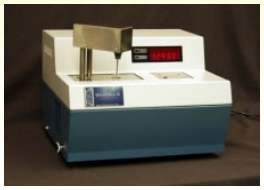
MilkTech International

UW-MRIL

Milk Quality
Introduction
Other Measurements in Milk



1

Objectives

- In this module we will learn these specific aspects of milk analysis:
  - Sediments
  - Rancidity
  - Acidity
  - Added water
  - Pesticides residues

2

Review
High Quality Milk has…

- Low bacterial counts
- Low somatic cell counts
- White appearance
- No objectionable odors
- No abnormal substances
  - Dirt sediments
  - Added water
  - Chemical residues
  - Antibiotic residues

3

In other terms…

- Milk Quality is defined by its:
  - Bacterial Count, Somatic Cell Count, Antibiotic Residues – see other lessons
- Other measurements are done to check milk safety to human health:
  - VISIBLE ADULTERATION AND ODORS.
    - ✓ Milk shall not be visibly adulterated, or have any objectionable odor, or be abnormal in appearance or consistency.
  - TEMPERATURE.
    - ✓ If milk is received or collected from a dairy farm more than 2 hours after the most recent milking, the temperature of the milk shall not exceed 45°F (7°C), or 50°F (10°C) in the case of grade B can milk. If the milk consists of a blend of milk from 2 or more milkings, and the milk is received or collected less than 2 hours after the most recent milking, the blend temperature shall not exceed 50°F (10°C).
  - PESTICIDES AND TOXIC SUBSTANCES.
    - ✓ Milk shall be free of pesticides and toxic substances.

4

Some definitions

- **Abnormal Milk:** Milk that is visibly changed in color, odor and/or texture.
- **Undesirable Milk:** Milk that, prior to the milking of the animal, is known to be unsuitable for sale, such as colostrum.
- **Contaminated Milk:** Milk that is un-saleable or unfit for human consumption following treatment of the animal with veterinary products, i.e. antibiotics, which have withhold requirements, or treatment with medicines or insecticides not approved for use on dairy animals by FDA or the Environmental Protection Agency (EPA).

5

"Sediments"

- Sediments that might occur in milk are:
  - Hair, sand, manure
  - The main cause of sediments occurrence in milk is a combination of:
    - ✓ Excessive udder hair
    - ✓ Sand bedding
    - ✓ Poor pre-milking hygiene

6

"Rancidity"

- *Oxidative rancidity:* Oxidative rancidity occurs when fatty acids are oxidised. In **milk** products it causes tallowy flavours. Oxidative rancidity of dry butterfat causes off-flavours in recombined **milk**.
- *Hydrolytic rancidity:* In hydrolytic rancidity, fatty acids are broken off from the glycerol molecule by lipase enzymes produced by **milk** bacteria. The resulting free fatty acids are volatile and contribute significantly to the flavour of the product.

7

"Acidity"

- Milk acidity varies according to the amount of lactic acid present in milk
  - Lactic acid is the principal acid produced by bacterial fermentation after **milk** is drawn from the udder.
    - ✓ Fresh **milk** contains only traces of lactic acid.
- The more lactic acid present in milk, means that more bacterial fermentation happened.
  - The amount of lactic acid is an indirect indicator of the amount of bacteria in milk.

8

"Added Water"

- Normal milk contains around 87% water.
- Extra water content in milk can be caused by:
  - Intentional addition of water (fraud)
  - Poor system drainage
  - Use of excessive water during prep
  - Back-flushing units with the vacuum on
  - Rinsing top of bulk tank

9

A Concern: Pesticide Contamination

- At the present time, chlorinated hydrocarbon pesticides are the chief concern among pesticides.
  - Many of its agents tend to accumulate in the body fat of both lactating animals and human beings, and are secreted in the milk of contaminated lactating animals.
- The accumulation of these toxic agents in persons continually consuming contaminated milk may reach hazardous concentrations.

10

Pesticide compounds can gain access to milk by various routes

- Insecticide contamination may result from:
  - Application to the lactating animals;
  - Inhalation of toxic vapors, by the animals, following application of insecticides to their environment;
  - Ingestion of residues in feed and water; and
  - Accidental contamination of milk, feed and utensils.
- Herbicide contamination may result from:
  - Residues on the lactating animals feed and in their water supply.
  - Accidental contamination with rodenticides.

11

Other residues in milk

- Cleaning chemicals
- Teat dips
- Feed additives
- Other drugs

  - Test methods are available
    - ✓ Not done on a routine basis
  - Regulations are controlled by:
    - ✓ Pasteurized Milk Ordinance
    - ✓ Milk and Dairy Beef Residue Prevention Protocol

12