Application of enzyme-linked immunosorbent assay for the surveillance of *Mycoplasma hyopneumoniae* infection in pigs

V. SØRENSEN *, K. BARFOD *, N.C. FELD ** and L. VRAA-ANDERSEN ***

Summary: A monoclonal antibody-based blocking enzyme-linked immunosorbent assay (ELISA) was used for serological surveillance of *Mycoplasma hyopneumoniae* infection in pig herds.

A follow-up study was conducted on "herd predictive values" previously reported for this ELISA.

Of those herds giving positive results by this ELISA, 42% were subsequently found to be infected, while 100% of herds giving negative results were uninfected. Previous reports recorded positive and negative herd predictive values of 39% and 99.8%, respectively.

Among naturally-infected animals, reaction in colostrum was more frequent than in serum, and this difference was most pronounced if the colostrum samples were obtained shortly before or after farrowing.

Coughing was found to be the most reliable clinical indicator of infection, but surveillance through clinical herd inspections alone failed to detect 30% of infected herds.

The time required for seroconversion following natural exposure to *M. hyopneumoniae* differed in two herds using different management systems: in one herd antibodies were first detected three weeks post-exposure, while in the other herd antibodies were not detected until five weeks after exposure.


INTRODUCTION

*Mycoplasma hyopneumoniae* is the primary causative agent of porcine enzootic pneumonia, which is often aggravated by secondary bacterial or viral infections. The disease is common in all pig-producing countries, and causes considerable economic losses (14).

* Federation of Danish Pig Producers and Slaughterhouses, Veterinary Department, Maglegårdsvej 2, DK-4000 Roskilde, Denmark.
** National Veterinary Laboratory, Bülowsweg 27, DK-1790 Copenhagen V, Denmark.
*** Federation of Danish Pig Producers and Slaughterhouses, Veterinary Department, P.O. Box 50, DK-8620 Kjellerup, Denmark.
In Denmark, a specific pathogen-free (SPF) programme was established in 1968 in order to avoid some of the health problems encountered in conventional pig herds. At present, approximately 3,500 herds are involved in the programme, accounting for approximately 25% of all pigs produced in Denmark and supplying 80% of pigs sold for breeding. In addition to the absence of more serious diseases at the national level, herds in the Danish SPF programme are declared free of six pathogens: *M. hyopneumoniae*, *Actinobacillus pleuropneumoniae* (serotypes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 12), toxin-producing *Pasteurella multocida*, *Serpulina hyodysenteriae*, *Sarcoptes scabiei* and *Haematopinus suis*. Until 1980, infections with these specific pathogens were infrequent in SPF herds, with an annual herd prevalence of less than 5%. Since then, an increasing number of infections with *M. hyopneumoniae* have been observed. Consequently, a parallel programme has been established, comprising herds infected with *M. hyopneumoniae* (designated as “MS”, or “minimal disease” herds). Airborne transmission of *M. hyopneumoniae* from conventional herds situated near the SPF herds and the trading of breeding animals subclinically-infected with *M. hyopneumoniae* are significant factors in these herd infections (6).

To minimise the spread of infections due to the trading of subclinically-infected breeding animals, the surveillance of SPF herds requires sensitive and reliable diagnostic methods. Until September 1991, monthly serological surveillance of the SPF breeding and multiplying herds for infection with *M. hyopneumoniae* was conducted using indirect haemagglutination (IHA) (4, 5). However, IHA has now been replaced by a monoclonal antibody-based blocking enzyme-linked immunosorbent assay (ELISA) (3), following an evaluation of both tests in comparison with clinical, pathological and microbiological findings in 124 SPF herds (13). The ELISA was found to be superior to the IHA with regard to herd sensitivity and yielded equally good herd specificity.

In order to provide a measure of the ability of this ELISA to detect infection at the herd level, positive and negative “herd predictive values” were calculated for this test (13). These values are used to interpret the serological results for herds and to advise practitioners. This follow-up study was therefore conducted when the ELISA had been employed in the surveillance programme for one year, with the objective of validating the previously-calculated values.

A second objective was to screen SPF production herds by means of the ELISA and thereby enable anamnestic information from the herds to be examined in relation to the serological results.

The third objective of this study was to examine the applicability of the ELISA to colostrum samples.

