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PG-Department of Microbiology



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This is to certify that **MISS. PRIYANKA BHADRVANATHI BHAVAKE**
Exam. No. **836553** has

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Department of Microbiology, Vivekanand College,
Kolhapur (Empowered Autonomous) for M.Sc.-Part-

I Semester B.Sc. in On Job Training Subjects
OJT1 & OJT2 and this is to certify that she has finished her work in the year
2023-2024.

Place: Kolhapur

Kolhapur Date: 20-05-24


Examiner


OJT in charge


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Place Kolhapur

Date 18/05/2024


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This is to certify that MISS. AKSHATA KRISHNAT BUVA
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II Semester II course in On Job Training: Sub code

01121M0121 and this report is presented in his/her bona fide work in the year

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Place:

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Place: Kolhapur

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This is to certify that **MR. VEJAY SANJAY KADAM** (Exam seat no. **836583**) has

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This is to certify that Aishwarya Amar Khadake (Exam seat no.
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Date: 13/01/2024

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This is to certify that Miss. Mubina Salim Momin (Exam seat
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Place:

Kolhapur Date: 20/11/2024


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Place: Kolhapur

Date: 14-5-24


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Place: Kolhapur

Date: **18-05-2024**


Examiner


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A
OnJobTrainingreport

InCollaborationwith

ZILLASAHAKARIDUDHUTPADAKSANGH LTD.

And

PGDepartmentofMicrobiology
VivekanandCollege,Kolhapur(Empowered,Autonomous)

By

SnehalBalasoChougule
M.Sc.Microbiology Part
I Semester II

Underthe Guidance of

Dr. K. K. Bhise
PGDepartmentofMicrobiology

DECLARATION

I the undersigned hereby declare that the On Job Training Report in Collaboration with ZILLA SAHAKARI DUDHI UTPADAK SANGH LTD. & PG Department of Microbiology, Vivekanand College, Kolhapur (Empowered Autonomous) is an original work done by me under the guidance of Dr. K. K. Bhoir, PG Department of Microbiology, Vivekanand College, Kolhapur (Empowered Autonomous). The matter included in this report is not a reproduction from any other sources.

I also hereby declare that this project has not been submitted to anytime to any other university or institution for the award of any degree or diploma.

Date:

Place: Kolhapur

Sushal Balasa Chougale

Name of Student

ACKNOWLEDGEMENT

At this juncture where the herculean task is nearing its pinnacle, science deems it a pleasure to look back and acknowledge efforts and support of all kith and kin that helped with zeal to turn a distant dream of an industrial training into reality.

We are extremely thankful to Dr. K. K. Bhat, Assistant Professor, PG Department of Microbiology, Vivekanand College, Kollapur (Empowered Autonomous), project guide for her valuable guidance and mentorship throughout the project work given to us during the study.

We are indeed grateful to Faculty Coordinator (OJT) Dr. G. K. Sontakke, PG Department of Microbiology, Vivekanand College, Kollapur (Empowered Autonomous) for his kind co-operation and valuable support and we are also thankful to all the staff members of our department for their direct and indirect support.

We are thankful to Principal Dr. R. R. Kamthar, for his kind co-operation and valuable support.

Also, we sincerely thank our parents for their pin-pointed assistance to complete the project work. Finally, we would like to appreciate our friends, colleagues for their direct and indirect contribution.

Date:

Place: Kollapur

Snehal Bhatnagar Chougale

Name of student

INTERNSHIP UNDERTAKING

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7. PAN	CNEPC7362D
8. Overall GPA	-
9. Internship Area (Company/Institute)	M.E.D.C. Gokul Shrigaon, Tal- Karwen, Dist- Kolhapur
I confirm that I agree with the terms, conditions, and requirements of the Internship Policy Student Signature:	
Date:	
I confirm that the student has attended the internship orientation and has met all paperwork and process requirements to participate in the internship program, and has received approval from her mentor.	
Sign of Department Faculty Coordinator Date	

TRAINING REPORT ON READY TO TRAINING AT

**KOLHAPUR ZILLA SAHAKARI DUDH UTPADAK SANGH LTD
KOLHAPUR**

DURATION : 10/01/2024 To 25/01/2024

DEPARTMENT OF MICROBIOLOGY,

VIVEKANAND COLLEGE, KOLHAPUR (EMPOWERED AUTONOMOUS).

