

## Evaluation of the efficacy of Herb-All™COCC-X against coccidiosis in broilers under experimental inoculation

### Introduction

Natural alternatives to chemical prevention of coccidiosis are highly needed. The aim of the present study was to evaluate the efficacy of the plant-based product, Herb-All™COCC-X, in the prevention of coccidiosis in broilers in an experimental model. In this study, two treatment groups and two control groups were implemented and compared.

### Trial setup

The trial was carried out at a specialized research station in Ploufragan, France. 320 one-day-old broiler chicks (Type Ross male) obtained from a commercial hatchery were kept and reared in 32 pens (10 birds per pen) until the age of 41 days. The birds were raised on litter in 1m<sup>2</sup> pens, enriched with cords to respect welfare recommendations. The 320 birds were randomly and equally distributed to one of 4 trial groups according to the live weight, so that the average bird weight remained similar in each treatment group. Treatment groups are described as follows:

- **Negative control:** non-infected animals, with no supplementation
- **Positive control:** infected animals with no supplementation
- **Maxiban:** infected animals with supplementation of Maxiban 160
- **Herb-All™COCC-X:** infected animals with supplementation of the herbal mixture Herb-All™COCC-X



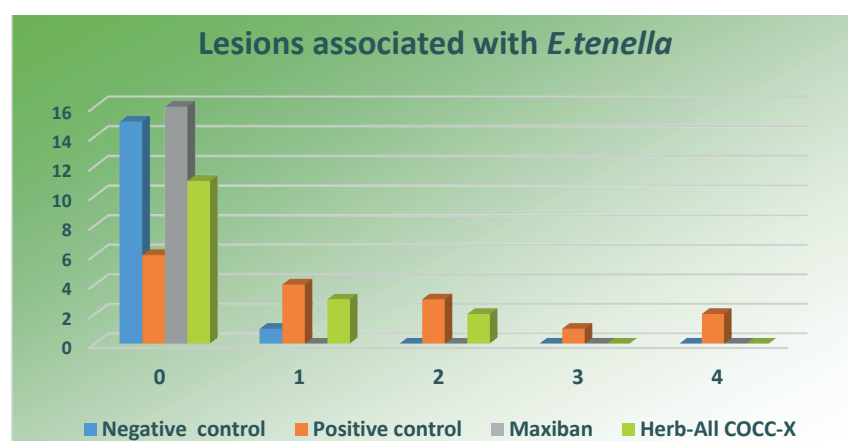
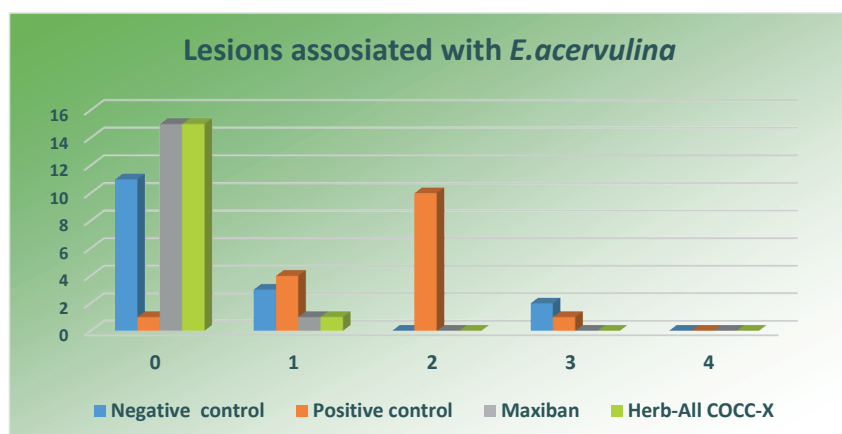
Picture: Trial boxes with individual installations for water and feed supply and space for 10 chicks

Depending on the treatment group, birds received, *ad libitum* either supplemented or non-supplemented standard commercial broiler feed without antibiotics and anticoccidials. In the first 20 days of age, a starter broiler crumb feed was distributed to the animals. From day 20 until the end of experimental phase (41 days of age), a growing pellet feed was fed. During the whole trial period, the dosage of Maxiban 160 (Narasin and Nicarbazine) was 500 g per ton of feed and 500 g of Herb-All™COCC-X per ton of feed, respectively. The strains of coccidia used in the inoculum were supplied by the Parasitological laboratory of ANSES at Ploufragan (F). These strains are maintained by regular passages on cockerels. Inoculum consisted of two strains of coccidia (*Eimeria acervulina* strain PA3 and *Eimeria tenella* strain PT5), the most common in the field and which pose different economic and health problems. In order to simulate the dynamic of infection under field conditions, a pre-inoculation was done at day 6 and day 11 of the trial. All birds, except those belonging to the Negative control, were twice pre-inoculated with a low dose containing 10'000 sporulated oocysts of *Eimeria acervulina* and 1'000 sporulated oocysts of *Eimeria tenella* (1ml by oesophageal route directly into the crop with a pipette). At 16 days of age the same birds were infectiously challenged by individual inoculation with an inoculum containing 80'000 sporulated oocysts of *E. acervulina* and 8'000 sporulated oocysts of *E. tenella*.

