

DIGESTIBILITY STUDIES IN CALIFORNIA AND NEVADA
COMPARING ALFALFA HAY TESTING METHODS

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The quality of alfalfa hay marketed in California and Nevada can vary considerably. A relatively simple chemical test (modified crude fiber) was developed at the University of California, Davis about twenty years ago to assist in the prediction of the feeding value of alfalfa. The modified crude fiber test has proven useful as a criterion of quality in the market place. About a decade ago works at the University of Nevada derived an alternative chemical procedure to evaluate alfalfa hay. (The Nevada testing methods are discussed in a separate paper of this proceedings).

The procedures used in the California and Nevada test are not identical and will not predict the same feed value for a split sample of alfalfa. The usual result is the prediction of a higher value for most hays by the Nevada procedure. Several examples are shown in Table 1. Each testing method demonstrates that the amount of fiber is inversely related to digestibility i.e., the higher fiber hays have a lower feed value. The difference in predicted value determined by the two procedures is more in the absolute value assigned to a particular sample than in the ranking of several samples from a higher to lower value. This is illustrated by the data of Table 1.

Table 1. Examples of predicting TDN of alfalfa by the California and Nevada testing methods

Sample No.	Fiber Content ^a		Predicted TDN ^a	
	MCF ^b	ADF ^b	California	Nevada
1	19.3	19.4	56.4	59.9
2	20.1	24.4	55.4	57.1
3	24.6	28.1	51.9	55.3
4	26.4	27.0	50.4	55.0
5	28.1	27.8	49.0	56.4
6	31.3	31.3	46.2	54.6

^a 90% dry matter basis

^b MCF is modified crude fiber; ADF is acid detergent fiber by Nevada procedures (Not official AOAC methods).

Preliminary investigations have not resolved all the reasons for differences between the two methods. The Nevada procedure, however, actually predicts percentage of digestible energy which for alfalfa hay is roughly two percentage units higher than TDN (a hay with 54% TDN would have about 56% digestible energy). This technical difference accounts for only some of the variability between testing methods. There is also the concern of some growers as well as some County Extension and University personnel that the California prediction procedures (developed largely from investigations using alfalfa hay grown in the Sacramento, San Joaquin and Imperial Valleys of California) might not be as appropriate for hay grown at higher elevations. In addition, varieties have changed and some advances in chemical analysis procedures have occurred. These are the major items which have prompted a cooperative re-evaluation of alfalfa hay by personnel from the Universities of Nevada and California.

Current Results

The initial experiments used lots of hay from four geographical locations (Lassen, Yolo and Imperial Counties of California and Churchill County Nevada). There were hays from cuttings made approximately ten days to two weeks apart from each location with an additional sample from Imperial County, making nine total lots. The hays were shipped to the University of California, Davis and processed into 3/8 inch pellets to facilitate feeding and handling. Half of each lot of pellets was transferred to University of Nevada, Reno. The experimental animals were blackface x whiteface lambs weighing about 85 pounds. The lambs were purchased from a Winter's, California flock and split between UCD and UNR for use on the trial. Digestion trials were conducted in a similar manner at each location. There were five trials with each lot of hay at UCD and three trials at UNR.

As of this writing the animal work has been completed, but laboratory analysis of the samples is incomplete. Comparisons currently available are shown in Table 2.

Table 2. Dry matter digestibility and TDN predicted from modified crude fiber of nine alfalfa samples.

Source of Alfalfa		<u>Dry Matter Digestibility^a</u>		<u>Predicted TDN^b</u>	
		U.C., Davis	U.N., Reno	U.C., Davis	U.N., Reno
Lassen	A	67.6 + .6	67.3 + .6	60.8	60.8
	B	65.6 ± .7	66.9 ± 1.2	60.0	59.7
Fallon	1	61.0 + 1.0	62.3 + .2	58.8	57.6
	2	57.6 ± .7	58.0 ± .5	53.7	55.1
Imperial	1	61.5 + 1.0	62.3 + .8	58.0	56.8
	2	60.3 ± .4	62.5 + 1.5	55.9	53.9
	3	60.5 ± .8	58.6 ± 1.3	56.3	55.2
Yolo	1	61.0 + .8	61.9 + 2.1	57.3	56.0
		58.2 ± .6	59.8 ± 1.9	52.5	52.7

^a Mean of 5 digestion trials at UCD and 3 digestion trials at UNR.

^b Predicted from modified crude fiber as determined in the laboratory at UCD and UNR. The standard error associated with the TDN prediction equation is 2.5 units. TDN is on 100% dry matter basis.

Agreement between Davis and Reno laboratories is not absolute, but generally the dry matter digestibilities and predicted TDN's are within one standard error of the measurement. This good agreement between laboratories is essential for confidence in comparisons to be made when all laboratory analyses are completed.