Since a previous, small-scale study (3) showed the presence of antibodies to *M. hyopneumoniae* in pigs which had been in contact with artificially-inoculated animals, the final objective of this study was to measure the amount of time required for pigs from *M. hyopneumoniae*-free herds to develop specific antibodies following introduction into naturally-infected herds.

**MATERIALS AND METHODS**

**Follow-up studies of serological analysis**

The Danish SPF programme is organised as a series of pyramids, with the breeding and multiplying herds at the top, and a number of production herds dependent on each
of them at the bottom. The breeding and multiplying herds are monitored intensively for signs of infection with the “SPF diseases” listed above; monitoring includes serological analysis of twenty blood samples and clinical inspections every month.

Serological analysis in this study was performed by a monoclonal antibody-based blocking ELISA as previously described (3, 13). A total of 134 SPF breeding and multiplying herds were included in this follow-up study of the herd predictive values previously calculated for this ELISA.

Surveillance of the specific pathogen-free production herds

The production herds are monitored by clinical inspections every third month and, since 1991, by annual serological screening.

A comparative evaluation of the significance of clinical anamnestic information and the results of serological herd testing was conducted in 758 SPF production herds. Twenty blood samples from each herd were taken by a practitioner and sent to the laboratory, together with anamnestic information on the herds. The reporting of anamnestic information was not fully standardised.

Colostrum analysis

To evaluate the use of colostrum samples for surveillance purposes, twenty-four gilts derived from a MS herd were transferred to an experimental farm, and paired blood and colostrum samples were obtained from these animals. Colostrum samples were obtained from three teats, two to five times within thirty hours after farrowing, in order to establish the optimum time for this type of sampling. Colostrum samples from nineteen sows in seven SPF breeding herds were used as negative controls. Colostrum from five sows originating from one herd was sampled several times after farrowing, while the remaining fourteen sows were sampled only once near to farrowing. The colostrum samples were prepared as follows before being analysed by ELISA. Colostrum was frozen immediately after collection from the sows. Before analysis, the colostrum samples were centrifuged at 3,000 g and 4°C for 30 min. The fatty layer of the colostrum was removed by a vacuum-connected pipette, and the fat-deprived samples were analysed in a 1:10 dilution as described for serum samples (3, 13).

Seroconversion

In order to establish the time of seroconversion in naturally-infected pigs, a trial was performed in two herds with different management systems.

Pigs from two SPF sow herds (A and B) were included, both of which supplied weaners to a MS fattening herd. In both sow herds, piglets were weaned at the age of four weeks and kept in climate-controlled housing for the next four weeks. At the age of eight weeks, the weaners were moved to a pre-fattening unit. The pigs were delivered to the infected MS herd at a live weight of approximately 30 kg.

SPF sow herd A contained 325 sows. The corresponding MS herd produced about 3,000 pigs for slaughter each year. When the pigs were transferred to the MS herd, they were placed in a separate barn unit. There was a continuous flow of animals from the barn unit into the fattening unit.

SPF sow herd B contained 220 sows. The corresponding MS pig herd was newly-established, and produced approximately 2,500 pigs a year. Initially, one year before the study period, this was a SPF pig herd, but after eight months the herd was infected with
M. hyopneumoniae. Prior to the beginning of the study period, the herd had bought weaners from another SPF sow herd. When the weaners were transferred to the MS herd, they were moved into empty pens between the older pigs.

A total of 68 pigs entering MS herd A and 46 pigs entering MS herd B were monitored serologically. Blood samples were taken on the day of entry and subsequently every week until slaughter of the pigs (beginning eleven and ten weeks after introduction into herds A and B, respectively).

Data analysis

The proportion of infected herds among those which tested positive and the proportion of uninfected herds among those which tested negative were directly calculated from Table I and compared with the positive and negative herd predictive values calculated previously (13) for the same type of herd. The herd specificity estimate was calculated as previously described (13). The herd sensitivity estimate was based on all infected herds testing positive and not as previously described (13), where the infected herds were classified according to the observed onset of other signs of infection. Odds ratios were calculated from 2 x 2 tables (9) and the significance of the factors was determined by a chi-square test (Yates correction). Analysis of variance (11) was used to analyse differences in percentage results in colostrum samples from different teats of each sow, as measured by blocking ELISA. For each pig introduced to the MS herds, the percentage result by blocking ELISA was plotted against time (number of weeks in the infected herd). Around the time of seroconversion, there was a linear increase in the percentage result by blocking ELISA, and a regression line (11) was calculated for each pig. The estimated time of seroconversion for each individual pig was calculated as the point at which the cut-off value of 50% intersected with the individually-fitted regression line. Multiple linear regression (11) was used to study the association between time of seroconversion and the sex of pigs, as well as the age and weight at introduction and herd differences.

