University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Historical Materials from University of Nebraska-Lincoln Extension

Extension

1994

NF94-204 Computing the Dollar Value of Concentrates and Byproduct Feeds for Dairy Cattle

Rick Grant

Follow this and additional works at: https://digitalcommons.unl.edu/extensionhist

Part of the Agriculture Commons, and the Curriculum and Instruction Commons

Grant, Rick, "NF94-204 Computing the Dollar Value of Concentrates and Byproduct Feeds for Dairy Cattle" (1994). *Historical Materials from University of Nebraska-Lincoln Extension*. 261.
https://digitalcommons.unl.edu/extensionhist/261

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Nebraska Cooperative Extension NF94-204

NebFact

Published by Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln

Computing the Dollar Value of Concentrates and Byproduct Feeds for Dairy Cattle

by Rick Grant, Extension Dairy Specialist

Introduction

Feed costs represent 50 to 60 percent of variable milk production costs. Consequently, feed costs play a major role in determining the profitability of a dairy enterprise. Specifically, a producer should focus on "income above feed costs" to assess total feeding system profitability.

Concentrate and byproduct feed prices vary substantially throughout the year. Prices may reflect seasonal changes and both local and global markets for that feedstuff. Alternative feeds must be evaluated routinely to achieve optimum milk production, but at minimum cost. Criteria for feedstuff selection and inclusion in a ration are:

1. The nutrient composition of the feed. When this feed is included in the diet, will the ration still meet the nutrient requirements for milk production? All feeds must be analyzed for nutrient content, especially byproducts and forages, before incorporating them into a ration.

2. Does the price of the feedstuff, relative to other ingredients supplying the same nutrients, result in an economical ration?

In addition to the price of a particular feedstuff, the producer must also consider nutritional attributes of the feed not reflected in the price. A good example is the fibrousness of a feedstuff, such as whole cottonseed, which can stimulate rumination and maintain milk fat percent. Because of its ability to promote cud-chewing, a dairy producer may be willing to pay more for whole cottonseed than indicated simply by its ability to substitute for corn and soybean meal in a diet low in fiber.

Producers often want rapid decisions on the feeding value of alternative feeds when formulating rations. Common questions include, "How much should I pay per ton?" and "When is this feed a good buy?"

The most accurate comparison for various feeds available to a producer would be based on a laboratory analysis and use of a computer ration formulation program to calculate opportunity prices for feeds. However, the following table allows you to quickly determine the dollar value of a particular feed relative to the current price for corn and soybean meal.

Using the Feed Pricing Table

Energy and crude protein are the two major nutrients required by the lactating dairy cow and so, feeds are often selected based on their relative content of these two nutrients. The pricing equations shown in Table I were developed for concentrates and byproduct feeds by dairy scientists at Ohio State University. These equations allow comparative feed value determination based on levels of crude protein (CP) and net energy for lactation (NEL). Corn and soybean meal (44 percent CP) are used as base feeds, with constants developed on a dry matter (DM) basis and then adjusted to an as-fed basis. The unit of cost ($/ton, $/bushel, etc.) used in the equations can vary, as long as the same unit is used for both corn and soybean meal.

Example Calculation. To calculate the comparative dollar value of corn gluten feed, assuming you can purchase corn at $100/ton (denoted as "x" in Table I) and soybean meal at $200/ton (denoted as "y" in Table I), use the following equation from Table I:

(0.647x + 0.437y) x % DM = comparative price
(0.647 x $100/ton for corn) + (0.437 x $200/ton for soybean meal)a x .90 = $136.89/ton for corn gluten feed.

The value calculated using the equations in Table I should be regarded as the maximum price to be paid for feeds based on their CP and NEL content. If the price of a feedstuff is lower than this calculated feed value, then that feed would be an economical replacement for corn or soybean meal in the diet. If the actual price is above the calculated value, then corn, soybean meal, or some other feeds priced below the calculated feed value would be more economical sources of CP and energy.

Direct Comparisons of Protein and Fat Sources

Because protein is more expensive than energy, and protein may be the only limiting nutrient in a specific diet, comparison of alternative protein sources alone may be desired. Such feeds can be compared based on cost per unit of CP:

$/unit CP = ($/unit feed)/(unit of feed x % DM x % CP)

To illustrate, the cost of CP from soybean meal and distillers grains were compared, assuming you could purchase soybean meal for $200/ton and distillers grains for $115/ton.

$200/ton divided by 2000 pounds x .89 x .499 = $.23/pound of CP from soybean meal

$115/ton divided 2000 pounds x .94 x .23 = $.27/pound of CP from distillers grains without solubles

In this case, soybean meal is the less expensive CP source (23 vs. 27:/pound) compared with distillers grains.

Balancing diets for undegradable intake protein (UIP; bypass protein) and degradable intake protein (DIP) has gained widespread interest. With CP adequate in a diet, but DIP above recommended level,

UIP can be increased, within least-cost principles, by comparing feeds high in UIP based on $/unit of UIP. To illustrate, the $/unit of UIP is shown below for soybean meal, distillers grains, and blood meal:

$200/ton divided by 2000 pounds x .89 x .499 x .35 = $.64/pound of UIP from soybean meal

$115/ton divided by 2000 pounds x .94 x .23 x .54 = $.49/pound of UIP from distillers grains w/o solubles

$415/ton divided by 2000 pounds x .92 x .872 x .82 = $.32/pound of UIP from blood meal

In this case, blood meal is the most economical source of UIP. Remember, for the pricing equations that compare sources of CP and UIP, simply insert your current cost/ton of feed to calculate the value of your specific byproducts and protein sources.

