MONITORING OF MYCOPLASMA *GALLISEPTICUM* LIVE VACCINE - K STRAIN

H. Bakri*; E. Hallaq
Vaxxinova International BV, Amman 11118, Jordan | *Corresponding Author: husam.bakri@vaxxinova.com

Introduction

Mycoplasma *gallisepticum* (MG) is an important avian pathogen and predominantly associated with chronic respiratory disease in chickens and turkeys. It causes poor growth and condemnation of broilers and turkeys, reduced egg production and reduced feed efficiency in layers (Yoder, 1984), leading to a considerable economic loss in poultry industry. Biosecurity and maintenance of MG-free replacement stock are ideal for the control of MG, but in large poultry populations, small geographic areas and multiple-age farms control by biosecurity alone is difficult and vaccine application is important (Whithear, 1996; Kleven, 1997, 2008a; Levisohn & Kleven, 2000). The Middle East area is known to have a high MG challenge due to multi-age and high density of farms in small areas. It was there for worthwhile to monitor the efficacy of the K-strain live vaccine. As previous studies showed its efficacy in broiler breeder and layer-type chickens in the protection of the respiratory and reproductive systems (Ferguson-Noel & Williams, 2015, Bekő et al ., 2020).

Materials and Methods

Two Broiler Breeder flocks of 15,000 birds each were vaccinated with Mycoplasma *gallisepticum* strain K5831B-19 ≥106.0 CFU per dose at 4 weeks old: 1st flock by spray and 2nd by eye drop, according to the vaccine leaflet instructions (a spray particle size adjusted approximately to 50 µm, while for eye drop the dose is 0.03 ml/bird). 240 Serum samples were taken for serology "ELISA-BioChek/HI -in house- Vaxxinova-Japan/ Serum Plate Agglutination test (SPA) Charles River", 140 trachea tissue for qPCR-BioChek kits, sequence analysis done via specialized institute. Serum and PCR Samples were taken according to the protocol as seen in *graph 1*. Additionally, serum and PCR samples were taken from progeny at 29 weeks old of breeders and PCR samples again were taken at 44 weeks old of breeders to check vertical vaccine transmission and presence of maternal derived antibodies.

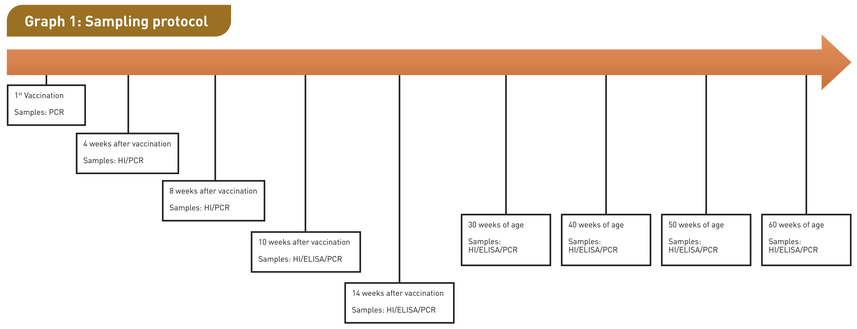
Results and Discussion

SPA results showed positive results starting from week 8 after vaccination, as shown in *graph 2*. These results were compatible with ELISA and HI results. ELISA titer values range between 1536 and 13957 for spray vaccination and between 2410 and 10879 for eye drop vaccination at 60 weeks of age, as shown in *graph 3*, compared to HI values range between 2 and 7 for both spray and eye drop, as shown in *graph 4*. The cycle threshold (Ct), the number of amplification cycles of qPCR until 60 weeks of age, were 26/40 to 31/40, while eye drop 32/40 to 32/40, as shown in *graph 5*. Mg was detected starting from 4 weeks after vaccination until 60 weeks of age as seen in *graph 5*. All results confirm compatibility with each other. Additionally, results of sequence and typing, confirmed the compatibility with the K5831B-19 as seen in *graph 6* vaccine strain. Additionally, progeny results showed negative PCR results at day zero, while MDA remained until 14 days old *(HI test-graph 7a)*, while in ELISA it dropped sharply almost at 7 days old *(graph 7b)*.

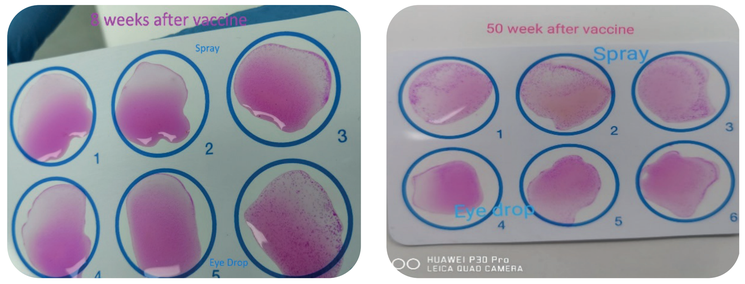
Conclusion

- Vaccine strain has been presented in birds until 60 weeks after vaccination.
- No difference in results between eye drop and spray administration.
- It was noticed that ELISA test could not detect antibodies earlier than 10 weeks after vaccination compared to SPA, HI test results.
- 1st batch of progeny of vaccinated flock, and one at 44 weeks old of breeders were tested HI to follow MDA and PCR to be sure no vertical transmission of vaccine; results showed negative while MDA continued for 14 days with HI test.
- Drugs for MG treatment were not used therefore, a save in costs reached app. 18,000 USD.

