LEAST COST RATIONS FOR BEEF COWS

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Introduction

Winter feeding costs represent between 50 and 60 cents of every dollar spent on keeping a cow a year. Thus, any attempt to control or reduce costs of operating a cow herd must focus on controlling or reducing feed costs. However, attempts at controlling or reducing costs are highly dependent on the forage system that the cow-calf operation uses. Forage systems vary depending on a variety of factors: weather, soil conditions, water availability, forage markets, crop systems operating nearby, calving date, other farm livestock or crop enterprises, farm feeding or feed delivery storage and facilities, to name a few. Many cow-calf operations that exist in or around regions of the country with a high concentration of crop systems rely on more than one forage option. Hay and(or) silages make up most of the winter forage options for cow-calf operators in the upper Midwest. Access to grazing or gleaning crop aftermath depends on the location, but in regions with heavy or early snow falls this option is somewhat limited. Regardless of the option, cow-calf operators must remain flexible to alter their winter feeding programs to operate within a least cost ration. This paper evaluates various least cost option alternatives for producers who base their winter feeding programs on hay or silage.

What are Feeding Costs?

Before a feeding program is defined within the context of cost, it is imperative that cost itself is defined. The question as to what really costs a producer seems to be a topic of hot debate in many situations when economists, animal scientists, extension educators and producers are involved--such as in an IRM farm meeting. The economist perspective, which makes sense in terms of dollars and cents, is that every item that is produced on the farm for use by any other segment of the farm, or the one that produced it, carries an inherent opportunity cost. Opportunity cost is most practically defined as the market value of a good or service. Thus, in making hay, costs associated with machinery use and ownership (twine, depreciation, storage, repairs, fuel and oil), hay land ownership and management (seeding, reseeding, weed control, fencing, taxes and utilities), operator time and labor, forage storage and a portion of time and capital investment made to operate the farm costs and allocated to making hay (taxes, utilities, miscellaneous; fixed or overhead cost) would be included. From a strict opportunity cost definition, the hay producer, whether hay is destined for consumption by his/her own cow herd or for sale, should recuperate this opportunity cost to have his/her hay operation break even. Should a person choose to ignore some or all of this cost, then investments in machinery repairs, replacements or hay land amendments or improvements must come out of producer's own capital. Depending on the cost and frequency of these investments, the producer risks losing capital under this strategy. Alternatively, opportunity costs are defined by the market value of the commodity.

Alfalfa and other hay making costs ranged from $49.75 to $217.01/acre for haying operations in Minnesota in 1995 (Farm Business Management Program; Table 1). Production records averaged from 1.5 to 3.8 ton/acre; thus, costs of hay making, based on estimates of input costs, ranged from $32.52 to 60.89/ton.

Table 1. 1995 Minnesota forage production costs and yields on owned land.

	Region					
Item	NW	WC-C	SC	SW	SE	NE-E
Alfalfa hay						
Expense/acre, $	118.28	174.23	217.01	169.29	214.07	134.94
Yield/acre, ton	2.54	3.70	3.80	4.60	3.60	3.40
Expense/ton, $	46.56	47.60	57.11	36.81	59.46	39.46
Corn silage						
Expense/acre, $	158.07	231.45	269.25	211.00	295.92	192.92
Yield/acre, ton	10.20	16.10	18.60	16.18	19.00	13.10
Expense/ton, $	15.49	14.37	15.93	13.04	15.57	14.76
Mixed hay						
Expense/acre, $	72.60	--	--	--	170.50	94.88
Yield/acre, ton	1.60	--	--	--	2.80	2.30
Expense/ton, $	44.97	--	--	--	60.89	41.98
Grass hay						
Expense/acre, $	--	--	--	--	--	49.75
Yield/acre, ton	--	--	--	--	--	1.50
Expense/ton, $	--	--	--	--	--	32.52

Compiled from the 1995 Northwest (NW), West Central and Central (WC-C), South Central (SC), South West (SW) and Northeast and East (NE-E) Minnesota Farm Business Management Programs--Minnesota Technical College System.

On the other side of the argument, some people, including some economists, believe that if there is no opportunity to sell, the opportunity cost can either be eliminated or reduced. A partial example is found when evaluating corn silage costs. Under most conditions, corn silage is a forage alternative when corn prices are low (such as during years of high production) or in regions where corn does not have sufficient time to mature before fall frosts. Under either circumstance, once the crop has been harvested and stored for silage the opportunity to sell the forage is greatly diminished. Thus, although one may calculate the value of corn silage from the current price of corn grain, silage stored in most structures is only of value to the site where it is stored or to someone who may use it within a short distance away.

