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GUIDELINES FOR
FAT TEST VARIATIONS IN RAW MILK

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ABSTRACT

This guideline discusses many of the reasons for fat test variations in raw milk. It references methods for testing sample vials for leakage. It provides advice to haulers about proper and improper ways of taking samples; explains reasons for variations between DHIA and Handler butterfat tests. It explains to the producer the reasons for variations in tests and how to correct them.

PREFACE

The Quality Assurance Task Force first prepared this Guideline in April of 1979 with Donald F. George as Subcommittee Chairman assisted by Frank R. Balliet, Charles W. Johnson and William B. Hastings.

A second edition was published in June 1988 and was sponsored jointly by the Quality Assurance Task Force and the Plant Equipment and Procedures Task Force with Charles W. Johnson as Subcommittee Chairman. Mr. Johnson was Assistant to the Market Administrator, Federal Milk Market Administration, Order No. 1. Members of his Subcommittee were:

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FAT TEST VARIATIONS IN RAW MILK

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FAT TEST VARIATIONS IN RAW MILK

INTRODUCTION

In 1890, the Babcock test for determining butterfat content of milk was first introduced by Dr. Stephen M. Babcock of the University of Wisconsin. Because of its simplicity and relative low cost of operation, the Babcock test was readily accepted by the dairy industry in this country.

As the testing of producer milk samples moved from milk plant boiler rooms and workshops into laboratories, improvements and innovations in equipment and technique resulted. Modifications were developed for testing products such as cream, skim milk, buttermilk, homogenized milk, chocolate milk, and other dairy products.

Certain electronic devices are now being used for butterfat testing. At present, no device is capable of automatically delivering correct butterfat content information on a milk sample until it has been calibrated to record butterfat at a level determined by a chemical test. The accuracy of any testing method or device is highly dependent on the condition of the sample being tested.

If the sample is poorly prepared or is of questionable condition, even the very best test procedure will not produce accurate results.

For more information on sample care and preparation see DPC 51, Controlling the Accuracy of Electronic Testing Instruments for Milk Components.

This guideline is designed to aid all concerned dairymen and quality-minded people in assuring proper sampling and operation of farm bulk tanks. The emphasis on sampling in this Guideline pertains to those factors that may affect the accuracy of the reported fat test of the milk. The following section on sampling is not intended to provide a comprehensive coverage of the subject, but only to identify those factors that may affect the results of the fat test of the milk. For more detailed information on sampling see DPC 7, Sampling Fluid Milk.

GUIDELINES FOR HAULERS AND HANDLERS

Haulers and handlers can cause inaccuracies in fat tests by improper sampling and handling procedures. It is important that samples be taken from well-mixed tanks and held in proper leak-proof sample containers under refrigeration until tested. Consideration should also be given to partial pickups.

Sampling Procedures and Care of Samples

Fresh vs. Composite Samples

The practice of taking universal fresh milk samples at every farm pickup is becoming more widespread, and it is the preferred method of sampling. This employs the use of single-service plastic vials or plastic bags as sample containers. This system provides the advantage of having fresh milk samples available at any time for performing other tests in addition to butterfat tests such as those for protein, lactose, total solids, bacteria, antibiotics, and flavor. It also eliminates the necessity of the hauler taking several sets of samples and provides a check of each producer's milk at each pickup.

The former method of sampling (which is still legal) was to accumulate a composite sample. The composite bottle may be carried on the bulk milk truck[1] or a measured fresh milk sample may be placed in a vial to be

[1] Maine and Virginia prohibit the carrying of composites on bulk milk pickup trucks.

added to the composite bottle upon returning to the plant. In either case, care must be taken to prevent spillage or fat clinging to the sides of the container. A preservative must be used for composite samples.[1]

Sampling Equipment

Sampling dippers or other devices must be clean and sanitized before use at each farm. The preferable size of dipper is one ounce but should be at least 10 ml. in capacity. When samples are taken from a sampling valve, it should be sanitized prior to use. Sampling from the farm tank outlet valve is not appropriate. (For more information of sampling, see DPC 7, Sampling Fluid Milk.)

