Comparison of endotoxin concentrations among commercially available Gram-negative, lipopolysaccharide core-antigen vaccines used to control bovine mastitis.

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INTRODUCTION

Lipopolysaccharide core-antigen vaccines have been developed to provide cross-protection against a variety of Gram-negative bacterial pathogens causing clinical mastitis in dairy cows.

A compositional difference of potential concern is a variation among products in endotoxin concentration.

Adverse effects attributed to parenteral administration of endotoxin to cows include reproductive failure, anorexia, and decreased milk production.

OBJECTIVE

The purpose of this study was to quantify the endotoxin concentrations in Gram-negative, lipopolysaccharide core-antigen vaccines used to control bovine mastitis.

MATERIALS AND METHODS

Four commercially available bacterins tested for endotoxins:

- **Vaccine A:** (Bovilis®-J5; Merck Animal Health Intervet, Inc., Madison, NJ, USA),
- **Vaccine B:** (Enviracor™ J-5; Zoetis, Inc.),
- **Vaccine C:** (Endovac-Dairy®; Endovac Animal Health),
- **Vaccine D:** (J-Vac®; Boehringer Ingelheim Vetmedica, Inc.).

Nine bottles of each vaccine, each bottle from a unique lot/serial number, were tested for endotoxin concentration by the Limulus amebocyte lysate assay using kinetic turbidimetric detection.

A single sample from each vaccine lot/serial number was the experimental unit, and a random intercept term was included in the model to account for the lack of independence among samples within replicates.

Data were analyzed using a linear mixed model for a complete block study design.

Gram-negative, lipopolysaccharide core-antigen vaccines used to control bovine mastitis differed in endotoxin content with a difference greater than 13,000-fold in endotoxin units/ml between the lowest and highest concentrations.

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RESULTS

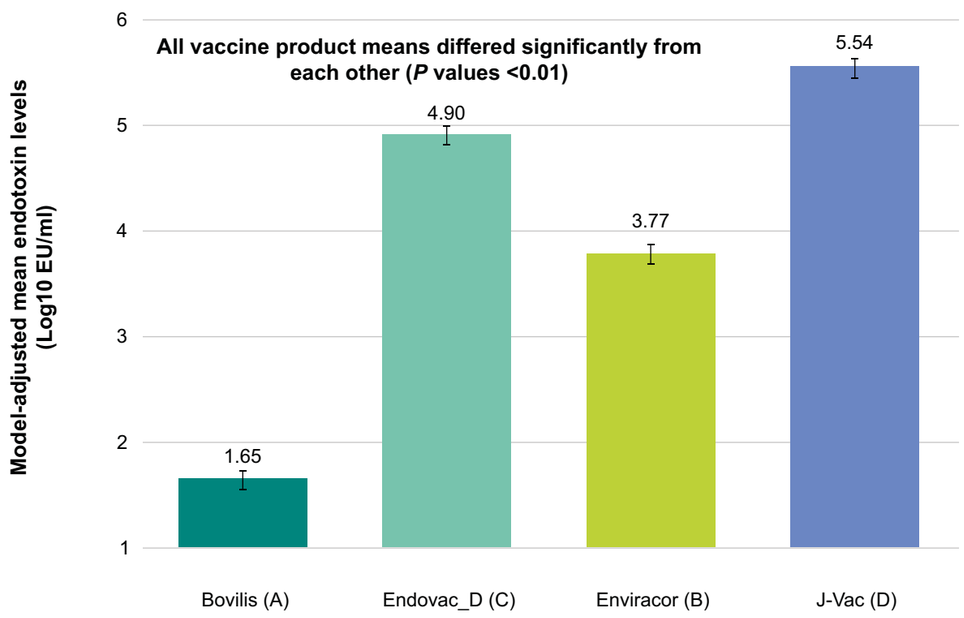
The overall effect of vaccine product was significant (P <0.05); rejecting the null hypothesis the endotoxin levels were equal among products.

Similarly, pair-wise comparisons of all vaccine products indicated that all means differed significantly (P values <0.01).

Model-adjusted means were:

- **Vaccine A** - 1.65 log_{10} EU/ml (range 0.53 - 2.09 log_{10} EU/ml)
- **Vaccine B** - 3.77 log_{10} EU/ml (range 3.62 - 3.90 log_{10} EU/ml)
- **Vaccine C** - 4.90 log_{10} EU/ml (range 4.65 - 5.19 log_{10} EU/ml)
- **Vaccine D** - 5.54 log_{10} EU/ml (range 5.34 - 5.66 log_{10} EU/ml)

FIGURE 1. Model-adjusted means (with SEM as error bars) for each vaccine product are displayed.



Means for all vaccine products differed significantly from each other (P values <0.01).

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