

Economic Evaluation of Alternative Feeds for Dairy

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Alternative feeding adjustments should be chosen on the basis of economics, feasibility and convenience. Feed evaluation factors given in Table 1 may be used to estimate whether or not various forages, roughages or concentrates are good buys in relation to shelled corn and soybean oil meal. Values so obtained may be regarded as an estimate of the maximum worth at these price relationships. Full feed programming and cost analysis of proposed rations are necessary to determine which alternatives are more economical.

Feed-evaluation factors (see Tables 1 and 2) are used to determine the economic nutritional value of forages or various ingredients and feedstuffs used for feeding dairy cows. With these factors, the economic value of each available ingredient can be compared with number 2 shelled corn, 44 percent soybean oil meal, and alfalfa hay.

To determine the comparative value of any ingredient, use the factors listed opposite that ingredient. Multiply the "shelled corn factor" by the current hundredweight price of shelled corn, multiply the "soybean oil meal factor" by the current hundredweight price of 44 percent soybean oil meal, and, when working with forages, multiply the "alfalfa hay factor" by the current hundredweight price of alfalfa hay; then add the two (or three) answers. (Note: Subtract if one of the factors is preceded by a minus sign.)

Compare the computed value with the actual price of the ingredient. If the computed value of the ingredient is greater than the actual price, the ingredient being considered is a better buy (by the amount of the difference) than the same nutrients from a combination of shelled corn, soybean oil meal, and (with forages) alfalfa hay. If the computed value is less than the price of the ingredient, it is NOT a good buy.

For greater precision, include preparation costs (such as for grinding and mixing) for whole grains, limited shelflife (such as wet corn gluten feed in warm weather), shrinkage (a problem with blood-meal) and, of course, the cost of transportation, storage and financing.

Example 1:

Assume that dry, shelled corn is worth \$9.82 (\$5.50/bu) per hundredweight and the price of 44 percent soybean oil meal is \$17 per hundredweight (\$350/ton). What if you can buy sunflower meal for \$11.75 per hundredweight. Should you use sunflower meal in a grain mix?

sunflower meal corn factor (0.144) x corn price (\$9.82) = \$1.414

sunflower meal soybean meal factor (0.656) x soybean meal price \$17.50 = \$11.480

sunflower meal computed value = sum (or difference) = \$1.414 + \$11.480 = \$12.894 per hundredweight, value as fed.

If the "computed" sunflower meal value (\$12.89) is more than its price (\$11.75, on a hundredweight basis, priced for April 2008, FOB, Eastern North Dakota), sunflower meal would be a good buy under these conditions without considering any other handling or delivery costs.

Example 2:

Assume the same prices for shelled corn and 44 percent soybean meal given in Example 1, and a price of \$8.00 per hundredweight (\$160/ton) for alfalfa hay from Table 2. You can purchase first-cut, early-head grass hay at \$6.80 per hundredweight. Should you buy this hay?

grass hay (first-cut, early-head) corn factor (-0.153) x corn price (\$9.82) = -\$1.502

grass hay (first-cut, early-head) soybean oil meal factor (-0.336) x soybean oil meal price (\$17.50) = -\$5.88

grass hay (first-cut, early-head) alfalfa hay factor (1.755) x alfalfa hay price (\$8) = \$14.040

grass hay (first-cut, early-head) computed value = sum (or difference) = \$14.040 - \$5.880 - \$1.502 = \$6.658

Since the "computed" value of the grass hay (\$6.66) is less than its market price (\$6.80), the grass hay would not be a good buy under these conditions.

Caution

These calculations DO NOT determine the market value of the product. They merely compare their energy, protein and forage value relative to the feedstuff in question. If an ingredient is shown to be a good buy, it should be used only within the limits suggested.

Notes:

(1.) To convert the price of 48 percent soybean oil meal to a 44 percent basis to use these feed evaluation factors, multiply the price of 48 percent soybean meal by 0.94.

(2.) Use ingredients and feeds with the greatest margin of value over cost to the fullest extent possible, in accordance with suggested limits.

(3.) Preferably use least-cost computer formulations to determine which ingredients and what levels should be used in rations balanced for all nutrients, including soluble protein, undegradable protein, fiber, nonstructural or nonfibrous carbohydrates, and fat, among others.

