Bulk Tank to Track, DHIA Testing to React

Cows "talk" to us every day about our success in building their rations and managing their feeding programs. Pounds of milk produced per cow measured from the bulk tank are the most basic and common measures used. Bulk tank results for fat and protein percent, as well as milk urea nitrogen, are available for each tank of milk, and can usually be accessed within a couple of days after being picked up at the farm. These test results and how they change from tank to tank can help us evaluate one of the key aspects of cow performance and herd profitability. Bulk tank sampling, while cheaper and easier than individual cow sampling, can be used for frequent analysis of changes taking place in the herd. That being said, one very important deficiency in using only bulk milk analysis is that we are left with knowledge of a problem, but little to no direction for solving it.

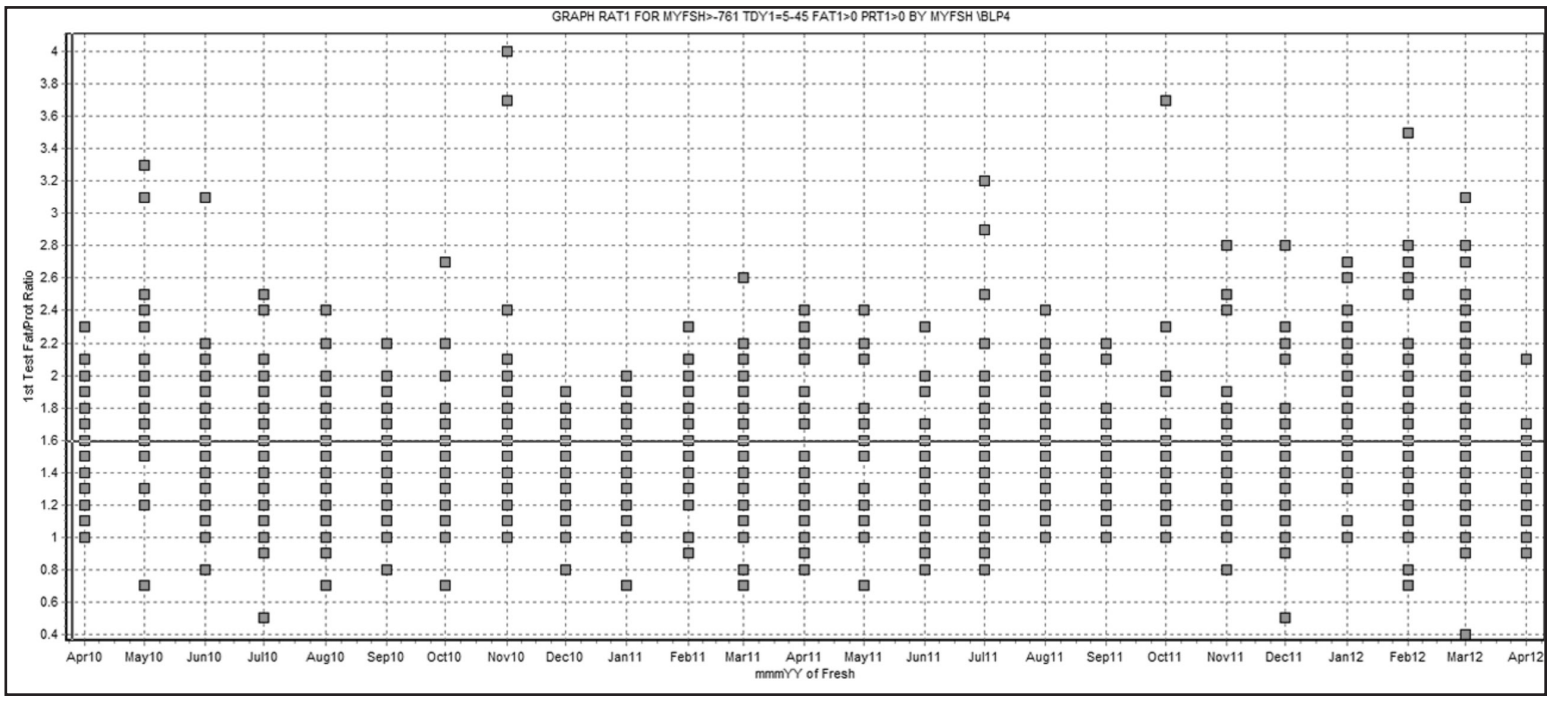

Figure 1: FIRST TEST %F: %P for Past 24 Months. This graph from Dairy Comp 305 shows a line drawn at a ratio of 1.5 (fat: protein), and each dot is the first test (5-45 DIM) of each cow fresh over a 2-year timespan. Notice the growing number of cows on the right side of the graph that are over 1.5: these are the most recently fresh cows, and far more than 40% are over 1.5.

More specific information, all the way down to the cow level, is available for herds on a regular DHIA testing program. These results, although primarily used by the nutritionist serving the farm, should be looked at on a regular basis as new results come in. Three components commonly used to judge our proficiency in dairy nutrition are percent fat, percent protein and milk urea nitrogen (MUN).

Milk fat and protein percentages, as well as percent fat to percent protein ratio, reflect ration nutrient content, rumen microbial output, and dry matter intake. Guidelines and differences by breed are shown in Table 1. It is interesting to note the consistency in the fat to protein ratio of all the breeds, even when normal fat and protein levels vary so much. Component variation within breeds is about 55% genetic, and the remaining 45% is largely controlled by how we manage cows. The variation in fat and protein percent from tank to tank and from test day to test day helps us evaluate that 45% that is largely influenced by our management.