RESULTS

Follow-up studies of serological analysis

During 1991, thirteen of the breeding and multiplying herds became infected with M. hyopneumoniae, as confirmed by culturing and identification of the agent.

Tables I and II show the ELISA results at the herd level, compared to the confirmed herd health status. In Table I, a herd was considered as giving a positive result in the ELISA if one or more of the twenty samples tested positive. Following this criterion, 42% of the 31 herds testing positive were infected with M. hyopneumoniae, while all of the herds testing negative were free of the infection. Using this criterion for herd positivity in the ELISA, all of the infected herds gave positive results, indicating a herd sensitivity of 1.00. Of the 121 non-infected herds, 103 were serologically negative, corresponding to a herd specificity of 0.85.

However, if two or more positive results from the twenty samples were required before the herd as a whole was considered infected (Table II), nine of the thirteen infected herds tested positive and 119 of the 121 uninfected herds tested negative. These values correspond to a herd specificity of 0.98, while the herd sensitivity of the ELISA was considerably diminished to 0.69.
TABLE I

Cross-classification of 134 specific pathogen-free breeding and multiplying herds according to the confirmed health status of the herds and results of testing for Mycoplasma hyopneumoniae by enzyme-linked immunosorbent assay (ELISA)

<table>
<thead>
<tr>
<th>Presence of infection *</th>
<th>ELISA result</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>13</td>
<td>18</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Negative</td>
<td>0</td>
<td>103</td>
<td></td>
<td>103</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>121</td>
<td></td>
<td>134</td>
</tr>
</tbody>
</table>

* verified by culturing and identification of the agent

The ELISA result for the herd was considered positive if one or more of the twenty samples tested per herd gave a positive result.

Surveillance of the specific pathogen-free production herds

Of the 758 production herds believed to be free of *M. hyopneumoniae* (based on clinical inspections) which were tested, 30% reacted positively (one or more positive samples) in the ELISA. Comparison between anamnestic information and the results of examination of blood samples showed that some of the anamnestic information has limited value in predicting the serological result. Symptoms and information not showing an association with the outcome of the ELISA included the following:

- influenza in the herd
- contact with a herd suspected of infection
- occurrence of pleurisy detected at slaughter.

The only symptom which had a statistically significant association with the outcome of the ELISA was coughing. Samples from herds in which coughing was reported were 2.5 times more likely to test positive than samples with other anamnestic information suggestive of infection.

TABLE II

Cross-classification of 134 specific pathogen-free breeding and multiplying herds according to the confirmed health status of the herds and results of testing for Mycoplasma hyopneumoniae by enzyme-linked immunosorbent assay (ELISA)

<table>
<thead>
<tr>
<th>Presence of infection *</th>
<th>ELISA result</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>9</td>
<td>2</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Negative</td>
<td>4</td>
<td>119</td>
<td></td>
<td>123</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>121</td>
<td></td>
<td>134</td>
</tr>
</tbody>
</table>

* verified by culturing and identification of the agent

The ELISA result for the herd was considered positive if two or more of the twenty samples tested per herd gave a positive result.
Herds for which the only information provided by the controlling veterinarian was that they were to be screened routinely, were less likely to give positive results in the ELISA than herds for which information was provided which might be related to respiratory problems (Table III).

### TABLE III

**Significance of anamnestic information in relation to serological herd diagnosis of Mycoplasma hyopneumoniae infection in pigs**

<table>
<thead>
<tr>
<th>Anamnestic information</th>
<th>Odds ratio</th>
<th>Chi-square</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with suspicious herd</td>
<td>0.90</td>
<td>0.08</td>
<td>NS</td>
</tr>
<tr>
<td>Influenza</td>
<td>1.31</td>
<td>0.13</td>
<td>NS</td>
</tr>
<tr>
<td>Lung lesions</td>
<td>2.28</td>
<td>0.35</td>
<td>NS</td>
</tr>
<tr>
<td>Clinical suspicion</td>
<td>1.59</td>
<td>0.08</td>
<td>NS</td>
</tr>
<tr>
<td>Coughing</td>
<td>2.55</td>
<td>11.7</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Routine screening</td>
<td>0.65</td>
<td>7.15</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

