

# Comparative response of two single dose vaccines for controlling neonatal calf diarrhea in beef cattle

Bejar JP<sup>1</sup>, Piñeiro, P<sup>2</sup>, Vicente MI<sup>2</sup>, Fraile L<sup>3</sup> and Elvira L<sup>2</sup>

## INTRODUCTION

Neonatal calf diarrhea is a leading cause of morbidity and mortality of beef calves in their first month of life. Moreover, it has a negative impact on profitability, animal welfare, and antimicrobials use. Related to preventive strategies, a positive impact of dams vaccination has been shown (Recca et al., 2003). However, the specific immune response may differ between apparent similar vaccines in dairy cows (González et al., 2022).

## OBJECTIVE

The objective of this study was to compare the results of two commercial vaccines for controlling neonatal calf diarrhea with a single dose registration at primary vaccination monitoring the immune response in beef dams and their calves.

## MATERIALS AND METHODS

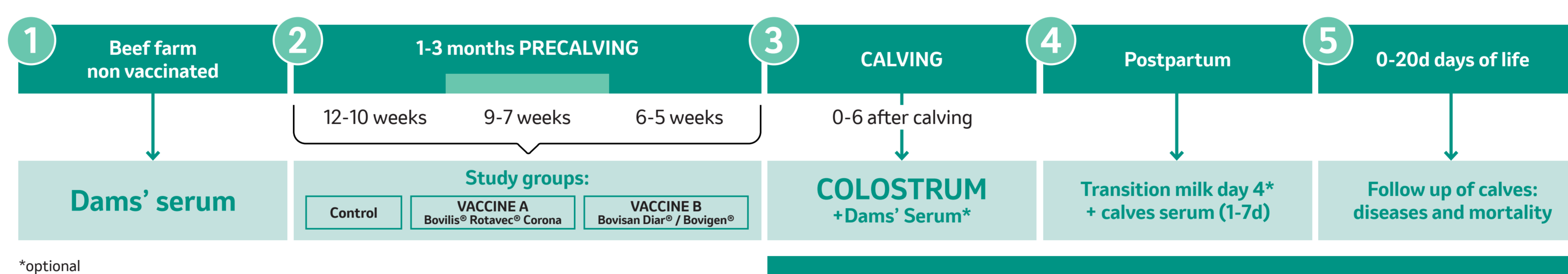
- ▶ A blinded randomized study was performed in two Spanish beef farms. 75 beef dams not previously vaccinated against NCD were randomly allocated to one of three study groups: a negative control group without vaccination and two vaccinated groups with two different vaccines (vaccine A: Bovilis® Rotavec® Corona and vaccine B: Bovisan® Diar / Bovigen®). Calves suckled colostrum and transition milk from their own dams.
- ▶ To monitor the immune response, the concentration of specific antibodies against the three pathogens included in the vaccine (*E. coli*, rotavirus and coronavirus) was quantified in dams' serum and colostrum and also in calf's serum. Commercial ELISA tests (BIO K126 Bovine Rotavirus, BIO K295 *E. coli* k99 and BIO K392 Coronavirus bovine) were used.
- ▶ All statistical analyses were carried out in a blinded way using SAS V.9.1.3 (SAS institute Inc., Cary, NC, USA). For all analyses, the individual dam or calf was used as the experimental unit. The significance level was set at 0.05 with statistical tendencies reported when p-value < 0.10. As baseline homogeneity analysis and a multivariable model analysis was performed.

As previously shown in dairy, a positive impact of vaccination in beef cows, and a more complete and balanced specific immune response against the three pathogens in the group vaccinated with Bovilis® Rotavec® Corona compared to the group vaccinated with Bovisan® Diar / Bovigen® was found.



