4 Discussion

The results of this study show the presence of the following differences by product in comparison with EVALON®:

- Clinical signs and alteration of droppings: more persistent in groups 3 and 5, less in group 4.
- Intestinal lesions: highest in groups 3, 4 and 5.
- OPG in the litter: replication peaks of the vaccines very high at 7 dpv in groups 3 and 5, while in group 4 there was a delayed peak at 21 dpv.

In conclusion, the results of this study indicate that both the attenuation itself and its degree may be important factors that must be taken into account when choosing live vaccines against coccidiosis; the lack of attenuation and the low degree of attenuation may partly justify the deterioration of the health of vaccinated animals. On the other hand, this study confirms the non-interference of EVALON® in productive parameters, as well as the absence of impact in the birds’ intestines. In addition to the durable protection offered by EVALON®, these factors put the birds in a better position to achieve the objectives of uniformity and weight during the rearing period.

References


come within the range of between 25°C and 26°C and over 50%, respectively. Feed and water were provided ad libitum. The commercial feed did not contain coccidiostats. The animals were divided into 5 groups (1-5) of 105 individual animals each, using weight as a stratification factor. Table 1 shows the study design and the parameters evaluated.
### Results

There were no clinical signs in groups 1, EVALON® and 4 throughout the study. Mild clinical signs, such as the presence of ruffled feathers and less activity, were observed in groups 3 and 5 (treated with non-attenuated vaccines). In addition, mild clinical signs were also observed in group 5, such as paleness in the legs and the crest, the body slightly arched and huddling. The duration of the mild clinical signs was variable. These manifestations were detected in group 5 for 2 days only, while in group 5 they lasted from 15 to 43 dpv.

Sporadic changes in the appearance of the droppings were observed in the EVALON® group and group 4, whereas in groups 3 and 5 the changes occurred almost continuously from the second or third week after vaccination.

There were no statistically significant changes in body weight at any time during the study (Mann-Whitney U Test; p < 0.05); however at 37 dpv, the weight in control group 1 and the EVALON® group reached its maximum value. These results are consistent with what was expected with EVALON®, since it is an attenuated vaccine, its replication is very fast with a peak at 21 dpv, leaving the digestive tract clear so that the animals can continue to grow without interferences linked to the vaccine strains (Figure 1).

Throughout the study, no statistically significant differences were observed in the EVALON® group (Mann-Whitney U Test; p <0.05) in the average of the intestinal lesions compared to the control group (group 1). In contrast, there were statistically significant differences (Mann-Whitney U Test; p <0.05) in the lesion score average in different intestinal regions in groups 3 to 5 compared to the control group. In particular, in group 3 lesions were observed in the rectum at 28 dpv. In group 4 lesions were observed in the duodenum and the jejunum at 28 dpv; in the rectum, 37 dpv. In group 5 lesions were observed in the rectum at 28 dpv and in the caeca at 37 dpv.

The Total Mean Lesion Score is the sum of the average lesion values for the different intestinal tracts in a number of birds (20 in this study).

Eimeria oocysts were detected in the litter of all vaccinated groups; however, in group 4, they appeared later compared to the other groups. The number of oocysts was higher in groups 3 and 5 compared to the other groups; the differences reached 14.9 x 10⁴ oocysts/g at day 7 (figure 3). However, after day 7, both groups 3 and 5 showed an evident decrease of oocysts per gram (OPG) in the litter, which may be due to the fact that, under experimental conditions, the densities of the individual animals are lower compared to field conditions and this may affect the correct distribution of vaccine oocysts. The EVALON® group behaved as expected with regard to OPG: since it is an attenuated vaccine, replication never reaches levels as high as that of the non-attenuated vaccines (groups 3 and 5) and, in addition, the profile of the OPG curve shows the peak of the first replication at 7 dpv, and the second peak at 21 dpv, which corresponds to the second replication, after which the animals develop immunity against coccidiosis.
### Table 1. Summary of the experimental process

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Days post vaccination (dpv)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intestinal lesion score and weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical signs, mortality, and alteration of droppings</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>Litter samples</td>
<td>X X X X X X</td>
<td></td>
</tr>
</tbody>
</table>

### 3 Results

There were no clinical signs in groups 1, EVALON® and 4 throughout the study. Mild clinical signs, such as the presence of ruffled feathers and less activity, were observed in groups 3 and 5 (treated with non-attenuated vaccines). In addition, mild clinical signs were also observed in group 5, such as paleness in the legs and the crest, the body slightly arched and huddling. The duration of the mild clinical signs was variable. These manifestations were detected in group 3 for 2 days only, while in group 5 they lasted from 15 to 43 dpv.

Sporadic changes in the appearance of the droppings were observed in the EVALON® group and group 4, whereas in groups 3 and 5 the changes occurred almost continuously from the second or third week after vaccination.

There were no statistically significant changes in body weight at any time during the study (Mann-Whitney U Test; p <0.05) in the lesion score average in different intestinal regions in groups 3 to 5 compared to the control group. In particular, in group 3 lesions were observed in the rectum at 28 dpv. In group 4 lesions were observed in the duodenum and the jejunum at 28 dpv; in the rectum, 37 dpv. In group 5 lesions were observed in the rectum at 28 dpv and in the caeca at 37 dpv.

The Total Mean Lesion Score is the sum of the average lesion values for the different intestinal tracts in a number of birds (20 in this study).

The Total Mean Lesion Score in each group.

Eimeria oocysts were detected in the litter of all vaccinated groups; however, in group 4, they appeared later compared to the other groups. The number of oocysts was higher in groups 3 and 5 compared to the other groups; the differences reached 14.9 x 10^4 oocysts/g at day 7 (Figure 3). However, after day 7, both groups 3 and 5 showed an evident decrease of oocysts per gram (OPG) in the litter, which may be due to the fact that, under experimental conditions, the densities of the individual animals are lower compared to field conditions and this may affect the correct distribution of vaccine oocysts. The EVALON® group behaved as expected with regard to OPG: since it is an attenuated vaccine, replication never reaches levels as high as that of the non-attenuated vaccines (groups 3 and 5) and, in addition, the profile of the OPG curve shows the peak of the first replication at 7 dpv, and the second peak at 21 dpv, which corresponds to the second replication, after which the animals develop immunity against coccidiosis.
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References