

Efficacy evaluation of a mixed *Mycoplasma hyopneumoniae* bacterin and a porcine circovirus type 2 vaccine

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Introduction

Diseases associated with *Mycoplasma hyopneumoniae* (M hyo, enzootic pneumonia) and Porcine Circovirus Type 2 (PCV2) infections are a major concern in the swine industry. M hyo has also been implicated as one of the major co-factors in the development of PCVAD.^{1,2} The objective of these studies was to evaluate the efficacy of both *Mycoplasma hyopneumoniae* and Porcine Circovirus Type 2 vaccines when the monovalent USDA licensed vaccines for the two agents are mixed and administered in a single combined injection.

Materials and methods

The efficacy of each fraction was evaluated in separate studies. This allowed for evaluation of M hyo and PCV2 vaccinal protection in their appropriate host animal challenge models.

M hyo evaluation

The M hyo efficacy evaluation was performed in conventional pigs approximately 3 weeks of age. Pigs were tested and determined to be seronegative for ELISA antibodies to M hyo and PRRS virus. Pigs also tested negative by PRRS PCR. At approximately 3 weeks of age, animals were vaccinated with a mixture containing Ingelvac MycoFLEX[®] and Ingelvac CircoFLEX[®] (Boehringer Ingelheim Vetmedica, Inc., St Joseph, Missouri, USA) in a single 2 mL intramuscular dose. The vaccine treatment was obtained by mixing equal volumes of the individual monovalent products (each labeled as 1 mL/dose) and then administering the mixture as a 2 mL/dose. Thirty three days after vaccination, vaccinated and challenge control animals were challenged with a virulent M hyo isolate. Animals were necropsied twenty eight days after challenge and the lungs were removed and scored for consolidation consistent with M hyo infection. The primary criterion for protection against M hyo challenge was lung consolidation scores. Statistical significance was determined by a Wilcoxon Rank Sum Analysis of lung scores for each group.

PCV2 evaluation

The PCV2 efficacy evaluation was performed in caesarian-derived, colostrum-deprived piglets. At approximately three weeks of age, piglets were vaccinated with Ingelvac MycoFLEX and Ingelvac CircoFLEX in a single 2 mL dose (mixed as described above). On day 31 post-vaccination, vaccinates and control animals were administered a virulent PCV2 challenge virus. Twenty two days following the administration of the challenge material, all animals were euthanized and selected tissues were removed and submitted for evaluation by histopathology and PCV2 immunohistochemistry (IHC). The primary efficacy criteria were prevalence of lymphoid depletion, lymphoid inflammation and lymphoid IHC. Tests for differences in percentages between treatment groups were performed using Fisher's Exact Test.

Results

There were no systemic or injection site adverse reactions that could be attributed to the vaccine mixture in either study.

M hyo efficacy

The group of pigs vaccinated with the vaccine mixture had significantly lower lung consolidation scores than the M hyo challenge control group (Table 1).

PCV2 efficacy

The group of pigs vaccinated with the vaccine mixture had significantly lower prevalence's of lymphoid depletion, lymphoid inflammation and lymphoid IHC positive pigs (Table 2).

Discussion

The mixture of Ingelvac MycoFLEX and Ingelvac CircoFLEX delivered in a single combined 2.0 mL intramuscular injection was safe and efficacious against separate M hyo or PCV2 challenges. The ability to mix these two products not only provides significant protection against

Table 1: Efficacy of Ingelvac MycoFLEX® after mixing with Ingelvac CircoFLEX®

Treatment	Number of animals	Group average lung score, (%)
M hyo bacterin - PCV2 vaccine mixture (vaccinated, challenged)	19	3.9 ^a
M hyo challenge controls (not vaccinated, challenged)	19	14.3 ^b
Strict controls (not vaccinated, not challenged)	6	0.0

^{a,b} $P < 0.0001$

Table 2: Efficacy of Ingelvac CircoFLEX® after mixing with Ingelvac MycoFLEX®.

Treatment	Lymphoid depletion +/total (%)	Lymphoid inflammation +/total (%)	Lymphoid IHC +/total (%)
PCV2 vaccine - M hyo bacterin mixture (vaccinated, challenged)	0/24 (0.0%) ^a	1/24 (4.2%) ^a	2/24 (8.3%) ^a
PCV2 challenge controls (not vaccinated, challenged)	20/24 (83.3%) ^b	21/24 (87.5%) ^b	22/24 (91.7%) ^b

^{a,b} $P < 0.0001$

these pathogens, it also reduces the number of injection sites, eliminates the animal stress and labor required for a second injection, yet provides confirmed efficacy and safety as demonstrated by these controlled studies.

References

1. Dorr, P.M. et al. (2007) J Am. Vet. Med. Assoc. 230(2):244–250.
2. Opriessnig, T. et al (2004) Vet. Pathol. 41:624–640.

