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DAIRY PIPELINE

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"With today's high feed costs, producers need to ensure that they receive what they expect."

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Are All By-Products Created Equal?

With the rising prices of corn and soybean meal, dairy producers are looking towards less expensive by-products in order to provide protein, energy, starch, sugars, fat and minerals in their dairy cattle rations. Common by-products include brewer's grains, distiller's grains, citrus pulp, hominy feed and yes, soybean meal. Soybean meal is the by-product created from the crushing of soybeans to extract the oil. There are a variety of venues through which a dairy producer can purchase these feeds. Although these feeds are low cost, producers should understand that they can vary considerably in nutrient content.

As a part of an intensive feed management project conducted in Virginia since 2006, feed samples from eight dairy farms were obtained on a monthly basis. The objective of this field trial was to determine if the use of feed management software would enable farms to feed their herds more accurately thereby enabling them to reduce overfeeding and improve whole farm nutrient balance. It is well known that forages vary considerably in dry matter, protein and phosphorus content and forage testing is commonly practiced on most progressive dairies. However, most producers and many nutritionists don't realize that by-product feeds can also vary quite a bit. Average dry matter, crude protein and phosphorus content of the major commodity by-product feeds are shown below in Tables 1 and 2, respectively. (Variation is represented by the standard error bars.) Most of these by-product feeds are relatively dry with little variation. However, note the large standard errors for several feeds. For wet brewers grains the average protein is close to the reference values shown in the NRC – Nutrient Requirements of Dairy Cattle of 28% crude protein. However, samples in this study tested as high as 36% protein. Dried distillers grains, a plentiful by-product of the ethanol industry, varied between 26% and 35% protein as compared to the "reference value" of 30% protein. It's often assumed that soybean meal contains 54% protein. However, samples from this study ranged from 49% to 56% protein.

Phosphorus is of considerable importance in nutrient management programs for dairies. Variation was exceptionally high for several feeds commonly used in dairy rations. Pay special attention to distillers grains, corn gluten feed and hominy. "Reference values" for these feeds as listed in the NRC are listed as 0.75% for distillers, 1.1% for corn gluten feed and 0 .5% for hominy. Variation in nutrient content impacts dairy cattle nutrition and nutrient management in several ways:

►Average values are assumed for by-product feeds when balancing rations if analytical values are not available. In order to account for this variation, it's not uncommon to include a "safety factor" and overfeed protein along with

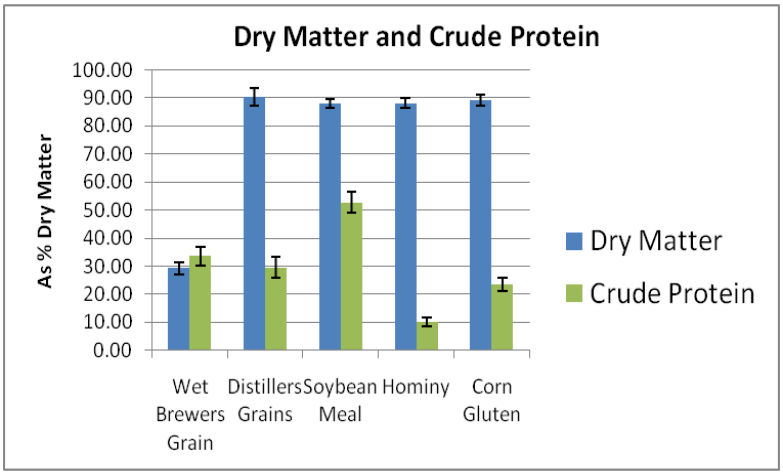

Table 1.

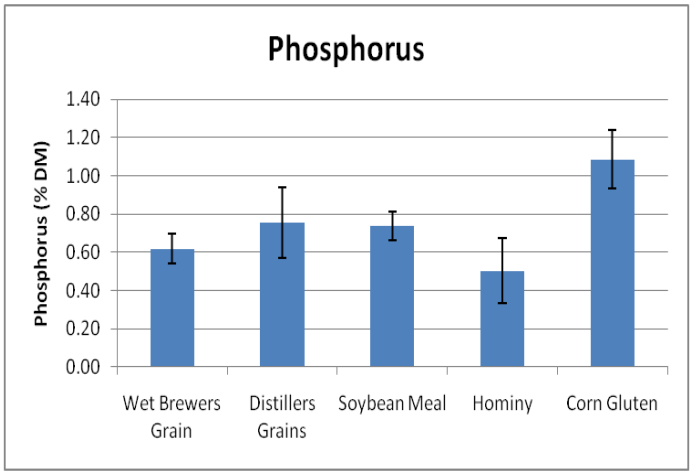

Table 2.

