EVALUATION OF THE COMBINED EFFECT OF PROBIOTICS AND COCCIDIA VACCINE IN COCCIDIA-CHALLENGED BROILERS

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INTRODUCTION

In the poultry industry, there is increased pressure to reduce the dependence on anticoccidial drugs for controlling coccidiosis. Vaccines and probiotics are considered two of the novel methods to control the disease without dependence on anticoccidial drugs. In this research, the added protective effect of the synbiotic (synergistic combination of probiotics plus one prebiotic), PoultryStar® (PoultryStar, BIOMIN GmbH, Austria) containing *Enterococcus* sp., *Bifidobacterium* sp., and *Lactobacillus* sp., plus fructooligosaccharide (FOS) derived from inulin was assessed in broilers vaccinated against coccidiosis with a live attenuated vaccine, HIPRACOX®, at day of age and challenged with a coccidia species mixture at day 15.

MATERIALS AND METHODS

456 day-old (DOC) male broilers of the ROSS 308 breed were housed for a 35-days grow-out in floor pens. The animals were divided into 3 treatment groups of 152 animals with 8 replicates per group (shown in Table 1).

Table 1. Trial Groups

GROUPS	DESCRIPTION
UUC (Uninfected untreated control)	No HIPRACOX® no PoultryStar® Unchallenged
IUC (Infected untreated control)	No HIPRACOX® no PoultryStar® Challenged
HCPS	HIPRACOX® + PoultryStar® (water + feed) Challenged

The HCPS group received a HIPRACOX® vaccination on the farm on arrival day via drinking water in bell drinkers and PoultryStar® sol (20 mg/bird/day) via drinking water with bell drinkers for the first 3 days. Moreover, PoultryStar® me was applied via feed 1 kg/ton during the starter phase (1-14) and 0.5 kg/ton during the grower phase (15-35). On days 21 and 22, 2 birds per pen were randomly selected, individually weighed and humanely euthanized. Lesion scores were assessed for *E. acervulina*, *E. maxima* and *E. tenella* by the method of Johnson & Reid (Johnson 1970) and they were then recorded as the average across the two birds for each segment. The total lesion score was calculated as the sum of lesion scores in the three intestinal segments (duodenum, mid-intestine, caecum). Faeces samples were collected from each group for the oocyst count per gram (OPG) on days 6 and 7 post-vaccination and 7 and 14 days post-challenge. Productive parameters were recorded as shown in Table 2.

Table 2. Summary of recorded productive parameters

PARAMETERS	DAYS POST-VACCINATION (DPV)				
	1	8	15	22	35
Mortality	Daily				
Body Weight (BW), Daily Weight Gain (DWG), Daily Feed Intake (DFI), Feed Conversion (FCR)	1	8	15	22	35

RESULTS AND DISCUSSION

On day 21, a significant difference in lesion score was detected between the IUC and the HCPS group, in fact the HCPS birds showed significantly lower lesion scores compared to the IUC ($P < 0.05$). Whereas, on day 22, the lesion score of the HCPS group was numerically lower compared to the IUC group, but with no statistical significance. In the OPG results, the HCPS group showed, as expected, vaccine replication OPG levels on days 6 and 7. Then, on day 22, oocyst output was less than half of the level shown by the IUC group, revealing that birds were already immunized and well protected at the time of the challenge, and on day 29 the OPG level was as low as that of a flock that is no longer shedding oocysts thanks to vaccine immunization. Even if there was no statistically significant difference, mortality in the HCPS group was numerically far lower compared to the IUC group. Results for productive parameters are shown in Table 3.

Table 3. Productive parameters

PARAMETERS	TREATMENTS		
	IUC	HCPS	UUC
D1-D8			
BW day 1, g	41.2[a]	41.5[a]	40.8[a]
BW day 8, g	174[a]	169[b]	172[a]
DWG, g	19.0[a]	18.2[b]	18.8[a]
DFI, g/chicken	19.9[a]	19.6[a]	19.3[a]
FCR	1.04[a]	1.08[a]	1.03[a]
D8-D15			
BW día 15, g	485[a]	449[b]	483[a]
DWG, g	44.3[a]	40.0[b]	44.4[a]
DFI, g/ chicken	57.0[a]	53.8[a]	57.7[a]
FCR	1.29[a]	1.34[a]	1.30[a]
D15-D22			
BW day 22, g	733[a]	775[a]	960[b]
DWG, g	35.7[a]	46.8[b]	67.8[b]
DFI, g/chicken	78.6[a]	87.1[a]	94.5[b]
FCR	1.29[a]	1.34[a]	1.30[a]
D22-D35			
BW day 35, g	2086[a]	2210[b]	2313[b]
DWG, g	104.2[a]	109.5[a]	104.2[a]
DFI, g/chicken	171.2[a]	168.3[a]	164.2[a]
FCR	1.65[a]	1.54[b]	1.58[a]
D1-D35			
DWG, g	51.5[a]	54.8[b]	59.0b
DFI, g/chicken	81.3[a]	83.2[a]	84.6[a]
FCR	1.58[a]	1.52[a]	1.43[b]
D15-D35			
DWG, g	74.1[a]	82.9[b]	88.9b
DFI, g/chicken	130.4[a]	133.9[a]	135.0[a]
FCR	1.77[a]	1.62[b]	1.52[b]

[ab] Means within rows that do not have the same superscript as the IUC group, differ significantly ($p \leq 0,05$) from this reference group.

When comparing performance parameters and considering the entire study period, birds from the UUC group performed significantly better compared to birds from the IUC group regarding body weight, weight gain and FCR. Birds treated with HIPRACOX® + PoultryStar® performed significantly better compared to birds from the IUC groups regarding body weight and weight gain, whereas FCR was better, but only numerically. In conclusion, results from the present study showed that the combination of HIPRACOX® and PoultryStar® had a positive impact on the zootechnical performance of the birds and on the coccidiosis lesion scoring after experimental induction of coccidiosis. This suggests a beneficial effect of the combination of HIPRACOX® and PoultryStar® on digestion and overall gut health.

REFERENCES

• Johnson J. y Reid W.M. (1970). Anticoccidial drugs: lesion scoring techniques in battery and floor-pen experiments with chickens. *Exp. Parasitol.* 28: 30-36.

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