For the purpose of the following discussion, and because I and many of the farm business management instructors feel that producers ought to be rewarded for their time, labor and investment, the remainder of the paper considers forage production costs as a function of producers investments in time, land, labor, machinery, and expenses associated with machinery, storage and overhead. As a simple method to estimate these costs, I have assumed market value as the sum of total costs to produce hay. In situations when an opportunity cost may be lost or diminished because of harvest or storage method, only operating costs were considered.

A component of cost that seldom is considered in cost determinations or analyzed as a cost reduction alternative is feed wastage or shrinkage. In hay feeding systems, estimates of hay losses at the feeding site range from 5 to 45%. These losses should be added to plant material losses due to mowing, raking, swathing, plant respiration, storage and transportation. Under most conditions, when hay feeders are used, losses are minimized at 5 to 10% (Table 2). When no hay feeders, or other provisions are made to prevent cattle from trampling, laying or soiling hay, estimates of hay loss range from 10 to 45%. Thus, whether a cow-calf producer buys or makes his/her own hay, an increase in hay cost should be made to account for 5 to 45% losses depending on his/her feeding situation. Similarly, some losses occur in storage or during feeding in silage-based systems (Table 2). Silage systems based on dedicated storage structures, such as upright silos, bunkers or even bags, have storage losses ranging from 6 to 21% depending on the moisture content of the material. Feeding losses using feed bunks average 4 to 11%. Thus, estimates of corn silage costs should include post-harvest losses totaling between 10 and 32%.

Table 2. Estimates of hay or silage DM waste.

Hay	Supply delivered, days	Feeder use	Waste, %
Square bale	1	yes	7
Large round bale	1	yes	9
Large round bale	1	no	12
Large round bale	2	no	33
Large round bale	4	no	45
Stack	>1	no	41

Silage	Storage waste, %	Feeding waste, %	Total waste, %
Hay moisture			
>70	21.2	11.0	32.2
60 to 79	10.1	11.0	21.1
<60	8.2	11.0	19.2
Corn plant moisture			
>70	13.7	4.0	17.7
60 to 79	6.3	4.0	10.3
<60	6.3	4.0	10.3

Adapted from Benson,1979; Wheaton, 1980; and Anderson and Mader, 1985.

Alternative Feed Options

Feed ingredient options are often limited by supply, demand (both of which determine price or purchase agreements), storage, feeds already in use, feed delivery, facilities or the type of cattle to feed. Feed ingredient supply and demand determine price. However, in many instances when the price is right, a purchase agreement is required to ensure that a set amount (usually a large one) of the ingredient is purchased for a defined period of time. One such case is that of corn gluten feed. This feed is an excellent source of energy, protein and phosphorus, but it is relatively inaccessible for cow-calf operators either because of herd size limitations or the seasonality of the need to supplement corn gluten feed in diets of beef cows (usually limited to 200 days/year). A possible solution to this situation is starting feed ingredient purchasing cooperatives or contracts. In this scheme, groups of cow-calf producers, or cow-calf producers and cattle feeders (year around users of commodities such as corn gluten feed) can more easily meet the demands of purchasing contracts that stipulate long-term use of a given supply of corn gluten feed.

Storage needs of various alternative feeds can limit their use by cow-calf producers. Many of these feeds are often bulky, delivered in large amounts or of high moisture content. Producers are advised to evaluate storage needs of the feed they plant to purchase to prevent losses associated with poor storage conditions.

The choice of integrating a "new" feed ingredient in a cow ration must be evaluated based on the type of feed that constitutes the "base" or home choice of feeds. Generally, energy-rich feeds, when combined with forages, tend to reduce the intake and utilization of forages (Rittenhouse et al., 1970; Kartchner, 1981; Vanzant et al., 1991). However, the decision to incorporate starchy feeds into forage-based diets should be determined by an economic evaluation of the cost and potential benefit or detriment on performance. Data from Kansas State Univ. Research (Marston and Lusby, 1995; Marston et al., 1995; Table 3) demonstrated that although forage intake and digestion were reduced by energy containing supplements, performance was not altered. Indeed, cows fed an energy-containing supplement gained more weight and condition before calving, had heavier calves at birth, which gained more weight postcalving, and had a higher pregnancy rate than cows fed a protein-containing supplement.