(Continued on page 2...)

Upcoming Activities

May 23—9th Annual Hokie Cow Classic Golf Tournament, contact Dr. Katherine Knowlton at knowlton@vt.edu or 540-231-4769 for details.

If you are a person with a disability and require any auxiliary aids, services or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

some minerals, notably phosphorus. Excess nitrogen and phosphorus are excreted in urine and manure, thus creating an environmental overload on the farm.

►When nutrient content is less than expected, dairy producers don't get what they pay for. One producer in our study received a "deficiency payment" from the supplier when soybean meal failed to meet minimum specifications.

The "take home" message from this work is that when by-products are purchased in large quantities, have them analyzed and ask that a minimum level is specified for dry matter content and protein. Most analyses will cost less than $40 including shipping. This is a small price to pay for quality control when considering that the value of the feed involved will exceed thousands of dollars. With today's high feed costs, producers need to ensure that they receive what they expect. Nutrient analysis also allows the nutritionist to formulate rations more accurately. Finally, more accurate rations allow dairy producers to reduce overfeeding of nutrients and become better stewards of our environment.

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Fiber, Starch, and Sugars are Carbohydrates that Supply Energy

In lactating dairy cow rations, carbohydrates compose about two thirds of the dry matter. Fiber (NDF = neutral detergent fiber) is the most abundant carbohydrate coming from the forage and other sources such as by-product feeds. Digestion of fiber, however, is usually lower than starch and sugars and as a result the energy value is less. There are some corn silage varieties that have higher fiber digestibilities and thus greater energy values. In addition soybean hulls, corn gluten feed, brewers grains, and distillers grains are good sources of digestible fiber.

The non-fiber carbohydrates (NFC) can be calculated by the equation: 100 – ((NDF – NDF protein) + crude protein + fat + minerals). In other words it is not NDF (corrected for protein content), crude protein, fat, or mineral. Another way to express is NFC = starch + sugar + soluble fiber. This soluble fiber does not appear in the NDF analysis and is not usually reported on feed test reports unlike starch and sugar. Soluble fiber is composed of beta-glucans, galactans, and pectin, is readily digestible and is an energy source. Digestion in the rumen yields more acetic acid rather than the propionic or lactic acids typical of starch and sugar digestion and is considered less of a risk for acidosis. Two feeds having relatively high levels of soluble fiber are citrus pulp (34% soluble fiber) and beet pulp (21%) according to the Degussa AminoCow Feed Program. Other feeds having some soluble fiber are soybean meal (10%), soybean hulls (10%), corn silage (10%), barley silage (8%), and brewers grains (8%). When reducing starch because of high corn prices it may be feasible to increase the level of soluble fiber but it should usually be limited to 8% of ration dry matter. Starch in dairy rations will typically be 20% or above and sugars less than 5% of the total dry matter. A ration containing 25% starch, 4% sugar, and 8% soluble fiber would have an NFC of 37%. Most rations have less than 40% NFC and more than this might put cows at risk of rumen acidosis.

In a recent analysis by Dr. Pat French of The Old Mill Troy, Inc. in Pennsylvania (personal communication March 2011) using Mid-Atlantic feed prices, barley (starch), citrus pulp (soluble fiber and sugar), soybean hulls (soluble fiber and digestible insoluble fiber), and molasses (sugar) were economical sources of carbohydrates. Before using, however, they should be figured into your feeding program along with your home-grown feeds and actual savings calculated using current prices. That is the only way to know if a feed fits and can reduce ration cost while supplying a needed component of the diet. In conclusion, soluble fiber, digestible insoluble fiber, and sugars have the potential to replace some expensive starch (corn) in the ration but avoid excessive amounts of each as well as total NFC.

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For more information on Dairy Extension or to learn about current programs, visit us at VT Dairy —Home of the Dairy Extension Program on the web at: www.vtdairy.dasc.vt.edu.

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