

REPORT ON INTERNSHIP TRAINING

**TAMILNADU CO-OPERATIVE MILK PRODUCER'S FEDERATION LIMITED
(TCMPT) AAVIN DAIRY INDUSTRY
SHOLINGANALLUR, TAMILNADU**



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CONTEXT

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INTRODUCTION

COMPANY PROFILE:

Aavin is a milk product brand name of Tamil Nadu Co-operative Milk Producers Federation Limited. It is an Indian dairy company, which headquarter is in Chennai, Tamil Nadu, India. TCMPF manages the activities such as milk procurement, processing, and marketing of milk and milk products.

The company formed as an apex body of three tier cooperatives set up in Tamil Nadu and the district-level milk producer unions. The Foundation of the Milk Co-operative Movement lies in the conviction that the country's socioeconomic development is intertwined with the development of rural India.

The company has taken various measures such as payment of attractive procurement prices to milk producers, huge investment in dairy infrastructure at all levels starting from Primary Dairy Co-operative Societies, to State level Federation. Aavin was established in 1972. In 1972, the company set up its first dairy plants in Chennai. In 1981, the company developed the "Anand pattern" by Dr. Kurian. In 2017-2018, the per capita availability of milk in Tamil Nadu increased from 169 gm/day in 1993-94 to 268 gm/day.

In 2017-2018, due to an increase in Milk production, the rise in per capita income, changing lifestyle, food habits, and export opportunities contributed to the rise in the demand for milk and milk products. The company expands the organization all over the world and provides the best quality milk products with customer satisfaction.

TAMILNADU CO-OPERATIVE MILK PRODUCERS' FEDERATION LIMITED:

The Dairy Development Department was established in 1958 in Tamil Nadu. The administrative and statutory control over all the milk cooperatives in the State was transferred to the Dairy Development Department on 1.8.1965. The Commissioner for Milk Production and Dairy Development was made the functional Registrar under the Cooperative Societies Act. With the adoption of the 'Anand pattern' in the State of TamilNadu, Tamil Nadu Co-operative Milk Producers' Federation Limited was registered in the State on 1st February 1981. The commercial activities of the Department such as Milk Procurement, Processing, Chilling, packing, and sale of milk to the consumers, etc., hitherto dealt with by the Tamilnadu Dairy Development Corporation Ltd., were transferred to the newly registered Tamilnadu Co-operative Milk Producers' Federation Limited, popularly known as "Aavin". Tamilnadu Co-Operative Milk Producers Federation Limited was constituted on 1st February 1981. Federation is Procuring, Processing, and Marketing Milk and Milk Products. The Federation has implemented Dairy Development activities under Operation Flood. Programme with the financial and technical assistance of the National Dairy Development Board. Chennai Metro is having 4 Dairies. Milk Procurement, Processing, and distribution are being attended by the District Unions in the respective areas. In the wake of liberalization policy, private dairies have also entered into the field of dairying. As per the directions of the Hon'ble Chief Minister of Tamil Nadu high priority has been given to improving the performance of milk Co-operatives by adopting a systematic approach and proper strategy in Milk Co-operatives. Significant achievement has been made by Milk Producers' Cooperative Societies, Unions, and Federations in the State of Tamilnadu. The cattle population in India is approximately 15% of the total cattle population in the world. India stood no. 1 position in milk production. Tamilnadu is one production. The milk production in Tamilnadu per day is 145.88 Lakh litres. TCMPF is a Cooperative Apex Body in the State of Tamil Nadu representing organizations of milk producers and implementing all round dairy development activities to achieve the following objectives

OBJECTIVE:

- To ensure an desired and conceptive market around the year for the milk produced by the farmer sombre.
- To make availaits quality milk and value-added dairy products to consumers.
- To build & develop village-level institutions as cooperative model units to manage.
- dairy activities o ensure the provision of inputs for milk production, processing facilities, and dissemination of know-how,
- To facilitate rural development by providing opportunities for self-employment at the village level, preventing migration to urban areas, and introducing a cash economy and opportunity for a sustained income.

