GROWER REACTION TO NIR ALFALFA QUALITY TESTING

S Sherwood Winans, Charles Chavez, Gene Fisher, Leigh Edwards*

INTRODUCTION

In La Paz County Arizona alfalfa is a major crop representing nearly 30,000 acres farmed along the Colorado River. Growers market alfalfa directly to the buyer or indirectly via brokers to dairymen, feedlots, horse industry, in Arizona, Southern California and other locations of the southwest.

Desert agriculture is open to new technology that gives the producer improved management and marketing information, hopefully resulting in producing a better quality product and more profit. Growers in the Parker Valley were introduced to NIRS method of alfalfa hay analysis in La Paz County in 1986. Because of interest in NIRS as another useful management and marketing tool a pilot project was initiated with three (3) grower cooperators in 1987.

NIRS/GROWER PILOT PROJECT

"What can NIR alfalfa hay testing do for me?", is a question often asked on the grower level. To gain practical experience with alfalfa hay quality technology producers (Chavez, Fisher, and Edwards) used the following procedures:

1. Grower recorded crop data. (age of stand, stage of growth, yield, cutting interval, etc.).
2. Identified stacks/units to be sampled.
3. Proper sampling techniques.[1/]
4. NIRS Analysis, by Pacific Analysis, Ontario, California.
5. Information base interpretive material. (See following) Emphasis was on how this information helped from a management standpoint with particular focus on sale of quality alfalfa hay for grower profit.

INFORMATION BASE

Alfalfa hay samples were sent UPS for 24 hour processing and working with John M Godinho, Pacific Analysis the following interpretive information is used.

GRADING HAY ON T.D.N.

TDN % 90 % DM basis	Quality Index	DDM % 100 % DDM base
56 or more	Super	68 or more
54-56	Excellent	66-68
52-54	Good	64-66
49-52	Fair	61-64
49 or less	Poor	

DDM % = 88.9 - 0.779 ADF %

The following table was extracted from the fourteenth California Alfalfa Symposium proceedings - page 37.

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1/Hay sampling and testing using NIRS at Dairyman's Alfalfa Symposium proceedings page 78-79

Proposed market hay grades for legumes, grasses and legum-grass mixtures

Grade	Brief Description	CP	ADF	NDF	Relative Feed Value*
Prime	Legume, prebloom	19	30	39	132%
1	Legume, early bloom, 20% grass-vegetative	17-19	31-35	40-46	118-132%
2	Legume, mid bloom, 30% grass-early head	14-16	36-40	47-53	101-117%
3	Legume, full bloom, 40% grass-head	11-13	40-42	53-60	88-100%
4	Legume, full bloom, 50% grass-head	8-10	43-45	61-65	75-87%
5	Mostly grass-head	8	46	65	75%

* Actual relative feed values may vary from state to state

* Source: Randy D Shaver and Neal A Jorgensen, University of Wisconsin, U.S. Dairy, Forage Research Center, U.S.D.A. ARS, Hay and Forage Grower, July 10, 1985.

NIRS ANALYSIS*
(Example)

NIR ANALYSIS REPORT

LAB NUMBER	7181-4
SAMPLE TYPE	Alfalfa Hay
SAMPLE ID	#32 A-2
DATE PROCESSED	06-30-1987
NAME	COLORADO RIVER FARMS
ADDRESS	P.O. BOX 180 EHRENBERG, AZ 85334

	ANALYSIS AS RECEIVED BASIS	DRY MATTER BASIS	90% DRY BASIS
MOISTURE,%	9.		
DRY MATTER,%	91.		
CRUDE PROTEIN,%	19.8	21.7	19.6
DIG. PROTEIN EST.,%	15.2	16.7	15.0
ACID DET. FIBER,%	25.8	28.3	25.5
MOD. CRUDE FIBER,%	22.0	24.1	21.7
NEUT. DET. FIBER,%	36.2	39.7	35.7
TDN EST.,%	57.0	62.5	56.3
ENE EST., THERMS/CWT	53.	58.	53.
NE/LACT,MCAL/LB	.644	.707	.636
P,%	.31	.34	.31
CA,%	1.58	1.73	1.56
K,%	2.12	2.33	2.10
MG,%	.35	.38	.34

