

# Whole flint corn grain or tropical grass hay free-choice in the diet of milk-fed dairy calves

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## INTRODUCTION

The solid diet is the main determinant for ruminal development. Diets that promote the production of SCFA, especially butyric and propionic acids, stimulate the ruminal epithelium development. The objective of our study was to investigate the supply of whole flint corn grain and tropical grass hay as a free choice associated with highly fermentable and small particles pelleted starter on ruminal and intestinal development of dairy calves.

## MATERIAL AND METHODS

- 42 dairy calves individually housed in tropical hutches;
- 6 L/d until 21d and then was reduced to 4L/d of whole milk;
- Water and concentrate free-choice (24% CP, 14% NDF, 46% NFC);

- 1) **Control:** starter concentrate only (A);
- 2) **Hay:** starter concentrate and free choice of chopped Tifton hay, after 21d (B);
- 3) **Whole corn:** starter concentrate and free choice of free choice whole corn grain, after 21d (C).

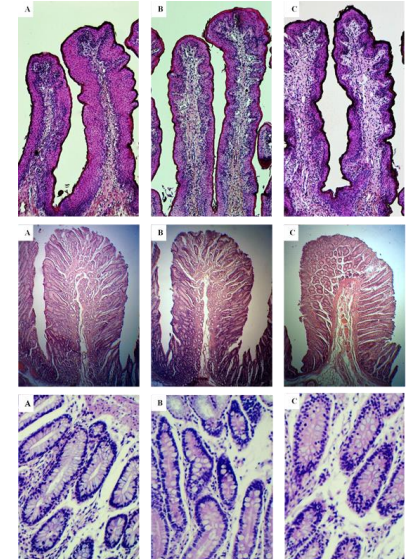
## RESULTS

**Table 1.** Morphometric parameters of calves receiving hay or whole corn grain free-choice in the diet

Item	Diet			SEM	P-Value
	Control	Hay	Whole corn		Diet
<b>Rumen</b>					
Number of papillae/cm <sup>2</sup>	199.9	189.7	180.2	21.81	0.78
Papillae height, mm	0.98	1.20	0.95	0.131	0.35
Papillae width, mm	0.30	0.38	0.29	0.027	0.09
Papillae surface area, mm <sup>2</sup>	0.30	0.45	0.29	0.060	0.17
Papillae KLT <sup>2</sup> , μm	11.42	12.45	11.76	0.384	0.21
ASA <sup>3</sup> , cm <sup>2</sup> /cm <sup>2</sup>	1.8	2.3	1.5	0.20	0.06
Papillae area, % of ASA	64.7 <sup>ab</sup>	72.8 <sup>a</sup>	54.4 <sup>b</sup>	4.25	0.05
<b>Duodenum</b>					
Villus lengths, μm	1811.3 <sup>ab</sup>	2051.2 <sup>a</sup>	1287.1 <sup>b</sup>	195.30	0.02
Crypt depth, μm	83.7	81.9	84.9	13.13	0.99
Nº of goblet cells /crypt	5.7	6.5	3.5	1.08	0.18
<b>Cecum</b>					
Crypt depth, μm	102.1	108.2	112.5	11.21	0.81
Nº of goblet cells / crypt	9.0	11.6	8.7	1.37	0.27

## CONCLUSIONS

Feeding a tropical grass hay free-choice with a fine particles pelleted starter improve ruminal and intestinal development, resulting in higher growth performance. On the other hand, feeding whole flint corn grain free-choice did not increase performance, probably because of its negative effect on ruminal and intestinal development.



**Figure 1.** Electron micrographs from the rumen, duodenum, and cecum of calves at weaning receiving hay or whole corn grain free-choice in the diet.

## ACKNOWLEDGMENTS