IN-PLANT VISIT

• RECEPTION DOCK:

Milk is received in insulated tankers of 9000 liters and 15000 liters capacity from different unions. Tankers are weighbridge before and after emptying. The reception section has two reception points for tankers which can be used alternately. Cleaning of tankers by flushing hot water is carried out at reception points, Milk pump with a capacity of 20000/hr is installed in the reception section.

Unloading of tankers is carried out in automated mode with PLC Control. A total of 5.2 lakh liters of milk is received per day on average which comprises mixed milk, Separated skim milk, and concentrated skim milk.

• TYPES OF SILOS:

1. RAW MILK SILO:

This tank is used largely at dairies for storing and keeping milk at cool temperature these are insulated storage tanks (silo). Inside the tank welding lines are ground and polished. The silo body material is stainless steel. The capacity of this silo is 1000000L.

The pumping raw milk is stored in this silo. This silo milk only goes to the plant to pasteurize and homogenization and from the processed milk. These milks are stored in the processed milk silo.

2. PROCESSED MILK SILO:

The processed silo was comparatively smaller than the raw milk silo. The capacity of silo less than the raw milk silo. The capacity of this silo is 30000 L. These silos are washed using CIP and sterilised after every refill.

This silos contain different types of milk such as:

1. TM - TONED MILK
2. DTM- DOUBLED TONED MILK
3. SM - STANDARISED MILK
4. FCM - FULL CREAME MILK
5. TEAMATE
6. COW MILK

so these milks only storage tank and go into the packing section to packed...

● **STORAGE SECTION:**

Milk is kept in enormous containers known as SILOS. There are 8 SILOS IN total, each with a volume of one million square meters. After entering the balancing tank and passing through a plant chiller, the milk from the tanker is pumped into the SILOS. different types of milk are kept in each SILO. Three SILOS are set aside for the storage of mixed milk (cow and buffalo milk combined). One for full cream milk. One toned milk. one for standardized milk. And the remaining two for separated skim milk (butter is removed from the milk).



- **BALANCE TANK:**

The float control balance tank maintains the milk flow at a constant. It generally has a sensor to maintain the flow of milk. It also receives the milk from flow diversion valve (FDV) When the pasteurization occurs improperly.

- **PROCESS CONTROL ROOM (PLC AND SCADA)**

PLC and SCADA are both used to monitor and control equipment in process automation across many different industries, such as telecommunication, water and waste control, energy, oil and gas, and transportation.

In this plant, PLC and SCADA systems are used to control all the operations, mainly opening and closing of every pneumatic valve.

- **PRODUCTION SECTOR:**

PASTEURIZATION:

The process of heating milk to 78°C - 2°C and cooling to below 50° C. Heating of milk to 78°C and holding it for 15 sec kills the harmful bacteria in it. Maintaining at 5°C can improve the self-life of milk and prevent the growth of harmful bacteria.

PASTEURIZER:

The pasteurizer has 5 section namely,

- ❖ Heating
- ❖ Regeneration
- ❖ Cooling section
- ❖ Holding coil

- **CLEANING IN PLACE SECTION:**

In order to ensure that all contaminated contact surface are cleaned to acceptably high and consistently reproducible standards, cleaning – in- place (CIP) Involves the circulation or recirculation of appropriate water rinses and chemical cleaning and sanitizing solution through plants and equipment that are kept in the assembled state.

- **DUPLEX FILTER:**

Duplex filter is used to filter the foreign matter present in milk. Here the duplex is placed after regeneration-1 to improve the quality of filtration (increased temperature of milk after the regeneration-1 process, promotes good filtration).

- **HOMOGENIZATION:**

It is the process of breaking fat globules at even size (2 μ). Homogenization occurs after regeneration -2 at 45°C. Hence the milk is forced through a small passage at high pressure.

It has 2 stage.

Stage 1:1500psi

Stage 2:500psi

It has 3 high speed pistons to break the fat molecules.

- **FLOW DIVERSION VALVE:**

It is to prevent the unpasteurized milk. It is a 3-way valve. It returns the unpasteurized milk to balanced tank to make it pasteurized since it cannot allow milk to the packing area.

