

ETHANOL BYPRODUCTS FOR BEEF & DAIRY CATTLE PERCEPTION VS REALITY

Rick Stock

Cargill Sweeteners North America
Blair, NE

rick_stock@cargill.com

Distillers grains are an excellent source of protein and energy. Distillers grains are normally available for use in ruminant diets in two forms: dried distillers grains and wet distillers grains. In general, there are two nutritional philosophies regarding their use in ruminant diets. Distillers grains can be fed at low levels (< 10% of diet dry matter) serving primarily as a source of supplemental protein. When fed at higher levels (15 to 40% of diet dry matter), distillers grains primarily serve as a source of energy replacing grain. Other than dry matter content, the profile of wet and dry distillers grains should be similar for most nutrients provided the distillers grains were produced at the same plant at approximately the same time.

In beef feedlot diets, the energy value of wet distillers grains may be 120 to 150% the energy value of dry rolled corn; however, the energy value is highly dependent on level of inclusion. The energy value of distillers grains is high due to its oil content. Replacing grain with distillers grains may also reduce acidosis; consequently improving gain and feed conversion. In lactating dairy diets, the corn oil may be an advantage at low levels of inclusion, but may be a detriment to fiber utilization at higher levels of inclusion.

The supply of both wet and dry distillers grains is plentiful and will increase. Recent reviews (Erickson, 2003; Grant, 2003; Klopfenstein, 2003; Erickson et. al, 2005) have summarized the nutritional value of distillers grains in beef and dairy diets. Optimum levels of wet distillers grains appear to be 20 to 40% (dry matter basis) for beef feedlot cattle and 10 to 20% (dry matter basis) for lactating dairy cattle. In “real world” ruminant rations, inclusion levels of distillers grains are typically less than the levels found to provide optimum performance in university trials. In the future, in order to use the abundant supply of distillers grains, higher inclusion levels of distillers grains will need to be fed.

However, we must first understand what limits the higher inclusion level of distillers grains and work to overcome these challenges. No doubt, a “cheap” price will encourage increased use of distillers grains, but a cheap price usually means the manufacturer is paying the customer to manage one or more of its problems. The problem should be the focus, not price. The question that should be asked is what is the value of distillers grains. Nutritional content is a component of value, but it is not the only driver of value. There are at least three other factors involved in the value equation: 1) Manufacturing focus, 2) Product variation, and 3) Paradigm paralysis.

Manufacturing Focus

In order to understand value, we need to understand the manufacturing focus of the milling industry. The terms ‘byproduct’ and ‘product’ are interesting and confusing terms. In the traditional sense, a byproduct is something that is produced as a result of producing something else. In most cases, the focus is on the primary product (ethanol), and the byproduct (distillers grains) just happens. The focus by the manufacturer defines the difference between a byproduct and product. This focus provides the understanding of the basic characteristic of each term. When producing byproducts, manufacturers think and act as to what is best for their company or business. Examples of a byproduct focus are as follows:

- 1) How much wet grains and condensed solubles do I need to use today to maintain my tank and bin levels?
- 2) Sell enough distillers grains to keep it out of the way of the plant’s operation.
- 3) Inventory is too costly to build.

When producing products, manufacturers first think about what is best for the customer. To make a product, the manufacturer has to understand the customer’s business. The manufacturer cannot ask the customer what is needed because many times the customer does not know what is possible to achieve. The manufacturer then must develop something of value for the customer. The manufacturer develops the processes necessary to create and deliver the value to the customer and, hopefully reaps the associated rewards. The collection of thoughts and actions throughout the process are fundamentally focused on the customer. Products are not necessarily superior to byproducts in nutritional value; they are simply focused on different aspects. Some manufacturers use the term co-product. Their intention is to raise the awareness and importance of the byproduct. However, the primary focus within the company is still to focus on

the needs of the manufacturer. Today, there are very few examples of a distillers product. Most plants sell distillers grains as a byproduct. Their commitment is the primary factor preventing them from changing their focus.

