

Athens, Georgia. 1981.

Study - Forage Protein Bypass

Objectives:

- 1) To determine the influence of Rotary Drum dehydration of Coastal bermudagrass (CBG) and alfalfa (Alf) on the extent of forage protein degradation during ruminal fermentation, microbial protein synthesized in the rumen, total proteins, and forage protein reaching the abomasums daily.
- 2) To compare the influence of feeding frequency and sampling time on the quantity of total protein and forage protein reaching the abomasum of steers fed dehydrated CBG and alfalfa.

Experimental Protocol;

1) Diets

- a) Coastal bermudagrass hay (ground and pelleted)
- b) Coastal bermudagrass (dehydrated, ground, and pelleted)
- c) Alfalfa hay (ground and pelleted)
- d) Alfalfa (dehydrated, ground, and pelleted)

2) Animals- Four steers - rumen and abomasum cannulated

3) Experimental design; 4 X 4 Latin square

4) Feeding Mechanism: The daily dietary allotment (approximately 8 lb) will be divided into 12 equal portions and fed at 2 hr intervals over each 24 hr period.

NIR Analysis:

Samples were scanned and equations developed for the various chemical components as listed in Table 1. Samples included: 4 diets, 20 abomasal, and 16 fecal samples. Total N = 40.

In addition, spectral scans for abomasal and fecal samples were averaged across periods for each diet. The averaging procedure was performed with the file program (opt. 4) to condense the data set to a usable size. The resulting data set consisted of:

- 1) 4 diet samples
- 2) Alf-hay ABO (avg. across periods)
- 3) Alf-hay fecal (avg. across periods)
- 4) Alf-Dehy ABO (avg. across periods)
- 5) Alf-Dehy fecal (avg. across periods)
- 6) CBG-hay ABO (avg. across periods)

- 7) CBG-hay fecal (avg. across periods)
- 8) CBG-Dehy ABO (avg. across periods)
- 9) CBG-Dehy fecal (avg. across periods)

(Total samples after averaging = 12 vs 40 without avg.)

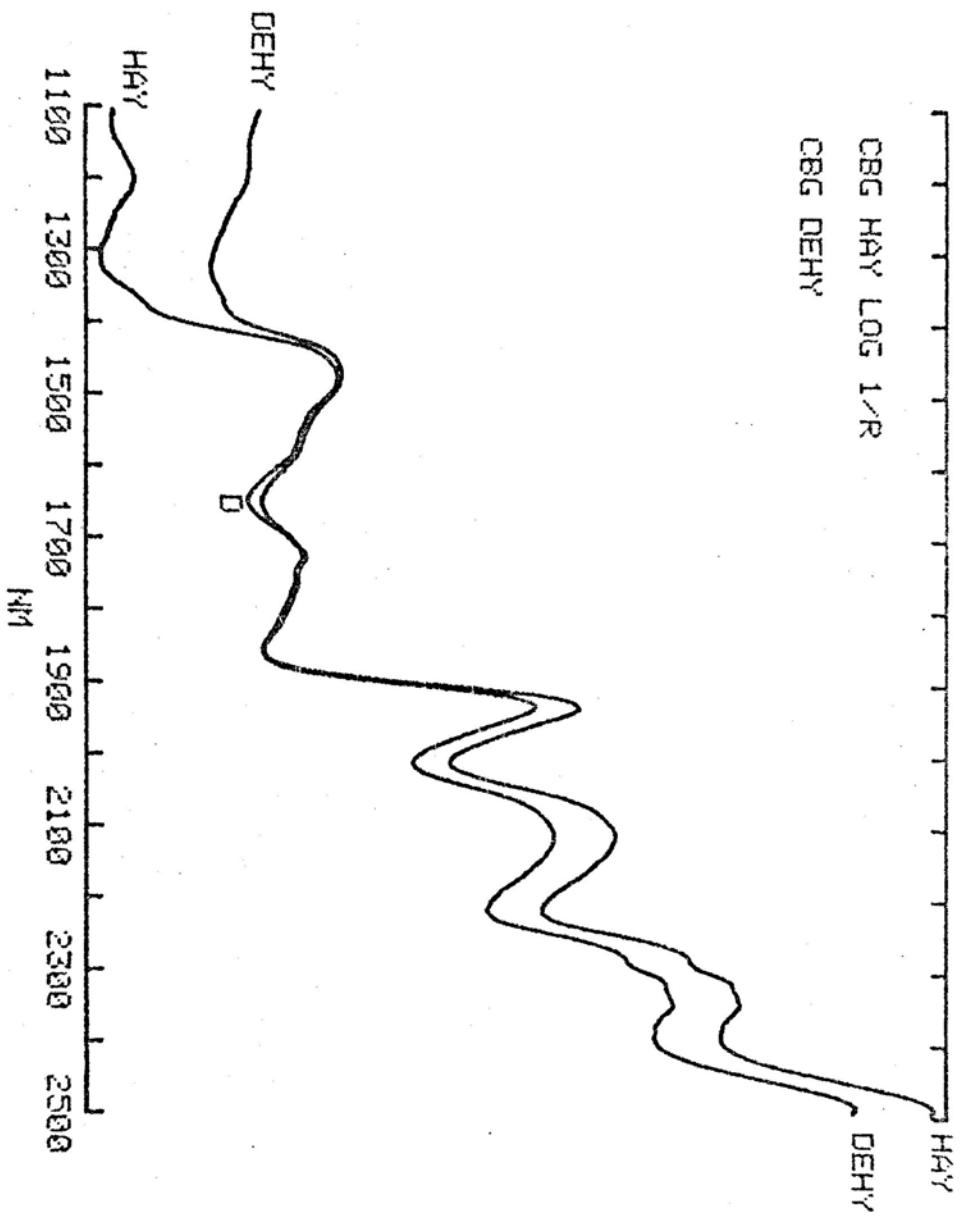
A calibration file was created for the various chemical components (Table 1) by averaging data across periods. A set file was created using second derivative math plus the default smoothing options. The resulting set file was used with the draw program to plot the spectrum of the diet, abomasum, and fecal samples.

