



Why are my DHI test and milk pay

It has been proven time and time again; you cannot compare apples and oranges. Yet, that is exactly what we are trying to do when we compare component results from DHI tests and milk processors. It is normal for the differences between the two results to vary as much as $\pm 0.2\%$ to 0.3% on a monthly basis for fat. The bottom line is that both of these test results are most likely accurate, yet the milk that is sampled is very different. It is important to remember that these are just samples estimating the milk fat and protein yield in the milk volume measured. While the percentages of nutrients in milk are easy to measure, it is ultimately the yield of each component that is the basis for milk payments to the dairy. Using DHI component test results can help dairy producers manage their herds and make decisions that may positively influence the results of milk processor component results.

What are you sampling?

When you look at a DHI herd summary and see the herd average for each component, producers are actually looking at the result of many calculations. The DHI milk fat and protein percentages reported start with calculating the amount of fat (or protein) produced for each cow. From there, the total amount of fat (or protein) is divided by the total pounds of milk produced on test day to provide the average component percentage. In a similar fashion, the herd average SCC is a weighted average of all cows on test, rounded to the nearest 1,000.

In addition, if dairy producers sample one of the two (or three) milkings, the lab results are converted to a 24-hour sample based on milking frequency and time(s) reported to the DHI field technician. The DHI test day average for each component is a true average of every cow on test in the herd – including cows with both saleable milk and cows with milk used on the dairy or discarded.

On the other hand, the milk samples taken for analysis by the milk processor only include saleable milk that was part of that specific pickup. Bulk tank/tanker samples may not represent the entire 24-hour milk production for the herd. Each herd is different with respect to milk market-

ing – some herds have multiple pickups per day, whereas other herds may only have milk pickups every other day. The composition of each pickup will vary on several factors.

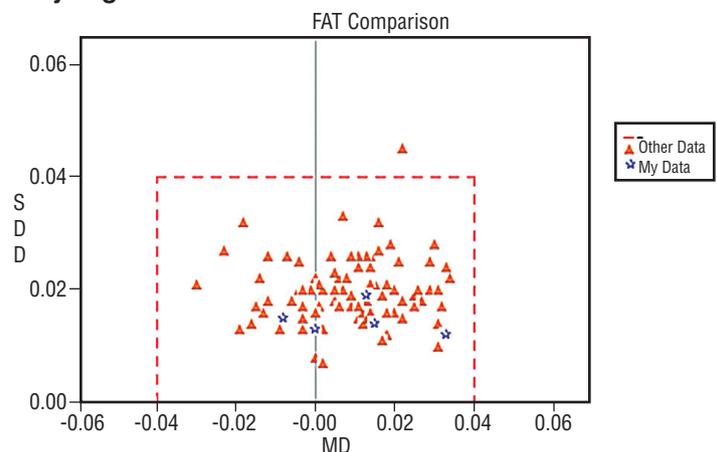
In herds with multiple milk pickups, there will be different strings of cows represented in each load. As strings tend to be built on lactation number, reproductive status and/or stage of lactation, it would be expected that the average composition of the milk produced by each string would vary. On the smaller side of the spectrum, herds with every-other-day milk shipments are more sensitive to individual cow events, such as freshening, dry-offs and milk withholding times. The smaller the herd, the larger the impact each cow has on bulk tank milk composition. While milk protein tends not to vary from milking to milking, fat may vary by as much as $\pm 0.6\%$. Herd management factors, such as feeding times, milking schedules and routine management events, contribute to this variation in milk fat content. The same variation can be seen in SCC content from milking to milking.

How accurate are DHI results?

Choosing a certified DHI laboratory is your assurance that you will receive accurate and reliable component results on each cow tested. Each certified DHI lab voluntarily participates in a monthly quality control process and must demonstrate accurate results with low variance. **Figure 1** illustrates all instruments (within certified DHI laboratories) that analyze milk fat. All participat-

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Figure 1. Performance of certified DHIA laboratories analyzing milk fat



ment component results different?

ing laboratories, including those with more than one instrument analyzing milk samples (as in the chart), must fall “within the box,” providing results $\pm 0.04\%$ on both milk fat and protein. For SCC, DHI laboratories operate within 10% tolerance. If a laboratory falls outside these tolerances, National DHIA, through its subsidiary Quality Certification Services, works with the laboratory to identify and correct any issues. While DHI-certified labs pride themselves on accurate results, collecting a quality sample is really the key to getting information on each cow for making management decisions.