Table 4 lists fermentation rates of feeds within defined categories. For cow-calf producers, winter forage systems are usually based on mid- to late-bloom hays or silages. Combinations of feeds which would disturb fiber degradation (reduce forage intake) involve moderate- to slow-fermenting feeds with fast-fermenting starchy (grains) or fatty (fats) feeds. However, under these and other conditions economic evaluation of the potential benefit (in the whole animal) must be measured against the cost of losing fiber digestion in the rumen.

Feed delivery system and facilities to feed (or lack thereof), often determines the alternative feed options producers can make. Under most conditions, producers are advised to keep these facilities to a minimum (low investment options). However, significant improvements can be made with electric fencing systems. Thus, a feed bunk can be replaced by dumping feed on the frozen ground in a row that is protected by a single strand of electric fence over the top of the row. This practice is best applied on hilltops, or slopes to prevent excessive trampling and enhance drainage when the snow melts.

Table 3. Effects of energy or protein supplementation[a] during gestation on cow weight, condition and performance.

	Supplement	
Item	Protein	Energy
No. of cows	172	170
Calving day of year	60	62
Initial BW, lb	975	972
BW change, lb		
113 days precalving	33[b]	53[c]
49 days postcalving	-33	-33
Initial BCS	5.8	5.8
BCS change		
Precalving	-.5[b]	-.3[c]
Postcalving	-.4	-.4
Pregnancy rate, %	79.7[b]	90.5[c]
Days to conception	79	78
Milk yield, lb/day	13.2	13.2
Calf birth weight, lb	81[b]	84[c]
49-day calf gain, lb	68[d]	73[e]

[a] Supplements were 2.7 lb/d of a 20% CP soybean hull based diet (energy) or 5.4 lb/d of a 40% soybean meal based diet (protein).
[b,c] Means differ ($P < .05$).
[d,e] Means differ ($P < .10$).

Adapted from Marston et al., 1995.

Table 4. Fermentation rates categorized for feeds within feed group.[a]

Fermentation rate	Fats	Grains	High energy by-products	Low energy by-products	Forages
Fastest	Vegetable	Wheat Barley	Bakery waste Cookie meal	Apple pomace Soy hulls	Early vegetative
Fast	Yellow grease Tallow	HM[b] corn[c] SF[d] corn	Potato by-product Molasses	Corn silage Sweet corn waste	Early bloom/ pre-boot
Moderate		HM[b] corn[e] R[f] corn	Hominy feed Carrots	Beet pulp Broiler litter	Mid-bloom
Slow	Oilseeds	SF[d] milo M[g] milo W[h] corn	Distillers grains Wet gluten feed Brewers grains	Cottonseed hulls Oat hulls Corn cobs	Boot stage Late bloom Dough stage
Slowest		R[f] milo	Dry gluten feed	Rice hulls	Straw

[a] Comparison of fermentation rates can be done only within groups of feeds (columns). However, even within columns feed may not vary significantly (low energy by-products) or they may vary dramatically (grains).
[b] High moisture.
[c] From bunker (ground).
[d] Steam flaked.
[e] From upright (whole).
[f] Rolled.
[g] Reconstituted.
[h] Whole.

From DiCostanzo et al., 1994.

A list of alternative feeds and their nutrient content is provided in Table 5.

Table 5. Nutrient composition of various by-product and non-typical feedstuffs (DM basis).

