

NAME OF TEST: Factors affecting the digestibility of Coastal bermudagrass.
OBJECTIVES: To determine the relationship of chemical characteristics of Coastal bermudagrass to the digestible energy content of the bermudagrass.

EXPERIMENTAL PROCEDURE: A series of Coastal bermudagrass hays were produced in which crude protein was not related to measures of forage maturity such as lignin, cellulose or crude fiber (Table 2). This was accomplished primarily by using heavier rates of nitrogen fertilizer or delaying the nitrogen application, or both, when the forage was allowed to advance in maturity before harvest.

Digestion trials were conducted with twelve hays, ground and pelleted, and each fed to two sheep. The sheep were allowed to fix their own rate of intake at the beginning of the trial. This rate of intake was then held, without difficulty, through the remainder of the trial. Thus, intake was a variable in the digestion rate.

RESULTS: The range and mean of variables studied in Coastal bermudagrass digestion trial are given in Table 1.

The correlation coefficients for the relationship of several variables in the Coastal bermudagrass hays are given in Table 2.

A significant correlation between intake and digestible energy and lignin and digestible energy were found. However, when protein was included with lignin and intake in multiple regression analysis, it, too, was found to have a significant effect on digestible energy. Where X_1 = percent lignin, X_2 = percent crude protein and X_3 = pounds dry matter intake per hundred pounds body weight and Y = estimated digestible energy (K cal./kg.), the regression equation found was $Y = 3212.68 - 158.50X_1 + 46.17X_2 - 132.65X_3$. The standard error of estimate was 112.7 Kcal./kg. and $R^2 = .8238$.

The effect of intake on digestible energy was apparently due to its negative on the digestibility of crude fiber or cellulose (Table 3).

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Table 1. The range and mean of variables studied in Coastal bermudagrass digestion trial.

Variable	Range	Mean
% crude protein	7.80 - 15.60	12.60
% crude fiber	25.20 - 33.10	28.22
% cellulose (Crampton and Maynard)	27.10 - 34.30	30.07
% lignin (Sullivan's acid-insoluble)	5.40 - 8.60	6.84
% ash	6.30 - 9.80	8.13
% ether extract	1.80 - 4.90	2.85
% NFE	42.00 - 53.10	48.26
Intake (lbs. D.M./day/cwt.)	1.08 - 3.67	2.07
Digestible energy (Kcal/kg.)	2062 - 2878	2435.70

Table 3. The relationship of the amount of several components of forage (percent of dry matter) to the amount of the component digested (percent of dry matter) as affected by intake.

X_1	X_2	Y	R^2
% crude protein		% dig. crude protein	.9210
% crude protein	Intake	% dig. crude protein	.9227
% ether extract		% dig. ether extract	.9671
% ether extract	Intake	% dig. ether extract	
% ash		% dig. ash	.4069
% ash	Intake	% dig. ash	.4410
% crude fiber		% dig. crude fiber	.3602
% crude fiber	Intake	% dig. crude fiber	.6204
% cellulose		% dig. cellulose	.3801
% cellulose	Intake	% dig. cellulose	.5959
% NFE		% dig. NFE	.3360
% NFE	Intake	% dig. NFE	.4019

Table 2. Correlation coefficients for several variables in Coastal bermudagrass hays.

Variable	Percent								
	Protein	crude fiber	Cellulose	Lignin	Ash	Ether extract	NFE	Intake	Dig. energy
Percent protein		.011	.109	.103	.111	.049	-.807**	-.009	.389
Percent crude fiber			.850**	.192	-.319	.179	-.505*	-.230	-.019
Percent cellulose				.136	-.082	.018		-.305	-.037
Percent lignin					.029	.531**		+.402	-.682**
Percent ash						.341	-.145	.222	-.012
Percent ether extract							-.262	-.074	.183
Percent NFE								.107	-.325
Intake									-.637**

* Significant at .05

** Significant at .01