A comparative study of the efficacy of commercial bivalent vaccines

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Porcine circovirus type 2 (PCV2) and M. hyopneumoniae infections have a major impact on health that, between the two, can encompass the entire stage. While the PCV2-related infection and clinical signs are usually observed at the end of weaning and at the beginning of rearing, those caused by M. hyopneumoniae usually occur during the rearing stage.

Both infections reduce daily growth, increase cost due to treatments and increase mortality rates. This reduction in productive performance also increases when secondary infections appear.

The most efficient way to control these diseases and reduce associated losses is vaccination. To protect pigs against PCV2 during weaning-rearing, most farms vaccinate piglets between three and four weeks of age; as for M. hyopneumoniae, piglets usually receive the vaccine in the first weeks of life.

Both vaccination protocols are widely used on pig farms and, seeing that the guidelines are quite similar, in many cases pig farmers choose to facilitate efforts by vaccinating against both pathogens at the same time. In keeping with this purpose and also to reduce the number of injections administered to piglets, bivalent vaccines against these two pathogens are sold.

Objective

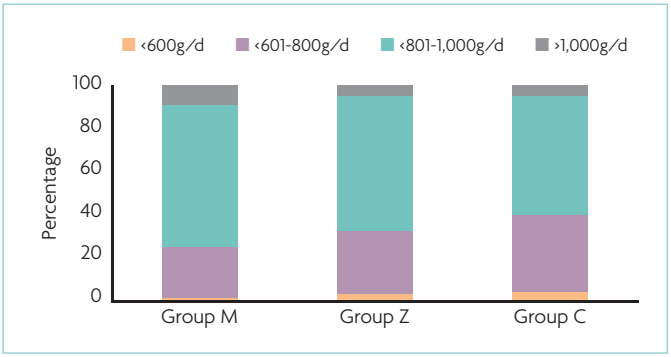
The purpose of this study was to compare the efficacy of the Porcilis PCV M Hyo vaccine and another commercial bivalent vaccine against both PCV2 and M. hyopneumoniae in terms of improvement in average daily weight gain (ADWG) and final weight, compared to a control group, in a commercial farm with an active PCV2 infection.

Materials and methods

This field study was carried out on a commercial farm of approximately 250 breeding sows in north west Spain, with an active PCV2 infection during the rearing stage and presence of compatible clinical signs at three months old. It is important to note that, at that time, this pathogen was not included in the vaccination protocol.

The study included two batches with a total of 646 pigs. All piglets were weighed and individually identified at 25 days of age. In each, the piglets were randomly assigned to three homogeneous groups according to body weight (p=0.086), excluding those that were weak and non-viable.

Fig. 1. Percentage of pigs at each ADWG interval during the rearing phase.



Pigs from the three groups together in the same pen. Each group was identified by coloured ear tags.

At 26 days of age (two days before weaning), two of the groups (M and Z) were vaccinated against PCV2 and M. hyopneumoniae (Porcilis PCV M Hyo and another commercial bivalent vaccine against PCV2 and M. hyopneumoniae, respectively), while the third group (C; control) received physiological saline as a placebo.

In the weaning pens, the piglets were distributed into pens of approximately 45 pigs. They were later taken to the same feedlot where each pen had 15 animals inside. In both stages, they were randomly distributed in the pig pens, mixing pigs vaccinated with either one vaccine or the other and unvaccinated pigs.

Data was collected throughout the study on the number of deaths and the production stage in which they occurred. Pigs were also weighed at 76 and 159 days of age to calculate ADWG at weaning, rearing and throughout the entire study.

Pearson's chi-squared test was used to compare the percentage of deaths among the three groups. The ADWG during each production stage and the weights at each moment of the study were compared using ANOVA tests.

Results

The mortality rate in pigs in Groups M, Z and C is shown in Table 1. Group C always had a higher mortality rate compared to vaccinated groups; however, this value was not statistically significant at any particular stage (p›0.05).

During weaning, the ADWG was statistically the same between the three groups (p = 0.219). In contrast, the pigs in Group M showed a statistically higher ADWG during the rearing stage than those in Group C (p=0.017), which could not be demonstrated by those in Group Z.

