

Hipragumboro-GM97: safer than you might think

The integrity of the bursa of Fabricius is essential

The integrity of the bursa of Fabricius should be preserved at all times due to the essential role of the organ in the development of the active immune response. In this respect the strong Gumboro vaccines have been a great help to control the outbreaks of vvIBDv (very virulent Infectious Bursal Disease virus). Although some vaccines are not exempt of risks due to the fact that they might cause different degrees of lymphoid depletion to the bursa of Fabricius.

Evaluating vaccine safety

The safety of Hipragumboro-GM97 has been evaluated in comparison to Gumboro vaccines of the same category. To perform these safety evaluations, it is required to determine the maximum level of damage induced to the bursa of Fabricius and the subsequent rate of recovery.

The development of the study

In our study 4 groups of 35 commercial Ross broilers were placed in 4 isolators at one day of age. At 16 days of age they were vaccinated via oral route with a dose of the different Gumboro vaccines.

The clinical signs were monitored daily from day 0 to day 35 post vaccination. Furthermore 5 chicks per group were euthanized at different intervals of time (0, 3, 7, 14, 21, 28 and 35 days postvaccination) and the following determinations were performed:

- Macroscopic lesions of the bursa were evaluated.
- The bursa body weight (BBW) ratio was calculated.
- Bursa spleen weight (BSW) ratio was calculated.
- Index of bursal damage or B-lymphocyte depletion in the follicles was determined.

The results showed different levels of bursa damage

The vaccination of the broilers with a dose of the commercial vaccines did not induce any clinical signs and the bursas hardly showed any macroscopic lesions of congestion and oedema.

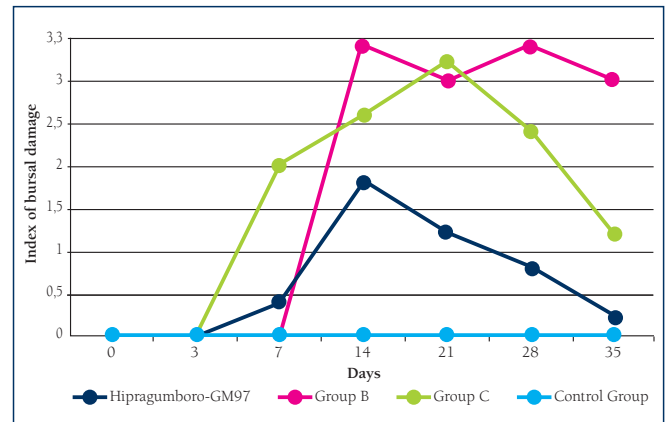
The group vaccinated with Hipragumboro-GM97 showed the highest ratio of BBW and BSW, which indicates the lowest affection of the bursa weight. Hipragumboro-GM97 induced a level of B-lymphocyte depletion of 1.8 at 14 days post-vaccination, while the other two vaccines (B and C) produced a level of bursa damage of 3.4 and 3.2 respectively.

Furthermore the group vaccinated with Hipragumboro-GM97 showed the quickest rate of bursa recovery which was completed at 35 days post-vaccination.

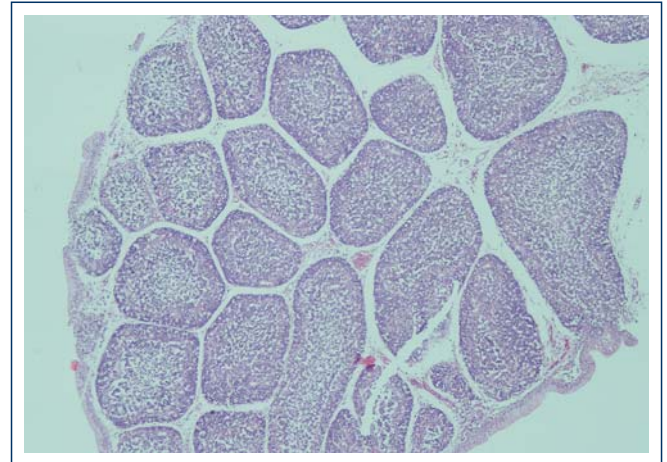
The results indicated that Hipragumboro-GM97 showed the highest bursa safety from all the vaccines included in the experiment.

The study was presented to the XLV Scientific Symposium of AECA-WPSA, Barcelona 16, 17 April 2008. The full study is available upon request.