- **TRIBLENDER:**

Tri blenders are used to mix dry SMP powder with a liquid in a continuous basis. It uses a centrifugal pump as the primary drive for the mixing and the infeed of the both liquid and the dry powder.

- **BUTTER MELTING VAT:**

Butter melting vat is used by people for melting butter owing to its operational fluency and temperature resistant design. Its converts butter oil. The butter oil gets filtered and joins the homogenization process.

- **RO (REVERSE OSMOSIS) PLANT:**

Plant capacity production is 10kl per hour purpose the of RO plant is to reduce the scale forming and to allow contamination.

RO water is used for:

- ❖ Solar panel
- ❖ Processing
- ❖ UHT plant
- ❖ Boiler

- **BOILER HOUSE:**

A boiler, often known as a steam generator, is a machine that uses heat to turn water into steam. Depending on the need, different boilers are used to produce different forms of steam, including wet steam, dry steam, and super- heated steam. This, location generates steam that is used for pasteurization among other things.

- **REFRIGERATION SECTION:**

The dairy business depends heavily on its refrigeration system. Various refrigeration system types are employed depending on factors like size, application, design, capacity, etc. The compressor, condenser, expansion valve, and evaporator are the parts of the refrigeration system vapour our compression refrigeration is the basis of refrigeration. The workforce needed to transfer heat from a low- temperature body to a high- temperature body is provided by the compressor.

- **PREPACKING SECTION**

one Prepack machine is specially designed for filling 5 liters pouch. Each of the these prepack machine have overhead mini tank with a holding capacity of 40 litres which gravity feeds milk into the pouches via nozzle. Pasteurized milk stored in silos is pumped to prepack overhead tanks each with a capacity of 15000 litres prior to sachet. A plate chiller is installed en-route to maintain the temperature of milk well below 5° C. The quality parameters of pasteurized 37 milk like COB, MBR time, acidity, fat SNF are tested prior to filling in pouches to assure its quality. Samples are acquired every one hour during sachet to keep a check on the keeping quality of milk.

- **FILM:**

Per day film usage 8 tons

Film thickness:

63 microns for half litre film 110 microns for 5 litre film

Empty film thickness:

A mini sachet (225ml)-1.9g

A half-litre sachet -2.7 to 2.9g

one litre sachet- 4.5g

A five-litre sachet 28g

MILK SACHET VARIETIES:

- Double toned milk: half litre sachet
- Toned milk: half and one litre sachet
- Standardized milk: 5 litter, half litre and 225 ml sachets.
- Full cream milk: half litre sachet



- **PACKAGING SECTION:**

- ❖ **FULL CREAM MILK: (FAT 6% AND SNF 9%)**
- ❖ **TONED MILK: (FAT 3% AND SNF 8.5%)**
- ❖ **STANDARDIZED MILK: (FAT 4.5% AND SNF 8.5 %)**
- ❖ **DOUBLE TONED MILK: (FAT 1.5% AND SNF 9%)**
- ❖ **DELITE MILK: (FAT 3% AND SNF 8.5%)**
- ❖ **TEA MATE MILK:(FAT 6.5 % AND SNF 9.0%)**

- **EFFLUENT TREATMENT PLANT:**

Oil, sludge, grease, and other pollutants can contaminate water, which can be treated using the ETP mechanism and method. This method is intended to clean industrial wastewater so that it can be reused or safely dumped into the environment. The effluent treatment plant is utilised to purify water used in the dairy industry's butter, powder, packaging, loading, and tray wash sections as well as tanker cleaning.

Tests done in ETP:

Chemical oxygen demand (COD)

Biochemical oxygen demand (BOD)

Mixed liquid suspended solids (MLSS)

Total suspended solids (TSS)

Total dissolved solids (DTS)

Oil and grease PH Dissolved oxygen (DO)

Volatile fatty acid (VFA) Chlorine Sulphuric.

NOTE:

Chemicals added in aeration tank urea, DAP, etc. if it is necessary.