Feedstuffs	DM	TDN	ME	NE_m	NE_g	CP	Ether extract	Ash	Ca	P	K
	----- % -----		-------- Mcal/lb --------			---------------------------- % -------------------------					
Animal fat	99	177	2.91	2.16	1.60	.0	99.5	.0	.00	.00	.00
Apple pomace	40	56	.92	.54	.28	5.6	5.2	3.5	.13	.12	.49
Bakery waste	95	95	1.55	1.06	.73	11.2	12.7	4.4	.14	.26	.53
Barley	88	84	1.38	.94	.64	13.0	2.1	2.6	.05	.38	.47
Beet pulp	91	74	1.22	.80	.52	9.7	.6	5.4	.69	.10	.20
Blood meal	92	66	1.08	.64	.37	86.0	1.4	5.8	.32	.26	.10
Brewers grns. (wet)	23	66	1.09	.69	.41	27.0	6.5	4.8	.33	.55	.09
Brewers grains	91	66	1.09	.69	.41	27.2	7.2	3.9	.33	.55	.09
Broiler litter	89	66	1.09	.69	.41	24.5	3.0	22.0	3.16	1.78	1.68
Canola meal	90	76	1.25	.83	.54	36.5	7.9	7.5	.72	1.14	.90
Carrots	12	84	1.38	.94	.64	9.9	1.4	8.2	.40	1.35	2.80
Cookie meal	90	93	1.52	1.05	.73	7.0	14.0	4.4	.14	.26	.53
Corn	87	90	1.48	1.02	.70	9.5	4.2	1.4	.02	.35	.37
Corn cobs	90	50	.82	.44	.19	.32	.7	1.7	.12	.04	.87
Corn glt. feed (wet)	40	83	1.36	.92	.62	26.2	2.4	7.5	.36	.82	.64
Corn gluten feed	92	83	1.36	.92	.62	26.2	2.4	7.5	.36	.82	.64
Corn gluten meal	90	89	1.46	1.00	.69	67.2	2.4	1.8	.08	.54	.21
Corn silage	35	70	1.15	.74	.47	8.0	3.1	4.5	.23	.22	.96
Cottonseed hulls	91	42	.69	.31	.07	4.1	1.7	2.8	.15	.09	.87
Cottonseed meal	90	80	1.31	.83	.54	44.0	1.6	7.1	.18	1.21	1.52
Cottonseeds	93	96	1.58	1.10	.77	23.9	23.1	4.8	.16	.75	1.21
Cull beans	90	84	1.38	.94	.64	25.3	1.5	5.2	.18	.59	1.47
Distillers grains	93	86	1.41	.96	.66	23.0	9.8	2.4	.11	.43	.18
Feather meal	93	70	1.15	.74	.47	91.3	3.2	3.8	.28	.72	.31
Fish meal	90	74	1.22	.76	.48	67.0	8.0	21.0	5.90	3.30	.60
Hay	89	55	.90	.52	.26	13.0	2.3	8.4	.30	.35	2.32
Hominy feed	90	95	1.55	1.02	.75	11.5	7.7	3.1	.05	.57	.65
Meat/bone meal	93	66	1.09	.65	.40	50.4	10.4	31.5	11.06	5.48	1.43
Molasses	78	79	1.30	.87	.58	8.5	.2	11.3	.17	.03	6.07
Oat hulls	92	35	.58	.19	.00	3.9	1.8	.6	.15	.15	.62
Oat screenings	90	77	1.26	.78	.54	12.9	4.6	2.5	.08	.49	.55
Potato by-products	53	87	1.43	.99	.68	5.3	.4	3.4	.04	.18	1.38
Soy hulls	90	66	1.08	.65	.39	8.0	2.1	5.1	.49	.21	1.27
Soybean meal	89	84	1.38	.94	.65	44.0	1.5	7.3	.33	.71	2.14
Sunflower meal	93	65	1.07	.67	.40	49.8	3.1	8.1	.44	.98	1.14
Sweet corn waste	32	72	1.18	.77	.49	7.7	5.2	4.9	.30	.90	1.15
Thin stillage	5	88	1.45	.99	.68	29.7	9.2	7.8	.35	1.37	1.80
Vegetable fat	100	177	2.91	2.16	1.60	.9	99.9	.0	.00	.00	.00
Whole soybeans	92	91	1.50	1.03	.71	42.8	18.8	5.5	.27	.65	1.82

What are Least Cost Rations?

Our typical concept of cost is that which we can see at face value. From this perspective, hay priced at \$40/ton would always be considered more costly than corn silage priced at \$20/ton. However, producers must take into consideration various factors when pricing ingredients and formulating least cost rations. Moisture and nutrient content determine the true cost of each feed ingredient. In the example above, hay containing 85% dry matter (DM) costs \$47.06/ton DM (\$40/.85), while corn silage containing 35% DM costs \$57.14/ton DM (\$20/.35). Now, our perception shifts and we consider corn silage more expensive on a DM basis. However, if cows are to derive most of their energy from either of these two sources, then we must price them based on their energy content. From this perspective, corn silage energy costs \$81.63/ton (\$57.14/70% TDN), while hay energy costs \$84.04/ton (\$47.06/56% TDN). Thus, we now find that hay and corn silage priced each at \$40 and \$20/ton, respectively, are quite comparable in cost. One may take into consideration the protein contribution of each (since cows also require protein) and find a truer comparison of these forage sources. A reference protein source such as soybean meal must be used to price protein. Thus, for a diet of a lactating cow (requiring 11% crude protein; soybean meal at \$240/ton), corn silage is worth \$15.48/ton when hay is priced at \$40/ton. Similarly, hay is worth \$51.22/ton when corn silage is priced at \$20/ton. Thus, given the prices and nutrient contents considered in this example, hay is worth more than corn silage. It is because of these complicated relationships among price and nutrient content of various feed ingredients that computers are often used to arrive at least cost ration formulations.

