Fecal microbiome of dairy calves fed with different liquid diets

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INTRODUCTION

Feeding a liquid diet to the newborn calf has considerable implications for the development of the intestinal microbiota, as its composition can shift population to a highly adapted microbiota. Milk acidification may positively affect microorganisms that are beneficial to the intestine health.

The objective of this work was to evaluate the microbiome of dairy calves fed with different liquid diets.

MATERIAL E METHODS

- 15 Holstein calves housed in tropical shelters, fed with 6 L of different liquid diets:

I. whole milk
II. milk replacer (22.9% CP; 18.5% fat; diluted to 14% solids)
III. whole milk acidified to pH 4.5 with formic acid.

- Calves were weaned at the 8th week of age, group housed and fed with starter concentrate and coast-cross hay ad libitum.
- Fecal samples: collected at birth (0) and at weeks 1, 2, 4, 8 and 10.
- Extracted DNA → V3 and V4 region amplicons of the 16S rRNA gene → Amplified by PCR → Sequenced by the Illumina MiSeq platform.

Table 1 Fecal microbial diversity of calves fed different liquid diets

Indices	Diet			p-value		
	Acidified milk	Whole milk	Milk replacer	D[1]	A[2]	D x A[3]
Shannon	2.61[ab]	2.76[a]	2.50[b]	0.028	< 0.001	0.788
Simpson	0.85[ab]	0.88[a]	0.84[b]	0.054	< 0.001	0.532
Chao1	62.43	63.08	60.12	0.747	< 0.001	0.618
Pielou	0.65[ab]	0.69[a]	0.63[b]	0.021	< 0.001	0.650

[a, b] Values within a row with different superscripts differ significantly at $P<0.05$. [2] D = diet. [3] A = age. [4] DxA = Interaction between diet and age.

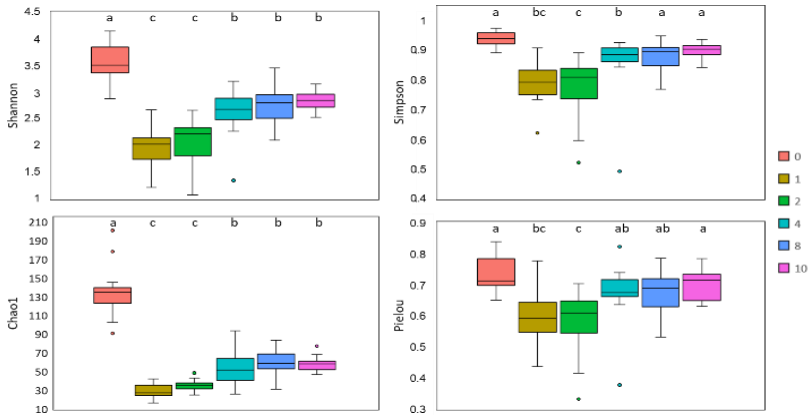

Figure 1 Diversity indices in fecal samples from calves fed different liquid diets.

RESULTS

Bacterial composition

Thirty-eight bacterial phyla were identified, and the most abundant in were:

Bacteroidota: 38.45%
Firmicutes_A: 24.83%
Firmicutes: 10.34%
Proteobacteria: 9.65%
Firmicutes_C: 7.21%

CONCLUSIONS

It is possible to modify the microbiome by changing the liquid diet. However, differences according to calves' age may show in the future, what would be the best time for possible interventions in the diet to manipulate the intestinal microbiome to improve animals' health and performance.

ACKNOWLEDGMENTS

FAPESP CNPq CAPES