ADVANTAGES:

1. ETP converts wastewater into clean & safe water and it saves us money.
2. It protects our environment from pollution and ETP eliminates the need to transport clean water.
3. It protects humans from various diseases caused by wastewater.
4. ETP helps in minimizing waste and It saves water by recycling the old or polluted water.

ULTRA-HIGH-TEMPERATURE HEATING TREATMENT:

Just like the Pasteurization of milk, Ultra High-Temperature processing is a heating method that is used to reduce the microbial load to an acceptable level. In this processing technique, the milk is heated to a temperature of 140°C for 2 seconds. The milk used here is pure cow milk without any adulteration or processing. The milk is received at 5°C and stored in SILOS. The equipment used for heating milk is called Double Tube Heat Exchanger. The raw milk is gradually heated through a series of heating coils within DTHE.

After the milk is heated to a temperature of 140 C, the milk is passed through the holding tube for 2 seconds. The milk is immediately cooled by 2°C to prevent any off- flavour development. The milk passes through the DTHE to gradually get cooled to 30°C. The process then enters the packaging section which is maintained under aseptic conditions. The 92-micron 9-layered pouches are rinsed with Hydrogen Peroxide solution to maintain sterility. Excess H₂O₂ is removed by rubber strips present inside the machine. The packaged milk is tested for its properties. The milk produced by this method has a shelf-life of 3 months until opened.

SOLAR WATER HEATING UNIT (CST):

Water fed to the boiler is heated using solar water heating system heating system. Water from the soft water tank is circulated through tubes underneath the solar heating panels where the temperature is raised around 65°C, the heated water is stored in feed water tank from where it is pumped to the boiler. There are two feed water tanks catch with holding capacity 10,000 litres. The main advantage of using solar heating system is reducing in fuel consumption

QUALITY CONTROL LABORATORY

- ORGANOLEPTIC TEST
- TEMPERATURE
- CLOT ON BOILING TEST
- METHYLENE BLUE REDUCTION TIME TEST
- FAT
- SOLID NOT FAT
- CORRECTED LACTOMETER READING
- ACIDITY
- ADULTERANTS TEST
- STANDARD PLATE COUNT
- SWAB

PRELIMINARY TEST

ORGANOLEPTIC TESTS

1) ODOUR:

The raw milk should be free of any unpleasant smell such as acidic smell. Normal milk should not have any off -or unnatural smell in it. If the smell is slightly sour, the milk might have undergone microbial deterioration.

2) TASTE:

The milk should be free of unpleasant taste. Adulteration of milk with salt, sugar, etc. can also be detected by taste ,and if found positive must be rejected.

3) APPEARANCE:

The raw milk should be free from any foreign matters and offcolors. Normal milk should be free from these. The presence of visible dirt, straw, or manure indicates that milk has been handled in an unhygienic way. The color of the milk of cows and sheep should be slightly yellowish-white and that of buffaloes and goats absolutely white. If the color is reddish, the milk may contain blood; if it is yellowish, it may contain pus. Such milk may be secreted from the infected udder (mastitis) and should not be accepted.

4) TEMPERATURE:

The temperature of the milk sample is checked using a thermometer. The temperature of the received milk should not exceed 8-9°C.

CLOT ON BOILING (COB)

- Take 5 ml of milk in a sterilized test tube.
- Heat it for just boiling and observe clotting on the side of the tube.
- When the whole of the milk clots to be adhering to the sides of the tube the result can be recorded as "positive".
- If clots are absent the result shall be recorded as negative.
- Remark COB positive milk is not accepted for processing. The removal of the oxygen from milk and the formation of reduction substances during bacterial metabolism causes the color to disappear.

STANDARDS FOR RAW MILK:

METHYLENE BLUE REDUCTION TIME (MBRT)

Methylene blue dye is prepared by dissolving 1 tablet of standard methylene blue tablet in 200ml of cold, sterile, distilled water in a sterile flask. Allow to stand for an hour and ensure the complete dissolution of the tablet. This is further diluted with 600ml of sterilized distilled water and kept as a stock solution.

PROCEDURE:

- Take 10ml of milk in a sterilized test tube.

