

Evaluation of the Immunological Response and Production Performance in Broiler Flocks Vaccinated With 3 Different IBD Vaccines in the Hatchery

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Introduction

Infectious Bursal Disease (IBD) leads to significant health issues and economic losses in poultry, affecting young broilers, breeders, and layers. It causes mortality, immunosuppression, secondary infections, and lowers the effectiveness of other vaccines. In-ovo and day-old injectable IBD live vaccines were developed to address issues like poor administration quality and timing of on-farm water vaccinations. IBD hatchery vaccines are designed to ensure a more consistent and timely immunization compared to traditional on-farm methods. By vaccinating at this early stage, producers can reduce the risk of disease outbreaks associated with missed or delayed administration. A range of IBD vaccine technologies, utilizing various strains and production methods, have led to diverse vaccine characteristics. This study aims to evaluate the immunological response and production performance of commercial broilers that administered one of three distinct IBD vaccines at the hatchery.

Material and Methods

Ninety thousand day-old-chicks (DOC) from the same breeder flock (ROSS 308) were assigned to groups A, B, and C and were vaccinated by SC injection at the hatchery with either the MB naked strain live IBD vaccine (Group A) or one of two different IBD immune-complex vaccines (Groups B and C). All groups were subsequently placed in the same broiler farm. At 14, 21, 28, and 35 days of age, twenty blood samples from each group were collected for IBD ELISA (Synbiotics) and Newcastle Disease (ND) Hemagglutinin-Inhibition (HI) testing. Additionally, five birds from each group were euthanatized at 21 and 28 days of age to determine the Bursa-to-Body-Weight ratio (BBW). ND vaccination program was kept the same in all groups with spray ND Live and injected ND Killed vaccine together with the live Gumboro vaccines. Production parameters were measured and compared among the three groups at slaughter age (Table 1). Statistical analyses were performed using Pairwise Wilcoxon test and differences were considered as significant at $P < 0.05$.

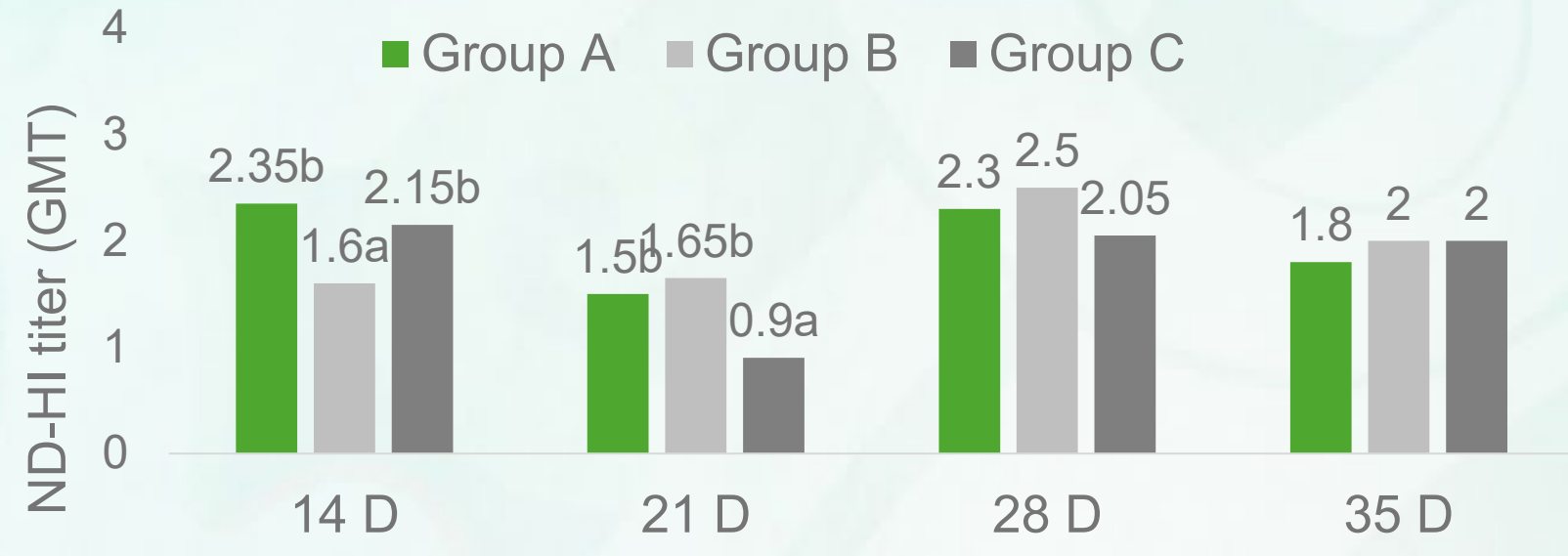
Table 1. Vaccination program and summary of monitoring parameters in 3 different flocks of day-old-chicks.

