

INTERSHIP REPORT



TAMIL NADU CO-OPERATIVE MILK PRODUCERS FEDERATION LIMITED

(AAVIN) AT
SHOLINGNALLUR, TAMIL NADU.

TRAINING PERIOD (03.10.2023 – 17.10.2023)

Submitted to partial fulfilment of requirements

For the award of degree of

MASTER OF SCIENCE

IN

CHEMISTRY

SUBMITTED BY:

BAKYAPRASANNA S (42910003)

BATCH (2022-2024)

DEPARTMENT OF CHEMISTRY



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

ACKNOWLEDGEMENT

The internship opportunity I had with AAVIN, Sholinganallur was a great chance for learning and professional development. Therefore, I consider myself as a very lucky individual as I was provided with an opportunity to be a part of it. I am also grateful for having a chance to meet many wonderful people and professionals who led me through this internship period.

First and foremost, I would like to express my heartily thanks to **Deputy General Manager-DGM of AAVIN, Ambattur**, who in spite of being extraordinarily busy with his studies, took time out to hear, guide and keep me on the correct path and allowing me to carry out my internship training at AAVIN Sholinganallur dairy.

Bearing in mind previous I am using this opportunity to express my deepest gratitude and special thanks to **Mrs. Devaki- AGM of AAVIN, Sholinganallur** for taking part in useful decision and giving necessary advices and guidance and arranged all facilities to make this training easier. I choose this moment to acknowledge her contribution gratefully.

It Is my radiant sentiment to place on record my best regards, deepest sense of gratitude to **Mrs. Sushila, Mrs. Bhanumathi, Mr. Kalaiaarsan, Mrs. Usha and Mr. Arun** for their careful and precious guidance which were extremely valuable for my study both theoretically and practically.

Further, on I want to thank **Mr. Bilal, Mr. Arivazhagan, Mr. Govindan** and all other staff members who made this demanding time efficient and also joyful.

I perceive this opportunity as a big milestone in my career development. I will survive to use gained skills and knowledge in the best possible way, and I will continue to work on their improvement, in order to attain desired career objectives.

THANK YOU ALL!

INDEX

CHAPTER NO	TITLE	PAGE NO.
1	INTRODUCTION	2-3
1.1	THE PRODUCTION LEVEL OF MILK	
1.2	DISTRICT UNION OF FEDERATION	
1.3	FUNCTIONS OF CO-OPERATIVE MILK PRODUCERS UNION	
2	PURPOSE AND SCOPE	3-4
2.1	INTERNSHIP PURPOSE AND STUDY	
2.2	SCOPE OF THE STUDY	
2.3	OBJECTIVES	
3	DAIRY PROCESS	5-9
3.1	COLLECTION OF MILK	
3.2	DAIRY PROCESSING	
3.3	CIP SECTION	
3.4	TYPES OF AAVIN MILK	
4	QUALITY CONTROL LAB	10-18
4.1	TESTS INVOLVED IN CHECKING QUALITY OF MILK	
4.2	ACIDITY IN MILK	
4.3	DETERMINATION OF FFA	
4.4	HARDNESS IN WATER	
	INSTRUMENTAL METHODS OF ANALYSING	
4.5	MILK QUALITY	
5		18-24
5.1	UHT PLANT	
5.2	EFFLUENT TREATMENT PLANT OF AAVIN	
	CONCLUSION	25

CHAPTER-1

1.INTRODUCTION

ABOUT THE COMPANY

India is well known as the 'Oyster' of the global industry and the largest producer of milk in the entire globe. The cooperatives contribution is high to this total production. In Tamil Nadu, AAVIN is the first cooperative milk society dealing with milk and value-added products of milk. AAVIN union is a government which was founded in the year 1958. Milk is procured from the village level societies twice a day. The milk cost payment is made on the basis of a quality test which consists of Fat and Solid Non-fat content.

1.1. THE PRODUCTION LEVEL OF MILK

The AAVIN Dairy industry produces about 65,000 litres of milk during the Summer period and 80,000 litres of milk during the Winter period. This happens because during the dry summer months there will be a low availability of green fodder for cattle for the fall of milk production.