- Add 1ml of MB dye to get a concentration of 1 part of dye to 300000 parts of milk and plug with a sterilized cork.
- Invert the tube to mix the contents and incubate at 37°C in a water bath.
- The color of milk in the tube is examined first 10 minutes and then every half an hour and the time required for complete decolorization is noted.
- Incubate two control tubes with each batch consisting of
 - a) 10 ml of milk mixed with 1ml of methylene blue solution.
 - b) 10ml of milk mixed with 1 ml of water.
- Immerse both tubes in boiling water 3 minutes to destroy the natural reduction of the milk.
- Comparison of tests with (a) Will show when decolorization is beginning and comparison with (b) will show it is complete.

MBRT TIME IN HOURS	QUALITY OF MILK
5 hours and above	Very good
3-4 hours	Good
1-2	Fair
1/2	Poor
Less than 10 mins	Not accepted

ACIDITY TEST

- The clean conical flask is taken and 10 ml of thoroughly mixed milk sample is added.
- 10 ml of distilled water is added and a few drops of 2 percentage phenolphthalein solution is added.
- The mixture is titrated against 0.1N NaOH filled in the burette. The titrated reading is noted down at the appearance of pale color.

Calculation:

Percentage of acidity in milk = $\frac{M \times N \times V}{W}$

Where the M- Molecular weight of NaOH

N – Normality of NaOH

V – Volume of NaOH

W – Weight of NaOH

Note: Fresh milk contains 0.1 percentage to 0.11 percentage of existing acidity due to the presence of milk proteins etc. milk acidity will increase due to the presence of micro-organisms (developed acidity). The milk will be started to clot at the boiling when milk's total acidity reached 0.17 percentage to 0.18 percentage. The milk acidity below 0.16 percentage is fit for processing and for products it should be below 0.14 percentage.

DETERMINATION OF FAT BY GERBER METHOD:

PROCEDURE

- Take 10 ml of Gerber acid (90 percentage sulfuric acid in a butyrometer.
- Add 1ml of amyl alcohol ($C^*H-\{3\} - C^*H-\{2\}-CH(2)CH(2)CH(3)$) + close the neck with a stopper.
- Mix the contents thoroughly until the curd has dissolved.
- Transfer the butyrometer into a water bath of 65 degrees c + 2°c and keep it for 5 mins.
- Dry the butyrometer into a centrifuge for centrifugation at 1100ppm for 5 mins.
- Take the butyrometer and place it in the water bath of 65°c + 2 degrees c and keep it for 5 mins.
- The scale of separation of fat and acid gives the percentage of fat.

Note: For raw milk minimum fat is 3.0 percentage below will be confiscated.

CORRECTED LACTOMETER READING (CLR)

- Adjust the temperature of the milk sample to 84°F Mix the milk gently by pouring it several times from one bottle to another avoiding the

incorporation of air. Fill the lactometer cylinder with the milk sample. Allow the lactometer to float freely on the milk without touching it. The sides of the cylinder. Ensure some quantity of milk overflows the cylinder when the lactometer is inserted. Allow the lactometer to come to rest and then take the visible lactometer reading.

SOLID NOT FAT (SNF)

Take the average of the two visible lactometer readings, modified RICHMONDS formulae:

$$\text{SNF} = \text{CLR}/4 + (0.2 * \text{FAT}) + 0.36$$

PHOSPHATE TEST:

The manufacture of milk that is safe and pathogen – free depends on the pasteurization process. An enzyme called alkaline phosphate is naturally found in milk, but it is destroyed at a temperature that is very close to the pasteurization temperature. When determining whether milk has been effectively pasteurized or whether it has been tainted with raw milk after pasteurized, the alkaline phosphate test is utilized. This test is based on the idea that, at an alkaline pH, the alkaline phosphatase enzyme in raw milk releases phenol from a disodium para-nitro phenyl phosphate and creates a complex that is yellow in color. The amount of yellow color created is inversely related to the enzyme's activity.

