Butterfat Variations

With the advent of more frequent bulk tank component testing, questions arise concerning changes in day to day butterfat tests. Often this leads to finger pointing at improper sampling techniques or worse yet mistrust between the dairy farmer and the handler of their milk. So, we ask the question "what should we expect from component testing each bulk tank?"

Dairy producers often only view Bulk Tank variations as short-term differences between % butterfat. Variation can be used as a measure of "Quality, Compliance, and Consistency" in management.

Believe it or not, daily fat measurements may vary as much as +/- .5%. Knowing this as well as sources of this variation can help dairies find opportunities when fat tests tell them that management may have faltered or at least changed. It is common for producers to ignore this use of variation and simply state, "But nothing has changed".

Many things can change on a daily basis that will impact fat test. These include:

1. Different cows going into the tank is one very normal occurrence on dairies. Fresh cows with typically higher fat test enter the tank while cows dried off, sold, or withheld because of treatments all contribute to differences in the bulk tank fat variation.

2. Milking management can have a large impact on tank analysis especially when tanks are filled with only one or two milkings. Regular milk harvest crews may perform differently than relief crews. One of the more noticeable differences in fat test may happen from one milking to another, especially when the time between those milkings are quite different. Milk from cows after a 14-hour period would be expected to be lower in % fat compared to the 10-hour period of the same day. Significant volume change per cow is inversely related to % fat. When volume is higher then % fat is normally lower and vice versa.

3. Sampling routines may also be a factor. Pick-up time as compared to when the milking finished will have some influence, especially if the number of milkings in the tank vary day to day. Of course agitation time needs special attention and tank recommendations should be posted and followed. A more subtle reason may even be that milk from the tank does not represent 24 hours of production and may be different each day.

4. Bulk tank performance itself can influence the fat tests. Look to see any indications of churning such as butter clumps. This will lower fat test results. Frozen milk on the sides of the tank can alter fat results as well as pose a threat to quality and cleaning procedures. Lastly, lines going into the tank as well as the tank itself must drain properly.

5. Milk volume or production changes have the best chance of causing fat variation. Milking time change, feeding changes, weather swings, water access, BST cycle, and activity changes all can cause more than expected variation. We often overlook the impact that heat synchronization, foot trimming, or vet procedures have on production and components.

We can use bulk tank daily fat variation as another tool to fine-tune our diary management. After we get past the physical and procedural problems that we have listed, we can concentrate on nutritional aspects that we have the most control over. Using bulk tank fat variation as a feeding management analysis tool requires that we use more than bulk tank fat test of the last 2 pick-ups. We need to look at a series of fat test results. The University of Minnesota has come up with a tool that applies standard deviation to determine if bulk tank variation is significant or not.

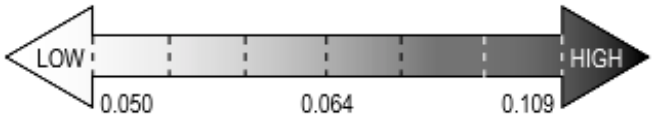
The tool works by collecting the last 20 days of bulk tank fat tests and calculating the difference each day from the previous test. First, list the 20 measurements as column A. Column B will start with the second result and fill until the 20th result will be compared to the 19th in column A. Column C will be the difference between A and B and will represent the difference in each consecutive day. This will give us 19 results that we can add together and average as the mean. This total is then divided by 1.13 and our variation will be that result.

Figure 1.

		Column A		Column B	Column C
	1		2		
	2		3		
	3		4		
	4		5		
	5		6		
	6		7		
	7		8		
	8		9		
	9		10		
	10		11		
	11		12		
	12		13		
	13		14		
	14		15		
	15		16		
	16		17		
	17		18		
	18		19		
	19		20		
AVERAGE					+1.13
		MEAN			VARIATION

You can then plot your variation as in Figure 2 and draw some conclusions from the butterfat variation calculated for your farm.

Figure 2. Bulk Tank Milk Fat



Day-to-day milk fat percent variation

Of course we would all like to see variation at the low end of the scale indicating we are probably following protocols netting the best possible performance from our herd. Being at the high end or of the chart would suggest that training, written procedures and management overhauls might be good for the dairy.

Figure 3.

	Column A		Column B	Column C
1	3.56	2	3.66	0.1
2	3.66	3	3.7	0.04
3	3.7	4	3.6	0.1
4	3.6	5	3.5	0.1
5	3.5	6	3.71	0.21
6	3.71	7	3.61	0.1
7	3.61	8	3.5	0.11
8	3.5	9	3.61	0.11
9	3.61	10	3.7	0.09
10	3.7	11	3.5	0.2
11	3.5	12	3.62	0.12
12	3.62	13	3.7	0.08
13	3.7	14	3.65	0.05
14	3.65	15	3.66	0.01
15	3.66	16	3.51	0.15
16	3.51	17	3.61	0.1
17	3.61	18	3.71	0.1
18	3.71	19	3.6	0.11
19	3.6	20	3.5	0.1
				0.092221705