1.2. DISTRICT UNIONS OF FEDERATIONS

There are about 17 district Co-operative Milk Producers Unions functioning in Tamil Nadu, covering 30 Districts. They are:

- **Kancheepuram- Tiruvallur**
- **Villupuram**
- **Vellore**
- **Dharmapuri**
- **Salem**
- **Erode**
- **Coimbatore**
- **Nilgiris**
- **Madurai**
- **Dindigul**
- **Trichy**
- **Thanjavur**
- **Pudukottai**
- **Sivagangai**

- Virudhunagar
- Tirunelveli
- Kanyakumari

1.3. FUNCTIONS OF CO-OPERATIVE MILK PRODUCERS UNION

01. Establishment of chilling centres.
02. Formation of new milk routes to collect milk produced by the members of the societies.
03. Collection of milk from societies, process, and pack in modern dairy.
04. Supply of Quality of milk.
05. Fixation of procurements and selling milk price of milk.
06. Supply of inputs to the members of the societies.

CHAPTER-2

2.PURPOSE AND SCOPE

2.1 INTERNSHIP PURPOSE AND STUDY:

The purpose of the internship is to obtain extra knowledge about the dairy centre and to know about the function and activities of AAVIN. In this internship, I get to know about the milk and milk-based processing methods of AAVIN situated at Sholinganallur.

I have attained a lot of information which includes production, products, sales, profit, loss etc. In this project, we also took effect to know about, assessing the quality of the milk via various tests and also, I have learned about the waste-water management.

2.2 SCOPE OF THE STUDY

I have started this internship to know about the milk and milk-based processing methods of AAVIN situated at Sholinganallur (Chennai). I have attained a lot of information's which include production, products, sales, profit, loss etc. in this training period, I also took effect to know about

assessing the quality of the milk via various test and also, we have learned about the wastewater management.

2.3 OBJECTIVES

1. To obtain extra knowledge about the dairy centre.
2. To know about the functioning and activities of AAVIN.
3. To know about the financial highlight of the dairy centre.
4. To know about the process of a dairy product in the dairy centre.
5. To know about the waste water management in the dairy centre.

CHAPTER-3

DAIRY PROCESS

3.1 COLLECTION OF MILK

RAW MILK- MILK RECEPTION

The milk is collected from many villages. The milkman gives their milk through dairy form situated on their village. Therefore, both societies and milk givers can earn money with some profits. The collection of milk which is directly got from the milk giver is known as "Raw Milk". The milk can be collected in the morning and evening.

3.2 DAIRY PROCESSING

The milk collected from the chilling centres are brought to the dairy and are kept for assessing the quality. Some of the types of milk viz., standard milk, high fat, high protein milk, are being produced for the requirements of the consumers, the surplus fat is converted into ghee. The high fat and high protein milk are packed in 500ml sachets. In the dairy, milk, ghee, butter, ice-cream flavoured milk, rose milk, butter milk, etc., are being manufactured and marketing.

The overall steps for processing of milk is carried out in five sections. They are

- Storage Section
- Processing Section

- Boiler Section
- Packing section
- Refrigeration

STORAGE SECTION

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.

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.



MILK CHILLING

Chilling is not a pasteurization process but it is a necessary step when dealing with large volumes of milk. Milk leaves the cow's udder at temperatures above the ambient, which encourages rapid bacterial multiplication that speeds up spoilage. However, reducing temperature to between 2°C to 5°C arrests bacterial growth and metabolism. This provides a head start at keeping the quality before proper pasteurization commences.

PROCESSING SECTION

STANDARDIZATION STAGE

It is important to standardize milk fat to ensure that you end up with a product of consistent quality in the market. Different consumers prefer different products.

There are customers who will consume skim milk only while there are those who will take low-fat milk. There are those who will take standardized milk while there are those who prefer high-fat milk.

Standardization is necessary to ensure that all the customers are catered for. Again, it is during the process of standardization that you get to separate the butterfat that is used for making cream and other fat-based products such as butter and ghee. This process of cream separation is done in a cream separator.

HOMOGENIZATION

It is the process of breaking fat globules at even size (2p). Homogenization occurs after regeneration -2 at 45°C. Hence the milk is forced through a small passage at high pressure. It has 3 high speed pistons to break the fat molecules. This tank comprises 10,000 Litres capacity.

It has 2 stage:

- Stage 1:1500psi
- Stage 2:500psi

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. Pasteurization destroys 100% of pathogenic bacteria, yeast and mold and 95% to 99% of other bacteria.