NS: not significant

### Colostrum analysis

All of the colostrum samples taken from SPF breeding herds gave negative results by the ELISA, except for two colostrum samples from one herd. Four weeks later, serological reactions were detected among the twenty monthly blood samples from this herd, at the same time as clinical signs of infection with *M. hyopneumoniae*. The pathogen was cultured from lung lesions and the status of this herd was changed from SPF to MS. The colostrum samples from this herd were subsequently excluded from the negative control samples in this study. Of the twenty-four MS sows kept on the experimental farm, sixteen yielded positive results from initial colostrum samples, while only four sows gave positive results in tests on serum samples at the time of farrowing. Seven of the sixteen initial colostrum-positive sows began to give negative results again during the sampling period, at a mean time of 11 h after farrowing, with a 95% confidence upper limit of 18 h and a 95% confidence lower limit of 4 h after farrowing. Figure 1 shows examples of the ELISA results plotted against time after farrowing. It was not possible to demonstrate statistically-significant differences between the ELISA results from different teats from each sow, and the above calculations were made on the basis of mean percentages.

### Seroconversion

In the two herds into which susceptible pigs were introduced, variation was observed in the number of pigs demonstrating seroconversion (Table IV). In herd A, only 81% of the pigs showed seroconversion before slaughter, compared to 100% in herd B. The calculated mean time required for seroconversion was 3.2 weeks greater in herd A than in herd B (Table IV) and the results for each herd differed significantly (multiple regression, $P < 0.0001$). The time required for seroconversion in the two herds was not
Results of blocking enzyme-linked immunosorbent assay (ELISA) performed on colostrum samples taken from three sows at various times post-partum and serum samples taken from the two positive sows at farrowing

influenced by the sex of the animals, nor by weight or age at moving. The first positive serological reactions were observed three and five weeks after exposure in herds B and A, respectively. Figure 2 shows the rates of positive reactions plotted against time after introduction to the respective herd. In herd A, the rise in the rate of positive reactions has a later and slower onset than in herd B.

**TABLE IV**

*Descriptive statistics of two pig herds*

<table>
<thead>
<tr>
<th>Herd</th>
<th>No. of animals</th>
<th>Weight in kg at moving*</th>
<th>Age in days at moving*</th>
<th>No. of animals lost</th>
<th>No. of animals developing antibodies in serum No. (%)</th>
<th>No. of weeks before antibodies present in serum*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd A</td>
<td>68</td>
<td>33.8 (4.4)</td>
<td>81.3 (5.9)</td>
<td>0</td>
<td>55 (81%)</td>
<td>9.3 (2.0) **</td>
</tr>
<tr>
<td>Herd B</td>
<td>46</td>
<td>34.1 (7.2)</td>
<td>80.2 (9.9)</td>
<td>1</td>
<td>45 (100%)</td>
<td>6.1 (2.0) **</td>
</tr>
</tbody>
</table>

* mean followed by standard deviation (in brackets)

** mean time before seroconversion differs significantly between the two herds (multiple regression, P < 0.0001)
DISCUSSION

Follow-up studies of serological analysis

The previously-reported herd predictive values for this ELISA technique (13) are in conformity with the proportions of infected and uninfected herds detected according to the results described above. When a positive ELISA result in a single individual was considered sufficient for a positive diagnosis of the entire herd, 42% of the 31 herds testing positive were in fact infected with *M. hyopneumoniae*; this percentage corresponds well with the positive herd predictive value of 39% previously reported (13) for SPF breeding and multiplying herds with a low herd prevalence rate. All of the herds testing negative by ELISA were free of the infection, which likewise corresponds well with the previously-reported negative herd predictive value of 99.8% (13). The optimum frequency with which herd predictive values should be tested against the true herd health status could be a matter for debate. However, this comparison is performed annually because the herd prevalence rate is calculated annually and an annual list is produced of herds which are infected with each of the specific pathogens in the SPF programme. Nevertheless, this comparison is important in serological diagnosis, as it indicates when it is necessary to re-estimate herd sensitivity and herd specificity in order to maintain the value of predictions. In order to increase the herd specificity of the ELISA, the serological herd result could be interpreted as positive if two or more of the twenty blood samples are positive (Table II). However, this interpretation diminishes the herd sensitivity of the ELISA results to a level unacceptable for surveillance purposes.