- 3.5g of sodium carbonate and 1.5g of sodium bicarbonate are weighted and dissolved in 1liter of distilled water and the solution is sterilized, which serves as a buffer.
- 1.5g of p-nitro phenyl disodium orthophosphate is added to the buffer and acts as A substate.
- 1 ml of milk sample is taken in a test tube.5 ml of the above prepared buffer is added to the milk sample.
- The test tube is placed in a water bath maintained at 37 degrees c
- The appearance of yellow color confirms the presence of phosphatase enzyme indicating an improper pasteurization process.

ADULTERATION TESTS:

SUGAR:

- Take 5ml of milk in the test tube.
- Add .1ml of conc. HCl.
- Add 0.1g of resorcinol powder and mix thoroughly.
- Place the test tube in boiling water bath for 5 mins.
- Withdraw the tube and observe the color.
- Appearance of deep red color indicates presence of sucrose or ketose sugar.

STARCH:

- Take 5 ml of milk in a test tube.
- Bring to boiling condition and allow test tube to cool to room temperature.
- Add 1-2 drop iodine solution to test tube dissolve 1.3 gm of iodine and 1.5 gm of potassium iodine in sufficient distilled water and make up to 100 ml.
- Development of blue color indicates the presence of starch which disappears when the sample is boiling and appears on cooling.

UREA:

- Take 5 ml of milk in a test tube.
- Add 5 ml dimethyl amino benzaldehyde and dissolve 1.6 gm of p-dimethyl amino benzaldehyde in 100 ml of 10 percentage HCl.
- Distinct yellow color is observed in milk containing added urea shows a slight yellow color due to the presence of natural urea.

SALT (SODIUM CHLORIDE):

- Take 2 ml of milk in a test tube.
- Add 1 ml of 5 percentage potassium chromate.
- Add 2 ml of 0.1 N silver nitrate.
- Appearance of yellow color indicates presence of dissolved chloride.

MOLTO DEXTRIN:

- Take 5 ml of milk in a test tube and add equal vol of 10 percent acetic acid the milk will curd.
- Filter it and take 1 ml of filtrate in a test tube and add a few drops of orio
□ Appearance of brown color indicates the presence of molto dextrin.

NEUTRALISERS:

- Rosa acid test for the presence of carbonate.
- Take 5 ml of milk in a tube and add an equal vol of 95 percent alcohol.
- Add red color indicates the presence of alkali. □ Normal milk shows only a brownish color.

HYDROGEN PEROXIDE:

- Take 10 ml of milk in a test tube.
- Add 5 drops of 2 percent phenylene diamine hydrochloride.
- Mix thoroughly and observe the color.
- Development of an intense blue color shows the presence of hydrogen peroxide.

FORMALDEHYDE:

- Take about 10 ml of milk in a test tube.
- Add 0.5 ml of ferric chloride solution.
- Add carefully about 1 ml of conc H_2SO_4 .
- Down the side of the test tube in such a way that it forms a separate layer at the bottom of the test tube without mixing with the milk.
- Development of violet or blue color at the junction of the two liquids indicates the presence of formaldehyde.

AMMONIUM SULPHATE:

- Take 1 ml of milk and add 0.5 ml of 2 percent sodium hydroxide □ Add 0.5 ml of 2 percent sodium hypochloride.
- Add 0.1 ml of phenol solution and heat for 20 mins in a boiling water bath.
- Bluish color turns deep blue indicates presence of ammonium sulphate.

AUTOMATIC TESTING MACHINE MILK

O SCAN MINOR:

USAGE: Measure the fat, SNF, and protein in a raw milk and pasteurized milk.

Milk o scan analyses the product using the absorption of different wavelength the of “INFRARED” spectrum to detect the presence of specific parameter in milk like fat, SNF, auto cleaning and auto zero setting.

MILK O SCREEN:

USAGE:

- Measure the fat, SNF, and adulteration in raw milk.
- Fourier transform infrared, spectroscopy technology **PRINCIPLE:**
- Milk O Screen analysis the product using FT- infrared technology, assessing milk constituents, using absorption at different wavelengths in the in the infrared spectrum to detect the presence of specific parameters in milk like fat, SNF, and protein
- FTIR technology offers unique ability to screen milk for adulterants. Natural raw milk has particular spectrum like a unique finger print. Fourier Transform Infrared spectrum of absorbing or emission of a solid, liquid or gas.
- The milk o screen detects milk parameters fat, SNF, protein and adulteration like added water, maltodextrin, ammonium, sulphate, sucrose, urea, presence of other absorbing adulterants is displayed as abnormal milk.