The concept of marketing byproducts is essentially an oxymoron. Marketing is about customers and delivering value to the customers. This cannot be done with a byproduct. Merchants have a desire to deliver value to the customer, yet the very nature of byproduct leads to real conflicts. The most fundamental value drivers of quality and supply are often compromised. This is especially true given that supply of most distillers byproducts is due to the production of ethanol. Also, most manufacturers have little to no inventory from which to serve customers. Consequently, most byproducts are not marketed per se, but merchandised or traded like commodities.

The fundamental drivers behind successful merchandising are time and place, rather than net performance or service value. Literally, the material goes to the highest bidder at the moment. Typically, when we think of merchandising or trading, we think of commodities such as grain. Value is determined by time and place rather than net nutritional content. The concept of time and place coupled with the commonality of commodities gives rise to the fundamental of grain trading. Trading not only creates opportunities for the merchant to better his position, it is also a very efficient method of moving a commodity into its best-fit market. The fundamentals of trading may work well for grain, but for many byproducts, especially wet byproducts, they don't work well at all. Grain trading requires a fluid flow of a common substance. The characteristics of grain of a certain grade are essentially the same regardless of market. This is not true with byproducts. The characteristics of byproducts are very much plant dependent. While the byproducts may have the same name (distillers grains), the appearance, handling, and even energy content may vary greatly from plant to plant. Their substitution of like-kind byproducts may be difficult, misleading, and/or impossible. This results in causing enormous stress on the customer as well as the trader. It is not uncommon for the customer to feel as if the supplier is not really concerned about his business. Most manufacturers are concerned with meeting the needs and wants of customers, which creates a real dilemma with merchandising a byproduct. Due to the perishability of a wet feed, time is against the merchant selling a byproduct. Time interferes with the merchant's ability to trade and minimizes discussion about value resulting in a scenario of "sell it or smell it". Many trades are short-term deals to move the byproduct. In contrast, a product will usually be priced in a way to minimize short-term deals and focus on long-term pricing arrangements that are fair for both the customer and manufacturer.

For at least the last 10 years, the focus within milling plants has been to build plants as economically as possible. Inventory of feed ingredients has been viewed as an unnecessary expense – just sell it and get it out of the way. From a quality perspective, the question has been “what does it have to be” not “what should it be”. It is quite common for dry distillers grains to be difficult to handle because it will not flow from the railcar or trailer. Wet distillers grains are hot, sticky, and can mold quickly. Some handling problems could be dealt with at the manufacturing site by proper sizing of equipment, better drying technology, and cooling the product before shipping. But these changes are often viewed as unnecessary operational costs. Plants have breakdowns or planned shutdowns. Plants selling byproducts usually do not increase feed inventory before a shutdown to minimize the impact on the customer. Most manufacturers that are selling byproducts do not worry about inventory. This is simply the risk the customer must be willing to accept. If the customer is going to assume this risk, either he will pay a lower price for the byproduct, feed a lower inclusion of the byproduct, or both.

Variation

Most reference books and publications list one nutrient profile for all wet and dry distillers grains. Assuming one value for distillers grains is similar to assuming all grains (corn, sorghum, wheat, etc.) and all grain processing methods have the same nutrient profile. Each milling plant is different in the type or blends of grains it uses and the type of grain may vary throughout the year. Plants have different designs and capabilities. With a byproduct, it is the responsibility of the customer or his nutritionist to know and understand the nutrient profile and the variation of the nutrients for each plant’s byproduct. The manufacturer may supply average nutrient content, but it may have very limited information of the variation of its byproducts. On the other hand, manufacturers of products will collect data and show the variation of their products to the customers and their nutritional advisors.

What is variation? Nearly everything varies; our concern should be how much does each load deviate from the norm. With commodities, ‘dilution is the solution’ to dealing with variation. With byproducts, variation is a tool used by customers to negotiate a cheaper price while merchants attempt to downplay its effect on economic value. Two typical methods of dealing with variation in the manufacturing plant have been: 1) ignore it, or 2) make few measurements. In order to truly understand variation, every load must be sampled and analyzed.

