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Mycoplasma hyopneumoniae ELISA Serological Profiles: Vaccinates and Controls from Wean to Finish

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Introduction: Serological profiling for *Mycoplasma hyopneumoniae* (Mhp) titers has become a common tool to profile pigs for timing and incidence of infection. It is also being used to monitor maternal passive titer decay in young pigs and for vaccination seroconversion. The Tween 20 ELISA assay is most commonly used in the USA which detects a broader range of Mhp antigen antibodies than the monoclonal ELISA assay from DAKO Corp. used around the world. Tween 20 is typically called seropositive when titers read >.25 optical density (OD), which is above possible background titers to other mycoplasma species. Age group profiling for infection timing and incidence has been published but seldom sequentially in the same animals and rarely profiling vaccinates. A few papers have demonstrated the inconsistency of Mhp vaccination to a) seroconversion by this ELISA, b) the poor correlation of titers to protection and c) a rapid titer decline in vaccinates. The extended period of time required for a significant Mhp exposure and infection to result in seroconversion of pigs can further complicate judgements.

In this study we monitored sequential monthly serum titers in non-vaccinated controls and in vaccinates receiving commercial Mhp bacterins having either aqueous or oil based adjuvant systems.

Materials and Methods: One hundred ninety two (192) pigs were randomly assigned at weaning into 12 pens and were randomly assigned within sex to receive one of three treatments (n=64): a) controls not receiving Mhp vaccine, b) those receiving Intervet's aqueous adjuvanted Mhp bacterin and c) another commercial oil adjuvanted Mhp bacterin. Vaccinates received their respective bacterin according to label directions at weaning (18 days of age = study day 0) and again three weeks later. Three randomly assigned animals per pen were bled at the beginning of the study and approximately monthly up to an initial marketing 152 days later. All sera were collected and assayed together at one time by a commercial serology lab by the Tween 20 ELISA assay. Parameters showing protection included weight gain and lung lesion scores at slaughter.

Results: Figure 1 shows the monthly mean OD for each treatment. Figure 2 shows the percent of animals testing positive (>.25 OD) for each treatment monthly. Pigs started the study at weaning with very low mean OD titers even though Mhp is endemic in the herd as evidenced by lung lesions and seroconversion in these animals.

Viewing the mean OD titer at day 28 (one week after their second vaccination) the aqueous adjuvanted group had nearly no detectable titer increase while the oil adjuvant group had a mean titer increase to approximately 0.50 OD. Within a month this titer had declined to very near the 0.25 OD seronegative threshold. At study day 91 the vaccinates appeared to be in transition. Both vaccinated groups showed a slight mean titer increase versus the prior declining titer in the oil group. By day 123 the oil vaccinates mean OD titer continued higher, aqueous vaccinates jumped significantly above the seropositive threshold and controls had just begun to show a slight titer rise. At day 151 the oil group had further increased titer, the aqueous group had leveled off and the controls had further increased. The controls' final mean titer OD was not seropositive even though 30% had converted. The percent positive closely paralleled mean OD responses at most points except most notably the oil group at day 91 which showed increasing mean OD titer and yet a 20% drop in percent positive from day 60.

Discussion: Prior sensitization by vaccination for Mhp appears to allow a rapid anamnestic response to early developing exposure levels of shedding Mhp in the grow/finisher. Even the aqueous adjuvant group had not reached a mean OD titer seropositive status until the month following their first detected titer rise at day 91. Controls had still not reached a mean sero-positive OD titer 2 months after apparent

evidence of Mhp shedding by the mean titer increases in the vaccinates. This may imply that duration of immunity from vaccination is not critical when the delayed onset of disease following infection by Mhp allows significant and rapid anamnestic responses to take place. Serological responses to vaccination can be highly varied, dependent upon the vaccine, age of animals and exposure levels, and must be considered when evaluating titer profiles

Despite the marked differences in ELISA titers between the vaccinated groups, protection was similar. Vaccinates had significant ($p<.05$) improvements in lung lesion scores and weight gains over non-vaccinated controls. Lung lesion scores between vaccinate groups were similar though the aqueous adjuvant vaccinates had a significant ($p<.05$) final weight advantage (6 lbs.)

[1] LFM Quality Labs, [2] Intervet Inc.

Fig. 1: Mhp ELISA Mean OD

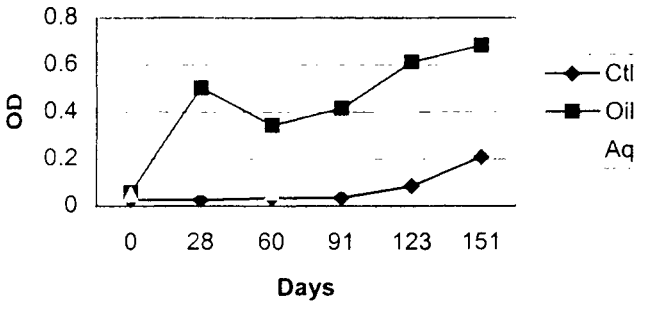

Fig. 2: Mhp ELISA % Positive