SUBMITTED BY

Miss: CHOUGULE SNEHAL BALASO

MISS: KHADAKE AISHWARYA AMAR

Miss : PATIL SAKSHI ANIL

Miss TAMMANA SULTAN DESAI

Mr. MAGAR PRATIK SHRIKANT

SUBMITTED TO

"KOLHAPUR ZILLA SAHAKARI DUDH UTPADAK SANGH LTD,
KOLHAPUR"

"GOKUL SHIRGAON, KOLHAPUR"

INTRODUCTION:

> Name of food industry.

The Gokul Dairy, Kolhapur zilla sahakari Dadh Utpadak sangh Ltd. Kolhapur.

> Trade name of in food industry

well known with its Brand 'GOKUL' is an operat flood co-operation dairy project, Gokul Shirgaon, Tal-Karver Dist-kolhapur. 416113.

> Location of industry

The industry is located 10 km away from Kolhapur City and 2-3 km away from Pune - Bangalore National Highway.

> Date of Establishment

16th March 1963

> History of the Company

Shri. Arjun Narake, shri. Anandrao patil and shri. samaik established GOKUL DAIRY' in 1963.

Different tests are done on milk like fat test, Parence etc. They used computer billing software for transaction.

In 1978, The National Dairy Development Board included Gokul in operation field area. And this was beginning of a new era for the milk union. During 1985, the average milk procurement was 2,14, 86 836 lit/day with 676 Villages Level societies affiliated to the Dadh sangh.

Gokul Products:-

- 1) Gokul Milk
- 2) Gokul skimmed milk powder (standard Grade)
- 3) Gokul Skimmed milk powder (Extra Grade)
- 4) Gokul Cooking Butter
- 5) Gokul Ghee
- 6) Gokul Shrikhand
- 7) Gokul Table Butter
- 8) Gokul Dahi
- 9) Gokul paneer
- 10) Gokul Lassi
- 11) Gokul Cream
- 12) Gokul Desi Butter (Desi Loni).
- 13) Gokul Buttermilk

Index

Sr.No.	Name of Topic	Date
1.	General Observation	10/01/2024
2.	Raw Milk Receiving Dock	11/01/2024
3.	Milk Chilling & Processing	12/01/2024
4.	Milk Packing & Dispatch	13/01/2024
5.	Paneer & Dahi Lassi mfg. & pkg.	14/01/2024
6.	Shrikhand mfg. & pkg.	15/01/2024
7.	Butter mfg. & pkg.	16/01/2024
8.	Ghee mfg. & pkg.	17/01/2024
9.	Milk powder mfg. & pkg.	18/01/2024
10.	Quality Control	19/01/2024
11.	Preparation of Submission of report	25/01/2024

➤ **General observation :**

It is big industry of milk processing and manufacturing product. There are so many employees who work hard for the growth of company. so all employees are kindful and helpful in nature. The industrial area consist variety of sophisticated machine and new technology of milk processing.

Co workers are doing their work by proper way. The place in industrial area was keeping constant washing and good hygiene. In Gekul Dairy plant has so much compartment division. Subdivision section where the processing has taking place.

The section are,

1. Milk collection and filtration
2. Raw milk and receiver dock
3. Milk testing and storage
4. Chilling Storage department
5. Product manufacturing

various milk products are lassi, ghee, butter, Paneer, Shrikhand etc.

Working time of employees minimum 8 hours with Suitable time of lunch break. various section servant have different time shift for working the management and discipline was strictly handled by workers. Important and export are followed by under security. Precautions.

➤ **Raw Milk Receiving DOCK (R.M.R.D) Section:**

- Firstly, the milk is collected at the R.M.R.D section which comes from 117 routes.
- Different numerical codes of each dairy are given for recognition purpose and register the amount of milk! *Coming from each dairy.
- Two different colours of for numerical code are used to indicate difference between cow & buffalo milk.

Blue - Cow

Red Buffalo

- To remove the caps of Milking cans with the help of machine.
- The milk cans are conveyed through the chain conveyors.
- Plunger - It is used to check the quality of milk & to detect unwanted material in milk by taking smell from it
- Abnormality of milk checked with the help of test called Red Alkali test.