BOILER SECTION

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.

PACKING SECTION

Prepack machine is specially designed for filling 5 litres pouch. Each of these prepack machines 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 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 8tons. Film thickness - 63 microns for half litre film 110 microns for 5 litre film.

Empty film thickness:

- Mini Sachet (225mL) - 1.9g
- Half-Litre Sachet - 2.7 to 2.9g
- One Litre Sachet - 4.5g
- Five Litre Sachet - 28g



Packing Machines

REFRIGERATION SECTION

Vapour adsorption cooling system is used. The milk is cooled with the help of the refrigeration compressor, where NH_3 is used as strong absorbent by water. A liquid pump is use to increase the pressure of strong solution. Finally the ammonia vapour will be condensed and recycled



3.3 CIP SECTION

Cleaning of dairy equipment and its sanitation are of utmost importance in dairy industry. Cleaning-in-place (CIP) involves circulation or recirculation of appropriate water rinses and chemical cleaning and sanitizing solutions through plants and equipment which is maintained in the assembled state, such that all contaminated contact surfaces cleaned to acceptably high and consistently reproducible standards. It involves usage of hotter, stronger and more soil aggressive chemical solution than manual cleaning. Filters and similar equipment should be taken out during CIP cleaning to prevent their damage. As the operation of CIP cleaning is inherently hazardous and not without danger and leaking and causing harm to men and material, its operation is automated in most of dairy industry including Sholinganallur dairy.

Cleaning Media

Media	Strength	Temperature	Time
Lye	0.8%-1%	70°-75°C	15 minutes
Acid	0.3%-0.5%	65°-70°C	15 minutes
Hot Water	-	80°-85°c	15 minutes

3.4 TYPES OF AAVIN MILK

There are 5 variants of milk available in AAVIN. They are

NAME OF MILK	FAT%	SNF%
Pasteurized Full Cream Milk (FCM)	6.0%	9.0%
Pasteurized Standardized Milk (SM)	4.5%	8.5%
Pasteurized Delite Milk or Cow Milk (DM)	3.0%	8.5%
Pasteurized Toned Milk (TM)	3.0%	8.5%
Pasteurized Double Toned Milk (DTM)	1.5%	9.0%



CHAPTER 4

QUALITY CONTROL LAB

4.1 TESTS INVOLVED IN CHECKING QUALITY OF MILK

There are different kinds of tests involved in checking the quality of milk

- A. Organoleptic Test
- B. Lactometer Test
- C. Testing Adulterants of Milk
- D. Fat Test
 - 1. Gerber Method
 - 2. Methylene blue Dye Reduction Test

A. ORGANOLEPTIC TEST

The appearance of the surface of the milk and the lid is observed and inspected right away after disposing of the lid of the incoming milk can. Any strange coloration of the milk, seen dirt and particles, changes in viscosity etc. are determined. Any strange odour, if noticed by way of inhalation of air status above the milk inside the upper part of the milk can also determined.

B. LACTOMETER TEST

If the milk appears to be too thin and watery and its colour is "blue thin" it is suspected that milk contains added water. Lactometer test serves as a quick method for determination of adulteration of milk by adding water. The lactometer test is based on the fact that the specific gravity of the whole milk, skim milk and water differ from each other.



LACTOMETER

C. TESTING ADULTERANTS IN MILK

Urea test, ammonia test, sugar test, glucose test, salt test, neutralizers test, hydrogen peroxide test, formalin test, nitrate test, starch test. These tests are carried out in the Milkoscreen apparatus.

Milkoscreen analyses the product using FT-IR technology, using absorption at different wavelengths in the infrared spectrum to detect the presence of specific parameters in the milk including fat, SNF and protein.

i) Detection of Sugar/ Sucrose

Place 3ml of sample milk in a test tube. Add 2ml of concentrated hydrochloric acid and after that 0.1g of resorcinol. If sugar is present in the milk it turns to red colour.

ii) Detection of Salt

Place 5ml of silver nitrate reagent in a test tube. Add 2-3 drops of potassium dichromate reagent to this. Further add 1ml of milk to this test tube and shake to mix thoroughly

- If the contents of the test tube turn yellow it means the milk contains salt.
- If the colour of the mixture changes to chocolate or reddish brown it means there is no salt present in the milk.

