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DEVELOPMENT AND EVALUATION OF A FIELD PRRS VIRUS ANTIBODY TEST IN SWINE SERA

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Introduction and Objectives

Poor detection of PRRSV-infected replacement gilts into the naïve herd and failure in the acclimatization procedures for replacement gilts are common causes of PRRSV- associated reproductive problems in breeding herds. These problems could have been reduced with a simple yet inexpensive serologic test that veterinarians can easily perform at any time needed for efficient screening and interpretation of PRRSV antibodies. At present, ELISA is the most common method to detect PRRS virus antibody. However, the ELISA requires expensive equipments and laboratory techniques. For these reasons, we have developed a field-based, accurate and simple test for detecting PRRSV antibodies.

Materials and methods

Gel-EIA test plates were prepared by coating non-infectious PRRS virus antigen on the bottom of petri dishes and overlaying agar gel as described previously[1]. For the test, a filter paper disc is adsorbed with each test serum, placed on the agar of the test plate, was incubated for 2 or 3 hours at 25° or 37° C, then the agar was peeled off. After washing the plate, antigen-antibody reaction was visualized by reacting with anti-swine IgG conjugated with peroxidase and subsequently overlaying agar containing a substrate and hydrogen peroxide. Positive samples showed color reaction. The results were read after 5-10 minutes. Various serum samples with known ELISA S/P ratios or history of PRRS virus infection were tested, and the sensitivity and specificity of the test were evaluated.

Results and Discussion

Results of gel-EIA antibody detection with their corresponding ELISA S/P ratios are summarized in Table 1. Percent agreement between the results of ELISA and gel-EIA are also described in Table 1. The gel-EIA showed 100% specificity when 40 pig sera from a SPF farm all showed negative in the tests. In another test, 238 of 254 sera from PRRS-free farms tested negative in gel-EIA indicating 93.7% specificity. Incubation at 25°C for 3 hours showed 100% agreement between the two tests.

Table 1. Results of gel-EIA for sera with known PRRS ELISA S/P OD values

ELISA OD	No. of sera	gel-EIA results 37° C/2hr +	37° C/2hr -	25° C/3hrs +	25° C/3hrs -
Naïve	40	0	40(100)	0	40 (100)[1]
<0.4	30	20	10(33.3)	30(100)	0
0.4-0.9	32	31(96.9)	1	32(100)	0
1.0-1.9	17	17(100)	0	17(100)	0
>2.0	10	10(100)	0	10(100)	0

[1]Percents of agreement between the results of ELISA and gel-EIA

The antigen used in the gel-EIA was a detergent-disrupted subunit fraction of the PRRSV virions. Thus, infectivity was not associated with this antigen allowing wide use without concern for spreading of infectious virus. At present, we are evaluating the use of whole blood collected in a filter paper strip as described in a previous paper[2]. Results of the gel-EIA were observed as early as 2 hours after antigen-antibody reaction both at 37°C and at 25°C room temperature. High correlation of gel-EIA results with corresponding ELISA S/P ratios and a higher sensitivity of antibody detection for sera with ELISA S/P ratio <0.40 which is the standard cut-off may suggest that gel-IEA is a more sensitive test than the commercially available ELISA. The test is designed to perform even within the farm, without the need for any equipment and with a simple practice. The test would also be relatively inexpensive.

References

1. Joo HS et al.1984. Am J Vet Res 45: 2096-2098
2. Annelli JF et al. 1990. Proc IPVS p. 216