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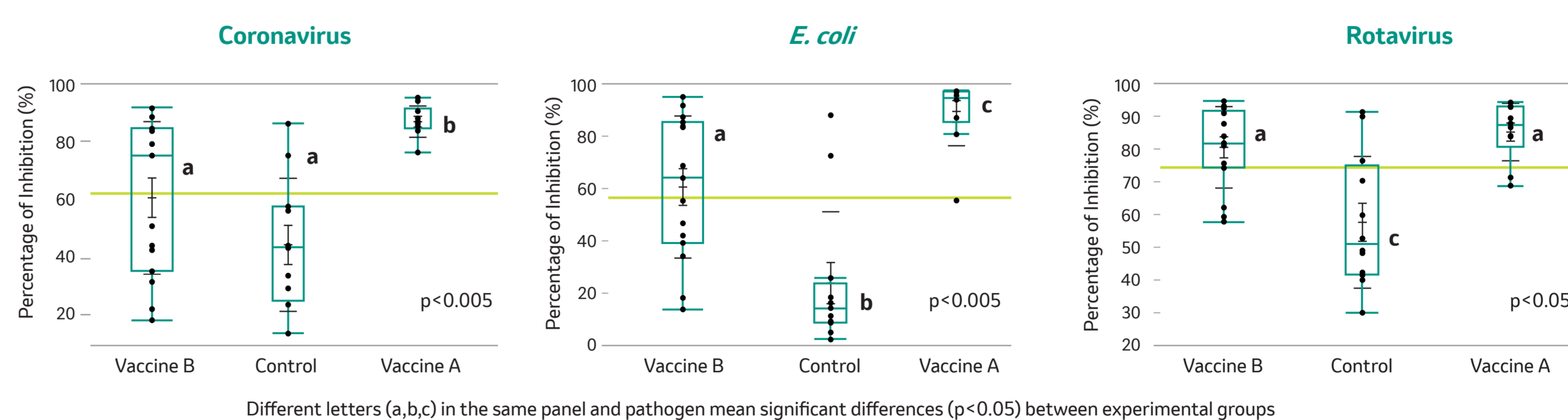
## DESIGN OF THE STUDY



## RESULTS

- ▶ A total of 37 cows complete the trial sampling: 12 control, 10 vaccine A and 15 vaccine B. Direct statistical analysis (Fig. 1) showed that colostrum of dams of Vaccine A group had significantly higher levels of antibodies against BoCV, BoRV and ETEC (P<0.05).
- ▶ Later, the multivariable analysis revealed the main impact of vaccine group for colostrum ETEC; and its main importance for BoCV and BoRV, as shown in Fig. 2 with BoCV example.
- ▶ Moreover, as shown in Fig. 3 the calves of dams from Vaccine A group had significantly higher levels of antibodies against ETEC compared to Vaccine B (93.4 vs 65.3% for Vaccine A and B, respectively) (P<0.05).

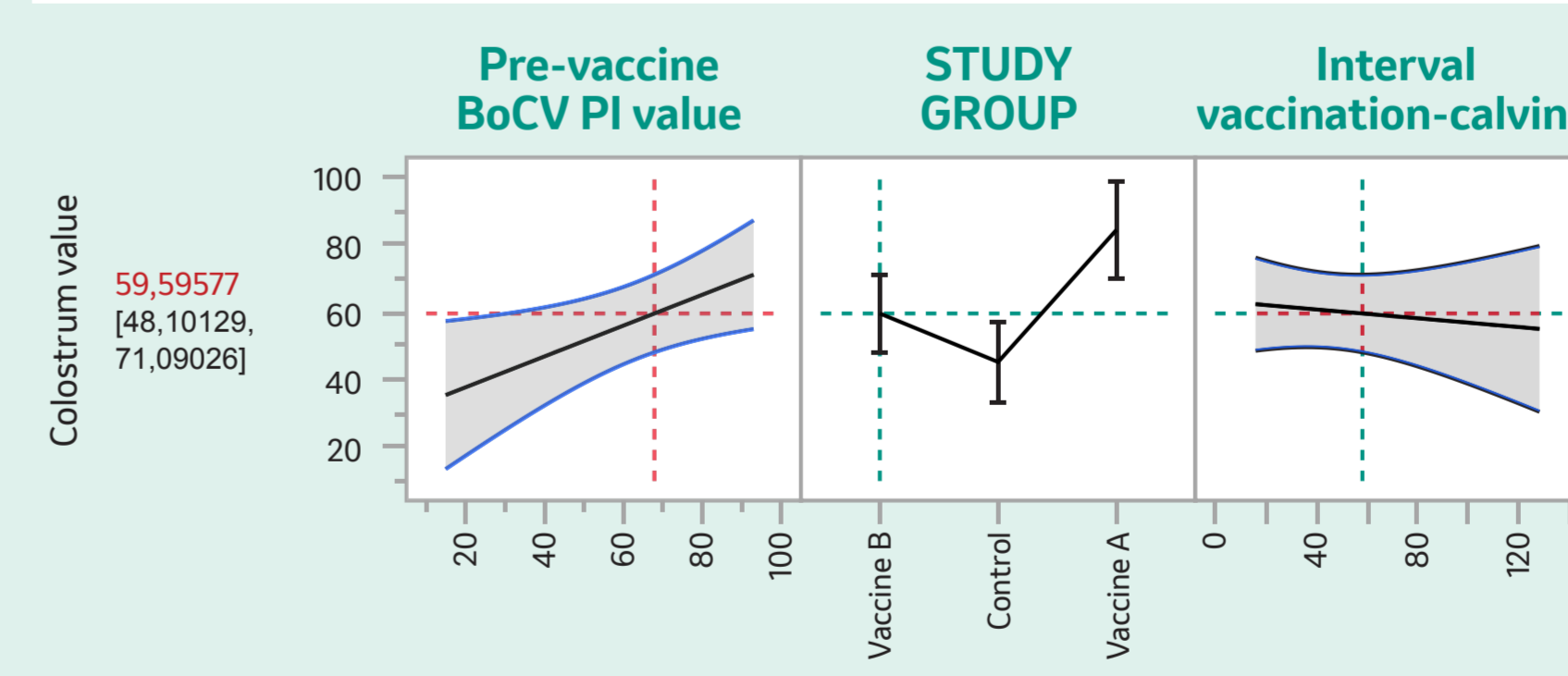
**FIGURE 1.** Boxplot showing specific immunity represented as percentage of inhibition (PI) of antibody titre in the colostrum by study group (Vaccine A, Vaccine B and Control) against coronavirus (BoCV); enterotoxigenic *E. coli* (ETEC F5 (K99)) and rotavirus (BoRV).



