

IN THIS ISSUE:

Nutrient Values Eliminate Guesswork
Consultant's Corner: A Nutrition Toolbox Essential
From the Maternity Pen: Five Key Transition Cow Factors
Happenings: Revamped Web site
Beyond Bypass: Feeding Micronutrients Could Accelerate Return to Fertility
Quality Corner: Bringing Ration Ingredient Savings to the Customer

Nutrient Values Eliminate Guesswork

In a tight dairy economy, locating and evaluating quality, affordable feedstuffs is paramount to the success of most dairies. But the "face value" of a commodity may not be its true value, depending on the specific nutritional needs of a given dairy, and the price and availability of other commodities that also could provide those nutrients.

 West Central

Patrick French, PhD, Technical Support Nutritionist for The Old Mill-Troy, Inc., North Troy, Vt., has developed his own method of evaluating the value of feedstuffs, taking both cost and available nutrient content into account. French says his Excel[®] spreadsheet-based method is more precise and comprehensive than the long-used Peterson method — which only evaluates for total digestible nutrients and crude protein — but highly user-friendly and efficient for nutritionists evaluating commodities on a day-in, day-out basis.

“Dairy nutrition is no longer based on just corn and soybeans, and energy and protein,” says French. “Today, if we want to best serve our clients, we need to look at a much broader range of nutritional components, like amino acids, starch and soluble fiber, and balance for fractions of those elements. And to help our clients stay cost-competitive, we need to be on our toes, constantly evaluating a wide range of traditional and non-traditional feedstuffs to provide those nutrients.”

French calculates weekly predicted values for a set of ration components using regression analysis of retrospective weekly prices. In this calculation, he uses only the digestible fractions or metabolizable amounts of each feedstuff. The result is a percentage point value for each nutrient component. For example, a recent evaluation showed that starch was worth \$2.30 per percentage point, soluble fiber was \$5.76 per point, and effective neutral detergent fiber

(eNDF) was \$1.27 per point.

“Using these values, we can then identify what available feedstuffs are undervalued in the marketplace,” explains French. Figure 1 shows how the predicted value of corn gluten meal is calculated using nutrient values, with a net result of \$807 per ton delivered. “If the current market price is \$582 per ton, this is an extremely undervalued feedstuff, and a very good buy,” says French. Figure 2 shows recent examples of undervalued and overvalued feedstuffs, using a margin of error of \pm \$28/ton.

Nutrient values also can be used to benchmark ration costs to determine the general cost per pound of dry matter. “Indicators look as if a pound of dry matter will cost about 10 cents through 2010,” says French. “It should be possible to formulate most rations at a cost less than the benchmark value, if one uses undervalued ingredients.”

The system also works well for assessing the value of locally available and non-traditional feedstuffs that do not have national pricing references. “We simply perform a laboratory analysis of the nutritional composition of the commodity, run the summation of the multiplication of the compositional numbers by the nutrient values, and arrive at an estimated value of the feed.”

Calculations also can be done to find the least-cost sources of individual nutrition components, by comparing the product of the value of an individual nutrient times the concentration of that nutrient in individual feedstuffs, then weighing those results against the overall value and availability of those feedstuffs.

No matter how undervalued a commodity is, French cautions that it’s not a good buy if you don’t need it. “You might stumble across an extremely cheap buy on hominy,” he explains, “but if it’s protein you need and not carbohydrate, it’s still not a buy that makes sense.”

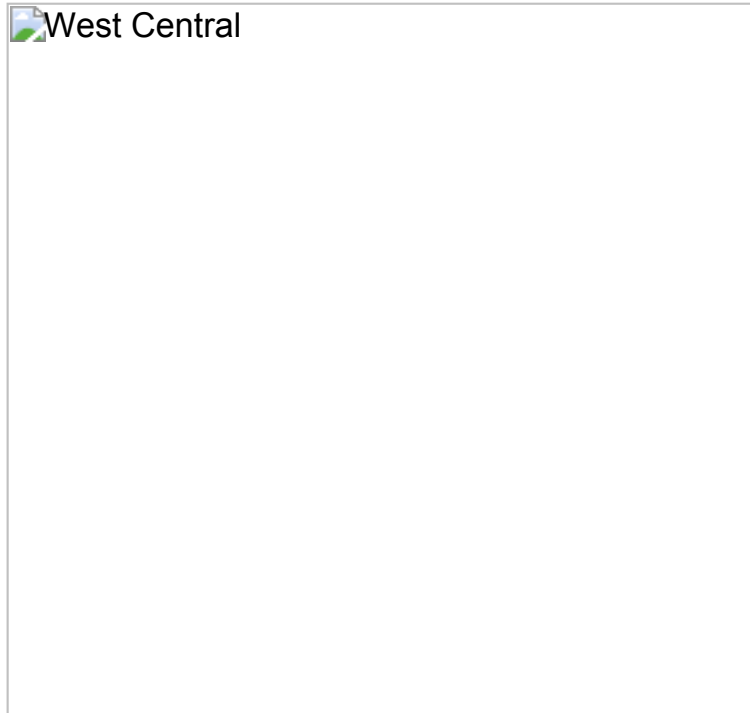
California nutritionist Mike DeGroot, PhD, has utilized nutrient values in his practice for more than a year, and is delighted with the accuracy and real-world applicability that they offer. “As an independent nutritionist, I need to constantly provide my clients with current feedstuff information, timely answers and well-balanced, least-cost rations,” he says. “This system has helped me achieve all of those objectives simultaneously.”