➤ Red Alkali Test

Process-

- i) Distilled water (10 (m³) + NaOH solution (16cm³) + Phenolphthalein indicator (2-3 drops) pink solution occurs.
- ii) Then in this pink Colour solution milk is added by using pipette and then titration process is carried out.
- iii) Then if pink colour remains milk is in well condition, and if solution becomes white in colour then milk is in not good Condition.

• RMRD (AB

Tests are conducted by advanced machines (ECOMILK). These tests are to check SNF, Fat, Protein which conducted on the platform.

• cleaning of cans - Flow diagram:

Pre rinsing with normal water and draining (min. 45°C)

Detergent (70°C)

☑ For soda + TSP (0.5 ± 0.1 alkalinity)

Hot water (80-85°C)

Hot water drying (90-100°C)

Steam pressure 3 kg/cm².

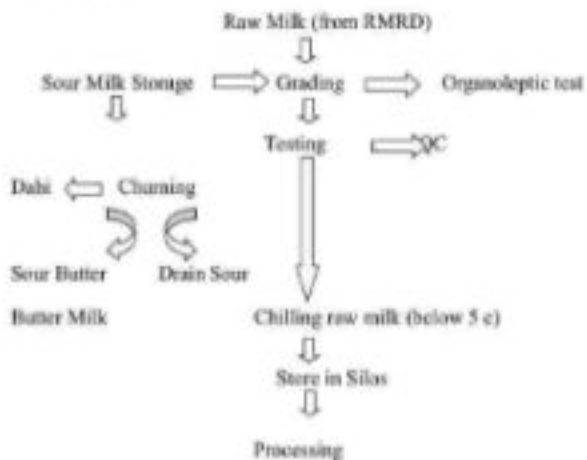
Closing the cans with a lid

- **Milk Chilling & Processing**

- **Introduction:**

Chilling is the process which is used to prevent contamination and spoilage of milk. In Gokul darry, plate heat exchanger chillers are used.

Flow diagram:



- **Silo -**

In Gokul, three silos are used to store chilled milk, each having capacity 60,000 lit. of which two silos are used for buffalo milk and one for Cow milk. These silos are insulated surrounding temp. Doesn't effect on it.

- **Chillers:**

In Gokul, 2 chillers are used to store chilled milk, each having Capacity 30,000 lit. of which two chillers are used for buffalo milk and one for cow milk. These chillers maintain milk temperature at 3-4°C. chilled water at 1-150 is used as coolant chilled water pipes are insulated by thermo coal, chilled milk is further use processing.



• PASTEURIZATION OF MILK

Introduction:

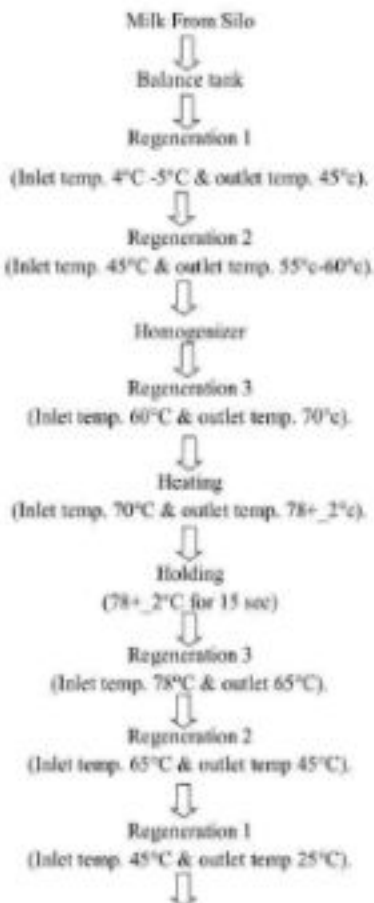
It is the process of killing pathogenic micro-organism present in milk by means of heat.

• Mode Method of pasteurization-

- 1) LTLT (Low Temp. long time) - 67.5°C for 15 min.
- 2) HTST (High Temp. Short time) - 78°C for 15 sec.
- 3) UHT (Ultra high temp.) - 121°C for 1-1.5 sec.