Serological reactor rates at different times after exposure to pigs naturally infected with *Mycoplasma hyopneumoniae* in two minimal disease herds

**FIG. 2**

Serological reactor rates at different times after exposure to pigs naturally infected with *Mycoplasma hyopneumoniae* in two minimal disease herds
Surveillance of the specific pathogen-free production herds

The fact that 30% of the 758 investigated herds reacted positively in the ELISA demonstrates that clinical inspection alone is not an adequate surveillance method for *M. hyopneumoniae* infections. The positive herd predictive value of 91% for this group of herds (13) indicates that a combination of clinical and serological surveillance is preferable in order to minimise the number of false-positive herd diagnoses. This screening contributed to a more reliable classification of production herds into SPF and MS, thus facilitating the organisation of trade and control patterns.

Some of the risk factors not found to have a statistically significant association with positive serological results in this study are undoubtedly related to the presence of disease. The reason why this relation could not be demonstrated was probably that in many cases the anamnestic information was not supplied in a standardised way. This might have caused some symptoms to be under-reported.

Colostrum analysis

In the single SPF herd which became infected with *M. hyopneumoniae* during the collection of negative control colostrum samples, the colostrum reactions were detected before any other signs of infection in the herd, indicating a higher herd sensitivity of the ELISA when colostrum rather than blood samples are used in the herd surveillance programme. This will eventually be confirmed when colostrum sampling in the herds is incorporated for routine surveillance in all SPF breeding and multiplying herds. The greater number of sows testing positive when using colostrum rather than blood samples also indicates that test sensitivity could be increased by preferring the use of colostrum samples. It has been previously reported that colostrum contains a higher concentration of *M. hyopneumoniae* antibodies than serum (2). This phenomenon is due to transfer of immunoglobulin IgM and IgG to colostrum from serum and to locally-produced secretory IgA (1). The local presence of IgA- and IgG-producing lymphocytes specific for *M. hyopneumoniae* in the respiratory tract has also been described (10) and these lymphocytes may also congregate in the mammary glands (8). The monoclonal antibody-based blocking ELISA used does not discriminate between the immunoglobulin classes, but detects only antibodies to a *M. hyopneumoniae*-specific epitope localised on a 74 kDa protein (3).

The confidence limits of the mean time required for negative results to occur in the seven sows which began to test negative again during the sampling period indicate considerable individual variations. In order to maximise the benefits of test sensitivity, the colostrum samples should be obtained as shortly after farrowing as possible.

Seroconversion

Feld and colleagues (3) used this ELISA to investigate the time required for the development of antibodies to *M. hyopneumoniae* in three experimentally-inoculated pigs and three contact-exposed pigs. The results showed an early seroconversion under artificial conditions. The results of the present trial are directly comparable to natural infections and included several pigs of the most susceptible age which were introduced to *M. hyopneumoniae*-infected herds of young pigs. This would be expected to result in a high risk of infection with *M. hyopneumoniae* (12, 15). However, the results cannot be applied to surveillance to conclude that a herd was probably infected three to five weeks before a single positive reaction occurred in the test samples. Such a conclusion can be biased by the size, frequency and selection of the herd test sample. The size of the herd test sample in the surveillance of the Danish SPF herds was calculated using the
hypergeometric distribution (7), and is based on a wish to obtain at least one positive reaction with 95% confidence if the in-herd reactor rate is ≥ 0.10. This rate was achieved in the two herds, four and seven weeks after exposure, respectively. The reactor rate varies over time (Fig. 2), influenced by the speed at which the agent is distributed between pigs and the time needed to develop circulating antibodies. Both factors probably depend on the management of the herd and infection pressure in the herd. Further study is therefore necessary to assess the influence of the test sample parameters on the time required to detect natural seroconversion to M. hyopneumoniae in herds with different infection rates.

**CONCLUSIONS**

When herd predictive values of a diagnostic assay are used as advisory tools, they should be checked periodically. If it is shown that the values no longer correspond to reality, the herd specificity and sensitivity must be re-estimated.

It was decided to maintain the criterion by which one or more reactors in twenty samples is regarded as a positive serological result for the herd.