Collecting a few samples minimizes the measurement, but not the variation. For example, 1000 loads of wet corn gluten feed were analyzed for dry matter and the data were summarized as follows:

- 1) 1 load sampled on the 15th of the month
- 2) 1 composite made from 40 loads (simulating 1 day's production)
- 3) 1 composite made for all loads shipped during the month
- 4) All loads analyzed individually

Table 1. Methods of demonstrating dry matter variation

Item	1 load per month	1 composite per 40 loads	1 composite per month	All loads
Average, %	43.8	43.8	43.5	43.8
Std. Dev.	0.90	1.14	1.72	2.04
Minimum, %	42.7	40.8	40.5	36.2
Maximum, %	45.7	46.3	46.4	51.2

Randomly selecting one sample per month or compositing samples (Table 1) reduced the estimate of variation (standard deviation) and masked high and low values compared with evaluating all samples. Reducing the number of loads sampled can provide the customer with a false sense of security in demonstrating reduced variation when the reduction never actually occurred. Variation can be reduced, if the manufacture decides to do so. In 2004, Sweet Bran[®], branded corn gluten feed product (60% dry matter), averaged 60.05 % dry matter with a standard deviation of .50. However, this consistent quality does not come without a price. The manufacturing facility must invest in equipment to mix ingredients, store ingredients, analyze ingredients and final product, and continually train personnel.

Dry matter is not the only component in distillers grains that varies. Variation in sulfur content of wet distillers grains is also very important. High sulfur content in feeds and water can result in central nervous system disorders resulting in death or chronic reductions in daily gain. Sulfur content of distillers grains should range from 0.4 to 0.5% (dry matter basis); however, samples have tested as high as 0.8 to 1.2% sulfur.

University studies generally try and remove variation in feed ingredients in order to detect significant differences in animal performance. Most universities will purchase all the feed they will need at the beginning of the research trial to reduce variation from load to load. Thus, university trials have evaluated feeds

under optimum conditions without outside interactions and disruptions. This does not mean that university results are not accurate; they are simply ideal comparisons to a control treatment.

Variation in product quality and supply erode the value of distillers grains. It is in the best interests of both the manufacturer and the customer to work together to reap the benefits of this energy feedstuff. Manufacturers need to work to reduce variation so the customer can experience its high energy content. On the other hand, customers must be willing to financially reward the manufacturer for his financial investment. Reducing variation can be a win-win situation for both parties or a lose-lose situation if they do not work together.

Paradigm Paralysis

We all have our biases concerning how ingredients should be fed. More often than not, our recommendations at the customer's operation will be conservative. When making ration changes, we do not want to take the risk of a poor decision reducing performance. This is especially important with dairy diets where an action today may affect performance for the next 300 days. However, conservative actions may result in less than optimum economic returns for the customers.

One of our paradigms in the feedlot is that byproducts inclusion should not exceed 20% of diet dry matter. The more variable the dry matter or nutrient content, the less byproduct that will be fed. Yet, in the university research high levels (30 to 40%) of ethanol byproducts have been shown to improve animal performance. It is extremely risky feeding a high level of a byproduct because the customer cannot rely on the consistency of the dry matter or nutrient content as well as he cannot rely on a consistent supply of the byproduct. Rations can be adjusted frequently, but there is a cost to making numerous ration changes. A product can be fed at higher ration inclusion levels because the manufacturer is focusing on the needs of the customer. High levels of a product have been fed to the dairy cow. Research with a wet corn-milling product replaced up to 70% of the dietary dry matter. This radical approach has challenged the paradigms of many dairy nutritionists.

In summary, the future of distillers grains is bright for those that understand the customer and are willing to make commitments to deliver value. The decision to focus on manufacturing a byproduct or a product is in the hands of the manufacturer. In addition, the future is bright for those willing to break

from tradition and combine sound nutrition science with the art of feeding livestock.

Implications

Distillers grains are an excellent feedstuff for ruminants. The focus by the manufacturer will determine its commitment to producing a high quality product or simply selling another byproduct. In turn, the customer must be willing to reward the investment made by the manufacturer to produce a high quality product or there will be no reason for making any changes. It truly can be a win-win situation.

Literature Cited

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