ethanol co-products for cattle

Factors Affecting the Economics of Corn Co-Products in Cattle Feeds

As the ethanol industry rapidly expands across Iowa and the Midwest, the supply of various corn co-products have become more abundant and available. Opportunities to reduce feed costs and improve profitability of livestock operations are and will continue to be more plentiful by the utilization of these feeds. However, proper ration formulation, economic analysis and feeding management are important in developing the most cost competitive and profitable feeding system. Some of the factors that weigh heavily in decisions relative to co-product feed pricing and inclusion rates include nutrient value of the feeds, nutrient value of competing feeds, consistency of product, reliability of supply, consistency of pricing, transportation and storage losses. The effects of transportation and storage costs and losses become more important with wet feeds. These effects are also greatly influenced by storage methods and handling on the farm.

Nutrient Value

Much of the economic value of any feed is directly determined by the nutrients that it contains. Many nutrients that contribute to the economic value of feedstuffs can be directly analyzed. Therefore, feed analysis is an important component of this equation. Protein, dry matter, fat, fiber, and mineral levels are all easily analyzed and compared. Processing methods between plants and nutrient content of the original grain can affect these values. Also book values may differ from the actual analysis due to changes in processing methods. A greater challenge is determining the appropriate energy value to be used in pricing the feedstuff. Energy values cannot be directly measured by feed analysis. With feedstuffs that approach or exceed corn in energy content the economic value of that energy often drives the value of the co-product.

Complicating the issue is variable energy value depending on the species, stage of production and moisture level of the feed product in question.

Estimates of energy value of these feeds must come from research (usually feeding or metabolism studies) under very specific conditions. Since this is a very active area of research, new and better information is constantly being added to the knowledge pool. Therefore, the energy value of corn co-product feeds is in essence a moving target. Good communication with nutritionists that are well-versed in new research and information as it becomes available is important in order to have the best estimates of feeding and economic values.

Economic Value of Competing Feeds

Once a nutrient analysis of a co-product feed has been established, then the value of those nutrients in competing feeds largely determined the feed's value.

Dry Mill Ethanol Plant

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Feeds that compete with the co-product depend on the primary nutrient(s) contributed. For example, for beef cattle protein, feed values are often determined by soybean meal or urea (finishing cattle). For energy, corn has historically been the low-cost source that most feeds are compared in the upper Midwest. Currently distillers grains are rapidly increasing in local availability as the dry mill ethanol industry expands. Livestock feeders that have experience or are currently using a similar feed from the wet corn milling industry (like corn gluten feed), may have interest in economic comparisons between distillers grain and corn gluten feed.

Reliable Supply and Pricing

Ration consistency is important for high rates of production. For feedlot cattle managed for fast growth and efficiency, a consistent ration helps maintain performance and reduce digestive upsets. In addition, budgeting or projecting the performance of new cattle requires a reliable assumption of feed prices and therefore costs of gain. Thus, consistency of co-products from a given source and the ability to forward price or assure price consistency is important to feedlot producers. On the other hand, low cost, "quick sale" may sometimes be available, particularly from startup plants. These feeds may be a tremendous value for producers as well as an excellent source of high quality nutrients. These feeds work best in lower production, lower cost systems such as stocker, backgrounding or cow calf programs.

A truck unloads wet distillers grains

Effect of Moisture

Research suggests that high moisture distillers grains, as well as corn gluten feed, have a higher energy value per unit of dry matter than distillers dried grains. This effect is unknown for modified or partially dried distillers grains, as well as for other classes of cattle, such as wintering cows. Moisture also may affect economics negatively by increasing storage and handling costs, and storage losses. These factors need to be accounted for when establishing the value of high moisture or difficult handling co-products.

Establishing Value

There are several ways of estimating the value of any feedstuff, including co-products. These range from simple calculations based on the value of one nutrient in one common feedstuff to very specific ration analyses and comparison. The simpler methods may help determine if a feedstuff is generally priced so that it may be a competitive feedstuff. More sophisticated methods evaluate very specific situations. The following are some general methods of establishing feedstuff value:

1. Simple nutrient value rules of thumb
    a. Compare to soybean meal protein value
    b. Compare to corn energy value
2. Relative value or shadow prices. This is the maximum value based on the nutrient content in a perfectly balanced ration
3. Situation specific calculations. In this situation, a producer may be contemplating substituting one corn co-product for another with different analyses.
4. Ration-specific calculations. This is comparing a current ration in detail to an alternative in equal detail.

Examples

The following are examples of pricing using some of the methods described for distillers grains and some assumptions on competitive feed pricing.

