Uses of oral fluids

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Highlights

The use of oral fluids for the diagnosis of the PRRS has quickly become generalised due, mainly, to the simplicity of the obtaining of the samples and to the fact that the sample allows the detection of the presence of the virus and of antibodies against the virus.

In general, the correlation between the results obtained with blood samples and oral fluid samples from the same animals is good.

In the adult animals and the piglets in the farrowing quarters it is more difficult to obtain appropriate oral fluids samples.

There are more discrepancies between the results obtained with sera and with oral fluids in piglets that are in the lactation period than in other age groups.

In order for the results of the samples of oral fluids to be reliable, the use of optimised techniques for this kind of samples is essential.

During these last years, techniques have been developed that enables to reveal the PRRSV infection in oral fluid samples. This approach is based on two facts:

1. The oral fluids contain significant amounts of IgA and IgG antibodies. In the case of the PRRSV, the most appropriate imunoglobulin isotype for the detection of specific antibodies in oral fluid samples seem to be the IgG isotype, that is found abundantly in the samples from infected animals.
2. After the infection, the virus is excreted through different organic secretions, including saliva. In fact, in this sample it is possible to detect the presence of the virus for relatively long periods, possibly as a consequence of the flowing out of the virus during the viraemia period, in the acute stage of the infection, and later on as a consequence of the freeing of the virus from the tonsil, an organ where the virus accumulates.

The use of oral fluids for the diagnosis of the disease has the advantage, for veterinarians and even farmers,

that the obtaining of the samples in growing animals is relatively easy, because it is no longer necessary to restrain the animals. As a consequence, it is possible to obtain samples from a high number of pigs and make periodical controls without trouble in growing pigs and in future sows.

We have to add, to all this, the good correlation shown with the results obtained from serum samples; making it a reliable technique.

Nevertheless, in spite of its advantages, we must bear in mind that the system has some limitations. In the first place, in the gathering of samples we normally work with pools because, except in sows, the samples are taken from ropes hung in a pen, so the animals bite them. Yet, we cannot assume that the pool obtained by hanging a rope per pen will represent all the animals in the group, because the access to the rope will depend on aspects such as the size of the group, the dominance relationships between individuals, the kind of rope and the age of the animals. It is true that when the PRRSV circulates in a population of growing animals, the prevalence is normally high, and due to the high sensitivity of the technique, positive results are normally found, although we only have samples from a fraction of the animals in the group. In fact, it has been established that at least 60% of the samples will be positive when the prevalence in the pen is of at least 4%. Even so, we must be conscious that the pen is the unit, and not the individual, therefore, for the sampling of the population to be representative we must take the appropriate samples, depending on the size of the population, the number, design and distribution of the pens in a building. This is due to the fact that in spite of a positive result with a low number of infected animals in a pen, it is posible that, at least at the beginning of the infection, some pens are infected and some are not, so the taking of samples in a single pen in a building can limit the sensitivity of the technique.

On the other hand, we must bear in mind that it is possible to encounter some difficulties while obtaining samples of oral fluids, especially in adult animals, that reject to chew the ropes, and in young piglets, that normaly show a lower interest than older animals for the ropes used for obtaining the samples. In fact, it is in the young piglets where we see a lower correlation between the results obtained in the serum and in the saliva. The most incoherent results are found under field conditions, possibly due to the low prevalence of the virus in the litters on farms without clinical signs and to the bias introduced by the taking of samples. Due to this, and although the system was initially developed for the taking of individual samples in adult animals, its use has evolved with time, and currently it is accepted that the system is especially useful for the carrying out of the periodic monitoring of the animals housed in a group, especially growing pigs, in which the moment of the infection can be easily monitored. It is sometimes used in the replacement sows, in which it is uniquely interesting to verify that the adjustment programmes have worked correctly and that the animals have become infected when we had forseen it, although in the replacement sows, the use of oral fluids does not allow to check that all the animals have become infected simultaneously. In order to do this we will still need to take individual samples.

Figure 1. Oral fluids sampling in fattening pigs.

Finally, and regarding the testing of the samples of oral fluids in the laboratory, we must highlight that for the results to be reliable its is very important that the obtaining and storage of the samples are appropriate, because the saliva contains proteases and other enzymes that can degrade the antibodies, and also PCR inhibitors that may interfere with the RT-PCR test. Therefore, the samples of oral fluids must be sent to the laboratory quickly under refrigerated conditions because, otherwise, it is possible to obtain false results. It is also necessary that the serological and molecular techniques are optimised for their use with oral fluids, becasuse if we use techniques designed for testing serum, the results will not be reliable. Lastly, we must remember that the numerical values obtained in the case of the detection of antibodies differ from those normally found with serum, so the values of both kinds of samples are not comparable.

References

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