iii) Detection of Neutralizers

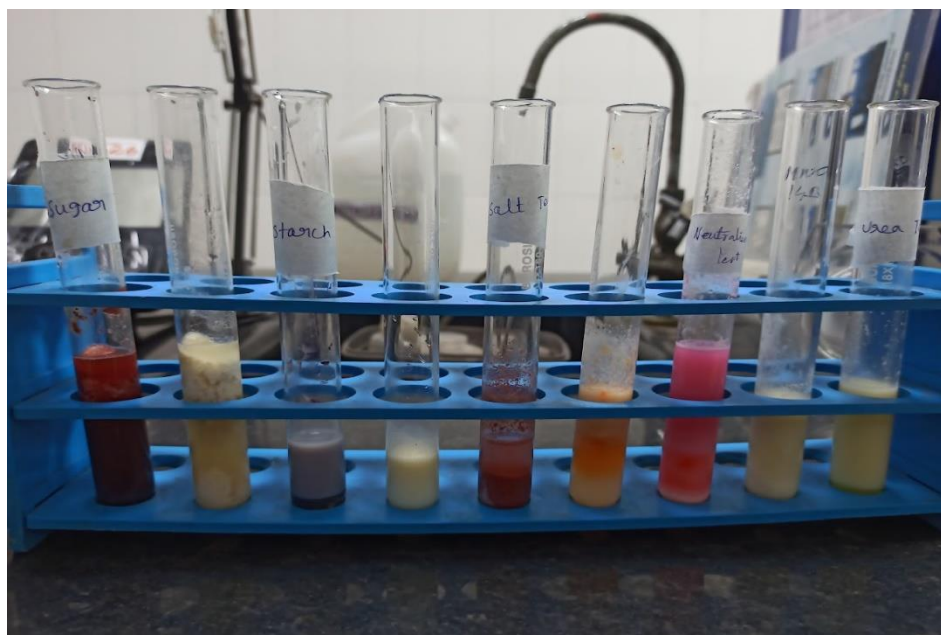
Take 3ml of sample in a test tube and add 5ml of rectified spirit to it, now add 4 drops of rosolic acid solution. Sodium bicarbonate will be present if the colour of the milk changes to red/rosy.

iv) Detection of Formalin

Take about 5ml of milk in a test tube and add equal volume of ferric chloride solution. Keep the test tube in water bath for 3 - 4 minutes and observe the colour.

v) Detection of Starch

Take 5ml of sample milk and add 2ml of iodine solution, if the sample changes into violet/blue colour indicates the presence of starch in the milk.



D. FAT TEST

i) Gerber method

The Gerber method is a primary and historic chemical test to determine the fat content of the substance, most commonly milk and cream. It was developed and patented by Dr. Niklaus Gerber of Switzerland in 1891. The Gerber method is the primary testing method in Europe and much of the world. But, the US is following the Babcock test primarily similar to the Gerber method.

Procedure:

- For performing this test, we should take 10ml of 90% Sulphuric acid and 10.75 ml of milk sample that may be raw milk or packed milk
- Then add 1 ml of amyl alcohol and shake it up and down.
- Centrifuge it by setting 1300 rpm.
- The appearance of the golden yellow proofs that the fat content is separated.



BUTRYOMETER

ii) Methylene Blue Dye Reduction Test

Methylene blue dye reduction test, is commonly known as the MBRT test is used as the quick method to assess the microbiological quality of raw and pasteurized milk. This test is based on the fact that the blue colour of the dye solution to be added to the milk get decolourised when the oxygen present in the milk get exhausted due to microbial activity. The sooner the decolourization, more inferior is the bacteriological quality of milk assumed to be. This test is widely used at the dairy reception dock, processing units and milk chilling centres where it is followed as acceptance/rejection criteria for the raw and processed milk. The test has to be done under sterile conditions. Take 10ml milk sample in a sterile MBRT test tube. Add 1ml MBRT dye solution (dye concentration 0.005%). Stopper the test tubes with a sterilized rubber stopper and carefully place them in a test tube stand dipped in a serological water bath maintained at 37 pm 1°C. Record this time at the beginning of the incubation period. Decolourization is considered complete when only a faint blue ring (about 5mm) persists at the top.