The sample containers (plastic or glass vials or plastic bags for fresh milk sampling or glass composite bottles) shall be free of all moisture because the presence of moisture will dilute the milk sample. The containers shall be made of food approved resins so as to be free of chemical contamination that might adversely affect the condition of the milk or test result. The containers shall also be free of bacterial contamination[2] that will result in deterioration of the milk sample. (Refer to Appendix J of the Grade A Pasteurized Milk Ordinance[3].)

All containers must have caps or other sealing devices that form an airtight, leak-proof seal.

Suggested Leakage Testing Procedure for Single Service Leakproof Vials

The vials shall be in accordance with Standard Methods for the Evaluation of Dairy Products16th Edition, 3.203.[4]

Bulk Tank Mixing and Sampling

Before sampling any lot of milk, it must be adequately mixed to evenly disperse the butterfat globules. Milk in most farm bulk tanks must be agitated for at least five minutes to secure a representative sample. Bulk tanks over 600 gallons in capacity may require longer agitation ten minutes or more. 3A Sanitary Standards for Farm Bulk Milk Tanks[5] require that,

> "Means for mechanical and/or air agitation shall be provided that will result in a variation in milk fat content of the product in the tank of not more than plus or minus 0.1 percent as determined by an Official AOAC Milk Fat Test, when the tank is filled to (1) 100 percent of its capacity with product and the agitator has been in operation for five minutes if the capacity of the tank is less than 1500 gallons or (2) 100 percent of its capacity with product and the agitator has been in operation for ten minutes if the capacity of the tank is 1500 gallons or larger."

Two methods of determining if adequate mixing of a tank of milk has been achieved are to secure two or more samples from different areas of the tank or at various time intervals and then compare the test results until results agree.

When bulk tanks are equipped with two-speed agitators, the high speed should be used when collecting a sample unless it causes significant foaming. Bulk tanks equipped with interval timers are strongly recommended. These agitate the milk for five minutes every hour and prevent the formation of a dense layer of the cream. However, they do not reduce the need for minimal five-minute observed agitation prior to

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[1] Maryland requests identification of kind of preservative if used.

[2] Some sample containers are sterile, but non-sterile single service containers are permitted by the FDA for raw milk if they do not contain more than one organism per milliliter of capacity. Approved laboratories must make rinse tests of randomly selected vials to determine levels of these non-sterile containers.

[3] Available from: Supt. Of Documents, US Government Printing Office, Washington, DC 20402-9371.

[4] Available from: Nelson Jameson Inc., 1-800-826-8302. Published by American Public health Association, 1015 15th Street, NW, Washington, DC 20005.

[5] 3A Sanitary Standards for Farm Cooling and Holding Tanks, volume 38 No., 10, October 1975. Journal of Milk and Food Technology.

sampling. A major problem has been to get haulers to agitate milk long enough prior to sampling. Insufficient agitation may be the largest single source of variation in fat and other tests.

Even if milk in farm bulk tanks is automatically agitated five minutes every hour, this does not reduce the required five-minute observed agitation time prior to sampling. If the milk is being agitated upon arrival at the farm, the milk hauler shall still wait the full five minutes, or more, depending upon the size of tank, before sampling.

Special care must be taken to allow sufficient agitation time for large volumes of milk such as from large farm bulk milk tanks, over-the-road tankers, and plant holding tanks. Samples must be representative of the entire volume of milk involved or they will result in erroneous information as well as wasted time and expense of testing. The importance of sufficient agitation time cannot be over-emphasized.

The milk sample container shall clearly identify the source of its contents.

The sample container, be it a composite bottle, plastic or glass vial or plastic bag, shall not be filled to more than three-fourths of its capacity. The air space is needed to facilitate proper mixing of the milk sample when the milk sample container is inverted in preparation for testing. If a sample completely fills the container, there is no room for complete mixing to take place.

