A Commercially Available Siderophore-Receptor and Porin-Based Vaccine Reduces the Prevalence of *E. coli* O157:H7 in the Feces of Beef Cattle under Field Conditions in 10 Commercial Feedlots

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Introduction

Beef cattle located in 10 commercial feedlots were used to determine the efficacy of the Siderophore Receptor and Porin (SRP) *E. coli* O157:H7 vaccine to decrease prevalence of *E. coli* O157:H7 in the feces of beef cattle under natural conditions.

Materials and Methods

Feedlots were randomly assigned to one of two treatments: 1) all cattle received an SRP *E. coli* O157:H7 vaccination at arrival and re-implant or 2) all cattle received a placebo. Pen floor fecal samples (20 samples per pen) were taken from five random pens within each feedlot once per month. Pens sampled contained cattle shipping out for harvest during the week samples were collected. Samples were collected during May, June, July, and August 2010 (n=4,000). *E. coli* O157:H7 was recovered from the fecal samples using anti-*E. coli* magnetic beads and was then harvested using CT-CHROMagar. Coinciding with the fecal sample collection, pre-harvest blood samples were taken from cattle entering the packing plant. Five samples were taken from a lot representing each yard during June, July, and August 2010 (n=150).

Results

The prevalence of *E. coli* O157:H7 was lower in the feces from vaccinated cattle (13.9%) compared to feces from cattle that received the placebo control (21.5%; P=0.07). S:P ratios of serum collected from vaccinated cattle were significantly higher than that of cattle receiving placebo control (P<0.001).

Significance

The SRP vaccine effectively reduced the burden of *E. coli* O157:H7 in cattle at the time of harvest. S:P ratios demonstrate that serology may be used as a strong indicator of compliance.