

SAFETY CONCERNS REGARDING COCCIDIOSIS VACCINES. COMPARISON OF ATTENUATED AND NON-ATTENUATED TYPE VACCINES

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INTRODUCTION

Vaccines against coccidiosis are mainly composed of live oocysts. Concerns about the safety of coccidiosis vaccines have been raised by field users. The aim of this study was to compare the safety parameters of commercial non-attenuated and attenuated (Jeffers, 1975) *Eimeria* vaccines with EVALON®, a live attenuated coccidiosis vaccine for breeders and layers. 525 chickens were vaccinated orally at 1 day of age with either PBS (group 1), an attenuated vaccine (groups 2 and 4), including EVALON® (HIPRA) (group 2), or non-attenuated vaccines (groups 3 and 5). Clinical signs and appearance of the faeces were evaluated daily. Birds were weighed and euthanized for intestinal lesion scoring at 21, 28, 37 and 43 days post vaccination (dpv). *Eimeria* oocysts were counted in the litter at weekly intervals.

RESULTS AND DISCUSSION

1. CLINICAL SIGNS, CHANGES IN FAECES

No clinical signs were recorded in group 1, group 2 and group 4 during the entire study. Mild clinical signs such as ruffled feathers and reduced activity were observed in groups 3 and 5 (non-attenuated vaccines). The duration of mild clinical signs was variable. They were detected in group 3 for just 2 days, whereas in group 5 they lasted from 15 dpv to 43 dpv. Changes in the faeces were sporadically observed in groups 2 and 4, whereas in groups 3 and 5 they occurred almost continuously from the second-third week post vaccination.

2. BODY WEIGHTS

No statistically significant changes in body weight were observed during the entire study (Mann-Whitney U test; $p < 0.05$); however, at 37 dpv, the weights of control group 1 and group 2 were the greatest.

3. INTESTINAL LESION SCORE

Throughout the study, group 2 did not show any statistically significant difference (Mann-Whitney U test; $p < 0.05$) in average intestinal lesions compared to the control group (group 1). In contrast, statistically significant different average lesion scores (Mann-Whitney U test; $p < 0.05$) were observed in different intestinal regions in groups 3 to 5 compared to the control group. In particular, group 3 showed lesions in the rectum at 28 dpv. Group 4 showed lesions in the duodenum and jejunum at 28 dpv; the rectum at 37 dpv; the jejunum, caecum and rectum at 43 dpv. Group 5 showed lesions in the rectum at 28 dpv and caecum at 37 dpv. The distribution of lesions in each group and in each intestinal region is represented in Figures 1-3. The results are represented as the percentage of animals in each group showing a specific intestinal lesion score.

Figure 1. Intestinal lesion score at 28 dpv.