Sampling dippers should always be immersed and emptied in the milk at least two times before taking the sample.

The outlet value of the bulk tank must never be opened or pumping out of the milk begun until the milk sample has been taken.

Milk of Questionable Condition

Milk that is sour or has been frozen or churned will result in incorrect fat measurements. If the decision is made to accept the milk it should be sampled; but if freezing or churning has occurred, the sample should be clearly marked so that it will not be tested for butterfat (fresh milk sample) or added to the composite samples.[1]

Care of Samples in Transit

All samples for butterfat testing should be held at a temperature between 32°F (0°C) (milk does not freeze at 32°F) and below 40°F (4°C) from the time of sampling until prepared for testing[2]. The preferred refrigerant is a mixture of ice and water.

An extra milk sample should be taken at the first farm on each route to be used as a temperature control (TC) sample. The driver should write on the cap of that sample the following information:

(1) TC

(2) time of sampling,

(3) date,

(4) producer number, and

(5) temperature of the milk when the sample was taken[1].

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[1] Virginia and Maryland require that a sample be taken each time the bulk tank is emptied. Samples determined by the hauler as not suitable for official analysis must be marked with an “X”.

[2] New York requires that samples which undergo transportation be held at a temperature between 33 °F to 40° F. Samples which do not undergo transportation may be stored at 33 °F to 45° F.

The temperature control sample shall remain with the rack of samples throughout the transportation and storage of the samples and can be used as the temperature control sample in the tempering bath in the laboratory.

While being transported in the bulk milk pickup truck, composite or fresh samples in glass containers or plastic vials or bags should be stored upright in a wire rack (or by other means) in an insulated case. Sample racks shall be identified with hauler identification and other pertinent information. Ice and water should be at a level equal to that of the milk in the bottles or vials. Bottles or vials must be sealed with overall caps with splash shields to prevent any water from entering and diluting the milk sample.

Regular inspection of the condition of the milk samples being transported on bulk milk pickup trucks has shown that a common problem is the failure to keep the samples within the allowable temperature range of above freezing and below 40°F (4°C). This is a major cause of butterfat test variations and continued efforts must be made to ensure that samples are maintained in the proper temperature range from the farm to the laboratory.

Irregular And/Or Odd Milk Pickups

Nothing can alter payment tests quicker than sampling and testing milk from odd milkings. This is because the morning's milking usually tests considerably lower than the night's milking. When milk is picked up on a regular basis, either every day or every other day, the morning's and evening's milk are blended and the test results from samples taken are representative of the farm's entire production for that period. But when sampling is done from odd or partial milkings, the tests can vary significantly from the normal.

The problem of odd pickups has become more pronounced in recent years as the farms get bigger and haulers, for reasons of efficiency, top off their load by making partial pickups.

When odd pickups are made on an infrequent occasion it is recommended that the bulk milk hauler "X-out" the samples from those pickups so that they will not be used for butterfat testing purposes. However, if odd pickups are made at a given farm on a regular and ongoing basis, it becomes very difficult to establish an adequate procedure to ensure accurate payment tests. To assure proper identification of samples taken, a separate number/letter may be assigned with the producer number for each pickup of milk, i.e. morning-1A, night-1B or one milking -2A, three milking -2B.

Another common problem is multiple tanks on the farm. Often one tank is smaller than the other is and, depending on the amount of evening's or morning's milk added to each tank, the tests can vary considerably. In these situations, the producers should follow the same filling procedures for each tank each day so that the milk (and butterfat) in each tank is consistent from day to day.

Three and One Milking Pickups - Depending on the interval between milking there can be considerable difference between morning and evening butterfat tests. Differences of several points (.20% -.30%) and in some cases up to 1% (3.0% to 4.0%) between morning and evening butterfat averages can occur.

