

# STUDY OF THE EFFICACY OF GUMBOHATCH® (LIVE VACCINE AGAINST INFECTIOUS BURSAL DISEASE) IN BROILER CHICKEN

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## INTRODUCTION

GUMBOHATCH® is a new immune-complex vaccine against Infectious Bursal Disease (IBD) developed by HIPRA (Spain). The intended use of the vaccine is to protect chicks once the maternal antibody levels start to drop.

The objective of this trial was to assess the efficacy of GUMBOHATCH® in broiler chickens after an experimental challenge with a high dose of a very virulent IBD virus (vvIBDV) strain.

## MATERIALS & METHODS

Twenty animals, either *in ovo* vaccinated with GUMBOHATCH® (n = 10) or mock vaccinated with PBS (n = 10), were used to assess the efficacy of the vaccine. The trial involved a challenge with a high dose of a vvIBDV strain at 24 days of age (Figure 1).

At day 6 after challenge, when the acute phase of the infection was expected to take place, animals were necropsied and the outcome of the infection was compared between groups. To assess the protection, bursae of Fabricius (BF) and spleens of the animals were weighed and examined macroscopically. A complete histopathological analyses of BF were performed based on Sharma et al. (1989). In addition, special attention was paid on clinical signs after infection. Growth rate of animals after infection was also monitored.



Figure 1. Summary of the animal experimentation phase.

## RESULTS & DISCUSSION

At the acute phase of the disease, non-vaccinated chickens inoculated with vvIBDV showed swollen bursae and a thin layer of gelatinous bursal oedema covering the serous surface (Figure 2b). In effect, presence of this **external oedema** is considered a clear sign of infection (Aricibasi et al., 2010, Ingraio et al., 2013). In the present experiment, it was noted in 90% of bursae of Fabricius of mock-vaccinated chickens and it was not observed in any animals of the vaccinated chickens.

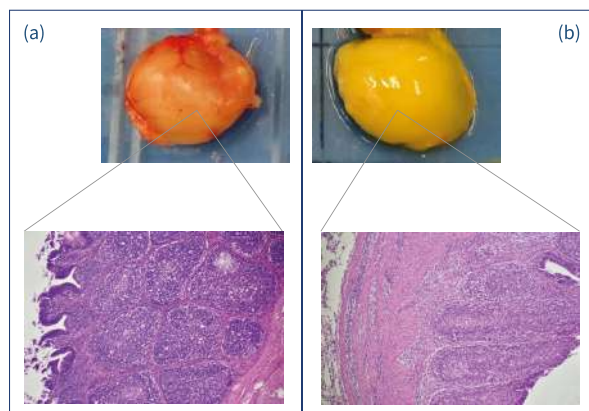


Figure 2. Bursae of Fabricius taken at necropsy (upper part) and its histological examination (lower part). Magnification: 25x. Jaume Altamira, Histovet.

- (a) Bursa with normal aspect, presenting a certain degree of lymphoid depletion (group GUMBOHATCH + vvIBDV);
- (b) Swollen bursa with gelatinous bursal oedema presenting a severe acute lesional stage including massive inflammation (heterophil and mononuclear infiltrates plus oedema) and lymphoid necrosis (group non-vaccinated + vvIBDV).

The **histological study** of the bursae indicated that lymphoid depletion was present in both groups receiving a Gumboro virus (Figure 2), which indicated the replication of the virus. However, there was a clear distinction between BF of non-vaccinated challenged birds, which presented a severe inflammation (heterophil and mononuclear infiltrates plus oedema that affected the full thickness of the bursae) and lymphoid necrosis, and bursae of vaccinated chickens (Figure 3a). Inflammatory response may be indicative of the highly virulent nature of the challenge strain, and its absence in the vaccinated animals may represent the protection conferred by the vaccine.

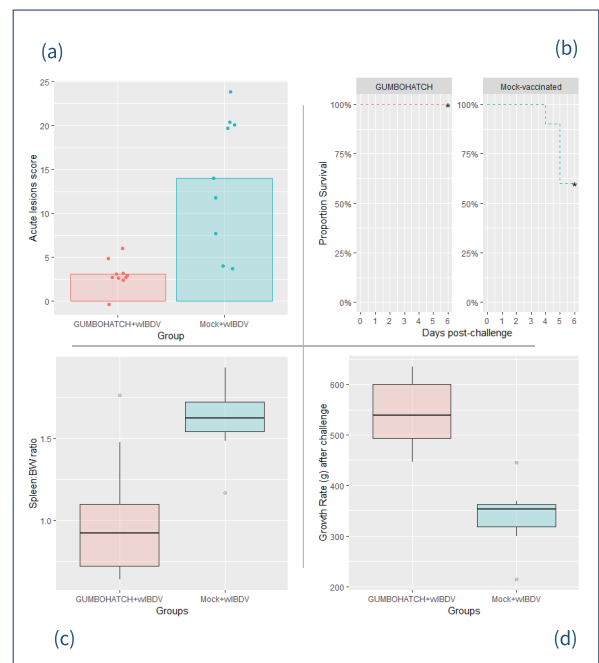


Figure 3. Differences between Gumbohatch and mock vaccinated chickens.

- (a) Individual and mean **acute histopathological functional lesion score** by group at day 30 (6 days after challenge). Acute lesion score is a composite score obtained with a sum of individual scores on heterophil and mononuclear infiltration, haemorrhage, luminal exudate, plical oedema, oedema of the muscular wall, serosal oedema, necrotic cysts and lymphoid necrosis, which are the features indicating acute lesions; each individual score was evaluated in a scale from 0 to 5;
- (b) Survival curves for appearance of **IBD clinical signs** (mainly ruffled feathers or mild depression);
- (c) Spleen: body weight ratio of each experimental group at day of necropsy;
- (d) Growth rate after challenge (from day 24 to 30) of each experimental group.

Moreover, clinical signs (Figure 3b), splenomegaly (Figure 3c), and a decreased growth rate (Figure 3d) were only observed in the mock vaccinated infected group, demonstrating the efficacy of the vaccine.

In summary, all these differences between vaccinated chickens and mock-vaccinated chickens indicated that the vaccine could clearly overcome the effects of the infection, protecting the animals against the challenge with the vvIBDV.

## CONCLUSIONS

The results of this study demonstrate the efficacy of GUMBOHATCH® vaccine in broiler chickens against infection with a vvIBDV strain.