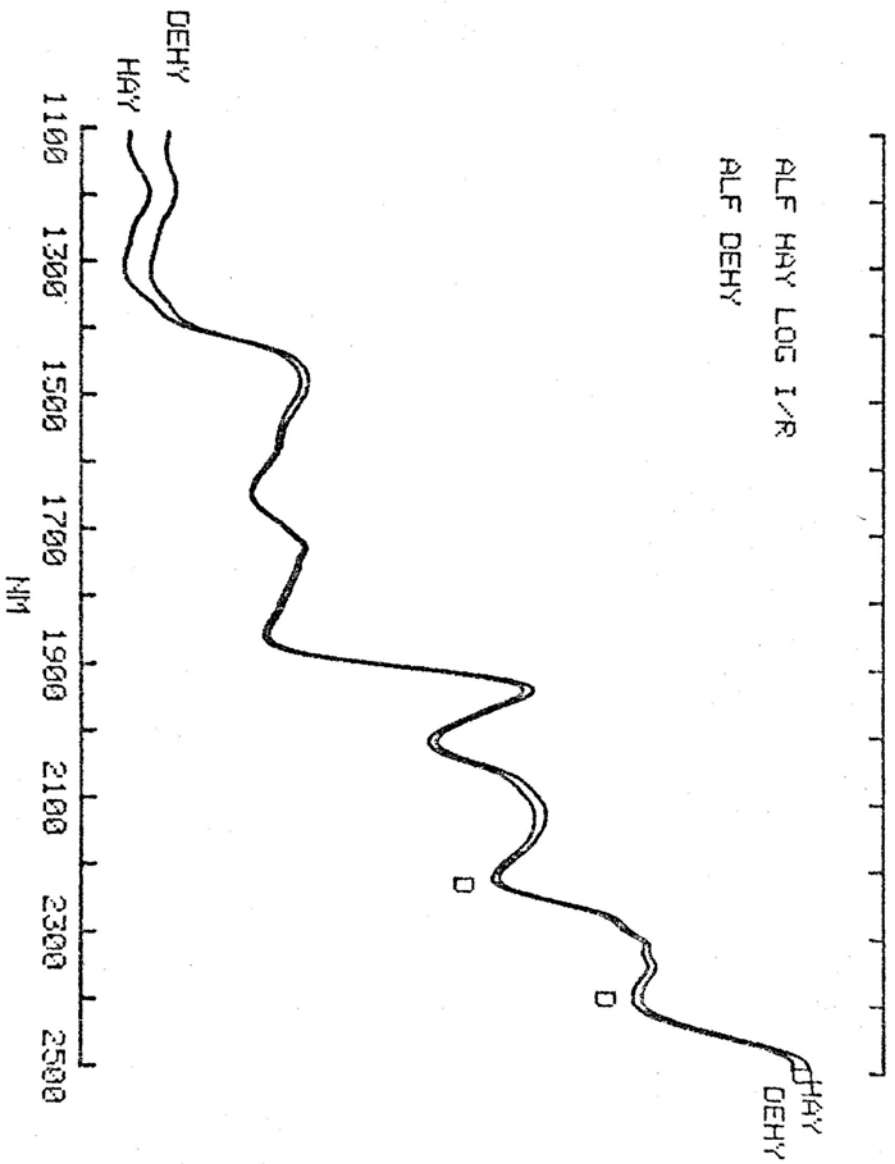
Subtractions performed consisted of:

- 1) Diet minus abomasum = ruminal digestion
- 2) Diet minus fecal = total material digested
- 3) Abomasum minus fecal = material digested in the lower GI tract.

Table 1. Equation Development for Chemical Components from Forage Protein Animal Trial Summer of 1981. (4 Diet Samples, 20 Abomasal, and 16 Fecal Samples, N = 40).

Component	Std. Dev	R ²	Press	λ_1	λ_2	λ_3	λ_4
ADF	2.41	.88	2.50	1.950	1.682	2.130	2.278
Cellulose	1.28	.88	1.38	1.546	2.398	2.206	2.350
Lignin	1.54	.85	1.58	2.326	2.262	1.174	
Crude protein	1.56	.47	1.62	2.170	2.242	2.062	
Amino Acid - CP	1.12	.85	1.67	2.158	1.350	2.054	
ADF-N	.10	.72	.11	2.306	2.210	1.694	





ALF HAY DIET 1
ALF HAY ABD 2
ALF HAY FECAL 3

