How Microbial Communities Differ in Ruminants on a Glycerin vs Common Diet

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Glycerin is a by-product of ethanol production and can be used as a feed additive to keep production cost low. Effects of glycerin supplementation on rumen microbial community composition is undocumented. We use culture independent high throughput sequencing methods to characterize the rumen microbial community to better understand the effect of glycerin on the rumen microbial community.

**Problem** – The microbial community composition when glycerin is supplemented in the diet is unknown. Additionally, if level of glycerin supplementation would effect rumen microbial population structure is unknown.

**Goal** of this research project was to characterize the rumen microbial population during glycerol supplementation and also to evaluate the microbial community composition under different levels of glycerin supplementation.

**Hypothesis**
- Glycerin supplementation and level of supplementation will change microbial community composition.

**Objective**
- Evaluate rumen microbial community composition during glycerin supplementation.
Material and Methods

- The experiment was conducted using 60 beef steers
- Maintained on a common diet for 21 days
- Transition to 4 treatment diets (0% Glycerin, 4% Glycerin, 8% Glycerin and 12% Glycerin) for 150 days
- Rumen samples were collected using esophageal tubing
- High throughput sequencing
- Bioinformatics analyses

Fig 2. Experimental design
Results

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<th>P-value</th>
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Conclusions

- Microbial community changed when animals were transitioned to glycerin supplemented diet from the common diet.
- Under the different levels of glycerin supplementation the global microbial community composition did not change.
- In the common diet and in glycerin diets, phyla Firmicutes, Bacterodietes, Proteobacteria and Tenericutes predominated.

Future Studies

- OTU level correlation analysis to identify microbial OTUs that respond to glycerin.
- Identify differential OTUs that are present in common diet and each of the treatment diets.
- Identify a core microbiota that responds to glycerin.