## Trial Result

**Zootechnical data:** The average body weight at slaughter at 41 days of age was 3'725 g in the Negative control group, 3'631 g in the Positive control, 3'596 g in the Maxiban and 3'559 g in the Herb-All™COCC-X group, respectively. These are no significant differences in body weight, except the Negative control group with no challenge and no supplement ( $p = 0.007$ ). The corresponding results for the average daily gains over the whole fattening period were 89.9 g, 87.6 g, 86.7 g and 85.8 g (no significant differences).

Feed consumption was not recorded for the first 10 days of the trial. Thus, feed conversion rate (FCR) could not be calculated. Nevertheless, a comparison of the mean FCR during the period from day 11 to day 41 showed no significant differences between all groups ( $p = 0.469$ ).



Graph 1+2: Lesion scoring associated with *Eimeria* infection 6 days after main oocysts oral inoculation at day 16.

**Clinical data:** An average mortality of 5.8% was recorded from day 6 to end of the trial at day 41. No significant differences were observed between groups ( $p = 0.448$ ). The main reason for mortality was due to unabsorbed yolk in early life. Affected chicks appear depressed with lowered heads. Based on the clinical report, none of the losses was due to oocysts infection. Oocysts count was performed on two pens by group and by date. Geometric mean was calculated to summarize the data. The number of oocysts per gram of excreta (OPG) is very high for the Positive control group with *Eimeria*-challenge and no supplement. The OPG levels are much lower for the other groups. Oocysts count are summarized in the table. Examination of the intestinal lesions were scored according to the Johnson and Reid following a scale from 0 to 4 (0 = no lesions to 4 = massive haemorrhage with brownish mucus contents and complete ballooning) at day 22 of the trial (i.e. 6 days after the main challenge) on 2 birds per pen for *E. acervulina* and *E. tenella* (see graph).

Group	OPG* at day 5 after challenge	OPG* at day 6 after challenge
Negative control	69'000	12'000
Positive control	865'000	440'000
Maxiban	98'000	30'000
Herb-All™COCC-X	68'000	11'500

Table: Average oocysts excretion per gram of feces (\*OPG) 5 and 6 days after the main challenge at day 16.

## Discussion and Conclusions

The main focus of this trial was to compare the effect of a classical Coccidiostat to a natural alternative on *Eimeria* infected young birds. Therefore, the clinical aspect was more important than the zootechnical results. In this study, the strains of coccidia used were pathogenic at the challenged dosages and allowed to induce a clinical coccidiosis. A difference in clinical lesions (*E. tenella*) between challenged and non-challenged animals were observed. The pre-inoculation seems to bring more heterogeneous results compared to other clinical trials with only the main oocysts challenge at day 16. These populations probably show different immune status depending on the inter-bird contamination between individuals with an impact on zootechnical and clinical parameters. Nevertheless, at the end of the trial period, when the birds were slaughtered under commercial conditions, no differences between groups were observed in terms of ADWG and FCR. It can be concluded that, both feed supplements to control coccidiosis - Maxiban and Herb-All™COCC-X – were effective against coccidian infection, although, small differences in measured lesion scoring in the hind gut were detected, the birds showed the same performances.

In this trial birds were submitted to a pre-challenge with a lower dose of sporulated oocysts to simulate practical conditions. There is no doubt, that this treatment in difference to the common challenge trial may had an influence on the results. But it has to be considered as mentioned by S. Adedokun and O. Olojede (2018) that immunized birds may display lesions and high oocysts counts with no growth retardation or clinically overt disease. In these cases the lesions are of no economic significance. The use of Herb-All™COCC-X acts thanks to the mode of action of the ingested herbs as a kind of “life vaccination”.

## Literature

Optimizing Gastrointestinal Integrity in Poultry: The Role of Nutrients and Feed Additives

Sunday A. Adedokun and Opey C. Olojede; Front Vet Sci. 2018; 5: 348.

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