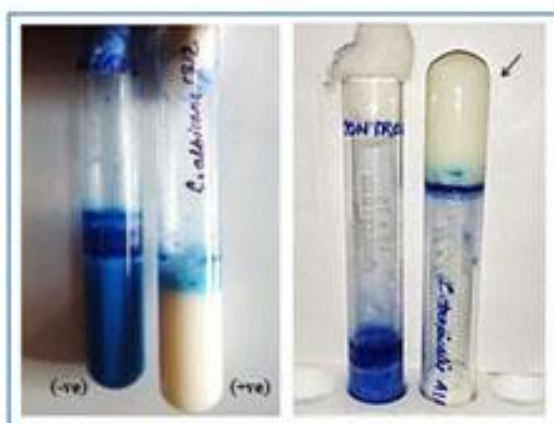


Fig. 2: MBRT and Clot Formation

COLOUR CHANGES OF MILK IN MBRT

Standard for Raw Milk

S.NO	MBR TIME IN HOURS	MILK QUALITY
01.	5 HOURS AND ABOVE	VERY GOOD
02.	3-4 HOURS	GOOD
03.	1-2 HOURS	FAIR
04.	½ AND BELOW HOURS	POOR
05.	LESS THAN 10 MINUTES	NOT ACCEPTED

4.2 ACIDITY IN MILK

Determination of acidity in milk

As a routine method the total titratable acidity is determined by using the titration method where the milk sample is titrated against standard alkali to the phenolphthalein end point. This corresponds to the pH 8.3 or 8.4. and at this end point the colour of the phenolphthalein would change from colourless in the acidic medium to pink in the alkaline medium.

Procedure

- The burette is filled with 0.1 N NaOH and 10 ml of milk sample is taken in the conical flask.
- Two drops of phenolphthalein are added to the sample as an indicator.
- The sample is titrated against NaOH until pale permanent pink colour appears.
- The process to repeated for 2-3 times to get concordant values.

"Acidity of more than 0.18% lactic acid would result in the curdling during heat processing".



ACIDITY IN MILK

4.3 Determination of FFA (Free Fatty Acids)

Procedure

- Weigh 10g of butter and melt it in a burner until it comes to a slight ghee stage
- In a conical flask, take 25ml of Ethanol and add few drops of phenolphthalein indicator to it
- Have a test titration against 0.1N NaOH with few drops of NaOH to check whether ethanol is neutralized
- Then add 5.6ml of melted butter sample to ethanol and add 2 drops of phenolphthalein and titrate against 0.1N NaOH
- Appearance of pink colour is the end point to be noted.

4.4 Hardness in water

Hardness in water is due to the presence of dissolved salts of calcium and magnesium. It is unfit for drinking, bathing, washing and it also forms scales in boilers. Hence it is necessary to estimate the amount of hardness producing substances present in the water sample.

As water plays a major role in dairy industry, hardness of water will check every 6 hours of softening process. Samples like raw water, RO water, sump water, boiler water will be taken for analysis.

Procedure

- The burette is filled with standard EDTA solution to the zero level.
- Take 50ml sample water in flask. If sample having high Calcium content then take smaller volume and dilute to 50ml.
- Add 1ml Ammonia buffer followed by 5 to 6 drops of Erichrome black - T indicator. The solution turns into wine red colour.
- Note the initial reading then titrate the content against EDTA solution.
- At the end point colour change from wine red to blue colour.
- Note the final reading and record it. Repeat the process till we get concordant value.



HARDNESS OF WATER BY EDTA METHOD

Other Parameters of water

It is also necessary to calculate the other parameters of water like pH, TDS (Total Dissolved Solids) etc.,

pH is calculated using both pH paper and pH meter, and TDS is calculated using conductivity meter.

4.5 INSTRUMENTAL METHODS FOR ANALYZING QUALITY OF MILK

There are two instruments that can be used to determine the quality of milk instead of doing it in a manual method. It has time consumption and also avoid several errors.

- I. MilkoScreen
- II. Lactoscope

1) MILKOSCREEN

Analyses the product using FT-Infrared technology, assessing milk constituents, using absorption at different wavelengths in the infrared spectrum to detect the presence of specific parameters in milk like Fat, SNF and Protein.

Accuracy and repeatability of results are comparable with the chemical methods, but with MilkoScreen, it takes far less time than conventional chemical methods. Results from MilkoScreen are accurate, direct and not calculated, unlike some contemporary techniques.



