples were collected from these parity sows at 0hr, 6hr, 12hr and 24hr after delivery the newborn piglets (Fig. 2 and 3). Total of 36 newborn piglets were selected for blood samples at 0hr, 6hr, 12hr and 24hr, respectively. All samples were collected and analysed repeatedly at week 1, 2, 3 and 4 (Fig. 4). The submitted samples were tested for PRRSV using Ingenasa ELISA kit and ELISA Microplate Reader Model Teco Diagnostics Register Establishment Number 1832216 at O.D (450nm). The O.D data was calculated for S/P ratio equaling to subtract sample O.D and average NC O.D divided by subtract average PC O.D and average NC O.D (Fig. 5).

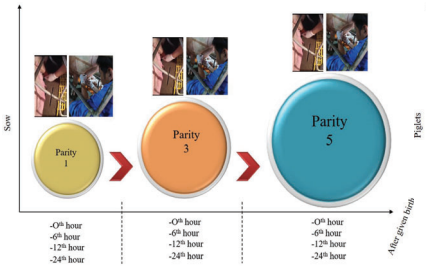

Fig 2: Samples collection of breast milk and blood from sow deliver piglets

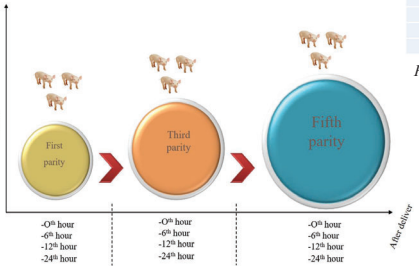

Fig 3: Samples collection of blood from piglets

Fig 4: Breast milk samples were collected and centrifuge immediately with Biosafety cabinet level 2

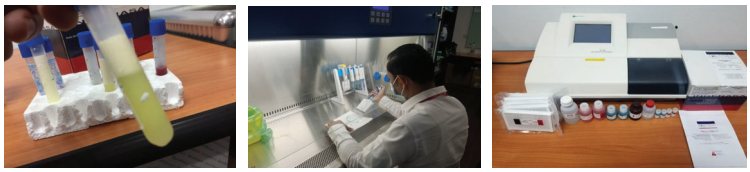

Fig 5: Ingenasa ELISA kit and ELISA Microplate Reader Model Teco Diagnostics Register Establishment Number 1832216 at O.D (450nm)

RESULTS

The results show that all parity sows can transfer maternal antibodies to piglets through breast milk two times more than across placenta after delivery (/week1/parity/0hr/6hr/12hr/24hr) (Fig. 6).

Week 1	Antibody titer PRRSV								
	Blood sample of sow			Milk sample of sow			Blood sample of piglet	PC	NC
After deliver	1st Parity	3rd Parity	5th Parity	1st Parity	3rd Parity	5th Parity			
0th hour	1.04	1.91	1.78	2.67	2.75	2.63	0.3	1.091	0.239
6th hour	0.79	1.85	1.81	2.57	2.62	2.30	1.71		
12th hour	0.57	1.66	1.64	2.56	2.41	2.03	2.00		
24th hour	0.66	1.82	1.37	1.16	2.14	2.01	2.19		

Fig 6: Antibody titter S/P PRRSV of sow at week 1

All parity sows decline IgG transfer of maternal antibodies to piglets through either breast milk or across placenta in week 2, 3 and 4 (Fig. 7, 8 and 9).

Week 2	Antibody titer PRRSV								
	Blood sample of sow			Milk sample of sow			Blood sample of piglet	PC	NC
After deliver	1st Parity	3rd Parity	5th Parity	1st Parity	3rd Parity	5th Parity			
0th hour	0.66	1.13	1.38	-0.06	0.11	-0.02	1.36	1.598	0.302
6th hour	0.79	0.97	1.51	-0.06	0.08	0.03	1.45		
12th hour	0.77	1.34	1.58	-0.08	0.11	-0.02	1.43		
24th hour	0.73	1.31	1.56	-0.08	0.08	-0.03	1.50		

Fig 7: Antibody titter S/P PRRSV of sow at week 2

Week 3	Antibody titer PRRSV								
	Blood sample of sow			Milk sample of sow			Blood sample of piglet	PC	NC
After deliver	1st Parity	3rd Parity	5th Parity	1st Parity	3rd Parity	5th Parity			
0th hour	0.56	1.05	1.45	0.06	-0.04	0.02	0.18	1.626	0.260
6th hour	0.61	0.92	1.44	-0.07	-0.06	0.01	0.14		
12th hour	0.53	0.93	1.29	-0.06	-0.02	0.04	0.70		
24th hour	0.53	0.96	1.33	-0.07	-0.07	0.02	0.73		

Fig 8: Antibody titter S/P PRRSV of sow at week 3

Week 4	Antibody titer PRRSV								
	Blood sample of sow			Milk sample of sow			Blood sample of piglet	PC	NC
After deliver	1st Parity	3rd Parity	5th Parity	1st Parity	3rd Parity	5th Parity			
0th hour	0.53	1.28	1.66	-0.01	-0.09	-0.01	0.52	1.350	0.259
6th hour	0.51	1.31	1.81	-0.08	-0.09	-0.04	0.50		
12th hour	0.44	0.21	1.70	-0.06	-0.01	0.01	0.85		
24th hour	0.51	1.43	1.72	-0.05	0.01	0.03	0.47		

Fig 9: Antibody titter S/P PRRSV of sow at week 4

The piglets receive a high increase in immunity of the average of IgG/hr in week 1 at 0.30, 1.71, 2.00, 2.19 from 0hr, 6hr, 12hr to 24hr (Fig. 6), while there is a decrease of the average of IgG/hr in week 2 at 1.36, 1.45, 1.43, 1.50; week 3 at 0.18, 0.14, 0.70, 0.73, and week 4 at 0.52, 0.50, 0.58, 0.47 (Fig. 7, 8, 9). In addition, from week 4 onwards, the maternal-derived antibodies are declined in piglets quickly after weaning.

CONCLUSION

This study provides a fundamental data of antibody titer-IgG in sows and newborn piglets from parity sows that is a primary site for PRRSV gilt vaccination program at twenty-five weeks of age and herd health status management as a scenario tree for Cambodian swine producers and Cambodia Livestock Raisers Association (CLRA), and contribute to raise CLRA's awareness to be well prepared for screening test antibody titer-IgG 30% of gilt replacement.

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