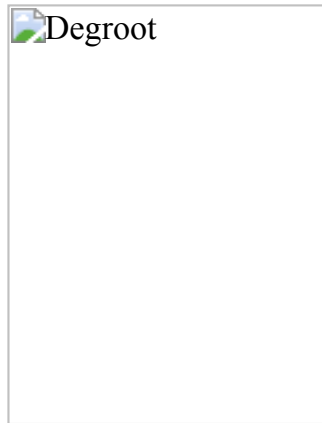
CONSULTANT'S CORNER

A Nutrition Toolbox Essential

By Mike Degroot, PhD, Degroot Dairy Consulting, Visalia, Calif.

I started using nutrient values from a custom, spreadsheet-based





system about a year ago. Dr. Patrick French was my major professor at Oregon State University, and he taught me a great deal about using Excel® and performing regression analysis to weigh the cost of feedstuffs against their nutrient content.

Although I use the same calculation methods as Dr. French, I've customized my spreadsheet to make it specific to the commodities to which we have access in the West. The set-up required a fairly significant time investment, but now that it is operational, I can plug in prices and obtain new nutrient values in just a few key strokes. I'm in touch with feed brokers and check commodity website postings regularly, so the spreadsheet is an extremely handy tool to determine good buys on ever-changing commodities.

The system also helps me identify the most cost-effective feedstuff if I am looking to satisfy a specific nutrient requirement for a dairy, such as fat, protein or carbohydrates. Often a commodity that looks inexpensive at first glance may actually be too costly to a dairy, either because we need to add a large quantity to the ration to satisfy nutritional requirements, or because nutrients are not taken into full consideration and are slighted in the ration, leading to long-term production and herd-health losses. By utilizing nutrient values, we know right where we're at — in terms of price and nutrient content — for every feedstuff at any given time.

One of the side effects of our recent, depressed dairy market is that herds have had to make ration changes a lot more frequently than I would like to see. But by being able to quickly ascertain nutrient values, I've been able to help my clients keep their ration contents consistent and ensure that their cows are still getting what they need, while also helping producers determine whether a "bargain" feedstuff truly is a bargain. For example, canola prices have been coming down quite a bit lately, while cottonseed is still fairly high. By running nutrient value calculations, I can help my clients determine whether they can "afford," nutritionally, to switch out of cottonseed and into less-expensive canola.

Whether milk is \$15/CWT or \$11/CWT, I have to help my clients make decisions that will maximize their feed dollars without sacrificing animal health and performance. My business is only as successful as theirs, so any tool I can use to ultimately help them improve their bottom line is of interest to me. Using the nutrient value system has helped me make faster, better-informed decisions that ultimately help my customers succeed.

FROM THE MATERNITY PEN

Five Key Transition Cow Factors

The Transition Cow Index® (TCITM) helps dairy herd managers and their advisors evaluate how they are doing in their management of transition cows, compared to other herds. But the system also creates a large pool of data from many herds, which can be used to evaluate management practices and trends at the macro level.

TCI, developed by Dr. Ken Nordlund of the University of Wisconsin School of Veterinary Medicine, Madison, Wis., utilizes 14 factors from the historical DHIA record of each individual cow, to predict:

- Milk yield at first test date.
- 305-day milk yield (without a herd production effect).

To help draw management conclusions from TCI data, Nordlund and his colleagues surveyed

50 Wisconsin free stall herds. The study included an equivalent number of herds from a range of TCI scores, and queried a wide range of management practices, housing characteristics and animal evaluations. When results of the management survey were compared with TCI scores, five key factors in transition-cow management emerged:

- Providing adequate bunk space of approximately 30 inches per Holstein cow in both the pre-fresh and fresh-cow pens.
- Minimizing pen moves and social stress in the prepartum period, particularly during the 10 days prior to calving.
- Increasing cow comfort through the transition period with amply sized stalls (targeting 50+ inches of width and 9+ inches of feet of length for mature Holstein cows).
- Providing sand resting surfaces (only sand or mattress surfaces were evaluated; any loose, deep bedding would be expected to be equivalent to sand).
- Using an efficient and effective screening process to identify cows needing medical attention or nursing care.