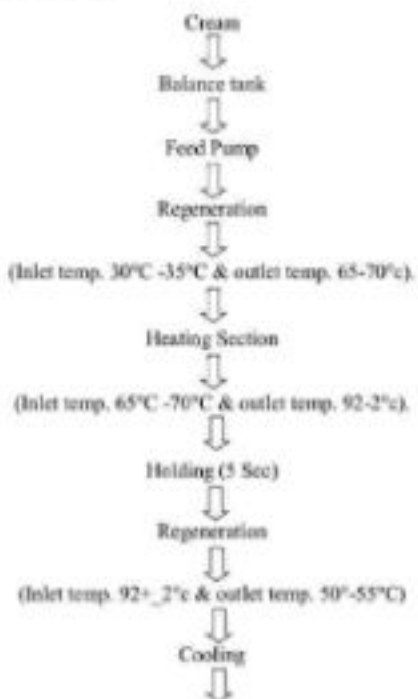
Flow Chart

1. Pasteurization :





2.Cream Pasteurization -



(Inlet temp. 55C-55°C & outlet temp. 25°C-30°C)



Chilling

(Inlet temp. 25C-30°C & outlet temp. 7±_2°C)



Pasteurized chilled cream



Cream storage tank

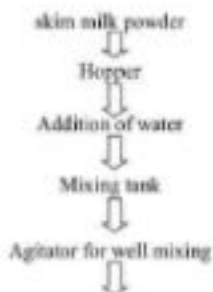
- **Milk standardization**

Standardization is an important procedure for the adjustment of fat and SNF as per specified standard. The standardization is done by skimmed milk for buffalo milk while buffalo milk for cow milk. The tanks are provided agitators inside for through mixing continuously. There are different Ratio for standardized milk & whole milk.

- **Operation parameters for standardization :**

Products	fat(%)	SNF(%)
Full Cream Milk	6.5	9.0
Cow Milk	3.5	8.5
Standardized Milk	4.5	8.5
Recombined Milk	3.0	8.5
Toned Milk	3.0	8.5
Double toned Milk	1.5	9.1
Skimmed Milk	0.5	8.7

Flow Chart



Pasteurization & Homogenization



Reconstituted milk.

• **Milk packing and Dispatch**

Milk from storage tank



Overhead balance tank



Filling cylinder



Vertical sealing & pouch formation



Filling of milk



200ml, 500ml, & 100 ml



Horizontal Sealing



Milk pouch



Weighing & leakage testing of pouch



Filling in crates



Crate cover



Cold storage (0.5°c-1.0°c)



Dispatch

• **Paneer and Dahi Lassi manufacturing, and packaging:**

4. Paneer :

The product obtained from the cow or buffalo milk of a combination there by precipitation with sour milk. lactic acid or citric acid Milk solids may be used in preparation of this product. Roe obtaining paneer, the coagulum is pressed and put in chilled water to get desired texture.

Flow chart:



B) Dahi Lassi

Lassi is uniform in texture and slight in flavour. The product obtained from pasteurized or boiled by Souring, natural or otherwise, by a harmless lactic acid or other bacterial culture. Dahi may contain added cane sugar. Dahi shall have the same minimum percentage of milk fat and milk solids- not fat as the milk, from which it is prepared. Milk solids may also be used in preparation of this product. Where dahi or curd is sold or offered for sale without any indication of class of milk, the standards prescribed for dahi prepared from buffalo milk shall apply.

Flow chart

Reception of milk \Rightarrow



Preheating (37°C-40°C)



Inoculation \leftarrow
(Coed 1.0-1.5% milk)

Sugar 18% Hot water 20%



Preparation of sugar syrup



Filling of Curd

skimmed milk
(5.0-5.5 fat & 9.2-9.4 SNF)

Lactobacillus Lactic



(Culture acidity 1.25%)



Holding /Incubation
Breaking Curd



Addition of syrup



Mixing



Batch Pasteurization
(78°C/30 min)



Homogenization (65%)



(1st state =1500 psi, 2nd state=500psi)



Chilling (below 5°C)



Storage (below 5°C)

- **Shrikhand Manufacturing and Racking Packaging**

Shrikhand is a semi soft sweet dish sour whole milk product prepared from lactic fermented curd by removing 'Whey' and using 'chakka' as a basic ingredient. Gokul produce two types of shrikhand Elachi and Mango.

- **CHAKKA:**



• SHRIKHAND:



➤ Butter Manufacturing & Packaging

Butter is a fat concentrated which is obtained by Churning cream, gathering fat into a compact mass & it contains not less than 80% fat.