For example: a producer who was on every other day pickup (4 milkings) and then started increasing production to a point where his bulk milk tank would not hold the four complete milkings. To accommodate the producer the hauler started picking up the milk before the producer milked on the second morning (3 milkings) and again after the morning milking was completed (1 milking). In this example the hauler did not take a sample from the first pickup (3 milkings) but he did sample the second pickup (1 milking) because the agitator was still running when he arrived back at the farm for the second pickup. In this example this sampling can change the producer's average butterfat test from 3.925% to 3.25% butterfat in one month. How this can happen is as follows:

1. The milking interval between night and morning milkings is not normally at perfect 12-hour intervals.

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[1] Virginia does not require the recording of the time or temperature on the cap because this information must be recorded on the producer’s receipt.

2. Evening milking normally test higher than morning milkings due to a shorter interval between the completion of the morning milking and the start of the evening milking.

3. In this example let's assume the samples taken from the three (3) milkings, two nights and one morning, average 4.15% butterfat.

4. The samples from the one morning milking averaged 3.25% butterfat. Since this was the only sample being taken the producer's butterfat average dropped to the 3.25% level.

The affect of irregular milk pickup on test results can be further illustrated by considering the following example. Using the test results from the above example, assume the hauler was taking a sample from the three (3) milkings and a sample from the one (1) milking. If you think this will solve the problem of sampling three (3) and one (1) milking think again.

For example: Simple Average Test

Sample from 3 milkings	=	4.15%
Sample from 1 milking	=	3.25%
Simple Average	=	3.70%

The problem with a simple average test as shown in this example is that three (3) milkings at the 4.15% test represented approximately three times the pounds of milk that the one (1) milking at the 3.25% test represented.

How should this problem be solved?? - -

Use a weighted average test for the producer's receipts as follows:

Weighted Average Test

	%BF		Lbs. Milk	Lbs. BF
3 milkings =	4.15%	x	3000 lbs.=	124.5
1 milking =	3.25%	x	1000 lbs.=	32.5
				157.0

157 ÷ 4000 lbs. = 3.925% weighted average

From the above two examples you can see that the weighted average test yielded a 3.925% butterfat test compared to the 3.700% butterfat test obtained from the simple average for a difference of 0.225% butterfat.

As can be seen from the above examples an incorrectly sampled, irregular milk pickup could have resulted in the producer being paid on a 3.25% butterfat test rather than his correct weighted average of 3.925% - - a difference of 0.675%. At a butterfat differential of 15 cents, a point would have cost the producer $1.01 per hundredweight off of his milk check.

By using a simple average test of 3.70%, as shown above, rather than the correct weighted average test of 3.925% this would cost the producer 0.225% butterfat each month. With a 15 cents a point butterfat differential this would equal approximately 33 cents a hundredweight lost to the producer each month.

How to Avoid the Problems - First, farm milk tanks should be large enough to hold at least two days complete milkings. (For more information see DPC 48, Cooling Milk On The Farm.) If everyday pickup is used the farm tank should be designed and manufactured as an everyday pickup tank. If it isn't cooling properly, churning or freezing might effect butterfat and bacteria problems can follow. If it is necessary to pickup milk containing odd milkings, a butterfat sample should be taken at each pickup and identified as to the number of milkings the sample represents and the producer number and pounds. This will allow the

testing laboratory and the paying handler to accurately determine the correct weighted average test of the producer's receipts for the month.

Partial Pickup[1,2]

Some dairy farms allow their haulers to make partial pickups leaving milk in the bulk tank. This practice should be avoided at all cost, since the same type of butterfat test problems described above can occur and in addition the chance of having high bacteria tests from not washing the tank between milk pickup is a very strong possibility.

GUIDELINES FOR PRODUCERS

Reasons for Butterfat Test Variations

Some cow, environment, and management factors that affect the butterfat test include:

Normal Variation

Daily fat tests can normally be expected to vary plus or minus about .5 percent. A likely cause of wider variations might be irregular milking intervals. However, with regular milking intervals and large herds, the variation should be considerably less.