As with forage testing, the key to accurate results starts with collecting a representative milk sample – both on DHI test day and by the milk hauler. DHI field technicians receive training in proper sample collection and handling prior to conducting herd tests. Whether it is the DHI technician or dairy producer conducting an unsupervised test (formerly known as Owner-Sampler), there are a few key points to remember.

First, adequate mixing is paramount to obtaining a representative milk sample. Minnesota DHIA technicians evaluated the composition of milk over time during milking. **Table 1** clearly illustrates that the first third of the milk leaving the udder was the lowest in fat and SCC content, and the highest in MUN content. Furthermore, the last milk leaving the udder was the highest in fat and SCC. To ensure that we are measuring the composition of the entire quantity of milk produced by the cow, all milk must be sampled.

Meter manufacturers recommend at least 5 seconds of mixing in the flask prior to obtaining the sample. As milk in the meter cools down quickly, it is recommended that this mixing time be doubled in cold milking parlors/barns. If a sample is undermixed, the resulting milk sample will be lower in milk fat content. If you are using a meter that has an interchangeable flask that pulls out, this milk should be inverted at least

Table 1. Distribution of components over milking time
(Courtesy of Minnesota DHIA)

Cow with 45 pounds of milk (milking approximately 90 pounds daily)

	Milk fat (%)	MUN (mg/dl)	SCC
Last 11 pounds milk	6.03	14	722,000
Middle 19 pounds milk	3.63	15	252,000
First 15 pounds milk	1.65	21	188,000

twice before placing it in the sample vial. For those dairies using on-farm electronic meters, it should be noted that using the manufacturer’s sampler designed for use with the meter is important, as well. This combination of meter and sampler, known as a coupled system, has been tested to give proper sampling of milk for laboratory analysis. There is no research to ensure accurate results using a sampler from a different manufacturer or from a third-party vendor (known as uncoupled systems). These uncoupled systems can provide milk samples to test for antibiotic residue, ELISA for Johne’s disease, milk culturing or even spot SCC checks, but cannot be used for DHI component testing.

In addition to mixing, proper sample collection and handling is also important. Immediately after mixing, sample vials should be filled, capped and inverted to mix with the preservative. It is recommended that sample vials be filled no more than 80% full. Overfilling sample vials may result in fat being lost in the cap, which is removed after reheating in the lab. As with undermixed samples, overfilled sample vials may also contribute to lower milk fat content in DHI samples.

Other sources of variation

As mentioned earlier, the two main sources of variation between DHI and bulk tank component tests are the cows or groups of cows being measured and the collection of samples. While one does not expect these two tests to be identical, a dairy observing major differences ($>0.5\%$) between the two results

should investigate other potential sources of variation. Improper milk cooling may contribute to a large difference between DHI and payment samples. Both excessive agitation and insufficient volume of milk in the tank when cooling begins may contribute to lower butterfat content in the payment samples. Other areas to review with your management team include ration changes, feeding times, weather changes, group/string changes, seasonality and routine on-farm management practices that may affect dry matter intake, milk production and milk composition. Each of these external factors has the ability to influence DHI and payment results on a daily basis.

The bottom line

Both DHI and payment laboratories provide consistent and accurate results for dairy producers. However, these results will not be identical every month. DHI results, both for individual cows and groups/strings of cows, provide essential management information for the dairy management team in many areas. Evaluating ration/diet changes with respect to milk production and composition, identification of high SCC cows to treat or remove from the saleable milk, or concentrating on the economics of the production cost of milk solids are just a few examples of the potential impact that using DHI results may have on bulk tank composition and potential dairy profitability. Large differences between the two sample results should be reviewed, but with proper milk handling and sample collection procedures, it is likely that both results are accurate.