[Read more details](#) about each of the five factors.

HAPPENINGS

A revamped West Central website was recently launched. The newly designed www.west-central.com now features complete team bios and up-to-date blog articles from each department.

Also featured on the new site are CBOT soybean meal bids. These can be found with the grain and market bids, under the grain tab.

BEYOND BYPASS

Feeding Micronutrients Could Accelerate Return to Fertility

Catering to the liver may be the key to overcoming postpartum negative energy balance and restoring dairy cow fertility, says Matt Lucy, PhD, Professor of Animal Science at the University of Missouri-Columbia.

Lucy says the energy demands of early lactation often outstrip the cow's ability to consume adequate nutrition to meet them, leading to adipose tissue mobilization and elevated blood nonesterified fatty acid (NEFA) concentrations. This process causes an uncoupling of the somatotropic axis [growth hormone (GH), liver growth hormone receptor (GHR) and insulin-like growth factor-I (IGF-I)], which controls many aspects of growth, lactation, body condition and reproduction in dairy cattle.

"During negative energy balance, GH concentrations are increased, but IGF-I concentrations are decreased," explains Lucy. "This causes the cow to enter a catabolic state, and can lead to accumulated triglycerides in the liver (fatty liver), ketosis, and an interruption in the normal hepatic mechanisms for nutrient partitioning during early lactation."

Taking steps to restore liver health should accelerate recoupling of the somatotropic axis and improve reproductive health and fertility, Lucy theorizes. He says one way to positively influence fertility is to provide specific nutrients that are designed to impact the cow's endocrine system, such as feeding hyperinsulinemic diets or supplementing with propylene glycol. Such

methods cause blood glucose, insulin and IGF-I to strategically increase, potentially improving fertility because the cow is “tricked” into thinking she has changed to an anabolic state.

A true recoupling of the somatotrophic axis could be induced by feeding supplemental, rumen-protected choline. This micronutrient is involved in the synthesis of very low-density lipoprotein (VLDL). Lucy says increased VLDL production may decrease blood NEFA concentrations and reduce liver triglyceride accumulation. “A limited number of studies have shown that choline supplementation pre- and postpartum has positively impacted liver health, milk yield, subclinical ketosis incidence, plasma glucose levels and body condition,” says Lucy. “While more research is needed for confirmation, it appears that enhancing dairy cow diets with rumen-protected choline could influence the factors that support restored postpartum fertility.”

QUALITY CORNER

Bringing Ration Ingredient Savings to the Customer

Nutritionists can use tools like those described by Dr. French and Dr. DeGroot to bring the value home to the dairyman by making full consideration of all the nutrient contributions of a “value” ingredient. As a perhaps over-simplified example, if a particular ingredient is purchased with the primary focus being on its contribution of protein and energy, but the formulation of the complete diet fails to take into consideration the substantial phosphorus contribution of that ingredient, then some supplemental phosphorus from a more expensive source may be fed when it is not even needed. Thus, two opportunities to bring savings to the dairyman are not realized; one by not taking full advantage of the cheaper source of phosphorus, and another by overfeeding phosphorus.

As I work with nutritionists around the country, I see a couple of different approaches to using the various nutrition models or ration balancing programs. One is to utilize an “optimization” or “least cost” feature to develop the ration. In situations like this, we need to make sure that the program has opportunity to capture the value that comes with the nutrient content of each ingredient. We can do this by opening up mixes of ingredients that have been “bundled” together for use as a single ingredient. Sure, it may mean re-formulating that mineral package or base supplement that you worked so hard to put together, but that’s how the savings from that good ingredient purchase are maximized and brought home to the dairy.

The other approach that I see is the use of the nutrition model simply as a summarization tool to calculate the nutrient contributions from all ingredients that the nutritionist has specified as constituting the ration. There is certainly nothing wrong with this, but just as when using an optimization feature, nutrient constraints, particularly some maximums, need to be scrutinized carefully. In either case, it is important to pay attention to the desired amounts of each nutrient in the diet, and avoid overfeeding of anything that does not yield an economic return over its cost. Failing to employ this simple concept is kind of like going to Sam’s Club and buying the 50 pound bag of mixed nuts, but only eating the cashews. If all the rest is wasted, maybe it wasn’t such a good buy in the first place.



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