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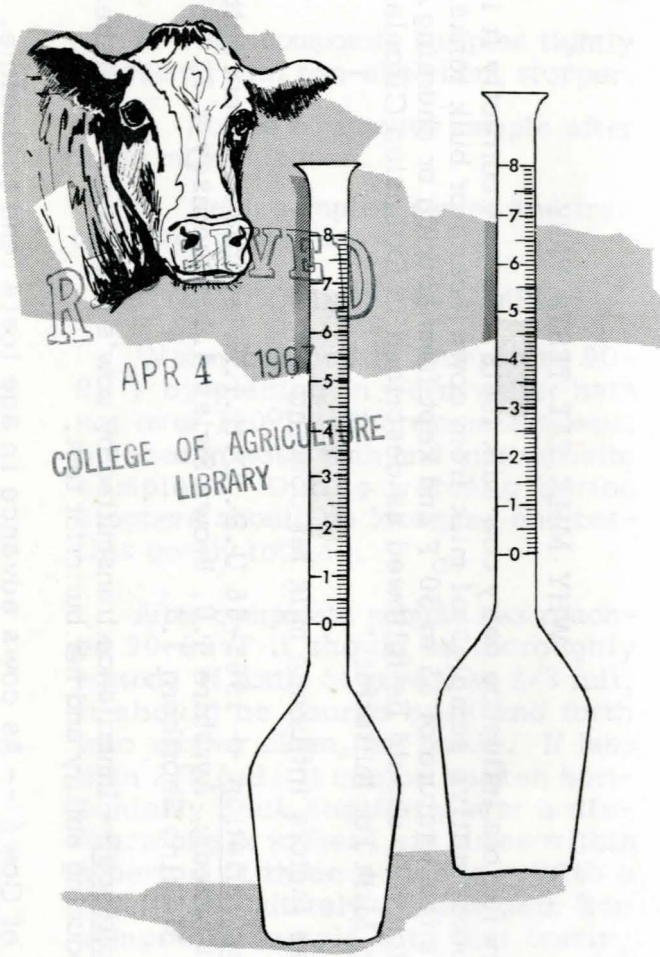
Why Milk Fat Tests Vary



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WHY MILK FAT TESTS VARY

Many factors influence dairy cow milk tests. To test correctly it is important to secure representative samples of milk from cows, cans or bulk tanks. Samples must be kept at a temperature of 35 to 50°F and kept from souring or churning. The testing procedure for milk should be followed as described in Extension Circular 64-645 entitled, "Testing Milk For Butterfat."

These factors influence milk fat content:

Breed Variation -- 1965-66 U.S. D.H.I.A. average percent butterfat in milk from different breeds: Ayrshire 4.0, Brown Swiss 4.1, Guernsey 4.7, Holstein 3.7, Jersey 5.1 and Milking Shorthorn 3.7.

Inheritance -- Inheritance transmitted by cow's ancestors establishes ceiling of cow's milk producing ability and her butterfat test.

Age of Cows -- As cows advance in age tests tend to decline. Milk fat tests for Jerseys and Holsteins were lower the tenth lactation than for the first nine.

Condition of Cows -- Cows in good condition at calving time produce higher testing milk than when thin at calving time.

Lactation Variation -- Tests are high soon after calving, decline to lowest point from third to seventh month of lactation and generally increase toward end of lactation.

Climatic Temperature -- A change of 10°F in weather will cause a change of from .1 to .3 percent butterfat. Hot weather lowers test, cool weather increases test.

Milking Practices -- Milking practices like completeness of milking, milking intervals and time of milking have some influence on tests. First milk will be low and strippings high in butterfat. Shorter intervals between milkings will show an increased test. Evening milk is slightly higher in tests than morning milk.

Miscellaneous Factors -- Miscellaneous factors like disease, estrus or heat periods, exercise, excitement and use of drugs have varying influences upon milk tests. Mastitis tends to decrease tests. Feeding of Thyroprotein tends to increase tests. Milk tests will vary up or down during estrus or heat period.

Feeds -- It is generally believed that low fat tests result from feeding rations which produce shifts in rumen metabolism resulting in low levels of acetic acid and high levels of propionic acid. Feed factors associated with a low test are: forage level below 1 lb. hay-equivalent per hundredweight of cow; feeding finely ground or pelleted forage; pelleting, flaking or cooking the concentrate ration (especially when corn contributes over 35% of total ingredients); and feeding high levels of concentrate or feed in which concentrates make up over 60% of total dry matter.

A reduced butterfat test is most likely due to a combination of several of these factors, such as feeding high levels of pelleted grain ration along with restricted forage.

Individual Cow Variation -- In 1966, low and high butterfat tests for different cows for all months in the University of Nebraska dairy herd were as follows: Brown Swiss 3.0 to 7.6, Guernsey 3.7 to 7.4, Holstein 2.4 to 9.0 and Jersey 3.1 to 9.1. These differences were due to a combination of factors listed above.

Composition of Herd -- Herd tests may vary from month to month because herd status changes. Each month cows are in different stages of lactation. New cows enter herd as first-calf heifers or purchased cows. Cows leave herd by means of sales or deaths or are turned dry. Kind, quantity and quality of feeds consumed by cows may change. Management practices might also change.

CARE OF COMPOSITE MILK SAMPLES

1. Fresh milk samples to be used in preparation of composite must be representative of the lot of milk sampled.

2. Immediately after securing milk samples, place and keep in a cold place. (35-45°F)

3. Keep composite samples continuously refrigerated. (35 to 50°F)

4. Keep composite samples tightly stoppered with non-absorbent stopper.

5. Rotate composite sample after fresh milk is added.

6. Keep samples sweet and free of butter granules.

TESTING COMPOSITE SAMPLES

Warm composite sample to 90-95°F by placing in warm water bath not over 110°F. Thermometers must be used in water bath and in composite samples. During warming period stoppers should be loosened and bottles gently rotated.

After composite sample has reached 90-95°F it should be thoroughly mixed. If bottle is more than 2/3 full, it should be poured back and forth into another clean, dry bottle. If less than 2/3 full, it can be shaken horizontally back and forth over a distance of six inches, six times within a period of three seconds. With a pipette immediately transfer milk from composite sample into test bottle, then reduce temperature to 60 to 70° F and proceed as outlined in Extension Circular 64-645.

The following are important in the management of dairy cows for securing maximum milk fat tests.

1. Have cows in good condition at calving time and during lactation.

2. Milk cows out completely at every milking.

3. Maintain satisfactory fiber content in ration.

4. Keep cows free from mastitis and other diseases or ailments.

5. Avoid sudden changes in feeding or management practices.

THE FIBER CONTENT OF FEEDS

The forages a cow eats are converted by bacteria and protozoa in the rumen reticulum into volatile fatty acids also called organic acids.

Three important volatile fatty acids are: acetic, butyric and propionic. To maintain a maximum butterfat test, it is necessary for the cow to produce an optimum amount of acetic acid. If production of acetic acid is reduced and propionic acid increased, butterfat of milk goes down or is depressed. Fiber in forages produces acetic acid.

Fiber in some feeds is more effective than fiber in other feeds in production of acetic acid. Fiber in plant changes during growing and maturing stage; therefore, it influences, at some stages more than other stages, the production of acetic acid.

To maintain a normal test it is essential that dairy cow eat a total ration with satisfactory fiber content. Feeds that supply fiber are hay, silages, corn cobs in corn and cob meal, and pasture grasses as they approach maturity. Other feeds supply fiber in different quantities.