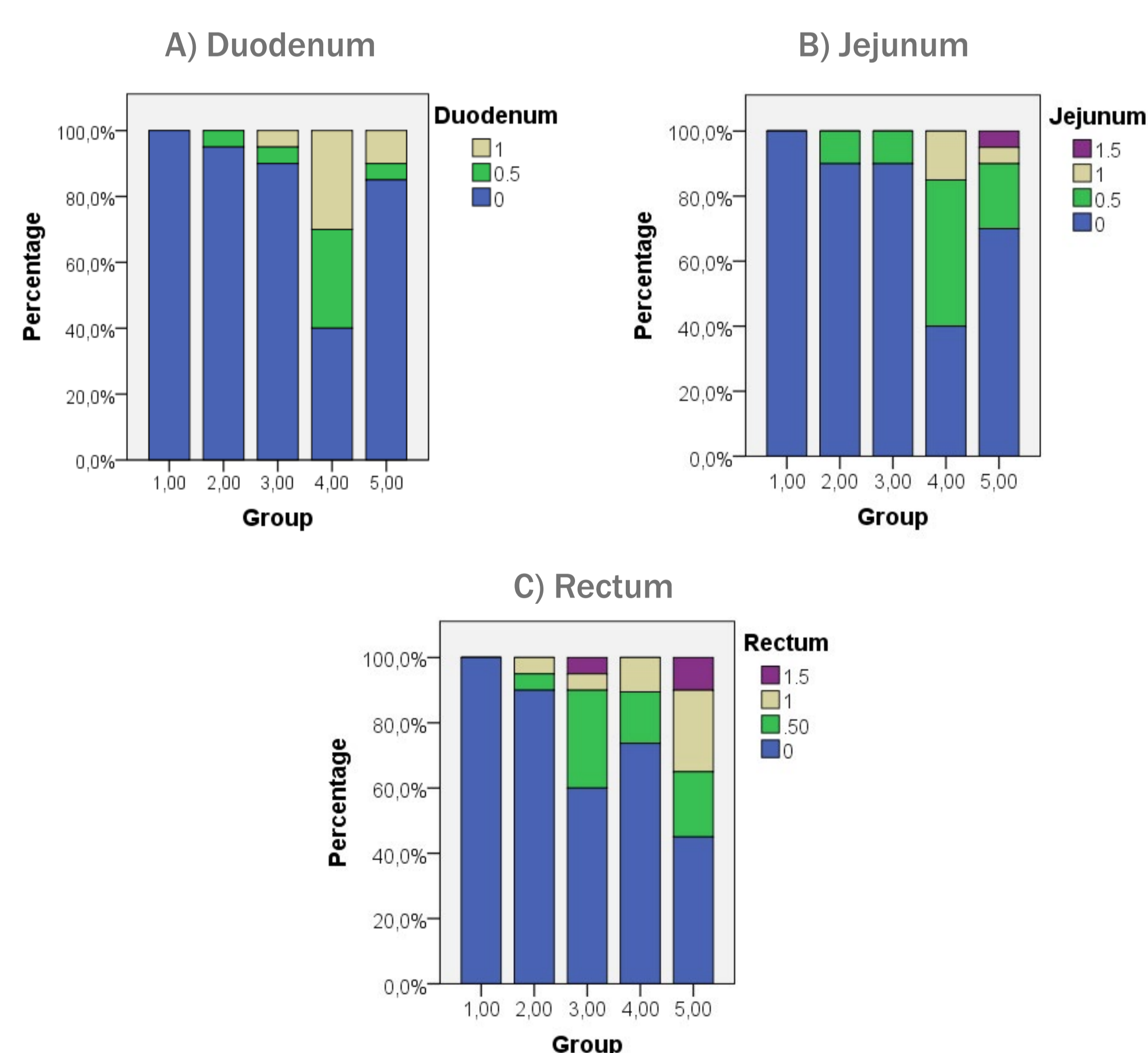


Figure 2. Intestinal lesion score at 37 dpv.