Group	Chicks Per Flock	Vaccine	IBD and ND Serology	BBW	Production Parameters
A	30,000	MB-1® ND live & killed	14,21,28 and 35 days of age	21 and 28 day-olds	Body Weight, FCR, Performance Index (PI)
B	30,000	Immune-complex B ND live & killed			
C	30,000	Immune-complex C ND live & killed			

Results and Discussion

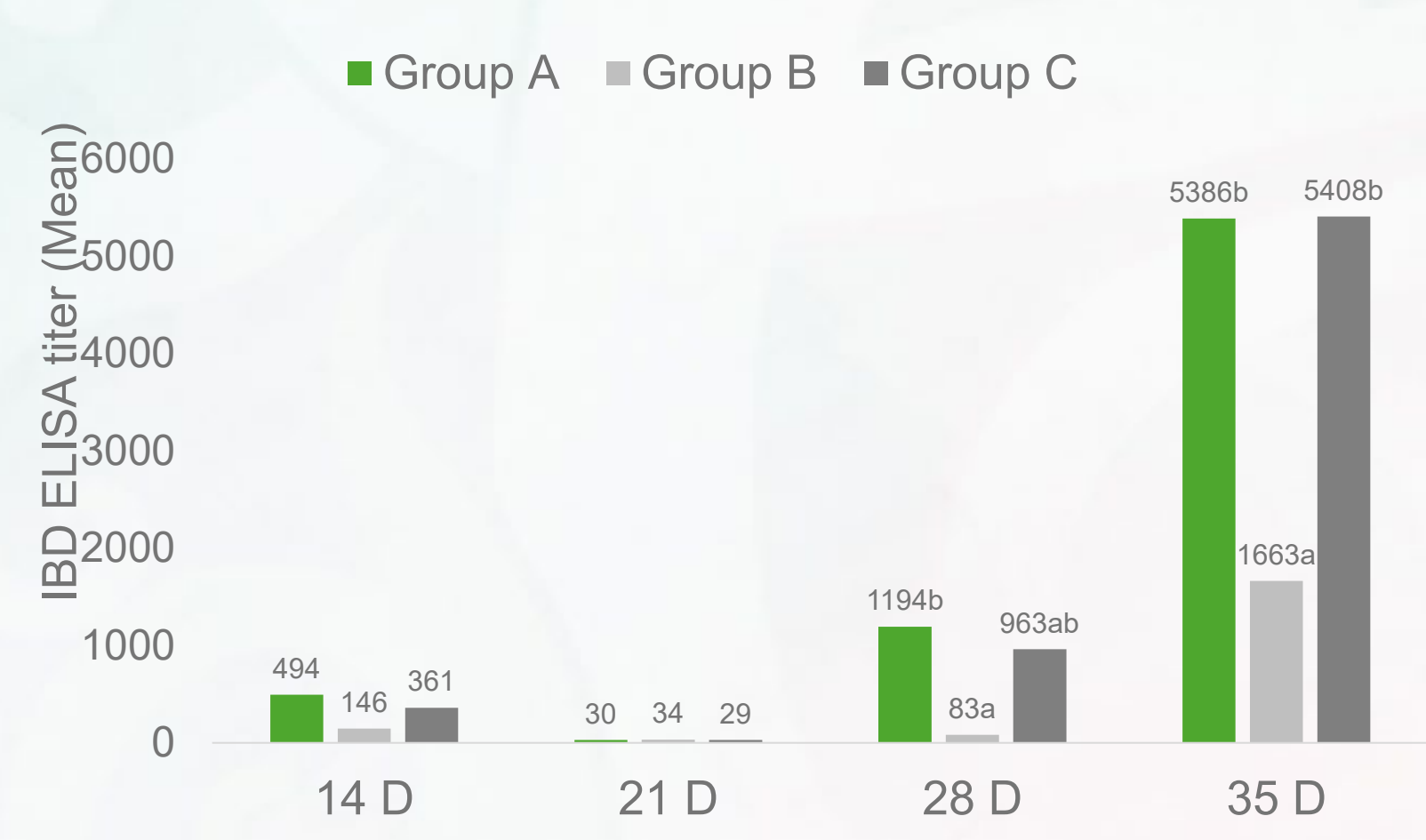
No significant difference in ND titers were found at 28 and 35 days old regardless of the IBD vaccine used. Group B had a significantly lower ND titer at 14 days old and Group C at 21 days old ($P < 0.05$). Different letters within the same age group indicate significant differences (Figure 1).