Relying solely on bulk tank component results to evaluate herd performance may not provide enough information to make the best possible management decisions. Similarly, looking only at herd averages on test day information can be misleading and often sends the wrong signal about how the herd may be doing. For instance, newly fresh cows may not have enough influence on the bulk tank or herd average butterfat to indicate something has changed, and we can experience a great deal of lag time before a real problem is recognized. We overcome a problem like this by using test day data where we can look at the herd by a specific management group.

Table 1. Average fat and protein content of milk produced by different breeds.

Breed	% Fat	% Protein	F:P[1]
Ayrshire	3.86	3.18	1.21
Brown Swiss	4.04	3.38	1.20
Guernsey	4.51	3.37	1.34
Holstein	3.65	3.06	1.19
Jersey	4.60	3.59	1.28

Source: USDA-AIPL summary of herds on DHI test during 2004.
[1]Ratio of fat to protein.

Table 1: Breed Averages For Fat and Protein

One place where we can look to see this kind of breakout is the Herd Summary 202. This report is used extensively to look at herds just beyond test day or rolling herd average. We have the oppotunity to look at cows by parity, as well as days in milk, on the Stage of Lactation Profile section (Table 2).

Looking at milk components and their relationship to each other can give us important clues about the performance of the herd. We commonly use fat and protein inversions (%fat less than %protein) in diagnosing poor rumen function. We also know that milk fat to milk protein ratios as referenced earlier may also have value in diagnosing of subclinical ketosis in early lactation cows. This is true because subclinical ketosis typically causes both an increase in milk fat percentage and a decrease in milk protein percentage. If more than 40% of cows at first DHIA test (1-40 days in milk) have a fat to protein ratio greater than or equal to 1.5, the herd may have an elevated level of subclinical ketosis (Figure 1).

