EXPERIMENT 2 STRAINING, FILTRATION AND CLARIFICATION OF MILK

Structure

2.1 INTRODUCTION

Several extraneous /foreign substances, soluble and /or insoluble find entry into milk on exposure to the atmosphere during milking, collection, transportation and storage. All these are not normal constituents of milk and their presences in milk is considered undesirable and highly objectionable. These extraneous materials found in milk may consist of dust, dirt, fodder pieces, hair, flies, dung, leaves etc. The presence of such substances not only affects the quality of milk as such but they may be accompanied by large number of microorganisms, which deteriorates the quality of milk, if their growth is not checked.

Clarification is considered to be the most effective means of removing extraneous materials from milk whereas straining, the least effective. Filtration can be placed in between these processes in effectiveness.

2.2 OBJECTIVES

- learn the importance of straining and clarification of milk.
- remove visible and nonvisible materials from milk.
- improve aesthetic quality of milk and reduce the sediment in milk.
- improve microbiological quality of milk to low extent.
- indicate standard of sanitation followed during the milking process at the farm.
- assemble and dismantle the clarifier.
- strain, filter and clarify milk to make it free from visible and invisible sediment.

2.3 EXPERIMENT

i. Principle

The filtration process involves use of filters, which are generally placed in the processing lines. In hot milk filters, the temperature is about 32 to 42° C while in cold milk filters, 4 to 15° C is used. For efficient filtration, filter is changed at certain

interval depending on quality of milk or may be reused after proper washing, cleaning and sanitization.

Clarification removes suspended foreign particles by centrifugal sedimentation. Due to the centrifugal force generated, by rotating disc, the heavier extraneous materials are separated from the liquid and are thrown to the outer edge of clarifier disc and collected as sludge on the inside surface of bowl casing. Removal of the accumulated sludge i.e. dislodging, is done manually or mechanically either automatically or semi-automatically.

ii. Requirements

Metallic strainer, muslin cloth, filter frame, filter, clarifier, pressure gauge, filter pad, thermometer, balance, spanner, sediment tester, detergents etc.

iii. Procedure

(A) Straining and filtering of milk

i) Sanitize straining material / muslin cloth by dipping it in boiling water for 5 minutes.

ii) Hold the muslin cloth properly or fix the filter in the milk pipeline tightly.

iii) Allow milk to pass through the sanitized muslin cloth / filter.

iv) Change the muslin cloth or clean and sanitize it for reuse.

(B) Clarification of milk

i) Dismantle the clarifier and clean all the parts.

ii) Assemble the distributor, discs and other parts as per instructions of the manufacturer.

iii) Tighten the hood along with discs with the screw nut.

iv) Start the clarifier and wait for five minutes till clarifier attains full speed.

v) Allow milk at 43 to 48 ° C to pass through the clarifier.

vi) Operate the clarifier for 3 to 4 hours.

vii) Stop the flow of milk.

viii) Switch off clarifier and wait till the bowl stops completely.

ix) Dismantle the clarifier and wash with a detergent.

iv. Observations

Presence of sediment in milk should be recorded by sediment tester.

i) Before straining ..... mg

ii) After straining ..... mg

iii) Before filtering ..... mg

iv) After filtering ..... mg

v) Before clarification ..... mg

vi) After clarification ..... mg

v. Results

Compare the sample discs with standard discs and classify the milk as “satisfactory”, “fair”, “Unsatisfactory” or “ very unsatisfactory” or “rejection grade” as per BIS standards.

2.4 PRECAUTIONS

i) The muslin cloth / strainer should be frequently cleaned and sanitized.

ii) Always strain the milk prior to its processing.

iii) Change filter pads frequently, depending upon the sediment in milk.

iv) Never filter or clarify milk after pasteurization.

v) Follow the manufacturer's instructions carefully for operating a clarifier.

vi) Do not forget to pre-heat milk to 45° C before feeding into the clarifier.

EXPERIMENT 3 CHILLING AND STORAGE OF MILK

Structure

3.1 INTRODUCTION

Milk deteriorates fast under ambient conditions with time, as the micro-organisms grow in a logarithmic manner. The initial high microbial load and the long time involvement between production and processing make it necessary to chill the milk immediately at the production /collection centres, before it reaches the dairy plant. Chilling is very effective in checking the growth of micro-organisms. Chilling of milk can be achieved by the use of ice, chilled water, brine water, liquid refrigerant etc. in surface cooler, bulk milk cooler, roto-freeze, shell and tube coolers, plate coolers, and intermittent absorption units.

3.2 OBJECTIVES

- understand importance of chilling of milk.
- use the correct method and temperature of chilling to avert growth of micro-organisms present in milk.
- maintain the quality of raw milk received.

3.3 EXPERIMENT

i. Principle

Depending upon the chilling equipment, milk is chilled by extracting heat from it by circulating cooling medium indirectly. Cooling medium commonly used is chilled water, brine, ice-water or liquid refrigerant. Once milk is cooled down to below 4 or 5° C, the chilled milk is stored in insulated / refrigerated storage tank till dispatched to the main dairy.

ii. Requirements

Chiller, milk pump, tipping tank, milk storage tank, chilled water tank, inter-connecting pipes and fittings, thermometers, cold milk filter etc.

iii. Procedure

i) Weigh the quantity of milk to be chilled.

ii) Dump the milk into the tipping tank/vat.