Producers should avoid making misleading comparisons of fat tests such as comparing a DHIA test and a payment test. A DHIA test of milk representing one day or one milking may vary considerably from a plant test covering seven or eight bulk tank pickups of the milk from the same herd. Comparisons of DHIA and payment tests usually do not vary by more than plus or minus .2 percent. This means that with a plant test of 3.7 percent a producer could expect his DHIA test to be in the range of 3.5 percent to 3.9 percent. A fairly accurate means of comparing DHIA and payment test results is to compare a minimum of six months' tests or, even better, a full year. (See suggested work sheet on page 9).

Day-To-Day Variation

This variation is larger than most people realize. Usually an increase in milk production results in a decrease in fat test and vice versa. However, a consistent relationship does not always exist between the fat test and the weight of milk delivered from day to day. Many herds have seasonal trends in production--changes in herd size, batches of new heifers, or other major changes affecting production and test.

Individual cows within any one particular breed will show variations in their ability to produce fat. Cows producing milk of high fat content are most likely to show greater variations.

Greater variation in milk tests may be expected in smaller herds.

The effect of environmental temperature in regard to the fat content of milk has been found to be quite definite. Hot, humid, uncomfortable weather affects both volume and butterfat test. Sudden storms or changes in temperature may noticeably affect the test.

Lactation

Generally, the amount of milk produced decreases and the fat test increases as the lactation period progresses. A noticeable decline in fat test usually occurs from time of freshening until the second or third months of lactation that is followed by a gradual increase in the fat test to the end of the lactation period.

Seasonal

Tests tend to drop in the spring/summer; increase in the fall.

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[1] Virginia requires the Milk Hauler to see that the farm bulk milk cooling or holding tank is completely emptied each time that milk is picked up.

[2] Maryland discourages partial pickups. If necessary, the milk hauler must return the same day to empty the bulk tank.

Health Problems

Diseases of cows may have varying effects on fat tests. Production may decline and milk fat tests rise. However, when cows have mastitis, ketosis, or milk fever, both production and fat tests usually decline.

Age

The age of the cow will not have too great an effect on the overall herd test. However, the fat test of individual cows may tend to decline from the first to the fifth lactation.

Exercise

Slight exercise may increase the fat test somewhat without reducing the quantity of milk secreted.

In Heat

Cows in heat are usually down in milk production and can be either up or down considerably in butterfat test.

Milking Practices

Milking practices that affect tests include changing milking intervals, insufficient vacuum, poorly operating equipment, or poor milking methods. Dairymen may follow more uniform practices on the day of the DHIA test for example, milking out more completely.

Nutrition

Nutritional problems can cause severe milk fat depressions that may or may not affect production. Daily herd samples may vary 0.5 percent or more because of improper nutritional practices. Some of the more common nutritional causes of depressed fat tests are:

1. Feeding rations high in concentrate and low in forage is by far the most common nutritional cause
2. Feeding forages that are too finely chopped
3. Feeding hay equivalent of less than 2 percent of body weight
4. Feeding low fiber, pelleted, or cooked feeds
5. Overfeeding or underfeeding prior to freshening
6. Feeding high-fat rations

Most of these causes are related to the fiber intake of animals. When the fiber intake of dairy cows is inadequate, low fat tests result. To avoid milk fat test depression, dairymen should make certain that all cows eat at least two pounds of hay equivalent per hundred pounds of body weight daily. They need fiber to allow the rumen to function properly. To help counteract a lack of fiber in the diet, dairymen may include a buffer in their concentrate such as sodium bicarbonate or magnesium oxide. A dairy nutritionist should be consulted in this regard.

Milking Intervals

Variation in time between milkings affects fat test. The test is usually lowest for the longest interval between milkings and highest for the shortest interval. Another factor related to daily variations is that cows milked in a parlor might change their milking order, and therefore, the interval between their milking times.

It's very common for there to be a considerable difference in test between the evening's milk and morning's milk, the morning's milk usually testing lower. It's for this reason that odd number of milkings should never be sampled for payment testing purposes.

