FACT SHEET

L-864

FACTORS THAT AFFECT BUTTERFAT TESTS

J. W. Davis*

Butterfat test is an important factor in determining the price of milk. This is true even though consumer demand for low fat milk has increased in recent years. The dollars and cents influence of percent butterfat to a dairyman's income can be illustrated by a herd of 100 cows that average 40 pounds milk per cow per day. If the butterfat test on this herd dropped .1 percent and the "butterfat differential" was 7.5 cents per point, it would decrease the value of milk produced by the herd in the amount of $3 per day or $90 per month.

Experienced dairymen know that butterfat tests vary from milking to milking or from day to day. They also know that good feeding and good management help to maintain relative uniform milk yield and fat tests.

WHY BUTTERFAT TESTS VARY

Some of the factors that affect percent butterfat are:

Breed. The 1967-68 Southern Regional DHIA average percent by breed was: Ayrshire, 4 percent; Brown Swiss, 4 percent; Guernsey, 4.7 percent; Holstein, 3.6 percent; and Jersey, 5.0 percent. Individual cows within each breed may vary at greater limits than this.

Inheritance. Percent butterfat is a highly heritable trait. A cow's ancestors establish the ceiling of her ability to produce milk and fat. No amount of attention to feeding and management will change an inherently low-testing cow to a consistently high tester.

Stage of lactation. Butterfat tests are usually high soon after calving, but decline rapidly to the lowest point by the second to third month. Then they gradually increase toward the end of the lactation.

Condition at calving. A cow in good condition at calving produces higher testing milk than one that is thin.

Climatic temperature. A change of 10 degrees F. in the weather will cause a change of from .1 to .3 percent butterfat. Hot weather lowers test; cold weather increases test.

Season of calving. Cows that calve in the summer tend to test slightly lower (.03 to .06%) during the resulting lactation than cows that calve in the winter.

Age. As cows advance in age, percent butterfat declines slightly.

Feed. Low butterfat tests can result from feed changes that produce shifts in rumen metabolism. For example, a feed change that causes lower levels of acetic and butyric acids in the rumen and correspondingly higher levels of propionic acid will result in lower butterfat tests. Feeding practices commonly associated with lower fat tests are:

- Low fiber intake such as feeding less than 1 pound good hay equivalent per 100 pounds body weight or feeding extremely high-quality legume hay and no non-legume hay.
- Grazing lush spring pasture or grass that is high in moisture content.
- Feeding finely ground hay or feeding pellets made from hay chopped in less than 1/8-inch lengths.
- Pelleting concentrates that are high in starch such as ration mixtures containing over 50 percent corn or milo.
- Flaking or cooking the concentrate ration.
- High grain feeding where the concentrate portion of the "complete ration" mixture makes up over 60% of the dry matter in the mixture. Free-choice feeding of both grain and hay, offered separately, will result in many cows eating more than 60 percent grain.

Completeness of milking. Different portions of milk drawn from the udder vary widely in test. For example, the first few streams of milk test very low while the last few streams (strippings) may test seven or eight times as high. This makes complete milk let-down and a good job of milking extremely important.

Excitement and stress. Cows often respond adversely to strangers in the barn, strange sounds, mistreatment or change in persons doing the milking. Anything that interferes with complete milk let-down will reduce both milk flow and butterfat test.

Miscellaneous factors. Items such as disease, fever, heat periods, exercise and use of drugs have varying influence on butterfat tests. Mastitis tends to decrease test. Slight fever and low-grade ketosis

*Extension dairy specialist, Texas A&M University.

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tend to increase test. A cow's butterfat tests usually fluctuate during the heat period.

Herd variation. Herd tests do vary from month to month because of a combination of the above factors. Each month, cows are in a different stage of lactation. Fresh cows in high milk flow will have greater influence on herd test than stripper cows being turned dry because of the difference in volume of milk produced.

RECOMMENDATIONS

- Be regular, both in time and method of milking.
- Work gently and calmly.
- Practice all steps of managed milking to affect complete milk letdown and rapid, thorough removal of milk from cow udder.
- Provide 40 to 60 days dry period between lactations.
- Practice lead-feeding of grain for all cows 21 days before they are due to freshen.
- Breed cows to freshen every 12 to 13 months.
- Feed forage at the rate of 2½ to 3 pounds of hay equivalent to 100 pounds of body weight. When forage is scarce or expensive, feed at the rate of at least 1 pound of hay equivalent per 100 pounds of body weight.
- Do not feed finely ground hay or pelleted forages made from finely ground hay.
- Feed some hay or silage when cows are grazing on lush pastures.
- Do not feed pelleted rations that contain more than 50 percent starchy grains such as corn or milo.
- Provide adequate shade and water during warm weather.
- Work with your veterinarian to develop a practical disease preventive program for the herd.
- Do not market milk from cows showing signs of mastitis or other diseases.

TESTING MILK FOR BUTTERFAT

To test correctly, it is important that representative samples be obtained from cows, cans or tanks. Samples should be cooled to 35 to 45 degrees F. and kept from souring or churning. Testing methods commonly used for determining the butterfat content of milk are as follow:

Babcock Procedure for Determining Percent Butterfat

- Warm milk sample, 90 to 110 degrees F.
- Mix sample thoroughly by pouring from one clean container to another at least three times.
- Using a standard milk pipette, transfer 17.6 ml. of the well-mixed sample to a clean milk test bottle.
- Add 17.5 ml. sulfuric acid—same temperature as milk (70 to 75 degrees F.).
- Mix well with rotary motion until all traces of curd have disappeared.
- Place in centrifuge and whirl for 5 minutes full speed.
- Add water, 140 degrees F. or above, until bulb of test bottle is filled.
- Place in centrifuge and whirl for 2 minutes full speed.
- Add water, 140 degrees F. or above, until the butterfat column is well within the graduated portion of the neck of the test bottle.
- Place in centrifuge and whirl for 1 minute full speed.
- Place test bottle in water bath, 135-140 degrees F., and immerse to just above the level of the top of the fat column. Allow to stand for 5 minutes.
- Measure the fat column with dividers. Read from the bottom of the upper meniscus to the bottom of the lower meniscus.

TeSa Procedure for Determining Percent Butterfat

- Prepare TeSa reagent solution at least 6 hours before use.
- Mix sample thoroughly by pouring from one container to another at least three times.
- Pipette 17.6 ml. milk into side arm tube TeSa test bottle.
- Add 15 ml. of TeSa reagent solution. Mix at once with rotary motion to uniform color.
- Place in active boiling water for 10 minutes (15 minutes if milk preservative is used).
- Remove from water bath and add hot water until liquid fills lower bulb of test bottle.
- Go back over the tray and add more clean hot water to bring the top of the column to near the zero mark on the reading scale.
- Allow test bottles to stand at room temperature for 5 minutes.
- Using the sample tray, agitate samples with rotary motion and place in water bath (132-140 degrees F.) for 3 minutes.
- Read test from the bottom of the upper meniscus to the bottom of the lower meniscus.

Caution: TeSa test reagent solution should not be used more than 2 weeks after the solution is prepared. Milk test reagent containing alcohol should not be used more than 3 days after preparation.

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