

## UTILIZATION OF LOW QUALITY ALFALFA HAY FOR EXCEPTIONAL MILK PRODUCTION

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Ten ton of alfalfa hay per acre -- sure it can be done, but who will buy it when it's in the bale? It comes as a surprise to few older hay growers that the average alfalfa hay yield for the state is less than seven tons/acre. Yields in this range place alfalfa growers in a low income bracket. In my estimation, one of the primary factors for the low yield is the hay growers response to the markets demand for excellent hay and lack of interest in high fiber hay. The man who has 1000 ton of 28% MCF - hay that no one wants - cuts earlier next time.

Changed Relative Value. The per acre costs of growing alfalfa have increased while the yields have not kept pace. I can recall that in my area back in 1962 an average corn crop of three ton was bought roadsided for \$48 a ton and an average alfalfa crop of six ton/acre sold for \$23 ton roadsided. 1982's six ton alfalfa crop was sold for \$85-95 roadsided and four ton corn crop was roadsided for \$88 a ton.

Alfalfa's role in the dairy ration is changing and will continue to be reduced as long as the current price relationship of alfalfa to other feedstuffs continues and certainly we expect it to continue for at least the immediate future. The dairyman, who is aware of new technology, is changing the diets of his animals. Alfalfa is no longer the primary feed ingredient. It is not even the primary roughage in a large percentage of dairies. A few west coast dairies are following the mid-west by feeding no alfalfa.

Why do dairymen buy alfalfa? For some, it's a thing they have always done. They would never consider doing otherwise. This group is the hay growers captive market. For others, who may be better equipped with new technology, alfalfa has become less important and corn silage has taken some of its place; but, it may be more difficult for dairymen to manage a diet which includes silage. This is perhaps the primary reason for the continuing demand for alfalfa. Alfalfa is a good source of protein and supplies an array of vitamins and minerals not found together in like amounts in any other feedstuff available to the dairy cow. All this comes together with one of the most important ingredients - fiber. The stem contains most of the fiber in the above-ground portion of the plant.

The fiber in alfalfa is composed of different types. Generally, the main ones being cellulose, hemicellulose and lignin. The ratio of these to each other changes as the stem matures. Generally, lignin increases and lignin has a low digestibility level. However, fiber is important to the ruminant animals to prevent a disease called parakeratosis. It also stimulates rumen motility which causes the important mixing of the rumen microscopic and macroscopic life with the ingested food.

Fibrous feeds help prevent founder and are extremely important in the process of forming butterfat. A low percentage of "long" fibers in the dairy cows diet causes low butterfat levels. Because each pound of butterfat is worth \$1.65 a lb, a herds reduction in butterfat yield of a couple tenths of a percent "can be" a bit upsetting to a dairyman. However, alfalfa along with most forages becomes less palatable as they become more mature

Allowed unlimited access but little choice, dairy cows will eat less high fiber hay fed in bale slices than low fiber hay fed the same way. In 1965 in cooperation with Dr. Manuel Borges of Chico State University we initiated a double reversal dairy feeding study looking at the effect of higher fiber rain-damaged alfalfa hay on milk production and economics. Neither of the hays we fed were of the quality dairymen are presently looking for and generally the hay was consumed at higher levels than current dairy diets allow. Average concentrate intake (fed on a 1 lb to 4 lbs grain-to-milk ratio) was near 14 lbs/cow day.

Economics Are Obvious. It should be noted that there was no attempt to balance nutrient intake when the cows received the high fiber hay. The data shows a milk income advantage to the lower fiber hay.

See Tables 1 and 2.