MICROBIOLOGICAL LAB

- **A microbiology laboratory is a laboratory devoted to the culturing, examination, and identification of microorganisms including bacteria, fungi, yeasts, etc. The microbiology laboratory has a crucial role in effective infection prevention and control**

- Among innovations in the dairy industry, the study of fermenting microorganisms takes an important part as they are essential ingredients in product manufacturing. Among beneficial microbes, probiotics used in dairy products bring health benefits through their consumption.

TESTS IN MICRO LAB:

- COLIFORM
- SPC (Standard plate count)
- SWAB

MEDIAS AND BROTH REQUIRED:

- Coliform selective media Violet Red Bile Agar
- SPC selective media-Tryptone Glucose Extract agar
- SWAB Test-Micron broth
- Saline solution Preparation:

- **COLIFORM**

Weigh about 41.53g of Violet, Red Bile Agar.

Measure 100ml of distilled water in a conical flask and add Violet Red Bile Agar and mix well.

Close the conical flask using aluminum foil.

Incubation time – 24 hours.

- **STANDARD PLATE COUNT (SPC)**

Weigh about 24.0g of Tryptone Glucose Extract agar. Take 1000ml of distilled water in a conical flask and add Tryptone Glucose Extract agar and mix well.

Close the conical flask with aluminum foil.

Incubation time is 48 hours.

- **SALINE SOLUTION:**

Weigh about 18g of sodium chloride. Take 1000ml of distilled water in a beaker add sodium chloride to it and mix it well.

Transfer it to the test tube about 9ml each for serial dilution.

Close the test tube with aluminum foil.

Autoclave the prepared media, broth, saline solution, and 1ml micro pipette used during serial dilution for 2 hours.

Note: On the laminar air flow chamber before the plating starts, check the burner, and clean the work area with a cleaning spirit and sponge. During plating control plate is the most important which to observe the changes in plating.

○ PROCEDURE:

- **The prepared media, saline tubes and pipettes are to be autoclaved initially at 121 degree C for 15 mins.**
- **Make sure the plates are sterilized in the hot air oven at 160C. The milk samples, Raw Milk, Std milk, Toned milk, and Full Cream milk are used respectively. The samples are then serially diluted, marking 5 dilutions for raw milk and 3 dilutions for each processed milk sample (TM, SM, and FCM).**

○ From this, for coliform

Raw milk – Take 1ml of sample from the 3rd dilution.

Pasteurized milk – Take 1ml of sample from 1st dilution. Pour the sample in petri plate and add about 5ml of selective media for coliform.

○ For SPC (Standard Plate Count)

Raw milk – Take 1ml of sample from the 5th dilution.

Pasteurized milk – Take 1ml of sample from the 3rd dilution. Pour the sample in petri plate and add about 5ml of selective media form Standard media for Standard Plate Count (SPC).

Pour 1ml of the sample in a petri plate and add the media and allow it to solidify and incubate it for 48 hours at 37C. Repeat the process for Day 2 and Day 3 refrigerated samples.

RESULT:

The formation of yellow color in the test tube indicates the presence of coliform bacteria, it indicates acid production and if bubbles collected in tube, then it indicates gas production.

CONCLUSION

To end with, the internship/ training that I received from the wonderful staff members was a useful experience. I have gained new knowledge, skills and met many new people. Related to our study. I learned more about the manufacturing of milk Furthermore I have experienced that it is of important that education in manufacturing is objective and we have to be aware of the industrial aspect of the topics we study. This internship program was not one-side, but it was industrial aspect of the topic we study. This internship program was good to find out what my strengths and weakness are, which helped me to define the skills and knowledge that are to be strengths and weakness are, which helped me to define the skills and knowledge that are to be improved in the future. At last, this internship has given us the new insights and motivation to pursue a career in the field.