Figure 1. ND-HI serology (GMT) comparison of all groups at 14, 21, 28 and 35 day-of-age



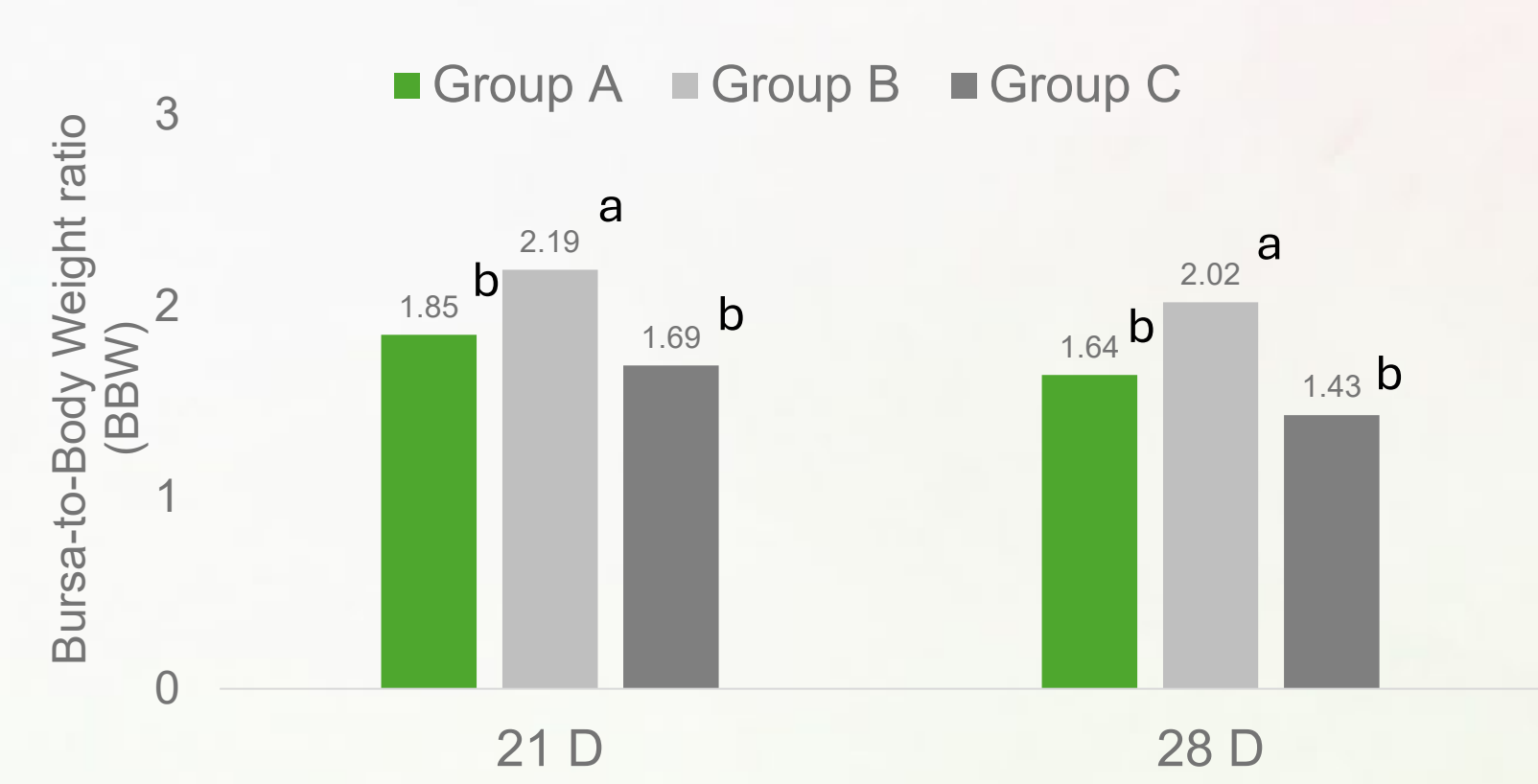
No significant difference in IBD titers were found at 14 and 21 days old. Group B had significantly lower IBD titers at 28 and 35 days old ($P < 0.05$), while groups A and C had earlier and higher IBD titers. Different letters within the same age group indicate significant differences (Figure 2).

Figure 2. IBD ELISA serology (Mean) comparison of all groups at 14, 21, 28 and 35 day-of-age



Similar to the results from IBD ELISA titer, there was a lower trend of BBW with no significant differences between Group A and C across all observed ages. Different letters within the same age group indicate significant differences (Figure 3).

Figure 3. Bursa-to-Body-Weight (BBW) comparison of all groups at 21 and 28 day-of-age



Chickens from Group A demonstrated superior zootechnical performance in all observed parameters (Table 2).

Table 2. Summary of broiler production parameters of all groups including average harvesting Body Weight (BW), Feed Conversion Ratio (FCR) and Performance Index (PI).

Group	BW	FCR	PI
A	2920 ^a	1.60 ^a	400
B	2375 ^b	1.69 ^b	325
C	2340 ^c	1.64 ^b	347

Conclusion

- The study results demonstrate that ND immunity was not compromised in all observed flocks.
- MB-1 vaccinated birds (Groups A) and birds in Group C elicited earlier and higher IBD immunity responses than Group B.
- Significantly higher (more that 20 INDEX points) production INDEX in the MB-1 vaccinated birds (Group A) indicating a possible protection from subclinical Gumboro – this needs to be confirmed with PCR in the next cycles.
- MB-1 vaccinated birds (Groups A), had higher, earlier titers against IBD and showed a better performance result indicating that naked MB live vaccine provided earlier and higher IBD immunity and production parameters without causing any interference with ND immunity.

