Work protocol of hygiene and disinfection to control streptococcus

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In many cases, production conditions require the utilisation of innovative alternatives in order to try to solve certain problems on the farm. That is exactly what happened in a recently opened pig farm in Spain, which began with a huge development of Streptococcus suis in piglets in the farrowing area.

Due to the piglets being slaughtered at 30 days old, the possibility of working with antibiotics was very limited, both by suppression period and tissue integrity in the inoculation areas. Therefore, it was decided to work following a specific protocol of hygiene and disinfection. Then, after demonstrating the effectiveness of this work methodology, it was decided to continue the work against Streptococcus in weaned piglets on a farm located in Italy.

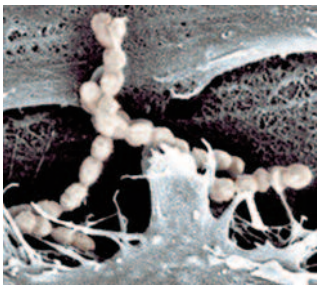
This article presents the results obtained in both field trials.

Streptococcus is a Gram positive bacteria found worldwide. Several species of these bacteria have been isolated in pigs, including Strep. dysgalactiae, Strep. agalactiae, Strep. porcinus and Strep. equisimilis.

However, the pathogenic species that produces the main pig streptococcal disease is Streptococcus suis. About 35 capsular types of Streptococcus suis have been identified. The capsular type 14 is an exception: although it is highly pathogenic for pigs, it was first isolated from humans. As Streptococcus suis is a zoonotic agent, its control is essential to safeguard both human and animal health.

Room	No. of sows	No. of piglets	No. of animals treated with antibiotics	No. of dead animals	Affected animals (%)
Control	14	183	33	8	22.40
Experiment	14	183	4	1	2.73

Table 1. Diagnosed cases of Streptococcus suis in field experiment one.



Streptococcus suis.

Streptococcus suis can be isolated from the tonsils, respiratory system and reproductive system of pigs. In order to carry out an effective control of these bacteria, it is necessary to know their epidemiology and pathogenesis. Initially, the transmission of the infection is vertical, from the sow to its offspring. Later, the infection is transmitted horizontally, from piglet to piglet, mainly due to usual management operations in the farrowing room.

In this regard, it should be noted that piglets coming from sows which do not carry the bacteria, will not possess maternal antibodies in order to protect them from the infection.

Nowadays, it is not easy to identify the sows which carry the bacteria. Furthermore, medication of the sows will not assure that they will remove their carrier status.

Therefore, it is necessary to develop control and prevention measures in order to assure the reduction of the microbial load of the piglet from the moment of birth.

Objective

The main objective of this work was to control the problem caused by Streptococcus in different circumstances. Firstly, the effectiveness of the developed work protocol was tested in the farrowing rooms in order to control these bacteria in young piglets.

Later, the effectiveness of the developed work protocol was tested in order to control Streptococcus in weaned piglets with a great health problem.

In both cases, the main objective was the reduction of the number of Streptococcus due to the implementation of a specific hygiene and disinfection work protocol based on the use of the ecological products OX-Virin (liquid biocide) and OX-S4 (powdered solid biocide).

Field experiment one

The pig farm where the first part of the work was conducted is located in Spain. It is a newly remodelled farm, with 500 sows. In order to carry out the experiment, two of the farrowing rooms were randomly selected. In each of the selected room there were 14 sows.

One of the selected rooms acted as an experimental room, and the other acted as control.

Hygiene and disinfection work protocol used as control:

- Cleaning and disinfection in the absence of animals: Cleaning was carried out using alkaline detergent. The disinfection of surfaces, equipment and environment was carried out using biocidal products based on aldehydes and quaternary ammonium salts.
- Cleaning (with water and neutral detergent) and disinfection of sows (with iodine based product) before entering into the farrowing room.

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At birth piglets were immersed in a solution of OX-Virin at 0.5% then dusted with the powdered OX-S4.

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- Application of powdered products based on phosphates on the heat mat and/or on the nests.
- Disinfection of utensils and equipments. Application of products based on iodine or alcohol by spraying or immersion.

Hygiene and disinfection work protocol applied in the experiment:

- Cleaning and disinfection in the absence of animals: Cleaning was carried out using the alkaline detergent OX-Netal. The disinfection of surfaces, equipment and environment was carried out using OX-Virin at 1%.
- Cleaning (with water and the neutral detergent OX-Net) and disinfection of sows (with OX-Virin at 0.5%) before entering into the farrowing room.
- The day before the birth, the mammary gland of the sow was disinfected with OX-Virin at 0.5%. The same disinfectant solution was used in order to disinfect the external part of the vulva.
- The day of the birth, piglets were immersed in a solution of OX-Virin at 0.5%. Later, piglets were dipped or dusted with the powdered product OX-S4, specially the parts of the body more inaccessible (underarm, groin, etc).
- Application of OX-S4 on the heat mat and/or on the nests.
- Cleaning and disinfection in the presence of animals. Solid residues were frequently removed and surfaces were disinfected using OX-Virin at 0.5-1%.
- Environmental disinfection: nebulisation with OX-Virin at 0.5% at least two times a week.
- Disinfection of utensils and equipments: Application of OX-Virin at 1% by spraying or immersion. It is necessary to maximise hygiene during all phases of animal management.