RESULTS GIVEN ONLY AS GOOD AS SAMPLE SUBMITTED

* NIR Analysis report by Pacific Analysis, Ontario, California

GROWERS VIEWPOINT

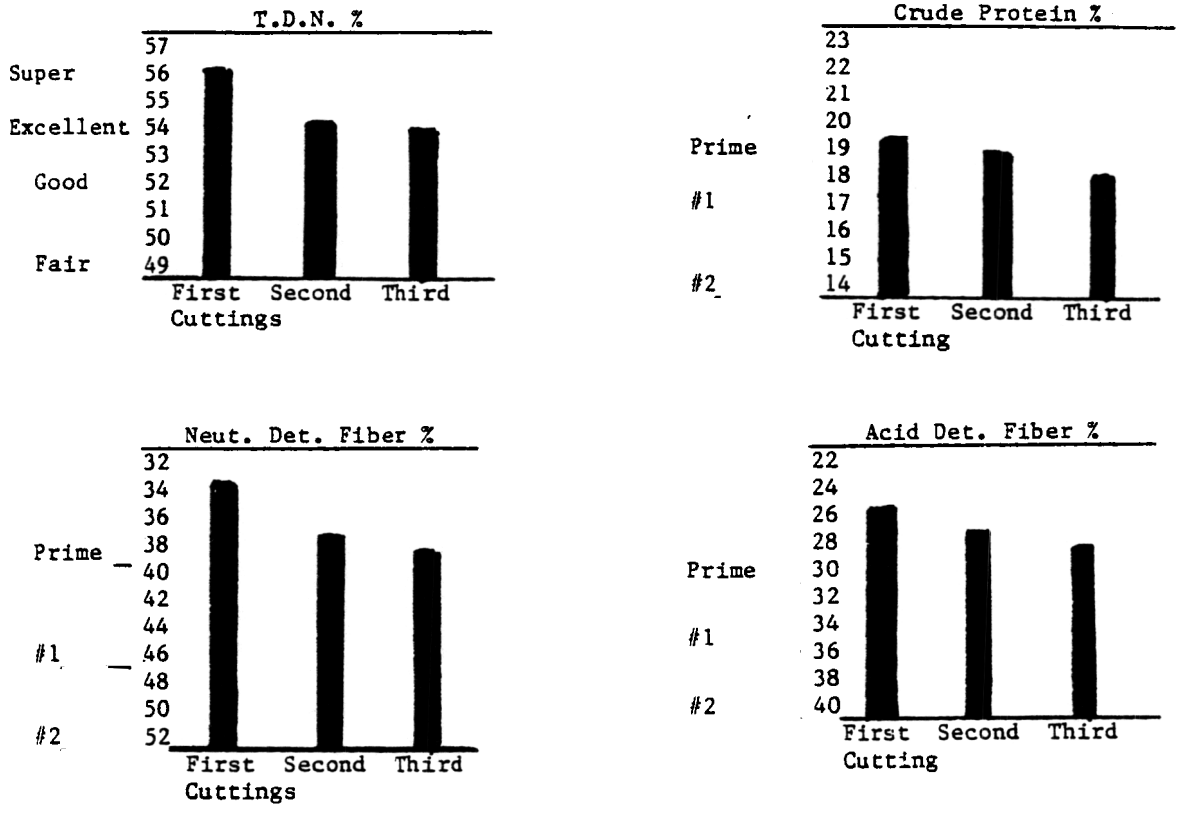
Colorado River Farms, Charles Chavez

We farm 3,500 acres of alfalfa on the Colorado Indian Reservation, Parker Valley,

Parker Arizona. 750 acres is on the California side, Blythe, California. 95% of our acres is in CUF 101, 5% Cibola.. This farm has been brought into production the last 3 1/2 to 4 years. Soils are varible Imperial clay to sand. There are 1,000 acres under linear sprinkler the rest flood. Seasonal yields range from 9 tons/ac under sprinkler irrigation to 10 ton/ac flood; average (8) cuttings. Our program is to manage and market alfalfa hay for quality.

NIRS was used to analize our first, second and third cuttings. Six (6) 500 ton unit/stacks were sampled using NIRS analysis at each cutting. The averages are shown with the following graphs.

ALFALFA HAY QUALITY
90% Dry Matter Basis



* Charts produced by Carl Goseh, Colorado River Farms

Results

The NIRS capability gave us accurate and rapid information. We also were consistant in producing a quality product! The alfalfa factors were:

1. TDN. First cutting 56% super quality index; second and third in excellent index.
2. Crude Protein. (18.8%-19.6%) all cuttings in prime or #1 grade range.
3. NDF. (33.0-37.7%) all cuttings in prime grade range. Low NDF preferred by dairymen.
4. ADF (25.6-27.7%) all cuttings in prime grade range.