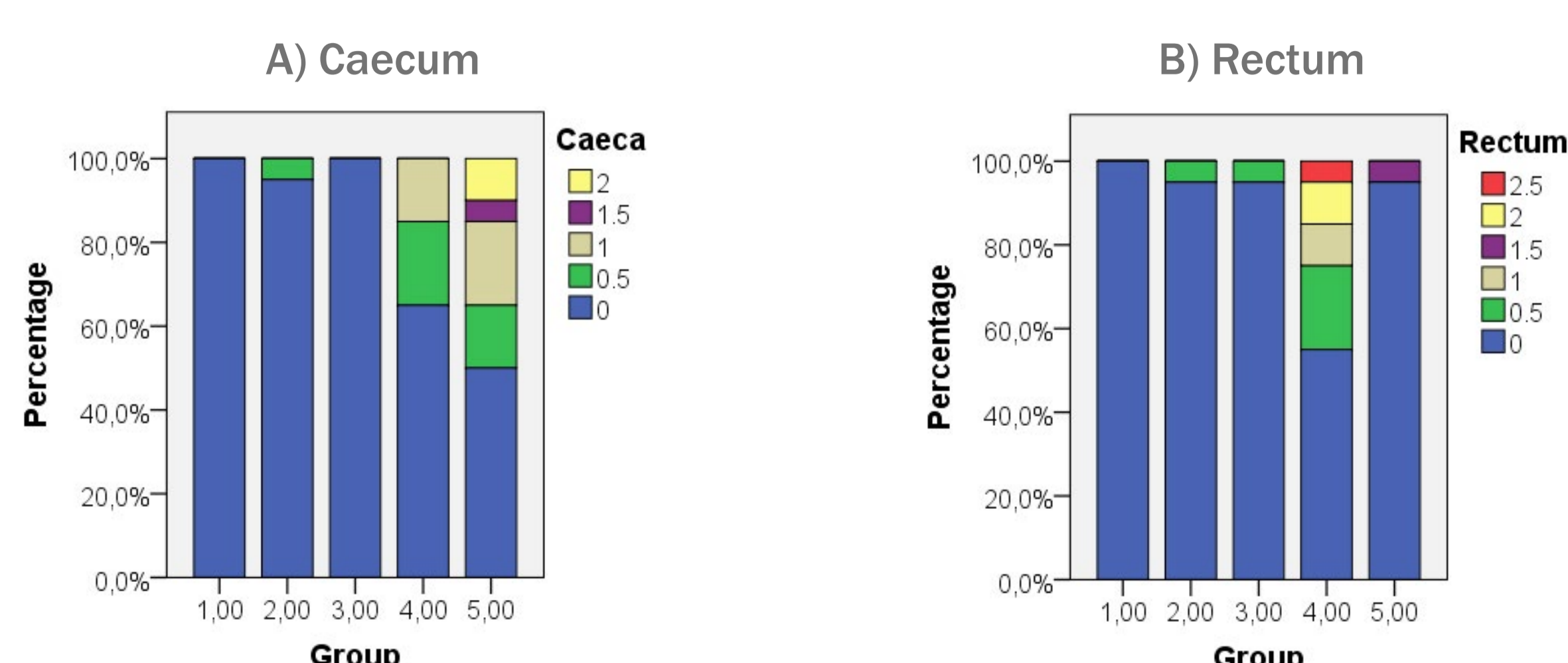
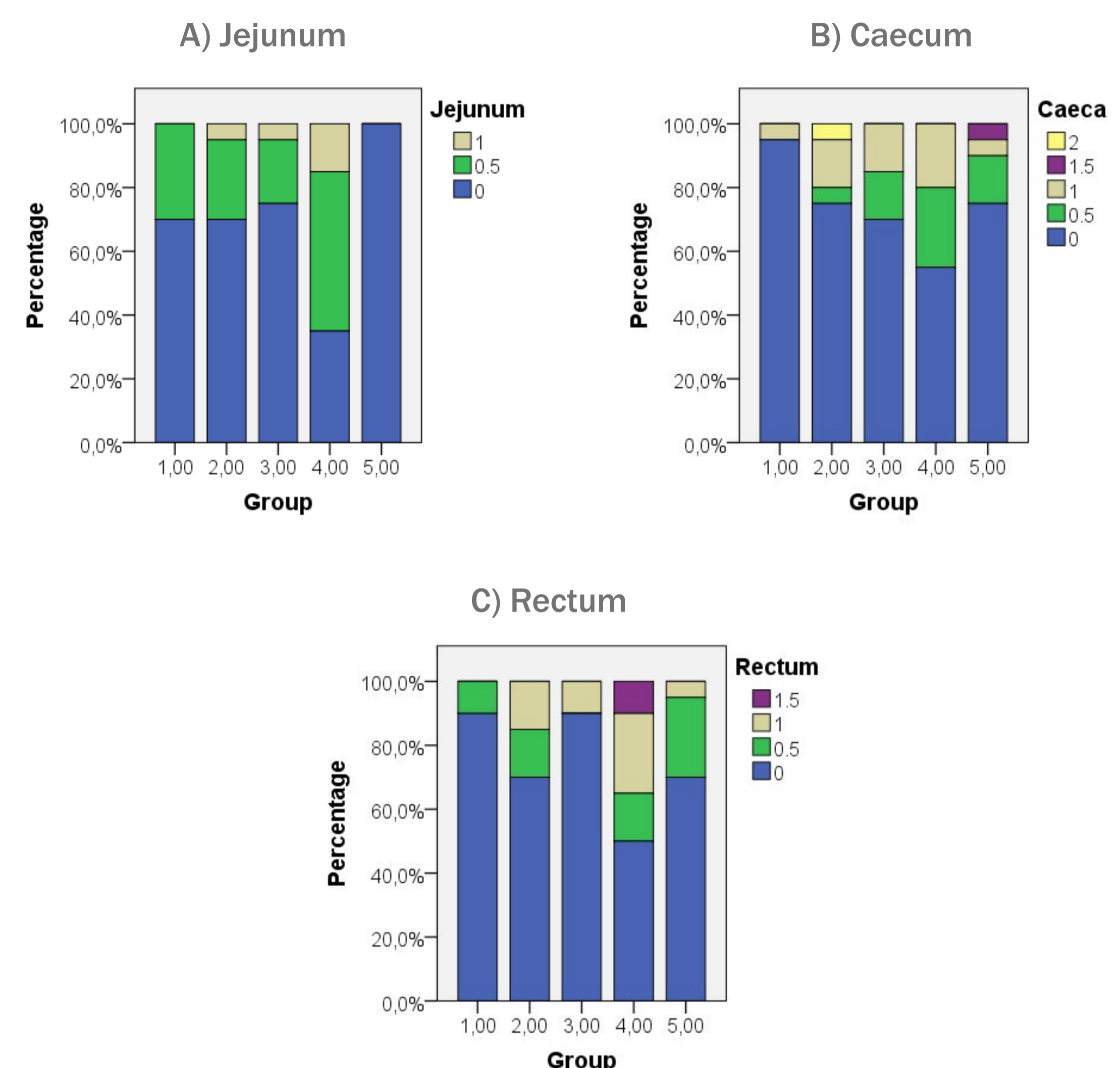