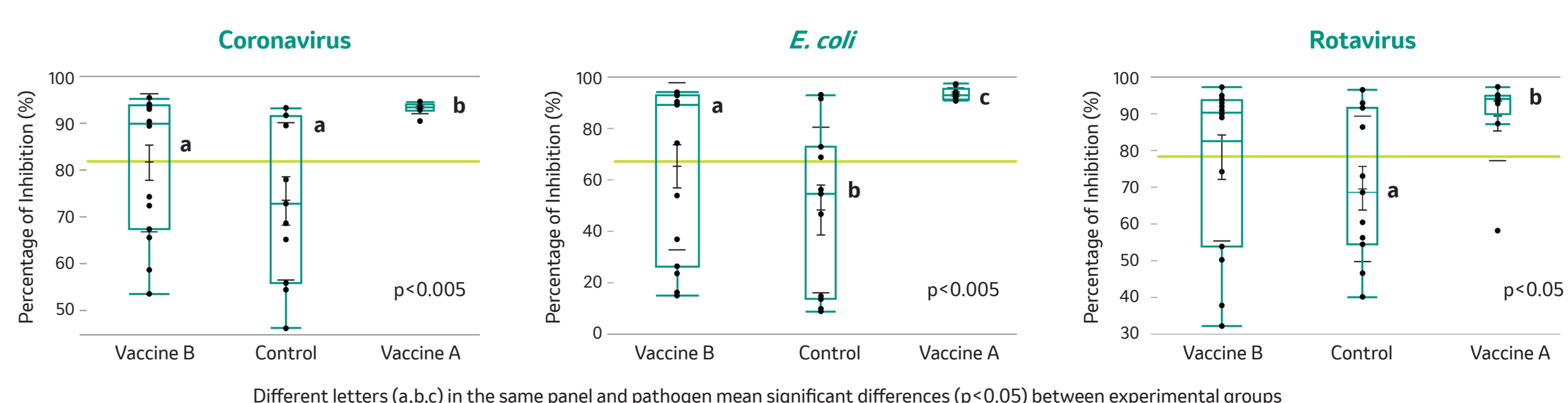
**FIGURE 2.** Prediction formulae to estimate BoCV percentage of inhibition value (PI) in the colostrum by study group, interval vaccination-calving and pre-vaccine BoCV PI value.

**Colostrum BoCV PI Value = 35.89**

- + (0.46\* Dams serum value prevaccination)
- + Study Group (Vaccine A: +21,27; Vaccine B: -3,46 and Control -17,81)
- + (-0,06\* Interval vaccination-calving)



**FIGURE 3.** Boxplot showing specific immunity represented as percentage of inhibition (PI) of antibody titre in the calf's serum by study group (Vaccine A, Vaccine B and Control) against coronavirus (BoCV); enterotoxigenic *E. coli* (ETEC F5 (K99)) and rotavirus (BoRV).



## AUTHORS' AFFILIATION

1. Practitioner AD SG Fonsagrada (Galicia, Spain) j.pablo.bejar@gmail.com
2. MSD AH Spain, Ruminant Technical Team, Salamanca, Spain laura.elvira@merck.com
3. Department of Animal Science, University of Lleida—Agrotecnio Center, 25198 Lleida, Spain; lorenzo.fraile@ca.udl.cat

MSD Animal Health

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