Can prebiotics and probiotics help avoid respiratory disease and antimicrobial treatment in beef cattle?

**Project Title:**
Enhancing the bovine respiratory microbiome through promoting commensal bacterial growth

**Researchers:**
Trevor Alexander PhD, Agriculture and Agri-Food Canada
Karen Schwartzkopf-Genswein PhD, Agriculture and Agri-Food Canada

**Objective(s)**

1. To characterize which prebiotics work best to encourage the growth of beneficial probiotics, and

2. To determine the effects of providing intranasal prebiotics and probiotics on the cattle respiratory microbiome.

**Background**

Bovine respiratory disease (BRD) is among the most common needs for antibiotic use in feedlots. It is difficult to develop effective vaccines for respiratory diseases because they often have an environmental component and involve multiple bacterial or viral pathogens.

Researchers have recently gone back to the drawing board to look at the community of bacteria in the respiratory system of cattle (respiratory microbiome) to identify whether there are differences in the microbiomes of cattle that get sick and cattle that remain healthy.

Previous studies have found more lactic acid-producing bacteria (LAB) in animals that were resistant to BRD infection. Researchers have attempted to provide cattle with an intranasal dose of LAB to help prevent disease. They found this led to a reduction in the number of disease-causing organisms while the LAB were present but were not able keep LAB in the nasal cavity for a long duration.
What they will do

These researchers will test whether providing a prebiotic along with the intranasal probiotic will allow the probiotic to remain in the nasal cavity for a longer period of time to prevent disease. The hope is that the prebiotic will encourage the growth of the probiotic and allow it to remain in place longer. In the first phase of this study researchers will evaluate a number of prebiotics to determine which ones best allow the LAB to thrive. In the second phase, steers will be given an intranasal dose of either a saline solution, the best prebiotic from phase one, the LAB probiotic, or both the prebiotic and the probiotic. Samples will be taken for up to 18 days afterward to test for the presence of bacteria, specifically BRD causing bacteria and the LAB.

Implications

If this technique proves to be successful it will be a non-invasive, non-antibiotic way to reduce the number of cases of BRD. As a result, animal welfare by preventing sickness will be improved in cattle with a reduced need for antibiotic use.

Proudly Funded By:

For more information, visit www.beefresearch.ca