However, producers are encouraged to find out the nutrient content of their forage and possible energy or protein supplements or alternative feeds, consider the amount of waste or shrinkage on each of these ingredients in the cost, and evaluate their options by determining the cost of energy or protein derived from each ingredient. The formulas to obtain costs on energy or protein basis are as follows:

$$\text{Cost of feed on a DM basis} = \frac{\$/\text{ton}}{\text{DM concentration (decimal units)}}$$

$$\text{Cost of energy from feed on a DM basis} = \frac{\$/\text{ton DM}}{\text{energy concentration (TDN in decimals)}}$$

$$\text{Cost of protein from feed on a DM basis} = \frac{\$/\text{ton DM}}{\text{protein concentration (CP in decimals)}}$$

For example, a producer who prices his home-grown hay at \$55/ton, considering waste losses, is interested in pricing either barley (\$100/ton; \$2.40/bu) or corn (\$105/ton; \$2.94) as an energy supplement. Using figures for nutrient content from Table 5, the producer calculates the cost of energy supplementation from barley at \$135.28/ton (\$100/.88/.84), and that from corn at \$134.09/ton (\$105/.87/.90). The difference is equivalent to \$.0006/lb TDN. Assuming that his cows may require 4 lb supplemental TDN during the winter period (200 days), the corn advantage would be only \$.47/cow—an almost insignificant difference. However, when the protein content of each grain is considered, especially if protein content of the home-grown forage is limiting (below 11%). Then, barley has an advantage over corn in supplying protein in addition to energy. The cost of protein derived from barley is $874.12/ton ($100/ton/.88/.13), and that from corn is $1270.42/ton ($100/ton/.87/.095).

Least Cost Choices

Sooner or later, producers will be faced with choices to substitute some or all of their forage base (either home-grown or purchased) because of weather and price conditions. During these conditions, producers must be prepared to be flexible and make choices that will permit cost savings or cost control. During "normal" years, price relationships among feed options may be well established and known by the producer. It is when "weather" years affect grain or forage crops that producers must be prepared to cope or take advantage of their situations. During years when "bumper" grain crops occur, a producer may consider using more grain in cow diets, especially if forage prices increase. Computer programs are often helpful in determining opportunity prices of alternative feed sources given a reference feed. One such program was used to generate Table 6. Provided two reference feeds, hay or corn silage, opportunity prices (maximum prices) a producer can pay for corn, barley, hay or corn silage were estimated. At a quick glance, figures in Table 6 reveal that as forage price increases, the price that can be paid for alternative feeds increases also. Within forage system, the price that can be paid for an alternative feed increases at a constant rate with the increase in forage price. Increases for corn, barley or corn silage within a hay-based system were $.47, $.39 or $5.13/ton, respectively, for each $10/ton increase in hay price. Similar increases within a corn silage-based system for corn, barley or hay were $.46, $.37 or $9.75/ton, respectively, for each $10/ton increase in corn silage price. Therefore, one could generate a "rule of thumb" that generalizes that for every increase of forage price of $10/ton, a producer can pay $.50 or $.40 more/bu of corn or barley. Another quick and simple rule of thumb to price corn or barley from either hay or corn silage would be to divide the price of hay by 23 to obtain the price that can be paid for corn or barley, or to divide the price of corn silage by 10.5 or 12 to obtain the price that can be paid for corn or barley, respectively. The corn factor (10.5) can be obtained to price corn silage relative to corn when making the decision to feed corn silage to beef cows or to sell corn grain.

At average corn or barley prices, the price of hay at which producers may consider deriving more energy from grain for their cow herds would be between $50 and $60/ton. Similarly, when corn silage price reaches $25 to $30/ton, producers may opt to include more corn or barley to provide energy in their cow diets.