MUN as Another Management Tool

MUN reflects the level and type of protein, carbohydrate balance and overall rumen health. Bulk tank MUN should range between 8 and 12 mg/dl. If bulk tank MUN changes by 2 or more points, a ration change may have occurred,

Stage Of Lactation Profile

			Stage of Lactation (Days)					
			1 - 40	41 - 100	101 - 199	200 - 305	306 +	Total or Average
Number Milking	1st Lact		28	41	85	59	56	269
	2nd Lact		14	31	51	41	30	167
	3+ Lacts		15	18	64	64	39	200
	All Lacts		57	90	200	164	125	636
Average Daily Milk	1st Lact		44	68	78	75	62	69
	2nd Lact		83	106	99	81	59	87
	3+ Lacts		93	109	114	92	67	96
	All Lacts		66	89	95	83	63	82
% Fat & Pro	1st Lact	% Fat	4.1	3.8	3.4	3.6	3.8	3.7
		% Pro	3.1	2.8	2.9	3.1	3.3	3.0
	2nd Lact	% Fat	3.8	3.5	3.9	3.3	3.9	3.7
		% Pro	2.9	2.7	3.0	3.1	3.5	3.1
	3+ Lacts	% Fat	3.9	3.7	3.8	3.7	4.1	3.8
		% Pro	2.9	2.8	2.8	3.1	3.4	3.0
	All Lacts	% Fat	4.0	3.7	3.7	3.6	3.9	3.7
		% Pro	3.0	2.8	2.9	3.1	3.4	3.0

Table 2: Stage of Lactation Profile

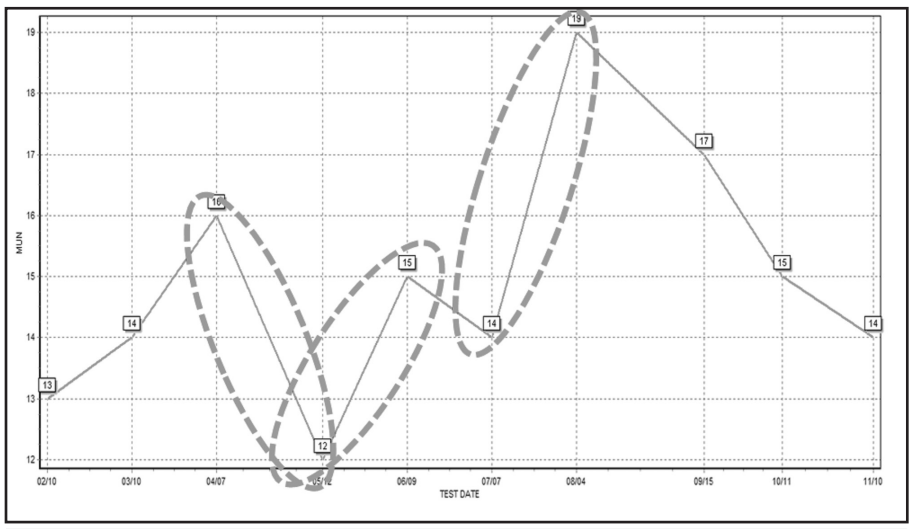

Figure 2: Milk Urea Nitrogen Herd Average Past 12 Months

and reasons for this change need to be investigated. One problem we experience using bulk tank MUN is the influence of higher-producing cows being greater than other cows. DHI testing of all individual cows overcomes this problem by treating all cows' MUN equally in pen and herd summaries. This is better information since we aim to feed all of our cows correctly, not just the average cow.

This graph of herd average MUN over time (Figure 2) indicates there were three 30-day periods where the MUN changed by more than 2 points, indicating that significant ration changes occurred. Tracking the bulk tank MUN may actually show changes in a shorter period than the 30-day test day interval. Either way, significant opportunities could be realized by making adjustments as changing MUN indicates.

Bulk tank analysis can tell us about the consistency in feeding management and may identify opportunities if performance indicators were to change. However, bulk tank analysis lacks target information and is likely to be slow in pointing out that specific parts of the herd are changing. Butterfat, protein, and MUN from each bulk tank should be monitored for unexpected changes so we can take appropriate corrective action. But when we decide to make a management change, it is better to use test day data to know the right place to start. Having access to the most complete, comprehensive information will result in the best management decisions.