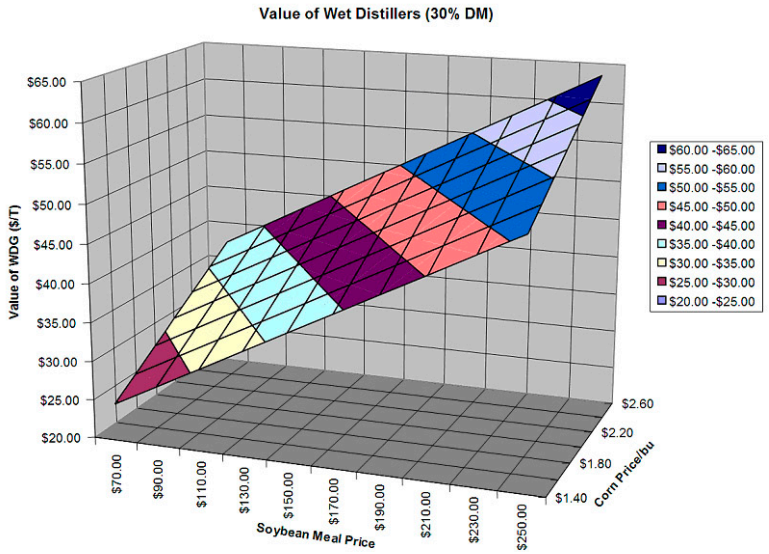
1. Simple Nutrient Value
If soybean meal is 50% protein, 88% dry matter and $200 per ton and distillers dried grains (DDG) is 30% protein and 90% dry matter, then the value of DDG as a substitute for soybean meal as protein source is:

$200/.88/.50 = 454 *.3 *.9 = $122 /ton

On an energy basis if it is assumed that DDG and corn are similar and the value of corn is 1.80 per bushel then the value of DDG as a replacement for corn energy is:

$1.80/56/.85 = .038 *.9 * 2000 = $68/ton

2. Relative Value or Shadow Prices
By using more advanced algebra or computer programs that use linear programs, relative value or shadow prices can be established. Basically this method determines the value of each nutrient and then multiplies that value by the analyses. The result is the maximum value for a feedstuff in a perfectly balanced ration. By repeating this process over a range of corn and soybean meal prices the following can be developed for wet distillers grains (see graph).



Graph: *Value of Wet Distillers Grains (30% Dry Matter)*

3. Situation Specific Value
An example of this method is shown on the following example entitled "Value of wet corn gluten feed and wet distillers grains with solubles compared with corn and urea". This is a downloadable program from the Iowa beef center at:

http://www.iowabeefcenter.org/content/CornCoproductValue.xls

The comparison here is very specific, but useful for cattle feeders that are currently feeding corn gluten feed. This program compares the substitution of wet corn gluten feed with wet distillers gains, taking into account not only nutrient content but also storage costs, transportation costs and even an incentive for handling wet feeds.

4. Ration Analysis and Substitution
The "litmus test" of evaluating a new co-product into a current ration is a current ration analysis followed by the development of a new ration using the new feedstuff, balanced for nutrients and under the specific conditions in which it will be fed. Economic comparisons and recommendations can then be made with confidence. This is how most nutritionists will ultimately approach the recommendations for co-product use. Table 1 on the following page is an analysis of two rations from the Beef Ration and Nutrition Decision Software (BRANDS) computer ration program. Ration A is a balanced conventional ration using corn, corn silage, alfalfa-brome hay and protein supplement. With the assumed feed prices the feed cost per pound of gain was $.27. Ration

B substitutes wet distillers grains and a mineral balancer for corn and the protein supplement. The distillers grains are added at 45% of the ration dry matter which increases the NEg of the ration. The feed cost per pound of gain in this example is $.24. So what is the cost savings in this example? If a 150 day feeding period at 3.3 pounds per day is assumed for the conventional ration, then the $.03 feed cost savings could be multiplied by 495 pounds. Therefore, the feed cost reduction by making this change would be expected to be approximately $15 per head. Notice that the rate of gain is expected to increase by about 10% due to the increase in ration energy. If this is the case then non-feed costs (yardage and interest) should be reduced by 10% as well. If non-feed costs were $.40 per day, then total non-feed costs should be reduced by 150*$.40*10% = $2.40. In this example with the assumptions made for feed prices and performance expectations, total cost reduction by changing to the coproduct based ration would be approximately $17.40 per head. Remember each situation is different. Feed prices change daily. Performance expectations change according to cattle type, weight, condition and environment. Only a specific analysis for each individual situation can determine the best option using a ration analysis program.

Table 1. Balanced Conventional Ration vs. Ration Including Wet Distillers Grains

Ingredients	Ration A lbs/day, (% dry matter)	Ration B (lbs/day, % dry matter)
Corn	17 (72.9)	7 (30)
Alfalfa / Brome Hay	3 (12.4)	3 (12.4)
Corn Silage	5 (10.1)	5 (10.11)
40% Liquid Supplement	1.2 (4.5)	-
Wet Distillers	-	20 (45.4)
Balancer	-	0.4 (2.0)
Average Daily Gain (lbs.)	3.35	3.51
*Lbs. Feed / lb. gain**	5.92	5.19
Feed Cost / lb. gain:	$0.27	$0.24

*on a dry matter basis

IOWA STATE UNIVERSITY
University Extension

Iowa Beef Center
IOWA STATE UNIVERSITY

Prepared by:

Daniel D. Loy, professor of animal science, Iowa State University Extension
Daryl R. Strohbehn, professor of animal science, Iowa State University Extension
Rachel E. Martin, communications specialist, Iowa Beef Center, Iowa State University

For more information on ethanol co-products for cattle, visit www.iowabeefcenter.org

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