Figure 3. Intestinal lesion score at 43 dpv.



4. OOCYSTS COUNT IN THE LITTER

Eimeria oocysts were detected in the litter of all vaccinated groups; however, in group 4 their appearance was delayed compared to the other groups. The number of oocysts was higher in groups 3 and 5 compared to the other groups with the differences reaching 14.9×10^4 oocysts/g (Table 1). After day 7 both groups 3 and 5 showed a significant decrease in the oocysts per gram (OPG) in the litter and this may be due to the fact that under experimental conditions the densities of the birds are lower compared to field conditions and this may affect the proper distribution of the vaccinal oocysts. Another factor influencing a bad replication was the fact that despite the fact that the facilities were kept above 50% relative humidity throughout the study, in general the litter was quite dry, which affects the survival of vaccinal oocysts. The EVALON® group behaved as expected in terms of OPGs: being an attenuated vaccine the levels of replication never reached such high levels as the non-attenuated vaccines (group 3 and 5) and moreover the profile of the OPG curve shows the peak of the first replication at 7 dpv, with a 2nd peak at 21 dpv which corresponds to the second replication after which the birds have developed immunity against coccidiosis.

Table 1. Oocyst numbers in litter samples.

GROUP	OPGs					
	7	14	21	28	37	43
1	0	0	0	0	0	0
2	37,733	1,365	16,125	3,557	17,082	935
3	186,887	10,570	6,046	1,530	1,839	5,615
4	0	0	20,063	11,611	8,592	7,276
5	142,408	24,198	22,260	1,665	5,629	11,179

CONCLUSIONS

In conclusion, the outcomes of this trial suggest that both attenuation and also its grade might be important factors to take into account when selecting live coccidiosis vaccines; lack of attenuation and poor grade of attenuation might be partly responsible for compromising the health status of vaccinated animals. Moreover, this study supports the safety of EVALON®, a live attenuated vaccine designed to confer protection without compromising the health status of vaccinated animals.

REFERENCES

- Jeffers T.K. (1975). Attenuation of *Eimeria tenella* through selection for precociousness. J Parasitol. Dec; 61(6):1083-90.