(4.) These values do NOT take into account the costs of commodity storage, time value of borrowed money, equipment needed for mixing ingredients, or transportation. You may find it more economic to work through a local feed dealer who can customize feeds to meet your needs.

Table 1. Feed-evaluation factors for feedstuffs used in dairy cow rations.

Ingredient Name	Crude Protein (%DM)	Net Energy, NEL (Mcal/lb)	Dry Matter	Feed Factors	
				Corn	Soybeans
Corn, shelled (15.5%)	10.0	0.90	88.0	1.000	0.000
Soybean meal, (44%)	50.0	0.88	90.0	0.000	1.000
Barley	12.8	0.87	89.0	0.901	0.077
Barley, high-moisture	13.1	0.87	72.0	0.723	0.068

Beet pulp	9.7	0.81	91.0	0.9130.018
Blood meal	93.0	0.68	91.0	- 1.010 2.078
Canola	40.8	0.77	92.5	0.0750.824
Corn shelled - high-moisture	9.5	0.90	74.4	0.856-0.010
Corn gluten feed, dry	23.0	0.87	90.0	0.6570.331
Corn gluten feed, wet	21.9	0.87	49.0	0.3560.180
Corn gluten meal, 60%	67.2	0.94	90.0	- 0.343 1.411
Cottonseed, whole	23.7	0.98	88.4	0.7810.313
Cottonseed, delinted	23.0	1.01	90.0	0.8550.293
Feather meal	88.0	0.70	92.0	- 0.966 01.988
Fish meal, Menhaden	66.7	0.76	92.0	- 0.598 1.481
Linseed meal	37.4	0.79	91.0	0.1880.720
Lupins	41.9	0.81	85.0	0.0970.779
Malt sprouts	28.1	0.74	94.0	0.3620.516
Meat and bone meal	54.1	0.74	93.0	- 0.310 1.179
Oats	13.0	0.80	89.0	0.7980.101
Oat mill coproduct	3.9	0.34	92.0	0.3920.003
Potatoes, raw	8.9	0.85	91.0	0.990-0.014
Rye	13.8	0.88	88.0	0.8800.098
Sorgham or milo	10.4	0.84	89.0	0.9180.026
Soybean meal, treated/high -UIP	48.7	0.89	92.0	0.0470.986
Soybeans, heated	41.8	0.99	90.0	0.3590.766
Soybeans, whole	41.8	0.96	90.0	0.3170.774
Soybean meal, 48%	54.4	0.91	90.0	- 0.070 1.104
Soyhulls	12.1	0.80	90.0	0.8290.080
Sunflower meal, 35%	35.0	0.44	90.0	0.1440.656
Triticale	17.6	0.88	90.0	0.8060.194
Wheat	11.3	0.89	89.0	0.9650.035
Wheat nudds	18.0	0.71	89.0	0.5490.249
Whey, dried	13.0	0.85	93.0	0.9070.091

Note: DM = dry matter.

Table 2. Feed-evaluation factors for forages fed dairy cows.

Feed Ingredient	Feed Factors			Crude Protein (%DM)	Net Energy, NEL (Mcal/lb)	NDF (%DM)	Dry Matter (%)
	Corn	Soybean Meal	Alfalfa				
Corn, shelled (15.5%)	1.000	0.000	-0.000	10.0	0.90	9.0	88.0
Soybean meal, (44%)	0.000	1.000	0.000	50.0	0.88	14.0	90.0
Legume hay, average analysis	-0.000	0.000	1.000	18.6	0.60	47.7	90.0
Corn silage, average analysis	0.100	-0.126	0.460	8.8	0.69	49.0	33.0
Small-grain silage, average analysis	-0.170	-0.101	0.550	14.0	0.63	59.0	32.3
sorghum-sudan silage, average analysis	-0.034	-0.124	0.548	11.0	0.57	64.1	30.0
Grass hay, first cut, prehead	-0.060	-0.176	1.484	18.4	0.69	56.0	89.0
Grass hay, first cut, early head	-0.153	-0.336	1.755	14.5	0.63	65.0	89.0
Grass hay, first cut, full head	-0.289	-0.486	2.042	11.0	0.55	75.3	89.0
Grass hay, first cut, mature	-0.363	-0.619	2.265	7.7	0.50	82.7	89.0
Grass hay, aftermath	-0.196	-0.343	1.796	14.5	0.61	66.9	89.0