MILKOSCREEN

2) LACTOSCOPE

The LactoScope is our most versatile mid-infrared analyser capable of testing a wide range of dairy product: milks, creams, whey, concentrates, ice-creams and yoghurt mixes. The latest hardware innovations allow to easily test the most challenging dairy products, such as creams with up to 55% fat and other viscous products. With a typical accuracy under 1% CV, a measuring time of 30 seconds, low cost of ownership and minimal downtime, this instrument is the preferred choice of the large processors and dairy laboratories. It tests raw and processed milk, cream and whey for fat, protein, lactose, solids and solids non-fat. It screens raw milk for abnormal content and can detect adulterants such as urea, ammonium sulphate, maltodextrin, sucrose and water.



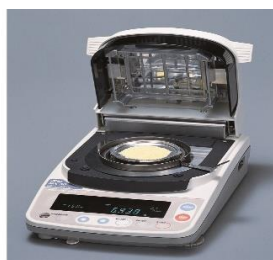
LACTOSCOPE

MOISTURE ANALYSER

Moisture analysers sometimes called “Moisture Balances”, are used to measure the moisture content in various types of samples including solids, liquids, and gases.

Moisture analysers are utilised in different industries for many different purposes. They can be used in the food industry to control the moisture. Excess amount of moisture in food may lead to staleness or bacterial growth. Furthermore, there are many food items which are sold by their weight; thus, it is important to make sure customers aren't overpaying for water weight. On the other hand, too little moisture can reduce the calorie count or make the food dry. Moisture is an important factor affecting the consistency, taste, shelf appearance and many other factors in food.

Moisture Analyser is used to find the moisture content in butter and milk powder in dairy industries.



CHAPTER 5

5.1 UHT PLANT

UHT stands for “Ultra High Temperature Processing,” which is just another way of heating milk to kill bacterial spores. In the pasteurization process, the milk is heated to 72°C (161.6°F) for at least 15 minutes, whereas the UHT process heats the milk at 135°C (275°F) for one to two seconds. This flash of extreme heat is said to kill off any spores in the milk. 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 H_2O_2 is removed by rubber strips present inside the machine. The processed milk would be packed in tetra packs of 200mL, 500mL, and one litre. The packaged milk is tested for its properties. UHT milk tastes different than its pasteurized milk, it tastes like it comes from a box and it tastes burnt. The processed milk has a shelf life of **90 days** and the **packets need not be preserved in refrigerators.**



UHT MILK PACKET



UHT PLANT IN AAVIN

5.2 EFFLUENT TREATMENT PLANT

An Effluent Treatment plant is a unit plant where using multiple methods wastewater is treated for its reuse or safe disposal to the environment. This process reduces the demand of fresh water while keeping environment clean.

There are majorly three stages of wastewater treatment i.e., primary (Separate sludge from liquid), secondary (Reduce biological population) and tertiary water treatment (to reduce harmful Chemicals). There are also substages in these processes such as bar screening, Aeration, Clarification, Chlorination, Water analysis, water testing and water disposal.

List of general chemicals used in ETP:

- For pH neutralization: Acids (HCl) and base (NaOH).

- Coagulant / Settling Aids: Aluminium Sulphate, Ferric Aluminium Sulphate, Ferric Sulphate, Ferric Chloride, these may be independent or in combination with Poly Electrolytes (Polymers).
- Nutrients: Urea, Di-ammonium Phosphate.
- Disinfectant: Chlorine, Bleaching Powder (Sodium Hypo-chlorite).

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

Preliminary Treatment: Its objective is physical separation of large sized contaminants. For example, cloth, paper, plastics, wood logs etc. This level/process include:

Screening: This is the first unit operation that occurs in waste water treatment plants. A screen is a device with uniform openings and its purpose is to remove large floating solids.

Sedimentation: It is a physical water treatment process using gravity to remove suspended solids from water.

Grit Chamber: The wastewater that moves into the grit chamber removes the dense inorganic solids such as gravel, metal fragments and sand which have made their way into the sewers. Removal of grit can prevent damaging of pumps & operational difficulties.

Clarifiers: These are tanks built with mechanical means for continuous removal of solids being deposited by sedimentation before biological treatment.