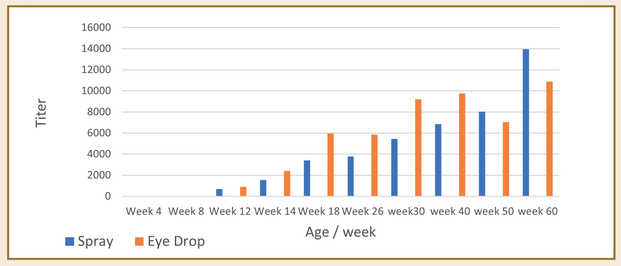
Graph 1: Sampling protocol



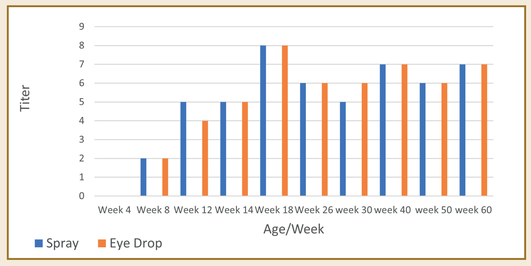
Graph 2: SPA Results



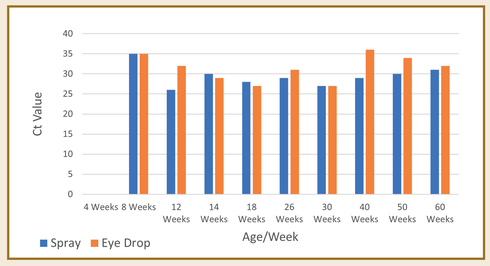
Graph 3: Mg-ELISA Results-Spray and Eye Drop



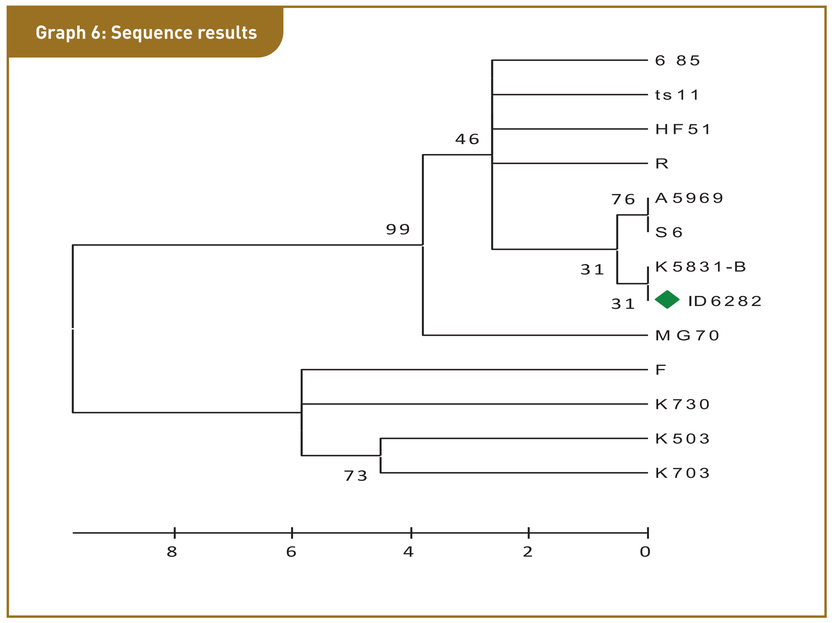
Graph 4: Mg HI Results-Spray and Eye Drop



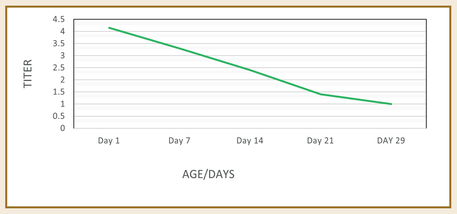
Graph 5: qPCR results-Spray and Eye Drop



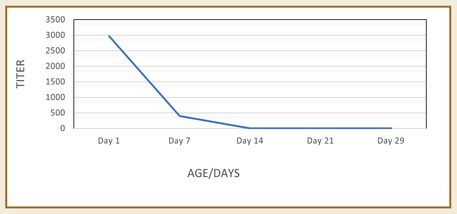
Graph 6: Sequence results



Graph 7a: Mg-HI results



Graph 7b: ELISA results



Graph 8: Mg clinical Signs

References

- *Yoder, H.W. Jr., Hopkins, S.R. and Mitchell, B.W. (1984). Evaluation of inactivated Mycoplasma gallisepticum bacterin for protection against air sacculitis in broilers. Avian Diseases, 28: 224-234.*
- *Whithear, K.G. (1996). Control of avian mycoplasmoses by vaccination. Revue Scientifique et Technique, Office International des Epizooties, 15:1527-53.*
- *Kleven, H. Calnek, B.W., Barnes, H.J., Beard, C.W., McDougald, L.R., Saif, Y.M. (Eds.). (1997). Mycoplasma synoviae infection. Diseases of Poultry, Iowa State University Press, Ames, IA: 220–228.*
- *Kleven, S.H. (2008). Control of Avian Mycoplasma infections in commercial poultry. Avian Diseases, 52: 367-374.*
- *Levisohn, S., Kleven, S. H. , (2000). Avian mycoplasmosis (Mycoplasma Gallisepticum), Revue Scientifique et Technique, 19(2):425-42.*
- *Ferguson-Noel, N. M., Williams, S. M. (2015). The efficacy of Mycoplasma gallisepticum K-strain live vaccine in broiler and layer chickens. Avian Pathology, 44(2):75-80.*
- *Bekő, K., Kreizinger, Z., Yvon, C., Saller, O., Catania, S., Feberwee, A., et al. (2020). Development of molecular assays for the rapid and cost-effective determination of fluoroquinolone, macrolide and lincosamide susceptibility of Mycoplasma Synoviae isolates. PLoS ONE, 15(10).*