

VETERINARY TECHNICAL UPDATE



Post-Vaccinal *E. coli* K99 Titer Response in Lactating Dairy Cows to Three Vaccines for the Control of Neonatal Diarrhea

Objective:

The purpose of this study was to measure the biological response of the dairy cow in late lactation to vaccination against neonatal scours. Vaccination for scours prevention prior to dry-off lessens the endotoxin concerns of stacking several gram-negative vaccines at one point in time. This study utilized post-vaccinal *E. coli* K99 pilus antibody titers as an indicator of vaccine response in comparing three commercial vaccines.

Materials and Methods:

Two hundred high-producing Holstein cows in late lactation were blocked and randomly divided into five groups of forty cows. All cows had been vaccinated approximately 14 months previous to enrollment with two doses of ScourGuard® 3K/C. Group A cows were negative controls and were restrained in headlocks during the treatment periods but were not injected or bled. Group B cows were positive controls and received a 2mL subcutaneous injection of saline on day 0 and day 21. Group C cows were injected with a 2mL intramuscular dose of ScourGuard 3K/C on days 0 and 21. Group D cows were injected with a 2mL intramuscular dose of Scour Bos® 9 on day 0 and Scour Bos 4 on day 21. Group E cows were injected with a 2mL subcutaneous dose of GUARDIAN® vaccine on days 0 and 21. All injections were given in the lateral neck region forward of the shoulder. Serum was harvested for titer evaluation on study days 0, 21, and 35. All personnel engaged in measuring antibody titers and collecting serum were blinded.

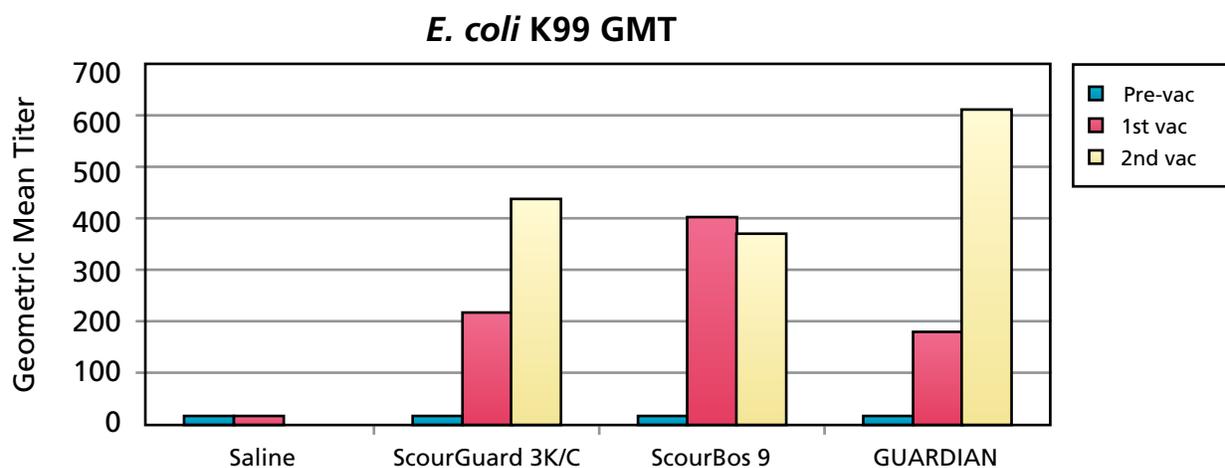
Results:

Prevaccination titers (day 0) in all groups were very low (Figure 1). Responses to the initial vaccination (day 21) were 28, 20, and 16 fold increases in geometric mean titer for Scour Bos 9, ScourGuard 3K/C, and GUARDIAN, respectively (Figure 1). Increases from the booster dose (day 35) were 100% and 241% for ScourGuard 3K/C, and GUARDIAN, respectively. Since the label directions for Scour Bos call for using the vaccine with no *E. coli* antigen in the booster dose, there was no increase in K99 titer from day 21 to 35 for the Scour Bos group. Final geometric mean titers at day 35 were 372, 436, and 612 for Scour Bos 9, ScourGuard 3K/C, and GUARDIAN, respectively (Figure 1).



Figure 1.

Comparison Increases in K99 Serum Neutralization Geometric Mean Titers from Three Commercial Vaccines



Discussion:

Pre-vaccination titers across the entire group of cows were very low approximately 14 months after vaccination with ScourGuard 3K/C. Scour Bos-vaccinated cows responded well to one dose, but titer levels had begun to decrease within 35 days of initial vaccination. ScourGuard 3K/C-vaccinated cows and GUARDIAN-vaccinated cows had a similar response to initial vaccination, but GUARDIAN had a superior titer 14 days after a booster dose.

Vaccination with GUARDIAN, a unique vaccine utilizing a water-in-oil adjuvant and sub-unit K99 technology, did not elicit an undesirable post-vaccinal response (reduced milk production) in this same study as compared to saline injection. The K99 titer measurements demonstrate that this technology also produces superior antibody response.

Conclusions:

Of three commercial scours-prevention vaccines tested per label instructions, GUARDIAN produced superior *E. coli* K99 titers.