

# VARIATIONS IN CREAM TESTS

A. C. RAGSDALE

The variations which occur in the percentage of fat in cream from farm separators is one of the most common causes of dissatisfaction among creamerymen and cream shipping patrons. When the cream is separated from the milk of the same cows, fed the same ration, and milked by the same men, it seems natural for the farmer to think that the percentage of fat or test of the cream should remain the same unless the cream or skimmilk screw is changed. When variations in the tests occur, he frequently concludes that it is due to inaccurate or careless testing. As a matter of fact, one should be more suspicious if the tests are uniform, as it is practically impossible to run a farm separator without some variation.

## CAUSES OF VARIATION

Some of the principal causes of the variations in the test of cream and skimmilk are:

1. The speed of the separator bowl,
2. The richness of the milk separated,
3. The temperature of the milk separated,
4. The condition of the milk separated,
5. The rate of the inflow of the milk into the separator bowl.
6. The steadiness of running, or vibration of the bowl,
7. The amount of skimmilk or water used to flush the bowl,
8. The cleanliness of the separator bowl, and
9. The adjustment of the cream or skimmilk screw.

**The Speed of the Separator Bowl.**—Changes in the speed of the bowl are undoubtedly the most common cause of variations in the test of the cream. As the speed of the separator is increased, the amount of cream is reduced and the percentage of fat increases. If the speed is reduced below normal, a larger quantity of cream is secured with a lower test. When a heavy cream is being skimmed, variations in the speed cause greater changes in the test than when a low testing cream is being skimmed. The lower the speed, below normal, the greater the loss of fat in the skimmilk. If a separator is adjusted to deliver a 40 per cent cream from a 5 per cent milk, a reduction in the speed to three-fourths normal may cause the fat test of the cream to drop as low as 30 per cent, and the loss of fat in the skimmilk may be increased from a normal of 0.02 or 0.03 to probably 0.15 per cent. The importance of turning the separator up to full speed is evident.

**The Richness of the Milk Separated.**—The percentage of fat in the cream is directly influenced by the percentage of fat in the milk separated. When all other conditions remain the same, the higher the test of the milk, the higher will be the test of the cream. (For a discussion of the factors affecting the percentage of fat in cow's milk the reader is referred to Missouri Experiment Station Bulletin 222). Thus, if a separator is set to produce a 40 per cent cream from 4 per cent milk, and the test of the milk drops to 3.5 per cent, a cream testing approximately 35 per cent fat would result. The amount of fat lost in the skimmilk is not affected by the richness of the milk separated.

**The Temperature of the Milk Separated.**—Milk should be separated when at a temperature of 90° to 95° Fahrenheit. If separated at a lower temperature, the test of the cream will be increased slightly and there will be a larger loss of fat in the skimmilk. This is because the milk and cream are more viscous at the lower temperatures, and it is harder to separate the fat from the milk; also the cream cannot pass out through the cream opening so fast. If the separator delivers a 40 per cent cream when a 5 per cent milk is separated at 90° F., the test of the cream will usually be increased to 41 or 42 per cent if the temperature of the milk being separated falls to 80° F. At lower temperatures the increase in the cream test and the loss of fat in the skimmilk is often very noticeable.

**The Condition of the Milk Separated.**—Dirty milk may clog the cream or skimmilk outlets decreasing the capacity and affecting the test. Sour cream clogs the machine and separation is less efficient. If the milk is reheated for separation, and while being heated is stirred vigorously, the natural fat globules are broken up into smaller ones and separation is less complete.

**The Rate of Inflow of the Milk Into the Separator Bowl.**—The rate of inflow into the separator bowl is ordinarily regulated by a float and does not vary to any great extent. However, if for any reason, the flow of the milk into the bowl is retarded the percentage of fat in the cream will tend to be slightly higher. We may get this higher test, if the supply can becomes nearly empty so that there is less pressure; if the milk is cold or has started to sour so that the viscosity of the milk is greater or if the faucet is partially closed. The loss of fat in the skimmilk is ordinarily not affected, but it may be slightly decreased. A variation of 2 or 3 per cent in the cream test due to these factors is not uncommon, and in extreme cases the variation may be much larger.

**The Steadiness of Running, or Vibration of the Bowl.**—Unless the separator is kept perfectly level and securely fastened to a solid foundation, vibrations of the bowl may occur. Worn spindle bearings and bushings, also, frequently cause the bowl to vibrate. The vibrations of the bowl cause imperfect separation with considerable loss of fat in the skimmilk. Under good conditions the loss of fat in the skimmilk should not exceed 0.03 per cent fat, but if the bowl is vibrating this loss may be increased to anywhere up to probably 0.15 per cent or even more.

**The Amount of Skimmilk or Water Used to Flush the Bowl.**—Unless the skimmilk or water used to flush the bowl is always measured, this may cause a reduced test of cream, depending upon the amount running into the cream. The most satisfactory plan in flushing the bowl is to add a definite amount of milk or water to the supply tank and allow it to gradually run into the machine. Where the quantity of cream separated is small, this factor may easily cause a variation of 2 or 3 per cent in the cream test.

**The Cleanliness of the Separator Bowl.**—The separator, as well as all utensils with which the milk comes in contact, should be thoroughly cleaned each time after being used. This may be done by first rinsing in cool or lukewarm water, and washing in hot water to which a good washing powder has been added, and then scalding with boiling water or sterilizing with live steam. If the bowl is not cleaned each time it is used, variations in the cream test and a loss of butterfat in the skimmilk usually result.

**The Adjustment of the Cream or Skimmilk Screw.**—The percentage of fat in the cream is readily regulated by adjusting the cream or skimmilk screw. This adjustment, however, is not ordinarily made frequently and variations in the cream test due to this cause are readily understood.

### **RICHNESS OF CREAM TO SEPARATE**

The farmer who is shipping cream or delivering it to a creamery should ordinarily skim the milk so that he has a cream testing about 35 to 40 per cent fat. Skimming a thick cream is beneficial to the farmer because he keeps more skimmilk on the farm, has less cream to cool, less labor and the transportation or hauling charges are less. The rich cream helps the buttermaker and the creamery, by giving a better quality of cream, which results in a better butter and means higher prices than if thin cream is received. The farmer receives first grade prices because high testing cream does not go off flavor as rapidly as thin cream.

### **TESTING MILK AND CREAM**

While the farmer selling cream should expect variations in the percentage of fat in the cream sold, he is also entitled to have his cream accurately and carefully tested by a man who thoroughly understands how it should be done, and who has the proper equipment for the test. In general, the operation of the cream test is the same as the whole-milk test but there are some modifications. The most important of these is that the cream sample must be weighed into the bottle instead of being measured. For a complete discussion of the testing of milk and cream and skimmilk, the reader is referred to Missouri Experiment Station Circular 119.

### **DELIVERING A GOOD QUALITY CREAM**

To produce a good cream on the farm the cream should be separated as quickly as possible after it is drawn. After separation, cool the cream either by setting the cans in cold water and stirring vigorously or by running the cream in a thin layer over a metal surface which is cooled by well or ice water. Cool to a temperature of 50°F. or lower and hold until delivered. Frequent delivery of cream will insure a higher quality product.

**The success of both the farmer and the creamery depends largely upon the quality of cream produced.**