Milk Measuring Devices

Many farms now use meters or weigh jars for DHIA sampling. This equipment is sensitive, requires constant checking, and standardized procedures for use and cleaning. Adding meters to an already overloaded milking system can reduce vacuum and decrease the accuracy of weighing devices.

Freezing and Churning

If either freezing or churning occur in the farm bulk tank, the milk loses its normal physical characteristics making it impossible to get a proper fat test. Milk can freeze during the first milking and thaw as additional milk is added. When insufficient cooling occurs, churning is common as milk continually agitates during the second, third, and fourth milking. A poorly operating pipeline milking system or dumping station may also cause churning.

Sample Handling and Testing

Sample handling and care is critical at all times and special attention should be given during periods of extreme weather. Samples should be stored and transported at temperatures above freezing and below 40° F (4°C) at all times. Ice water immersion is required for universal sampling and is strongly recommended for composite samples when transporting milk samples.

Incorrect laboratory analysis is usually the first thing a milk producer thinks of when the DHIA test doesn't match the dairy plant test. Although no laboratory is perfect, it is rarely the cause of the fat test variation. There are only small differences between the different testing methods such as Babcock, Gerber, ether extraction, and turbidometric or infrared electronic analyzers. Needless to say, this assumes accurate calibration of the electronic instruments.

Fresh milk samples used for payment testing are statistically as accurate as 15-day composites as long as they are taken and tested at approximately equal intervals on a stratified random basis during the month. One individual fresh milk sample may be misleading to a dairyman because of the inherent day-to-day variation.

COMPARING DHIA AND PAYMENT TESTS

Compare Tests for the same period

It is very important to compare tests for the same periods. The herd average test for a given month reported on the DHIA computer printout is a mathematically computed average representing one-half of the previous month's tests and one-half of the current month's tests. It is not actually the average test for the month sampled. Also, DHIA tests are rounded to the nearest tenth of a percent, whereas most payment tests today are reported to the nearest hundredth. For these reasons, it is strongly recommended when comparing DHIA and payment test results that an extended period of comparison be used to obtain a true picture. A minimum of six months of tests should be compared, and preferably, a full year's tests.

Sample Worksheet

COMPARING DHIA AND PAYMENT TESTS

Herd Owner _____ Date _____

Milking System _____ Herd Size _____ Tank Make and Size _____

Month	DHIA Sample Date	DHIA Test	Tank Test	Payment Tests 1	2	3	Payment Test Average	Other
6-month Subtotal								
6-moth Average								
6-month Subtotal								
6-moth Average								
Yearly Total								
Yearly Average								

Comments:

_____

_____

_____

_____

DHIA records are meant for comparing cows and making management decisions based on preserved samples and not as a basis for determining payments. In contrast, the handler or plant tests are for payment of milk based on fresh, refrigerated samples and are not very helpful in managing individual cow problems. DHIA receives no economic gain or loss by biasing fat test results.

DHIA tests and plant tests are seldom made on the same day or with the same milk. DHIA is a one-day or one milking per month sample. Plants run a series of fresh milk samples during the month representing at least six days' production. For these reasons, a difference not greater than 0.2 percent between DHIA and payment, when averaged over a period of six or twelve months, is acceptable. Consistent differences greater than 0.2 percent for this period of time constitutes a legitimate cause for concern and should be investigated.

Other Reasons Why DHIA May Be Different

Fresh cows are not included in the DHIA test until seven days after freshening.

Milk taken for farm and home use may be included in the DHIA samples but not in the plant samples.

Milk Handling

Faulty milking equipment may result in fat test variations by causing churning, so the equipment should be thoroughly checked. Pipeline milking systems must be of adequate size to ensure proper handling of the milk. Fittings on pipeline milkers must be tightened regularly and properly gasketed to prevent air incorporation and agitation. Likewise air leaks should be eliminated so as not to cause churning of the fat at warm temperatures.

PERFORMANCE OF BULK MILK TANKS

Improper operation of the farm bulk tank is one of the major causes of churning and/or freezing which normally lowers fat tests. The compressor of a direct expansion tank should not be started at the first milking until milk touches the agitator unless specifically recommended by manufacturer. If there is insufficient milk in the tank when the compressor is turned on, a thin layer of milk may freeze which, although it is not visible, can affect fat tests.