Table 1 - Effect of High Fiber Alfalfa Hay on Milk Production

<u>Item</u>	<u>Trial Mean</u>	<u>Mean Difference on Rain-damaged Hay</u>
Milk, lb. per day	39.1	-2.3**
Fat, lb. per day	1.53	-0.08**
4% FCM, lb. per day	38.6	-2.2**
S.N.F., lb. per day	3.46	-0.26**
S.N.F., %	8.85	-0.14**
Fat, %	3.92	0.03

\*\* Significantly different at  $p = <.01$

Table 2 - Alfalfa Hay (in pounds dry matter basis)

<u>Consumption</u>	<u>Of Both Hays</u>	<u>Rain-damaged vs Control</u>
Dry Matter	27.30	5.79** less
Crude Protein	5.94	1.43** less
Crude Fat	0.97	0.29* less
Crude Fiber	9.53	0.38 more

\* Significant at  $p < 0.05$

\*\* Significant at  $p < 0.01$

However, rain-damaged higher fiber hay is generally discounted. This year's discount in my area was \$30. The difference in cost of feeding the two like hays this year was \$85 vs \$55. This would amount to \$.69 per cow/day difference in cost of providing either hay at rates consumed. If we "casually" throw into the manger 6 lbs of whole cottonseed (\$155/ton delivered) at \$.46 per day to more than makeup the nutrient difference, we come out with a cost benefit in favor of the rain-damaged high fiber hay of \$.23 per day per cow!

Casualness can get us into trouble so lets look at an actual situation. I could be accused of stacking the deck by using this next example. The actual rations for the fall, winter and spring of 1980-81 shown in Tables 3 and 4 were fed to the first string of the 400 cow La Grone herd, Orland, California. The ration was developed by a commercial feed company. Note that the hay which was sent through a hammer mill is 28% MCF. It was during this period that the milk production was being made to put the La Grone herd into the category of the 2nd highest in the western states in both butterfat and milk production. La Grone herd DHI records for 1980 show 20,560 lbs of milk and 736 lbs of fat, for 1981 milk went to 23,562 lbs and butterfat to 903 lbs. In the spring and summer ration, 25% MCF alfalfa hay was used. The dairy's policy is to find a good buy on alfalfa hay and they balance a ration to fit it. The hay mill and mixer trucks allow them this economic advantage.

Table 3 - Least Cost Ration Prepared 8/22/80 by Stockton  
Hay & Grain for 95 lbs of 3.4% BF Milk\*

Alfalfa Hay CF 28	12 lbs
Barn Dairy Mix	18 lbs
Outside Dairy Mix	12 lbs
Oat Silage 30 DM	12 lbs
Whole Cottonseed	8 lbs
Beet Pulp	7 lbs
Loomix 4	2 lbs

\*Actual intake was reported to be 10% greater than estimated

Table 4 - Least Cost Ration Prepared 4/16/81 by Stockton  
Hay & Grain for 95 lbs of 3.5% BF Milk\*

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Alfalfa Hay CF 25	12 lbs
Corn Silage 30% DM	20 lbs
Almond Hulls Whole	6 lbs
Barley/Corn	12 lbs
Whole Cottonseed	8 lbs
Conc 20 Mash 8620	16 lbs
Barley/Corn Outside	4 lbs

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\*Actual intake was reported to be 10% greater than estimated.

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So why the mad rush for excellent hay? Under the present grain and cottonseed market conditions there can be only one reason - stem palatability. If the dairy cow fed bale slices will not eat the stems of fibrous hay, the venture can be an expensive experience for a dairyman. One he will not repeat - if he can help it!

What can you do about it? As a hay grower, look for varieties with softer stems. Use a mower conditioner that crushes each stem - a little mechanical tenderizing. Move your bale piles closer together to restrict air movement and moisture loss. If you can market more fibrous hay at current hay values, more profit may be there. Excellent hay selling at \$95/ton roadside and a seven ton yield is a \$665 gross. Average hay selling at \$75/ton roadside and a ten ton yield is \$750 gross. Today's dairyman, if he has a hay mill, can use high fiber hay sold at a price competitive with other feedstuffs.

In Conclusion. The answer to this quality-palatability problem you growers face ultimately lies in the hands of the plant breeder. Dairyman have long accused the plant breeder of implanting cow resistance along with aphid resistant and disease resistant traits. Maybe they are right. We have some dairymen, hay growers, that have gone back to the old varieties such as Vernal. They swear the hay tests better and cows eat the stems better. Currently, other dairymen, hay growers, are searching for seed of the "soft stemmed" old Caliverde; a variety that most plant breeders feel belongs in the "Edsel" category!

Stem density or hardness has been shown to be a selectable trait. However, few if any plant breeders have paid attention to it. Maybe it's about time they did!