During this stage, 75% of the pigs in Group M presented a daily growth higher than 800g, while in Group Z this percentage was around 70% and only 60% of unvaccinated pigs (Group C) achieved this daily growth (Fig. 1).

This means that, overall, the pigs in Group M showed statistically higher growth than those in Group C (p=0.036), while no significant differences were observed among the other groups. The average weight of the pigs was statistically equal at the beginning of the study (p=0.086) and remained as such by the end of the weaning stage (p=0.175).

However, at the end of the study, statistically significant differences were observed: the pigs in Group M showed a heavier weight than those in Group C (p=0.022) (95.77 v. 92.23kg). On the other hand, no statistically significant differences were observed between the pigs in Group Z (94.00kg) and C or between both vaccinated groups (Fig. 2).

Discussion

This research analyses the efficacy of two commercial bivalent vaccines (Porcilis PCV M Hyo and another commercial bivalent vaccine against

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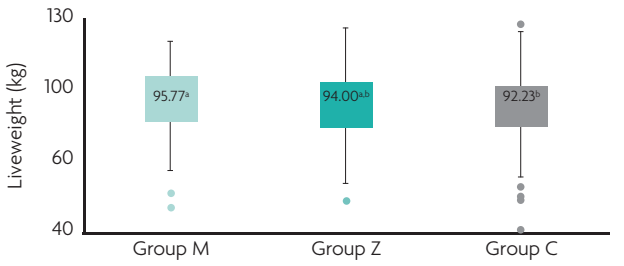
Group	Mortality rate (%)			Average daily weight gain		
	Weaning	Rearing	Weaning and rearing	Weaning	Rearing	Weaning and rearing
M	2.35[a]	3.85[a]	6.10[a]	373 ± 77[a]	861 ± 116[a]	670 ± 86[a]
Z	2.90[a]	2.99[a]	5.80[a]	383 ± 84[a]	835 ± 118[a,b]	658 ± 89[a,b]
C	3.54[a]	5.05[a]	8.41[a]	369 ± 78[a]	827 ± 128[b]	647 ± 92[b]

[a,b]Values with different letters indicate significant differences.

Table 1. Mortality rates and average daily weight gain (g).



[a,b] Values with different letters indicate significant differences (p<0.05).

Fig. 2. Final weight of the pigs in each group (kg).

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both PCV2 and M. hyopneumoniae) to control PCV2 infection under field conditions on an affected farm.

In general, the results show that vaccination improved most of the indicators analysed; it highlights the significant rise in ADWG in Porcilis PCV M Hyo-vaccinated pigs compared to the group of unvaccinated pigs.

Vaccination protects pigs against PCV2 and M. hyopneumoniae infections, thus minimising infections caused by these pathologies.

The higher death rate observed in the unvaccinated pigs could be related to this circumstance.

However, vaccines are not just used for this purpose, they also seek to ensure that pigs optimise the resources to them.

In other words, the unvaccinated pigs most likely had to use part of the energy provided by the feed to defend themselves against these two pathogens, while the vaccinated pigs used it to grow. Hence, during the rearing phase (when the farm was affected by PCV2), the vaccinated groups showed more pigs with a higher daily growth.

ADWG improvement is probably the variable that most determines the return vaccines. Although weight is usually used as a reference, since it determines the economic value of the pig, the final weight depends directly on the ADWG of the animals.

This research has shown that Porcilis PCV M Hyo vaccination, under field conditions, led to an improvement of 34g/day compared to unvaccinated pigs during the stage. This improvement, unnoticeable in daily observation, resulted in an increased weight of almost 4kg per pig at 159 days of age.

At this point, it is important to stress that both vaccinated and unvaccinated pigs were mixed in this study. Under these circumstances, it is likely that unvaccinated pigs acted as a source of PCV2 and/or M. hyopneumoniae towards the vaccinated ones, which would entail an immune response. That said, under normal conditions, where all pigs would be vaccinated, even better results would be expected.

Conclusions

In conclusion, the use of bivalent vaccines against PCV2 and M. hyopneumoniae in this study improved production. However, only the Porcilis PCV M Hyo vaccine led to a significant improvement in ADG and weight at the end of fattening compared to unvaccinated pigs. ■

References are available from the authors on request