Table 6. Opportunity prices of various feeds for cow diets balanced at 11% CP based on either hay or corn silage as the forage source and soybean meal (50% CP) priced at $240/ton.

Hay[a], $/ton	40	50	60	70	80
Corn[b], $/bu	1.64	2.11	2.58	3.04	3.51
Barley[c], $/bu	1.74	2.13	2.51	2.90	3.28
Corn silage[d], $/ton	15.48	20.61	25.74	30.87	36.00
Corn silage[d], $/ton	20	25	30	35	40
Corn[b], $/bu	1.95	2.40	2.86	3.32	3.78
Barley[c], $/bu	1.70	2.08	2.45	2.83	3.20
Hay[a], $/ton	51.22	60.97	70.72	80.46	90.21

[a] Hay DM, TDN and CP were: 85%, 56% and 11%, respectively.
[b] Corn DM, TDN and CP were: 89%, 90% and 9%, respectively.
[c] Barley DM, TDN and CP were: 89%, 86% and 13%, respectively.
[d] Corn silage DM, TDN and CP were: 35%, 70% and 8%, respectively.

Feeding Corn Grain-Based Diets to Beef Cows

Data from The Ohio State University indicate that cow diets can be composed mostly of corn (Table 7). A three-trial summary indicated that limit-feeding (DM intake = 1.2% of body weight) pregnant cows' diets made of 71% corn grain reduced pre-calving weight and body condition loss and increased calf birth and weaning weight.

Table 7. Performance of beef cows fed hay or limit-fed corn diets during gestation.

	Gestation diet	
Item	Limit-fed corn	Hay
No. of cows	89	123
Initial BW, lb	1,340	1,336
Final BW, lb	1,286	1,264
BW change, lb	-54[a]	-72[b]
Calf birth wt, lb	103[c]	96[d]
Calf weaning wt, lb	637[c]	616[d]
Conception rate	91	84.6
	---------------- DMI, lb/day ----------------	
Hay	2.1	30.3
Corn	11.2	0.0
Supplement	2.5	0.0
Total	15.8	30.3
Feed costs, $/day	.86	1.41

[a,b] Means differ (P < .10).
[c,d] Means differ (P < .05).

Adapted from Loerch et al., 1995.

At costs of corn, hay and supplement of $2.50/bu, $80/ton and $150/ton, respectively, daily feeding costs would have been reduced 61% by using the corn-based diet. Producers are encouraged to consider feeding corn grain-based diets to spring-calving cows when hay prices increase, but they must be cautioned that birth weight of cows fed corn-based diets may increase. In two of the three studies summarized, calf birth weight was increased 7 lb on average. Other considerations must be made regarding feeding facilities, corn processing method (whole vs rolled), cow size, fencing and exposure to cold weather. A list of considerations made by Steve Loerch (The Ohio State University, Personal Communication), with my adaptations to sub-zero weather calving conditions, is provided:

1. When turning cows into wintering lots (mid-gestation), feed 3 lb hay, 2 lb supplement and 14 lb whole shelled corn (per cow basis). It is important that whole corn be used to maximize corn grain digestion. Supplementing this diet with rumensin should prevent over-consumption and acidosis or acidosis-related problems.

2. Beginning January (late gestation), or when the weather turns bitterly cold, feed at least 3 to 4 lb hay, 2 lb supplement and 15 to 16 lb whole shelled corn (per cow basis).

3. Adjust corn intake to achieve desired weight and(or) body condition score. Cows used in the experiments in Ohio weighed 1300 lb - smaller cows would require less corn.

4. When starting the program, take 3 to 4 days adjusting the corn and decreasing hay to 3 lb. Make sure bunk space is adequate so all cows get their share, and that cows are in a securely fenced paddock.

5. The supplement used at the experiments in Ohio contained:

Ingredient	% as fed
Ground corn	32.1
Soybean meal	45.6
Urea	4.1
Limestone	7.8
Dicalcium phosphate	4.3
Trace mineral salt	3.2
Dyna-K	2.3
Selenium premix (200 ppm)	.4
Vitamin premix[a]	.2
Rumensin 80[b]	.12

[a] Vitamin A, 15,000 IU/gram; Vitamin D, 1,500 IU/gram.
[b] Deliver 192 mg monensin/head/day.

Composition of supplement is 36% CP, 3.76% Ca and 1% P.

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