

Practical Exercise 12

Sampling of milk and milk products for microbiological and chemical analysis

Objective: *This exercise is intended to train the students in the collection of milk samples from individual cow, milk cans and other containers, storage tank, milk tanker, pasteurizing plant and bottled milk.*

Milk is highly susceptible to contamination by micro organisms and it is also a suitable medium for the rapid growth and multiplication of bacteria at favorable temperatures. It is, therefore necessary to use very great care in the collection and handling of milk samples to prevent any extraneous contamination and to control the growth of organisms during transportation and storage of the samples. The results of bacteriological examination of a sample of milk would be valueless if the sample is not representative of the milk from which it is drawn, if it contains any extraneous organisms and if the original bacterial flora is altered due to increase or decrease in bacterial population during storage. For chemical analysis the samples may be drawn similar to that is obtained for microbial analysis. The samples should be thoroughly mixed and representative of entire lot or batch. It should be collected in a clean and dry sample bottles. Unlike microbial analysis samples for chemical evaluation can be stored for some time or even a day by using suitable permitted preservatives like potassium dichromate or formalin.

Materials

- Agitator (plunger)
- Dipper

- Ice box
- Sample bottles (250 ml capacity)
- Thermometer
- Alcohol (75%)
- Cotton
- Clean cloth
- Hypochlorite solution (available chlorine content 50 ppm)

Procedure

A. Individual cow or quarters of the udder

1. Clean the flanks and udder of the cow with the help of a body brush and a clean wet cloth. Wipe the udder with a piece of cloth soaked in hypochlorite solution (50ppm).
2. Dry the udder by wiping with a clean dry cloth.
3. Wipe the opening of the teat with a piece of cotton or cloth, dipped in 75% alcohol or alternatively immerse the teats in chlorine solution (50ppm) for a few minutes.
4. Discard the fore milk (if not required for special analysis).
5. Draw equal quantities of milk from each quarter into the bottle.
6. If samples from individual quarters are required, draw the milk from each quarter into separate bottles. Mark the bottles for identification.
7. Cool the sample immediately in ice water and transport them to the laboratory for analysis.
8. The samples of milk should be stored in a refrigerator about (4-6°C) till required for analysis.

B. Milk can or pail

1. Mix the milk in can or other container with a sterile plunger or agitator.
2. With the help of a sterile dipper remove the sample of milk and transfer into sterile sample bottle.

C. Bulk milk (Storage tank)

1. Mix the milk in the vat or storage tank thoroughly with the help of an agitator.
2. Draw representative samples with the help of a sterile dipper and transfer into sterile bottles.

D. Tankers

1. Thurst a sterile plunger of appropriate size inside the vat in different direction for at least 10 15 minutes to mix the contents properly.
2. Alternatively, compressed filtered air may be blown in Agitation should be carried out for at least 15 minutes.
3. Take the sample with a sterile dipper and transfer into wide mouthed sample bottle.

E. Pasteurizing plant

1. Sterilise by flaming or alternatively by applying cotton soaked in alcohol, nozzle of the heat exchanger or other outlets provided for different sections of the plant.
2. Allow a small quantity of milk to flow out into a bottle and discard it.
3. Then allow the sample to be collected in wide mouthed glass bottles.

F. Bottled milk

1. Collect 3 or 4 bottles at random from the bottling plant or from centers of distribution.
2. Keep the milk bottles in ice box and transfer them to the laboratory.
3. If necessary, equal portion of milk from each bottle can be drawn and a final composite sample is made.

G. cream/butter/milk powder

1. The samples may be drawn from the end point of the equipment or from the storage tank/storage room

2. Sample bottle can be used for cream while butter or milk powder trier is used obtaining butter and milk powder sample
3. Ensure that the samples are homogenously mixed and representative of the whole lot
4. Dairy samples brought in to laboratory are either stored at refrigeration temperature (around 4°C) before analysis or evaluated for microbial or chemical parameters

Precautions

1. Use only sterilized apparatus and equipment. Avoid all chances of contamination of milk and dairy samples
2. Stoppers of the bottles should not be removed from the bottles unless necessary.
3. At the time of filling the bottles with the samples place the stopper on a clean surface with the small end uppermost. Replace the stopper immediately after the sample is obtained.
4. Hold the bottles near the base in horizontal position as possible.
5. If chlorine is used for sterilization of dipper, rinse the dipper with the same milk at least thrice before drawing the sample. Collect uniform quantities of milk for each sample.
6. Do not fill the bottles or flasks more than $\frac{3}{4}$. Clearly label each sample bottle indicating the source, date, place, time and temp. Dispatch the sample to the laboratory as soon as possible in an ice box.

STUDY QUESTIONS

1. How will you take samples from individual animal?
2. Why sampling is important?
3. How will you take samples of dairy products?
4. What is the role of agitator?
5. What is the use of chlorine?