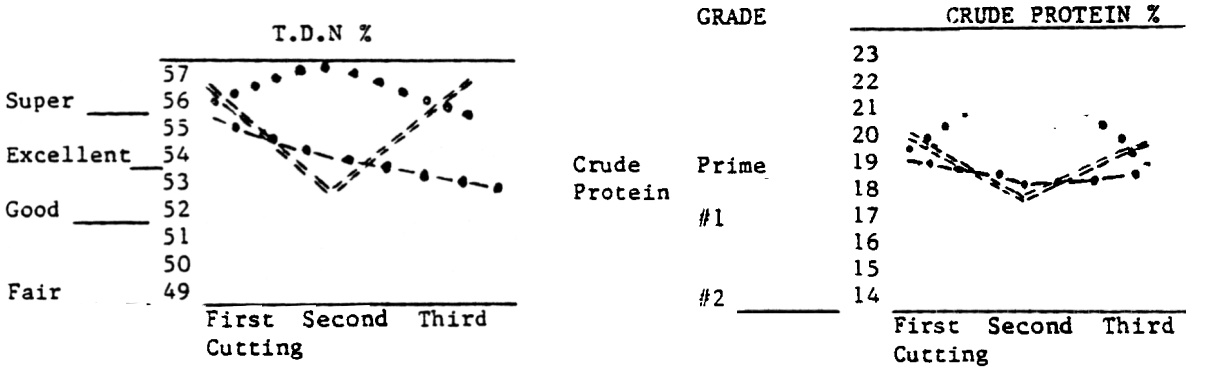
We also began to look at quality analysis under two irrigation methods. Compared are flood first year, flood second year, sprinkler third year.

ALFALFA HAY QUALITY/IRRIGATION METHOD

FLOOD FIRST YEAR =========

FLOOD THIRD YEAR _·_·_·_·_

SPRINKLER THIRD YEAR .....



Indications are sprinkler alfalfa may have the potential for producing higher quality alfalfa in our operation. TDN, Crude Protein and NDF values stayed in the excellent to prime quality range in both flood and sprinkler comparisons.

Sandhil Farms, Gene Fisher

Imagine an 1,140 acre farm in the Poston Valley on the Colorado River Indian Reservation. Our main crop is alfalfa with wheat being used as our rotation crop on 20-25% of the fields each year. Some years ago we tried to initiate hay sales based on TDN testing. At that time (1977 or 1978), there wasn't one Hay Broker that bought hay in our area that was even mildly receptive to the idea of selling hay based on analysis.

As time passed, brokers in Chino started testing stacks of hay in the valley and then buying from the farmer based upon the old "How much do you want for that stack with the weeds in it" or "the stack that went up dry". After the farmer bowed his head, lowered his voice and quoted a number the broker would buy the stack and then find a dairyman that believed in hay analysis and sell it based on those test results.

We have started making our contracts with a TDN clause for Quality and there by taking at least in apart of the "eye appeal only method" out of the negotiations. With NIR we can send the sample in one day and get the results over the phone the following day. We used it this year and every stack except one that was in dispute met the contract requirements. We have also tested "early" rain damaged hay and have found that a substancial difference between "eye appeal" meaning this hay is dry cow material and what the test results show. Some "rain damage" hay has shown to be very good dairy or "milk cow" hay.

We have found that NIR analysis are excepted by dairymen and this has given us another tool to use in marketing our hay. We look forward to using NIR analysis again in '88 to help us get the most out of our crop.

Colorado River Indian Tribes Farm, Parker, Arizona, Leigh Edwards, Manager

3,500 acres of alfalfa, a primary crop as part of an 8,000 acre operation. At present stands range from first year in alfalfa to sixth year. Presently, we are initiating a program to reseed, rotate and bring in new stands to achieve a 4 year cycle. Increased emphasis on weed control, fertilization, water management and harvesting procedures are centered on producing quality and more dollars.

NIRS was used this year to give us some experience with this technology and provide a check and balance to learning more about our hay operation and quality. Our hay has been marketed using the traditional method using visual method of stage of maturity, color, leaf, foreign matter, weeds, etc. However, with NIRS available I think we already are seeing some advantages to us on the growers side. The Agronomic side is how good of a job are we doing? We need to pin it down. Also, with our quality hay it's a negociations base with our broker and buyers. This first seasons experience has resulted in bringing dairymen to the farm with good results. I would expect us to get more detailed in using the NIRS information, and more experience is needed.

SUMMARY

NIR technology provides the alfalfa grower additional information helpful in improving management and marketing quality alfalfa hay. Proper sampling and attention to what NIR calibrations are used when intepreting analysis is of importance to sellers and buyers In this pilot project the California calibration 90% Dry Matter Basis is used. Participation and additional experience with NIR at the growers level particularly with those focusing on producing quality alfalfa is expected to grow.