Primary Treatment: Its aim is removal of floating and settleable materials such as suspended solids and organic matter. In this treatment both physical and chemical methods are used. It includes:

Flocculation: Flocculation is a physical process and does not involve the neutralization of charge. It involves the addition of destabilized particles

together into large aggregates so that they can be easily separated from the water.

Coagulation: is a process in which coagulants are added for the purpose of rapid settlement of minute solid particles in a liquid into larger mass. It permits particle removal by sedimentation and for filtration.

Neutralization: The main purpose of this process helps in maintaining the pH range of 6-9 to meet the requirements of different processing units in ETP system.

Primary Clarifiers: These are used to slow the velocity of the water to a point where organic solids will settle to the bottom of the tank and it contain an equipment that is used to remove floating solids and greases from the surface.

Secondary or Biological Treatment: The objective of this treatment is the further treatment of the effluent from primary treatment to remove the suspended solids and residual organics. In this step biological and chemical processes are involved.

Activated Sludge Process: This is used for treating industrial waste water using air and a biological floc composed of bacteria.

Aerated Lagoons: Is a treatment pond provided with artificial aeration to promote the biological oxidation of waste water.

Trickling Filters: Trickling filters, also known as sprinkling filters, are commonly used for the biological treatment of domestic sewage and industrial waste water.

Rotating Biological Contactor: It involves allowing the wastewater to come in contact with a biological medium in order to remove pollutants in the wastewater before discharge of the treated wastewater to the environment.

Tertiary/advanced/disinfection treatment: The purpose of tertiary treatment is to provide a final treatment stage to raise the effluent quality to the desired level before it is reused, recycled or discharged to the environment.

Chemical Coagulation and sedimentation: It is used to increase the removal of solids from effluent after primary and secondary treatment.

Filtration: The clarified wastewater is first passed through the adjacent filtration plant which contains large filter blocks to ensure high quality water.

Reverse Osmosis: In this process, pressure is used to force effluent through a

membrane that retains contaminants on one side and allows the clean water to pass to the other side.

UV Disinfection: It is considered as an ideal disinfectant for industrial waste water. It leaves no residual disinfectant in the water by ensuring the water quality. It does not produce any disinfection by-products.

The outlet wastewater

The water which is expelled from the industry is considered as non-toxic and purified from harmful bacteria. The water from the outlet is used up for the various purposes like washing or even as helpful for studying the basic parameter. The pollution control board officers will come there for the analysis of the inlet and outlet water sample. This is how wastewater is recycled and managed.

