Sunday, 14-15 April, 2024

University of Basra
College of Veterinary Medicine
Dept. of Public Health / Milk Hygiene
Division Milk Hygiene Course / Fifth Year
2023- 2024

Practical Lecture: 2nd Semester
Group (A, B)

Determination of Fat in Milk

Contents

Dr. Aqeel Al-Rumaid
B.V.M.S. (Theriatrics). M.V.M.P.H. (Meat hygiene).

DEFINITION:

Experimental procedure which gives a value for fat content in grams of fat per 100 g or per 100 ml of milk/dairy product

GERBER TEST FOR FAT

PRINCIPLE:

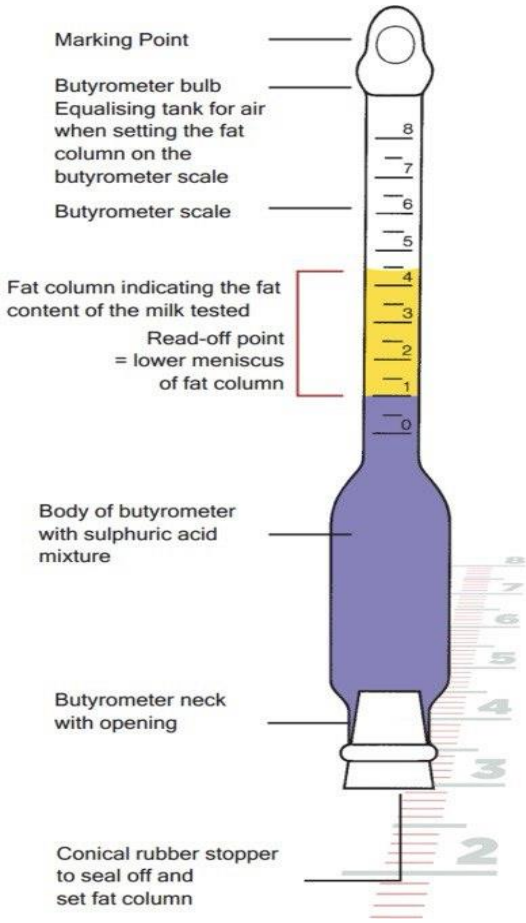
The principle is that both milk and concentrated sulphuric acid are mixed to produce an exothermic reaction that disintegrates the emulsion structure in milk. The sulphuric acid produces the necessary heat for complete digestion of the non-fatty material and dissolves the protein that forms the membrane around the fat globules. The exothermic reaction in combination with the isoamyl alcohol improves the separation of the fat from other solids for measurement. The free fat is separated from milk by centrifugal force and collected in the graduated portion of the neck of the Gerber bottle, which is calibrated to express the fat content of the product on a percentage fat by mass. This method is applicable to raw and pasteurized milk.

EQUIPMENT AND MATERIALS

1. Sulphuric acid (specific gravity 1.820-1.825 gm/ml at 21°C, colourless).
2. Isoamyl alcohol
3. Butyrometers (Gerber) 6%, 8%, 10% scales depending on fat content. Supplied with lock stopper and key.
4. Stoppers and shaker stands for butyrometers made from a suitable grade of rubber or plastic.
5. Pipette 10 ml size for sulphuric acid (with rubber suction device).
6. Pipette 1 ml size for amyl alcohol.
7. Pipette 11 ml size for milk test.
8. Bottle support rack to hold bottles in a secure. vertical position, preferably stainless-steel racks.
9. Electric centrifuge for bottles, standard style, with disc and a trunnion head to rotate at 1100 ±100 rpm and supplied with heaters to maintain internal temperature at 60°C.
10. Water bath at 65± 2°C.

PROCEDURE

1. Measure 10 ml of sulphuric acid at 15-21°C and transfer into the butyrometer.
2. Fill the 11 ml pipette with a well-mixed milk sample at no more than 24°C and allow the milk to drain into the bottle slowly at first to prevent a violent reaction with the acid; then permit the pipette to empty normally and blow out the last drop.
3. Add 1 ml of isoamyl alcohol using the 1 ml pipette and insert the lock stopper securely. With the stoppered end up, grasp the test bottle at the graduated column and shake the butyrometer until the curd is completely digested (no white particles are seen). Holding the hot butyrometer at the stopper and neck, invert it at least four times to mix the acid remaining in the bulb with the contents.
4. Put the butyrometer in the water bath at 60-63°C for 5 minutes.
5. Take the butyrometer out and dry with a cloth, place it in a centrifuge placing two butyrometers diametrically opposite, close the cover and lock After the required speed is attained, centrifuge for 4 minutes
6. Transfer the butyrometers and stoppers downwards into the water bath for at least 5 minutes (5-10 minutes)
7. Gently push the straight line at the bottom of the fat column upward to a main graduation mark and then promptly read the scale at the bottom of the meniscus at the top of the fat column to the nearest 0.05% graduation. Subtract the lower from the upper reading and record the difference as the fat percentage.



SIGNIFICANCE OF THE TEST:

The legal standard of the fat% of milk of different animals must be not less than 5.5% for buffaloes. 4% for the sheep, 3% for cow and 2.5% for goat and lower figures indicate adulteration of the milk either by partially skimming or by addition water to the milk. Sometimes a low fat % is due to incomplete milking.