After the first milking the producer must start the bulk tank when milking is begun. If the bulk tank has automatic controls, only the agitator need be started at the start of second and subsequent milkings. Clumps that cling to the walls of the bulk tanks upon emptying indicate freezing. One characteristic of the ice-like particles of protein and fat that may be observed in the tank is that they seem to disappear when touched.

Churning can be caused by excessive agitation at temperatures above 50°F. Bulk tanks should maintain blend temperatures below 45°F to prevent loss of fat.[1] **Tanks intended for every-other-day pickup should not be used for the daily collection of milk.**

Churning

To protect his own interest in helping to provide accurate samples a farmer should periodically check his farm bulk tank to see that it is operating properly. This can be done by a quick visual check of the milk within the tank, preferably at the time of pickup. Any sign of butter particles or ice particles on the surface is a good indication of problems. The presence of butter particles, either large pea-shaped or small flake-shaped, is a definite indication that something is wrong. Normally the presence of butter particles indicates inadequate cooling which causes churning of the milk as it agitates. However, sometimes churning is the result of problems in the milking system.

[1] Virginia requires that milk in farm bulk milk cooling or holding tanks be cooled to 40° F or less within two hours after the completion of each milking. Milk from farm bulk milk tanks shall not be picked up, transported, or delivered to a milk plant, receiving station, or transfer station when the temperature of that milk is in excess of 45° F.

Freezing

If freezing is noted, either by the presence of ice particles floating on the surface or milk frozen to the tank's cooling plates after the milk has been removed, a severe problem exists. When milk freezes the fat is altered and will not go back into its original state upon thawing. As a result of the damage to the fat, the butterfat test probably will be inaccurate and the flavor of the milk may be adversely affected.

Proper Bulk Tank Performance

There are several quick and easy ways to check for proper cooling. They are as follows:

1. Is the holding temperature of the farm bulk tank uniform or does it vary from milking to milking or day to day?

2. Does the compressor cut in and out more than normal?

3. Does it take the compressor more than one hour after the completion of milking to cool the milk to 40°F or less?

4. Does the compressor seem to be running more than usual causing not only quality and fat problems but wasted dollars in electricity?

5. Is the cooling radiator (condenser) on the compressor free of dirt and hay chaff to allow for the free movement of air?

6. Does the bulk tank continuously blow fuses?

7. Are there signs of churning?

8. Is there frozen milk in the tank?

If the answer to any of the above questions is yes, it may be worthwhile to have a serviceman check the tank. Also see DPC 48, Cooling Milk on the Farm. Few producers seem to realize that the condition of the milk at the time of the pickup may be the cause of fat losses. Producers know that each one point (.1 percent) of fat test loss will cost approximately $100.00 per month (at $1.00 per pound of butterfat- if 5,000 pounds of milk is produced every other day).

The next time the farm bulk pickup driver arrives at the farm it might be a good idea to be on hand for two reasons: first, to observe the procedures the pickup driver follows in obtaining the sample and second, to observe if there are any signs of freezing or churning in the farm bulk tank. A dairy farmer has the unique opportunity in that he can personally observe the measuring of his milk as well as the care given by the farm bulk pickup driver in obtaining a true representative sample of his product.

Bulk Tank Aging

How old is your tank? Does it meet today's needs for high cooling efficiency? Some of the bulk tanks in use today are the same ones, which were installed when first converting from, can cooling to bulk cooling. Often these are not on the same farms where they were installed originally. Sanitarians are concerned because many farm bulk tanks are not cooling milk properly. This affects both milk quality and accuracy of tests. Many of these tanks have been moved, overloaded continuously for years, and subjected to freezing and thawing, dust, and corrosion. Some may not have had preventive maintenance and were kept running until they finally failed. Some tanks may be thirty years old. How well are they doing their job?