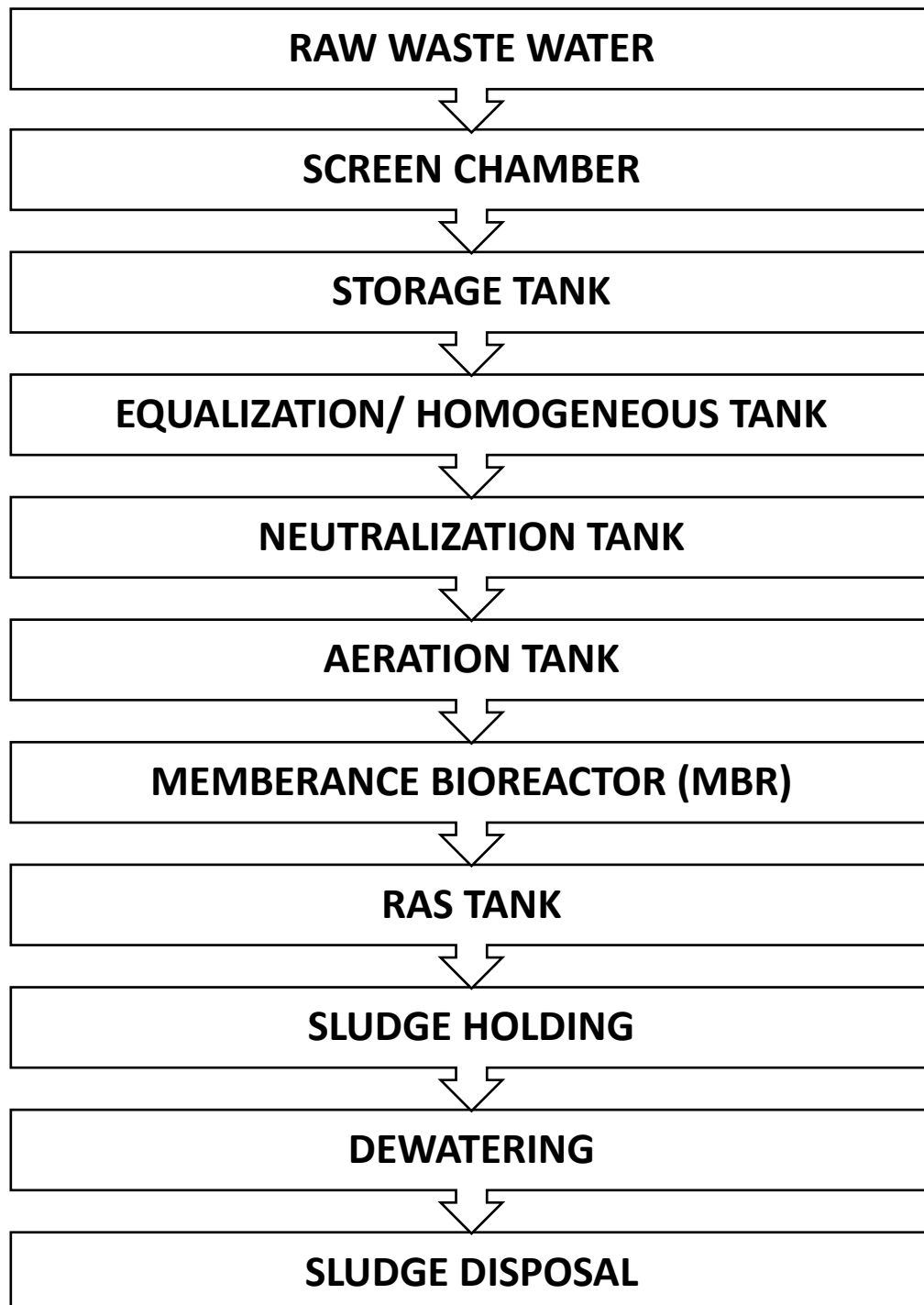
In AAVIN recycled water has been used for Tub wash, Gardening, and study about water parameters.

The space requirement for ETP

This space requirement to treat the wastewater from milk processing up to 65000 litres per day in a dairy plant.

- Equalization tank- 4m x 3m x 1.3m
- Primary setting tank- 4m x 4m x 2.7
- Secondary setting tank- 1.6m x 1.6m x 2.5m
- Aeration tank- 5.7m x 5.7m x 4m
- Anaerobic tank- 4m x 4m x 4.4m
- Sludge drying beds (4)- 3m x 2m x 2m

FLOW CHART FOR EFFLUENT TREATMENT PLANT (ETP)





AERATION TANK



RAS TANK



EQUALIZATION TANK



SLUDGE DISPOSAL

CONCLUSION

On the whole, this internship was a useful experience. I have gained new knowledge, skills and met many new people. I achieved several of my learning goals and got insight into professional practices currently advocated in the industry. Related to our study I learned more about the manufacturing of milk.

Furthermore, I have experienced that it is of importance that education is objective and we have to be aware of the industrial aspect of the topics I study. This internship program was not one sided, but it was a way of sharing knowledge, ideas and opinions. The internship was also good to find out what our strengths and weakness are. This helped us to define what skills and knowledge we have to improve in the coming time. I can confidently assert that the knowledge gained through this internship is sufficient to contribute towards our future endeavours. At last, this internship has given us new insights and motivation to pursue a career in core Dairy technology.



TAMILNADU CO-OPERATIVE MILK PRODUCERS' FEDERATION LIMITED,
Joint Managing Directors' Office
29 & 30 Industrial Estate, Ambattur, Chennai - 600 098.

Ref.No.1277/HRD/2021

Date:21.12.2023

CERTIFICATE

This is to certify that Ms.S.BAKYAPRASANNA, II Year M.Sc(Chemistry) student of Sathyabama Institute of Science and Technology, Jeppiaar Nagar, Rajivgandhi Salai, Ch-119 has done Internship Training in Tamil Nadu Cooperative Milk Producer's Federation Limited at Sholinganalur Dairy, Chennai-600119 from 03.10.2023 to 17.10.2023 (15days) and completed the same satisfactorily.


AGM(Admin)/HRD