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COMPARISON OF LIVE ATTENUATED AND LIVE-NON ATTENUATED VACCINES WITH REGARD TO THE SAFETY OF THE ADMINISTRATION OF AN OVERDOSE USING THE MODEL OF THE EUROPEAN MONOGRAPH IN SPF CHICKENS

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BACKGROUND AND OBJECTIVES

Coccidiosis poses significant challenges in the broiler chicken industry. Live vaccines are commonly employed to control the disease. However, many authors and researchers quite frequently regard coccidiosis vaccination as a unique concept, without any differences between products. However, depending on the type of technology used to produce the *Eimeria* strains that they contain, these vaccines can be classified as wild-type (non-attenuated) vaccines and attenuated ones. Limited information is available on the safety of wild-type vaccines, especially compared to live attenuated ones. The aim of this study was to compare under experimental conditions the safety of an overdose (10X) of an attenuated by precociousness vaccine with non-attenuated coccidiosis vaccines available in certain countries.

MATERIALS & METHODS

The birds were divided into 4 groups according to the coccidiosis vaccine received (Table 1). The overdosage study was performed according to the European Monograph model for safety trials which resembles similar conditions to the replication of vaccinal oocysts in the litter. On day 0, 160 SPF birds (14 days old) were randomized by weight, proportionally distributed in cages, and orally inoculated with the corresponding treatment. The inoculation of the different vaccines was always performed before the end of shelf-life of any treatment and managed according to the Summary of Product Characteristics of each product. The birds were blindly monitored for 14 days. Parameters evaluated to assess safety included Clinical Signs (CS), Mortality, Intestinal Lesions (IL), Body Weight (BW) and Feed Conversion Ratio (FCR). The excretion of the vaccinal oocysts in fresh faeces was measured by Oocyst per gram counts (OPG) from 3 to 9 days post-inoculation (DPI).

Groups	Administration	*Eimeria* species composition*	No. Animals
A	EVANT®	*E. acervulina, E. maxima, E. tenella, E. mitis, E. praecox*	40
B	Vaccine B	*E. acervulina, E. maxima, E. tenella*	40
C	Vaccine C	*E. acervulina, E. maxima E. maxima MFP, E. tenella, E. mivati*	40
D	Phosphate Buffered Saline Solution	-	40

**Compositions according with the technical information of the different companies*

Table 1. Experimental design

RESULTS

Due to the attenuation process, a shorter life cycle and earlier shedding of vaccinal oocysts are expected. Thus, Group A shedding started at 4 DPI and Groups B and C at 5 DPI. A double mild peak was observed in Group A, typical of different species shedding, *E. acervulina, E. mitis, E. praecox* expected at 5 days and *E. maxima* and *E. tenella* at 8 days. A higher peak of elimination of OPG was observed at 6 DPI in Group C, followed by Group B at 7 DPI and a lower peak of elimination in Group A at 5 DPI (Figure 1).

Regarding lesions and clinical signs, Groups B and C showed some birds with blood in the faeces. Group C had one dead bird attributable to the treatment with confirmed grade 4 intestinal lesion scoring. No abnormal signs of disease or deaths were recorded in Groups A and D. The IL evaluation performed at 6 and 14 DPI (12 birds per time point) indicated higher intestinal lesions in Groups B and C compared to groups A and D.

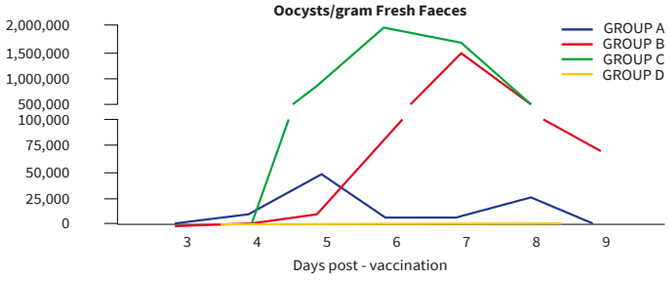


Figure 1. OPG counts in fresh faeces according to treatments.

Statistically significantly lower BW were detected at 14 DPI in groups B and C compared to groups A and D (Figure 2). Groups A and D showed similar FCR from 6 to 16 DPI (0.70 and 0.73 respectively), while groups B and C showed higher FCR in the same period (1.07 and 1.13 respectively) (Figure 3).

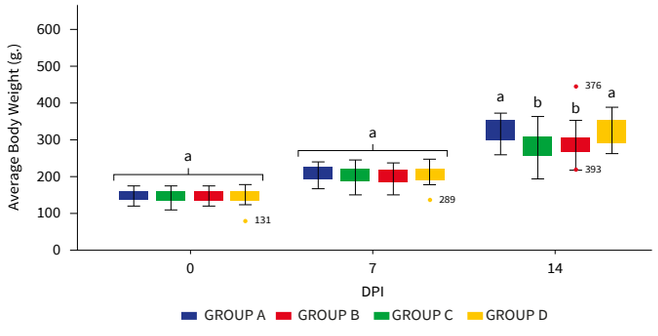
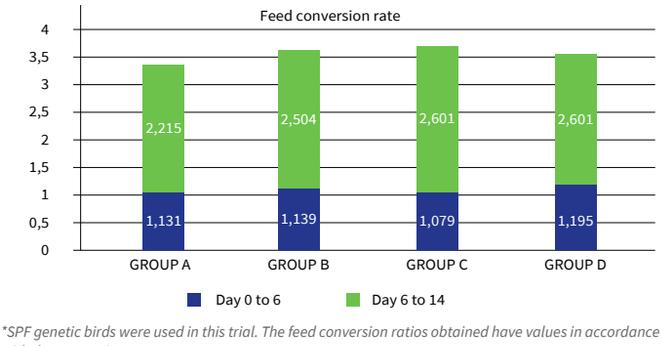


Figure 2. Coccidiosis intestinal lesions detected in at 6 DPI and 14 DPI in 12 birds per group per evaluation day established in the study.



**SPF genetic birds were used in this trial. The feed conversion ratios obtained have values in accordance with these genetics.*

Figure 3. Average feed conversion ratio according to treatments

DISCUSSION AND CONCLUSIONS

In conclusion, the results indicated that the vaccine administered in Group A is safer compared to the other vaccines administered. Moreover, an overdose of the vaccine in Group A (attenuated) does not cause major clinical signs of disease or mortality, only low and mild intestinal lesions are detected, with similar body weights and feed conversion ratios to the control group. It has been demonstrated that non-attenuated vaccines have higher oocyst shedding and produce more severe and frequent clinical signs and intestinal lesions in the animals, resulting in a loss of body weight and a poorer feed conversion ratio.