E. Coli Bacterial Extract vaccine with SRP® technology

Introduction
A field study associated with the siderophore receptor and porin (SRP) proteins-based vaccine has reported a reduced carriage of *E. coli* O157:H7 in feedlot cattle (Thomson, et al, 2009).

SRP® technology
E. Coli Bacterial Extract vaccine is conditionally licensed* by the U.S. Department of Agriculture and utilizes the same SRP technology as the *Salmonella* vaccine used in the poultry industry since 1996. Vaccines have always targeted an organism’s antigenic components necessary for virulence. SRP technology targets the absorption of iron, an essential nutrient for the growth and colonization of Gram-negative bacteria. The SRP vaccine stimulates antibody production to the SRP proteins on the bacterial cell surface. Immunized cattle produce anti-SRP antibodies that bind to SRP of the bacterial cell and help block iron transport, causing bactericidal effects.

Study design
The objective of the study was to demonstrate the efficacy of the E. Coli Bacterial Extract vaccine in a feedlot setting. It evaluated the effects of a regimen of three injections of E. Coli Bacterial Extract vaccine on cattle performance and the prevalence and shedding of *E. coli* O157:H7. A total of 1,284 yearling steers (20 pens) were randomly assigned to a treatment group:

- Group 1 injected subcutaneously with 2 mL of E. Coli Bacterial Extract vaccine on days 1, 21 and 42
- Group 2 injected subcutaneously with 2 mL of a placebo containing physiological saline emulsified with a commercial adjuvant on days 1, 21 and 42

Animals were pen weighed on days 0, 21, 42 and 98. Rectal fecal samples were collected on days 0, 42 and 98 and cultured for *E. coli* O157:H7. The quantity of *E. coli* O157:H7 in samples collected on day 98 was determined using 5 dilutions of the three-tube MPN (most probable-number immunomagnetic) enumeration method.
**Results**

No treatment effect was detected on average daily gain, daily feed intake or gain efficiency. Cattle administered the three-dose vaccine regimen showed a 84.7 percent reduction in *E. coli* O157:H7 recovered from feces when compared with those receiving the placebo for final day 98 samples. When *E. coli* O157:H7 was recovered, the concentration of the bacterium was less in cattle that received the vaccine regimen (0.90 log<sub>10</sub> MPN per gram) compared with those administered the placebo (2.53 log<sub>10</sub> MPN per gram).

**Summary**

The regimen of E. Coli Bacterial Extract vaccine used in this field study was associated with a reduction in prevalence and concentration of *E. coli* O157:H7 in feedlot cattle. The vaccine with SRP technology evaluated showed an 84.7 percent reduction in *E. coli* O157:H7 recovery. The vaccinated animals that remained positive carried 98.1 percent fewer bacteria per gram of feces than the positive animals in the placebo group. This vaccine technology for the beef industry helps reduce the preharvest shedding prevalence and concentration of *E. coli* O157:H7.

**References**


*This product is conditionally licensed. Efficacy and potency test studies are in progress.

All brands are the property of their respective owners. ©2011 Pfizer Inc. All rights reserved. SRP10034