The surveillance programme of the SPF system will probably benefit from using this ELISA to analyse colostrum samples obtained near the time of farrowing, as well as blood samples from the herds.

Clinical examination procedures in SPF production herds have managed to keep the rate of infection with M. hyopneumoniae at approximately 30% of the herds. Clinical control should consider coughing as the most significant symptom of this infection. For further control, serological surveillance of the herds is necessary.

Seroconversion after natural exposure to M. hyopneumoniae first occurred in one herd three weeks after infection, and in another herd after five weeks, as measured by this monoclonal antibody-based blocking ELISA.

**ACKNOWLEDGEMENTS**

The authors wish to thank O.H. Sørensen and M.O. Siig for their skilful technical assistance at the experimental farm, and K. Pihl and H.T. Pedersen for providing colostrum samples and herd information. Thanks are also due to I. Hansen, T. Nielsen and E. Bach for expert technical assistance in the two MS herds.

Mrs R. Jørgensen is gratefully acknowledged for performing the serological analysis.

* * *

**LA TECHNIQUE IMMUNO-ENZYMATIQUE APPLIQUÉE À LA SURVEILLANCE DE L'INFECTION PAR MYCOPLASMA HYOPNEUMONIAE CHEZ LES PORCINS.**

V. Sørensen, K. Barfod, N.C. Feld et L. Vraa-Andersen.

Résumé : Un test enzyme-linked immunosorbent assay (ELISA) de compétition faisant appel à des anticorps monoclonaux a été appliqué à la surveillance sérologique de l'infection des élevages porcins par Mycoplasma hyopneumoniae.
Un suivi des valeurs attendues pour ce test ELISA, a été réalisé au niveau de chaque élevage en fonction des études précédentes.

Les élevages qui ont réagi positivement à cette épreuve ELISA se sont ensuite avérés infectés à 42 %, tandis que 100 % de ceux donnant des résultats négatifs étaient indemnes. Les études précédentes indiquaient des valeurs attendues, positives et négatives, de 39 % et 99,8 % respectivement.

Chez les animaux atteints d'une infection naturelle, la réaction a été plus souvent positive avec le colostrum qu'avec le sérum, cette différence étant encore plus nette lorsque les prélèvements de colostrum étaient effectués juste avant ou après la mise bas.

Si la toux est apparue comme la manifestation clinique la plus pathognomonique, la seule inspection clinique des élevages n'a pas permis de détecter l'infection dans 30 % des cas.

Le délai d'apparition des anticorps dans le sérum après exposition naturelle à M. hyopneumoniae varie selon la conduite des deux élevages étudiés. Dans l'un d'eux, les anticorps ont commencé à être détectés trois semaines après l'infection, alors que dans l'autre il a fallu attendre cinq semaines.


* * *

LA TÉCNICA INMUNOENZIMÁTICA APLICADA A LA VIGILANCIA DE LA INFECCIÓN POR MYCOPLASMA HYOPNEUMONIAE EN LOS PORCINOS. – V. Sørensen, K. Barfod, N.C. Feld y L. Vraa-Andersen.

Resumen: Una prueba de competición ELISA que recurre a anticuerpos monoclonales se aplicó a la vigilancia serológica de la infección por Mycoplasma hyopneumoniae en rebaños de cerdos. Se llevó a cabo un seguimiento de los valores predictivos observados previamente para esta prueba ELISA en cada rebaño. Los grupos que reaccionaron positivamente a la prueba resultaron infectados en un 42%, mientras que 100% de los que dieron resultados negativos estaban indemnes. Las observaciones precedentes habían mostrado valores de previsión positivos y negativos de 39% y 99,8%, respectivamente.

En los animales que padecían una infección natural, la reacción fue más frecuente en el calostro que en el suero, y esta diferencia se acentuó cuando las muestras de calostro se recogían justo antes o justo después de la parición. Si bien la tos apareció como la manifestación clínica más fiable de la infección, la inspección clínica simple no permitió detectar la infección en el 30% de los casos.

El plazo de aparición de los anticuerpos en el suero tras exposición natural a M. hyopneumoniae varió en dos rebaños con distintos sistemas de gestión: en uno de ellos, los anticuerpos empezaron a detectarse tres semanas después de la infección, mientras que en el otro hubo que esperar cinco semanas.

REFERENCES


