Comparison of *In Vivo* Nylon Bag Dry Matter and Organic Matter Digestibility of Oklahoma Range Forages During Different Seasons

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Story in Brief

Central Oklahoma native range forage samples were collected from April through December to determine seasonal compositional changes and the relationship or correlation of *in vivo* nylon bag dry matter digestibility (DMD) to nylon bag organic matter digestibility (OMD). Forage samples were "hand separated" into live and dead vegetation during May, June, July and September (growing season). During the non-growing season (April, October, November and December) samples were identified as standing dead vegetation (STDV). Samples (ground through 2 mm screen) weighing 3 g were placed in 100 mesh nylon bags and incubated in the rumen for 48 hr in fistulated steers grazing native range. The DMD and OMD correlation coefficients ranged from .9432 to .9941 even though differences in ash digestion were recorded. The data obtained suggest that either DMD or OMD may be used about equally well in determining forage quality.

Introduction

Forage quality is often measured by *in vivo* or *in vitro* dry matter digestibility studies. Variations in ash content of forages may influence *in vivo* nylon bag dry matter digestibility (DMD) values of forages when attempting to assess forage quality. Ash content of forages might vary due to plant maturity, contamination with dust, soil (particularly during different seasons), or other factors. Perhaps, forage quality could be more accurately assessed by measuring organic matter rather than dry matter digestibility when evaluating range forages throughout different seasons. Hence, the major purpose of this study was to determine the correlations between DMD and OMD of Oklahoma native range forages throughout different seasons.

Materials and Methods

Forage samples were collected throughout the year from a native range watershed located at the northwest end of Lake Carl Blackwell in Noble County, Oklahoma. Forage samples were "hand separated" into live and dead vegetation during May, June, July and September (growing season). During the non-growing seasons (April, October, November and December) samples were identified as standing dead vegetation (STDV). Nylon bag *in vivo* dry matter digestibilities (DMD) were determined monthly on the forage samples to coincide with the time of forage collections. The nylon bag material used was 100 mesh.

Three Holstein steers (544 kg) were fitted with rumen cannulas for the purpose of running the nylon bag *in vivo* digestion trials. The fistulated steers grazed native range at the time of the *in vivo* trials. Three g samples of forage were put in nylon bags, and the bags placed in the rumen for an incubation period of 48 hr. After 48 hr the bags were removed, dried at 55 C for 48 hr and weighed. Dry matter digestibility was calculated as disappearance during ruminal incubation.

Ash content was determined on the forage samples prior to placing in the nylon bags in the rumen and after 48-hr incubation. For ash determination, a 1 g sample was weighed into a porcelain crucible and incinerated at 600 C for four hr.

Nylon bag *in vivo* organic matter digestibility (OMD) was calculated as organic matter (ash free) disappearance during incubation. Organic matter was assumed to be dry matter in the sample minus ash (determined on samples before and after incubation).

Results and Discussion

Dry matter (DMD) and organic matter digestibility (OMD) values are presented in Table 1 for April through December along with correlation coefficients. DMD values of the live forage were 49.1, 46.4, 48.4 and 42.5 percent for May, June, July and September, respectively. OMD values for the same forages were 50.6, 48.1, 49.6 and 45.0 percent during the same months, respectively. DMD for the standing dead vegetation was 28.6, 42.0, 23.5 and 14.7 percent during April, October, November and December, respectively, and OMD was 28.4, 43.5, 22.2 and 17.7 percent during the same months. Correlations between DMD and OMD for April, May, June, July,

Table 1. Dry matter digestibility and organic matter digestibility values with correlation coefficients.

Month collected	Forage	Nylon bag DMD	Nylon bag OMD	Correlation coefficient
		%	%	
April	STDV	28.6	28.4	.979
May	LIVE	49.1	50.6	.990
June	LIVE	46.4	48.1	.989
July	LIVE	48.4	49.6	.995
September	LIVE	42.5	45.0	.964
October	STDV	42.0	43.5	.994
November	STDV	23.5	22.2	.973
December	STDV	14.7	17.7	.943

Table 2. Ash compositions of forage samples prior to and following 48-hr nylon bag ruminal digestion.

Month collected	Forage	Ash content of forage prior to incubation	Ash content following incubation	Mean ash content when bags were inserted[b]	Mean ash content when bags were removed[c]
		%	%	g	g
April	STDV[a]	9.1	14.1	.255	.301
May	LIVE	7.6	10.9	.208	.153
June	LIVE	7.7	10.8	.214	.160
July	LIVE	6.8	9.0	.185	.128
September	LIVE	7.2	12.0	.194	.187
October	STDV	7.1	9.6	.197	.154
November	STDV	8.5	9.4	.240	.205
December	STDV	7.5	10.4	.213	.241

[a]Standing dead vegetation.
[b]Ash in forage placed into nylon bags at beginning of ruminal incubation.
[c]Ash in forage at time nylon bags were removed following 48-hr ruminal incubation.

September, October, November and December were .979, .990, .989, .995, .964, .994, .973 and .943, respectively. Ash content of the forage samples, prior to and after ruminal incubation in the nylon bags, is shown in Table 2. Ash content of the forage ranged from 6.8-9.1 percent prior to incubation and from 9.4-14.1 percent following incubation. Ash disappearance from the nylon bags ranged from positive to negative. Ash may arise not only from minerals in the forage, but soil contamination due to dust, wind, etc. Nevertheless, the high correlations in these data suggest that relative differences in the forage quality of native ranges, as measured by *in vivo* digestibility, can be determined about equally well using either DMD or OMD.

Cattle Breeds, Feedlot Performance and Carcass Characteristics

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Story in Brief

Gain and carcass measurements of steers from four past trials were sorted by breed. Overall feedlot gain favored the Angus by Hereford (AH) crossbred steers over the Angus (A) and Hereford (H) by 8.4 percent. Herefords gained less rapidly than either A or AH the first 40 to 60 days but more rapidly than A during the remainder of the 117 to 167-day trials. Rib eye area per hundred lb of carcass and cutability favored A. AH had slightly more fat over the rib eye and a poorer yield grade.

Marbling and federal grade favored A over AH and AH over H. The percent of steers grading low choice or above for A was 88 percent, for AH was 70 percent and for H was 54 percent. Percentage of steers grading choice plateaued for all breeds at about 1100 lb live weight. How carcass characteristics changed with carcass weight depended on breed.

Introduction

Performance and carcass characteristics of 618 feedlot steers from four past trials were sorted by breed into three classes: Angus (A), Angus by Hereford crossbred (AH) and Hereford (H). Feedlot performance for the first 40 to 60 days and subsequently in the 117 to 167-day feeding trials was available. Steers for all trials were obtained as feeder calves or yearlings from similar weight groups entering feedlot pens in Guymon, Oklahoma. No information on age or specific background of the steers is available, but the cattle should represent a typical sampling of steers available for feeding in the Great Plains.

Groups were slaughtered at a constant number of days on feed with no sorting by breed. Although 13 different breeds or crosses were visually identifiable in these trials, insufficient numbers of other breeds and crosses were available for analysis. The alteration in carcass characteristics for every 100 lb change in carcass weight was calculated.