average							
Grass hay, late fall	- 0.097	-0.247	1.591	16.5	0.66	59.8	89.0
Legume hay, first cut, prebud	0.046	0.155	0.801	23.9	0.68	40.5	87.0
Legume hay, first cut, bud	0.094	0.058	0.808	19.5	0.6	42.0	87.0
Legume hay, first cut, bloom	0.061	-0.106	1.016	14.7	0.59	49.0	87.0
Legume hay, first cut, mature	- 0.064	-0.258	1.278	10.6	0.50	59.2	87.0
Legume hay, aftermath	0.098	0.053	0.809	19.3	0.64	42.0	87.0
average							
Legume hay, late fall	0.078	0.096	0.808	21.3	0.66	41.3	87.0
Grass haylage, first cut, prehead	- 0.015	-0.007	0.528	21.0	0.67	49.5	40.0
Grass haylage, first cut, early head	- 0.048	-0.076	0.625	16.6	0.60	57.5	40.0
Grass haylage, first cut, full head	- 0.095	-0.142	0.734	12.6	0.52	66.6	40.0
Grass haylage, first cut, mature	- 0.123	-0.196	0.801	8.8	0.45	73.0	40.0
Grass haylage, first cut, aftermath	- 0.054	-0.091	0.620	14.5	0.55	59.2	40.0
average							
Grass haylage, first cut, late	- 0.081	-0.045	0.614	18.9	0.58	58.0	40.0

fall							
Legume haylage, first cut, prebud	- 0.008	0.077	0.499	25.0	0.69	43.3	47.0
Legume haylage, first cut, bud	0.001	0.042	0.476	21.0	0.62	44.9	47.0
Legume haylage, first cut, bloom	- 0.037	-0.030	0.577	17.0	0.55	52.3	47.0
Legume haylage, first cut, mature	- 0.096	-0.133	0.744	12.0	0.47	63.2	47.0
Legume haylage, first cut, aftermath average	- 0.006	0.049	0.434	20.0	0.57	45.0	47.0
Legume haylage, first cut, late fall	- 0.016	0.075	0.427	22.1	0.59	44.0	47.0
Corn silage, urea	0.064	-0.087	0.467	13.2	0.69	49.0	34.0
Corn silage, NH3	0.075	-0.099	0.469	12.0	0.69	49.0	34.0
Small-grain silage, boot	0.016	-0.080	0.494	16.0	0.72	54.0	30.0
Small-grain silage, early head	- 0.051	-0.143	0.662	14.0	0.68	68.0	30.0
Small-grain silage, milk	- 0.073	-0.159	0.662	11.0	0.58	72.0	30.0
Small-grain silage, dough	- 0.100	-0.220	0.848	10.0	0.60	77.4	30.0
Grass pasture, spring prehead	0.019	-0.024	0.282	19.0	0.74	48.2	20.0
Grass	0.010	-0.025	0.288	19.0	0.72	49.7	20.0

pasture, summer prehead Grass								
pasture, fall prehead Grass	0.031	-0.004	0.246	21.0	0.77	43.1	20.0	
pasture, early head Grass	- 0.022	-0.063	0.358	14.9	0.63	61.0	20.0	
pasture, head Grass	- 0.036	-0.093	0.401	11.0	0.57	68.0	20.0	
Legume pasture, spring, prebloom	0.011	0.032	0.208	25.0	0.73	41.0	20.0	
Legume pasture, summer, prebloom	0.003	0.041	0.188	25.0	0.68	41.0	20.0	
Legume pasture, fall, prebloom	0.010	0.053	0.175	27.0	0.72	38.0	20.0	
Legume pasture, bloom	0.014	0.022	0.173	20.0	0.61	42.0	20.0	
Sorghum- sudan pasture, 30 inch	- 0.013	-0.055	0.377	15.3	0.64	58.3	20.0	
Sorghum- sudan pasture, 40 inch	- 0.015	-0.086	0.413	13.3	0.65	61.9	22.0	
Pea vine silage	- 0.020	-0.071	0.397	13.1	0.57	59.0	25.0	
soybean silage	- 0.040	-0.022	0.377	17.7	0.55	55.0	28.0	
Rape tops	0.065	-0.041	0.201	14.0	0.85	41.2	15.0	

Note: DM = dry matter; NDF = neutral detergent fiber.

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