# RESEARCH FACTS

UNIVERSITY OF SASKATCHEWAN
Livestock and Forage Centre of Excellence
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## IN PROGRESS

# Investigating the use of a probiotic to control *Mycoplasma bovis* infections

### PROJECT TITLE

Investigating the use of a probiotic (*Mycoplasma bovirhinis*) to control *Mycoplasma bovis* infections

**In progress:**

*Results expected in December 2021*

### RESEARCHERS

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### Background:

*Mycoplasma bovis* has emerged in the last decades as a major pathogen of feedlot cattle, being responsible for chronic pneumonia and polyarthritis syndrome (CPPS). There are no efficacious vaccines for the disease, hence antimicrobial therapy is the main method of prevention and control. However, this has resulted in antimicrobial resistance, particularly to the macrolide drug class, which are used extensively in feedlots. The objective of this study is to determine whether intranasal administration of probiotics will disrupt the colonization of the nasal passages by *M. bovis* and thereby reduce the incidence of mycoplasmosis. In short, this study seems an alternative to antimicrobials for controlling mycoplasmosis in feedlot cattle.

### Objectives:

Using *in-vitro* methods, identify one or more probiotics that interfere with the growth of *Mycoplasma bovis*. Using feedlot cattle, determine if inoculating the probiotic(s) into the nasal passages will prevent the subsequent colonization of an inoculum of *M. bovis*.

## What They Will Do:

This project is divided into two main phases. Phase 1 is dedicted to using *in-vitro* screening to determine if select probiotics will interfere with the growth of *Mycoplasma bovis.* Phase 2 involves the administration of the probiotic(s) along with *M. bovis* to feedlot cattle.

**Phase 1**
Two *in-vitro* inhibition assays (trans-well and small molecule extraction) have been used to screen probiotics to determine if they inhibited the growth of *M. bovis*. To date, we have screened 52 *M. bovirhinis* isolates and 12 aerobes derived from deep nasopharyngeal swabs of feedlot cattle. None of the *M. bovirhinis* demonstrated inhibitory properties, but four of the 12 aerobes showed promising anti-mycoplasmal activity (NS4, NS7, NS8 and NS9). Four commercially available *Lactobacillus* spp. isolates were also tested, but none demonstrated inhibition activity.

The NS9 isolate consistently demonstrated inhibitory activity and has been identified by genomic testing. We have also conducted whole genome sequencing (WGS) of the organism, which will be used to develop PCR assays that can differentiate our isolate from other naturally occurring isolates in the environment.

**Phase 2**
The second phase, involving the use of cattle at the Livestock and Forage Centre of Excellence, should have started in the first quarter of 2020; however, the COVID-19 pandemic has delayed the start of the trial. Once we begin, then the in-life study at the LFCE will involve six pens of cattle of 10 head per pen. One pen of cattle will be left untreated (negative control), one pen will only receive the probiotic (positive control), one pen will only receive the *M. bovis* challenge and, in three pens, the cattle will receive the probiotic on Day 0, followed by the *M. bovis* challenge on Day 7. Nasal swabs will be taken before and after treatment and analyzed to determine if the probiotic controlled the growth of *M. bovis*.

## Implications:

The use of probiotic(s) to control mycoplasmosis in feedlot cattle is still in the proof of concept stage. However, if results are encouraging, the next stage would be a large clinical field trial involving multiple feedlots. Conceivably, probiotics could be used, by themselves or in conjuction with other measures, to help control mycoplasma infections in feedlots, thereby reducing the use antimicrobials.

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