Rumen pH Levels

Project Title: Determining the Incidence, Prevalence and Severity of Subacute Ruminal Acidosis in Feedlot Cattle

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Background

Grain-based finishing diets contribute to rapid, efficient and economical growth in feedlot cattle. However, some researchers and animal welfare advocates are concerned that this may pose a risk to animal welfare. The concern is that grain-based diets increase the risk of rumen acidosis, the lowering of the pH level in the rumen due to microbial fermentation of dietary starch. Acute rumen acidosis (grain overload) is a well-known risk when cattle that are not adapted to grain consume too much grain, too quickly. This causes the rumen to become too acidic very quickly and can result in severe health problems. To prevent this from happening, feedlots use step-up programs to carefully adapt forage-fed feeder cattle to grain-based finishing diets. Subacute rumen acidosis, a phenomenon in which rumen pH doesn’t drop as drastically, but tends to remain relatively low all the time, is still a potential risk even after cattle have been adapted to grain-based finishing diets.

The frequency and consequences of chronic subacute rumen acidosis have not been studied extensively, because measuring rumen pH has traditionally required rumen fistulated animals and very intensive measurements.

Objectives

To develop an understanding of the numerous animal, dietary and feeding management factors that may influence the risk of sub-acute ruminal acidosis in feedlot cattle.

Researchers will conduct a pair of trails. The first trial will continuously measure rumen pH in fistulated beef steers, over the entire backgrounding and finishing period. This will identify when subacute ruminal acidosis is most likely to occur in the feeding period. A follow-up trial will be done at a large commercial feedlot in Saskatchewan and will focus on the highest risk period identified in the first trial. A particularly novel element of this second trial will be the use of a rumen bolus that allows the continuous collection of pH data in cattle, without the need for rumen fistulation. This approach should help to overcome some of the common limitations
associated with small pen trials at academic or federal research facilities. Animal performance data, feed intake, pH and liver abscess scores will be used to assess the incidence of subacute ruminal acidosis and whether it impacts productivity, health and animal welfare under commercial conditions.

Implications

This information will help to address concerns expressed by some consumer and animal welfare advocate groups regarding potential risks associated with feeding grain to cattle. This research will have practical implications for animal health, welfare, nutrition, and feedlot management, in addition to a deeper understanding of the digestive physiology and microbiology of feedlot cattle.

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