The actual energy value for a specific fat source can vary depending on the interactions of the fat with other dietary components, the digestibility of the fat, and level of fat added to the diet. Since different energy values are assumed for fat in the feed industry, the economic value of fats should be compared based on $/unit fat — not based on $/Mcal NEL. Also, commercial fat sources may differ in amount of fat and chemical nature of the fat, thus the preferable comparison among such fat sources would be $/unit fatty acid.

Summary

Use of the table in this NebFact will allow you to calculate the comparative value of a particular feedstuff, relative to corn and soybean meal, to determine the economic feasibility of including it in the ration. Keep in mind, however, that attributes of the feedstuff, such as fibrousness or fat content, may give it a greater value than calculated by the use of the equations in Table I.

Table I. Chemical composition and price equations for various alternative feeds.[1]

	Composition[2]						
Feed	*DM*	*CP*	*UIP*	*NEL*	*NDF*	*EE*	*Price Equation[3]*
	(%)	(%)	(% of CP)	(Mcal/kg)	(%)	(%)	
Corn, cracked	89	10.0	52	1.84	9	4.3	——
Soybean meal, 44% CP	89	49.9	35	1.94	14	1.5	——
Almond hulls	90	2.7	—	1.33	25	3.6	(0.750x - 0.051y) *DM
Barley	88	13.5	27	1.94	19	2.1	(0.943x + 0.125y) *DM
Beet pulp	91	9.7	45	1.78	54	.6	(1.011x - 0.022y) *DM
Blood meal	92	87.2	82	1.50	—	1.4	(-1.197x +

							2.222y)*DM
Brewers grains, dry	92	25.4	49	1.63	46	6.5	(0.357x + 0.518y) *DM
Brewers grains, wet	21	25.4	42	1.67	42	6.5	(0.371x + 0.515y) *DM
Canola meal	92	44.0	28	1.72	36	1.2	(-0.042x + 0.998y)*DM
Citrus pulp	91	6.7	20	1.76	23	3.7	(1.019x + 0.049y) *DM
Corn, ground ear	87	9.0	52	1.91	28	3.7	(1.012x + 0.007y) *DM
Corn gluten feed	90	25.6	25	1.91	45	2.4	(0.647x + 0.437y) *DM
Corn gluten meal	90	67.2	55	2.06	14	2.4	(-0.357x + 1.568y)*DM
Cottonseed, linted	92	23.0	32	2.22	44	20.0	(0.915x + 0.381y) *DM
Cottonseed hulls	91	4.1	—	.99	90	1.7	(0.440x + 0.009y) *DM
Cottonseed meal, 41% CP	91	45.6	43	1.74	26	1.3	(0.029x + 1.011y) *DM
Distillers dried grains, wo solubles	94	23.0	54	1.98	43	9.8	(0.567x + 0.555y) *DM
Feather meal	93	85.0	71	1.61	—	3.2	(-1.343x + 2.343y)*DM
Fish meal	92	66.7	60	1.67	—	10.5	(0.544x + 1.622y) *DM
Hominy	90	11.5	65	2.01	55	7.7	(1.145x +0.037y) *DM
Linseed meal	90	38.3	35	1.78	25	1.5	(0.200x + 0.836y) *DM
Meat and bone meal	93	54.1	49	1.63	—	10.4	(-0.253x + 1.273y)*DM
Molasses, beet	78	8.5	—	1.72	—	.2	(0.946x + 0.007y) *DM
Molasses, sugarcane	94	10.3	—	1.60	—	.9	(1.003x - 0.105y) *DM
Oats	89	13.3	17	1.77	32	5.4	(0.835x + 0.140y) *DM
Rice hulls	92	3.3	—	.17	82	.8	(0.023x + 0.066y)

							*DM
Rye	88	13.8	19	1.94	—	1.7	(0.905x + 0.131y) *DM
Soybeans, raw	92	42.8	26	2.11	14	18.8	(0.420x + 0.862y) *DM
Soybean hulls	91	12.1	25	1.76	67	2.1	(0.910x + 0.089y) *DM
Sunflower meal	93	49.8	26	1.47	37	3.1	(-0.28x + 1.199y) *DM
Wheat	89	16.0	22	2.04	—	2.0	(1.085x + 0.042y) *DM
Wheat bran	89	17.1	29	1.60	51	4.4	(0.622x +0.283y) *DM
Wheat middlings	89	18.4	21	1.56	37	4.9	(0.773x + 0.269y) *DM
Whey	7	14.2	—	1.87	—	.7	(0.900x + 0.136y) *DM

[1]Table from "Economic Value of Feeds Based on Nutritional Principles". M.L. Eastridge, Ohio State University, 1992.

[2]All values (NRC, 1989) expressed on dry matter (DM) basis: CP = crude protein, UIP = undegradable intake protein, NEL = net energy for lactation, NDF = neutral detergent fiber and EE = ether extract.

[3]Price equation based on composition of feeds from NRC (1978); x = price of corn ($/unit) and y = price of soybean meal ($/unit).

File: NF204 under: DAIRY
D-1, Business Management
Issued November 1994

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.

University of Nebraska Cooperative Extension educational programs abide with the non-discrimination policies of the University of Nebraska-Lincoln and the United States Department of Agriculture.