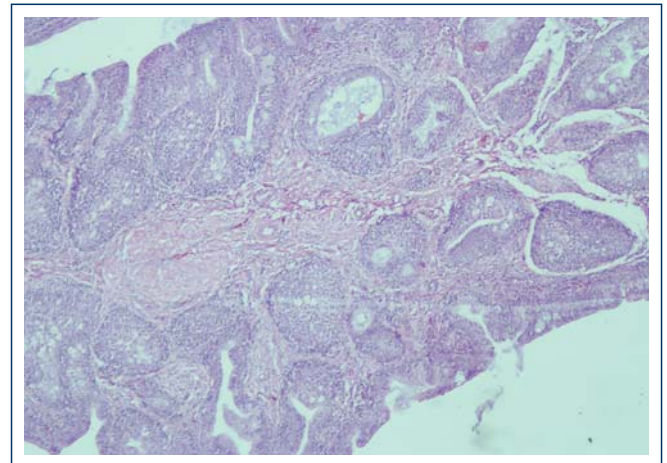
The following graph shows the weekly evolution of the index of bursal damage for each vaccinated group:



The following histological sections show the integrity of the bursa of Fabricius, 14 days after the administration of Hipragumboro-GM97 in comparison with another bursa from group B.



Group Hipragumboro-GM97



Group B

Prevention of the Gumboro situation in Europe in 2007

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With an accurate use of the available tools on a routine basis, it is very likely that the 2007 situation (damage) of vvIBDV outbreaks can be prevented for a long time.

These available tools are the following:

Proper cleaning and disinfection is a must.

A professional level of hygiene management including proper cleaning and disinfection are always very important, especially in infected houses.

Close monitoring of the field situation.

Monitoring the IBDV field situation, that is watching and studying the IBDV situation in an organised way:

- Detection of clear clinical cases, as can be seen after infections with the vvIBDV strains in unprotected birds is relatively simple.
- Detection of outbreaks with only limited or no clinical signs, as can be seen in vaccinated birds is much more complicated. However, even the detection of these subclinical infections is important.
- Firstly, subclinical infections can be the cause of poor performance.
- Secondly, a subclinical infection is a risk factor for a clinical outbreak in the next flock. As a successful vaccination induces antibodies, serological detection of infections relies on detecting increased antibody levels (higher levels than one would expect after a vaccination).

Serology and clinical signs should be observed.

Most manufacturers of commercially available ELISAs provide indications of what titre is to be expected after a successful vaccination with a live vaccine. When the IBDV titres are higher than expected for a vaccination only, it is advisable to look for other signs of IBDV challenge, like poor performance (e.g. feed conversion), wet litter, increased mortality, and atrophic bursae. If more signs are present, the presence of IBDV field virus in the house is likely. It has been shown many times that a clinical outbreak of IBDV in a chicken house has been preceded by a subclinical outbreak in the previous flock. Although this way of monitoring has shown to be of value, there are limitations that should be considered:

Firstly, late challenges will be missed by serology.

Secondly it has been shown that highly protected birds do not always show a (clear) rise in antibody level after challenge. Therefore, a "normal" level of IBDV antibodies is no guarantee that the flock has not been challenged.

Vaccination technique is critical.

Checking the application and take of the vaccination(s) is required. By adding a blue dye to the vaccine water, the percentage of birds that have drunk enough of the vaccine water can be determined. Checking IBDV titres at slaughter provides information about the application and take of the vaccines (all sera of vaccinated broilers at slaughter age should be positive for IBDV antibodies). When a number of negative sera are detected, it is advisable to check the vaccination procedure (application and timing) at the farm.

Vaccination time must be calculated.

Gumboro vaccines are in use throughout the world but all have a common problem i.e. when is the best time (age) to vaccinate? If you administer a live IBD vaccine to chickens that still have too many maternal derived antibodies (MDA), the vaccine will be neutralized by those antibodies. As a result the vaccine will not induce protection or only after a delay (Block et al, 2007). On the other hand, one doesn't want to wait too long before vaccinating as this will leave the flock unprotected against early challenge. When the Gumboro virus is in the neighbourhood, one wants to vaccinate as soon as possible. However, the level of MDA in the progeny of different breeder flocks can differ quite a lot. For these cases determination of the level of MDA against IBDV by ELISA on sera from the progeny (or breeders) can be used to estimate the optimal time of vaccination (De Wit, 2001). The principle behind estimating the optimal age(s) of vaccinating is simple, i.e. measure the level of MDA at a very young age and, as there is a regular decline (log₂ scale) of the MDA in the chick, it can be predicted when the level of MDA will be low enough to allow vaccination. It also provides information about the variation of the titres within the flock, what can be used to decide about the desired number of vaccinations and their timing.

References

- J.J. de Wit (2001). Gumboro Disease: estimation of optimal time of vaccination by the Deventer formula. *Annual report and proceedings of COST Action 839: Immunosuppressive viral diseases in*, pp 170-178.
- H. Block, K. Meyer Block, D.E. Rebeski, H. Scharr, S.de Wit, K. Rohn and S. Rautenschlein (2007). A field study on the significance of vaccination against infectious bursal disease virus (IBDV) at the optimal time point in broiler flocks positive for maternally derived IBDV antibodies. *Avian Pathology*, 36(5), 401-409