Results

Table 1 shows the results obtained in the control room and in the experimental room once piglets were weaned. Results refer to diagnosed cases of Streptococcus suis.

In the farrowing room where the experimental work protocol was applied, the percentage of affected animals was 2.73%.

However, in the farrowing room where the control work protocol was applied there were 22.40% of affected animals.

Furthermore, in the experimental room piglets showed a better growth rate than in the control room. This is believed to have been due to the great reduction of general microbial load caused by the applied experimental work protocol.

Table 2. Field experiment two.

Room	No. of animals	Weaning date	Batch
1	430	9th December 2011	Control
2	**362**	**9th December 2011**	**Experimental**
3	369	9th December 2011	Control
4	379	9th December 2011	Control
5	398	9th December 2011	Control

Field experiment two

The second part of this work was carried out in Italy, where a semi-closed cycle pig farm with 2,000 sows was selected. The medical history of the selected farm revealed serious PRRS problems and a high microbial load in farrowing and weaning areas.

This high microbial load was mainly caused by Streptococcus as a complicating agent of the recirculation of PRRS virus present the first month after weaning. The experimental group of animals consisted of 32 sows.

At weaning time, piglets were placed in many weaning rooms. All of them were similar in density, ventilation, facilities, etc, with the exception of rooms 1 and 5 that were slightly larger (Table 2).

Hygiene and disinfection work protocol used as control:

- Cleaning and disinfection in the absence of animals. Cleaning was carried out using alkaline detergent. The disinfection of surfaces, equipment and environment was carried out using biocidal products based on aldehydes and quaternary ammonium salts.
- Cleaning (with water and neutral detergent) and disinfection of sows (with iodine based product) before entering into the farrowing room.
- Application of powdered products based on phosphates on the heat mat and/or on the nests.
- Disinfection of utensils and equipments. Application of products based on iodine or alcohol by spraying or immersion.

Application of the powdered product OX-S4 on heat mats and nests.

Hygiene and disinfection work protocol applied in the experiment:

- Cleaning and disinfection in the absence of animals: Cleaning was carried out using the alkaline detergent OX-Netal. The disinfection of surfaces, equipment and environment was carried out using OX-Virin at 1%.
- Cleaning (with water and the neutral detergent OX-Net) and disinfection of sows (with OX-Virin at 0.5%) before entering into the farrowing room.
- The day before the birth, the mammary gland of the sow was disinfected with OX-Virin at 0.5%. The same disinfectant solution was used in order to disinfect the external part of the vulva.
- The day of the birth, piglets were immersed in a solution of OX-Virin at 0.5%. Later, piglets were dipped or dusted with the powdered product OX-S4, specially the parts of the body more inaccessible (underarm, groin, etc).
- Application of OX-S4 on the heat mat and/or on the nests.
- Cleaning and disinfection in the presence of animals. Solid residues were frequently removed and surfaces were disinfected using OX-Virin at 0.5-1%.
- Environmental disinfection: nebulisation with OX-Virin at 0.5% at least two times a week.
- Disinfection of utensils and equipments: Application of OX-Virin at 1% by spraying or immersion. It is necessary to maximise hygiene during all phases of animal management.
- Cleaning and disinfection of weaning room: Before the entrance of animals, spray OX-Virin at 1%. Later, dust the powdered product OX-S4 on surfaces and also on piglets during their arrival.

Results

Table 3 presents the results obtained five weeks after weaning. The application of the experimental work protocol considerably reduced the number of dead animals. In all cases dead piglets were necropsied, and as much as possible, laboratory analysis were carried out.

In most cases, during necropsy an increase in the size of lymph nodes and interstitial pneumonia with diffuse poliserositis, specially at cardiorespiratory level was observed.

In the laboratory it was demonstrated that, in most cases, animals were PCR positive to PRRS, streptococcus being the bacterial agent most isolated.

The group of animals treated with the hygiene and disinfection experimental work protocol, in addition to showing a great decrease in mortality, also showed a significant reduction in terms of parenteral treatments and the number of animals retarded in growth.

Room	No. of animals	Weaning date	Control date	Days	No. of dead animals	% of dead animals
1	430	9th Dec 2011	13th Jan 2012	35	16	3.72
2	**362**	**9th Dec 2011**	**13th Jan 2012**	**35**	**10**	**2.76**
3	269	9th Dec 2011	13th Jan 2012	35	22	5.96
4	379	9th Dec 2011	13th Jan 2012	35	19	5.01
5	398	9th Dec 2011	13th Jan 2012	35	26	6.53

Table 3. The results obtained five weeks after weaning for field experiment two.

Conclusions

Taking into account presented data, it can be concluded that the implementation of the developed hygiene and disinfection work protocol allows effective control of the infection caused by Streptococcus suis.

The work guidelines proposed not only allowed a statistically significant decrease of the percentage of animals affected by Streptococcus suis, but also led to improved production rates, proving to be an effective, ecological and economically viable solution. ■