There are 4 types of butter Manufacturing:

- 1) white butte
- 2) Table butter
- 3) Yellow butter
- 4) Cooking butte

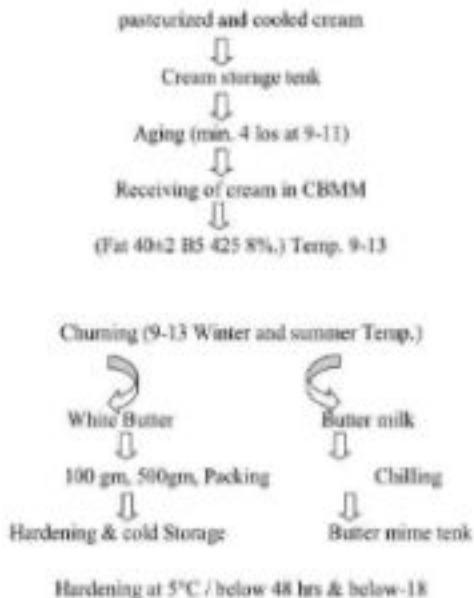
• Chemical Analysis:

- | | |
|-------------|-----|
| 1) Moisture | 16% |
| 2) Fat | 80% |
| 3) Salt | 15% |
| 4) Curd | 25% |

• White Butter:

Plane butter is manufacture by CBMM (continuous butter Manufacturing machine) from cream of 4212% fat of buffalo if 4012 % fat of cow. white butter is Produce for conversion of surplus fat. It is used in the Production of ghee.

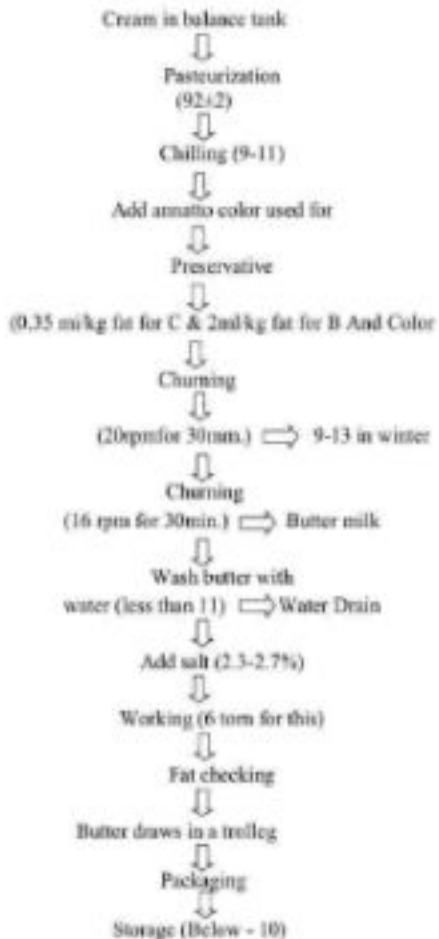
Flow Chart



> Table butter:

The table butter is sold under brand name "Gokul butter". The production is done as per demand.

Flow chart



➤ Ghee Manufacturing & Packaging

Ghee is defined as clarified butter fat or from Cream to which no coloring matter is added, according to PFA rules.

• Chemical composition:

- | | |
|--------------------|--------------------|
| 1) Milk fat: | 99-99.5% |
| 2) Moisture | not more than 0.3% |
| 3) Free Fatty acid | Max. 2.8 |
| 4) Acidity | upto 0.3% |
| 5) Colour | Yellowish white |

Flow Chart :



> Filling & Packaging:

After settling period of 8 to 10 hrs. Ghee is filled & packed at 40°C. If Ghee is directly taken for filling & Packaging after filtration.

Packing	200 ml	500 ml	500 ml	1000 ml	5 lit.	15 kg
Parameter	Jar	Pouch	Bottle	Pouch	Bottle	Tin

> Milk Powder manufacturing & packaging

Milk powder is the product obtained by removal of water from milk by heat or suitable means, to produce a solid containing 5% or less moisture.

• There are two types of powder formation;

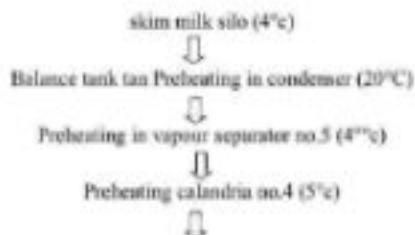
- 1) WMP (Whole milk powder)
- 2) SMP (Skim milk powder)

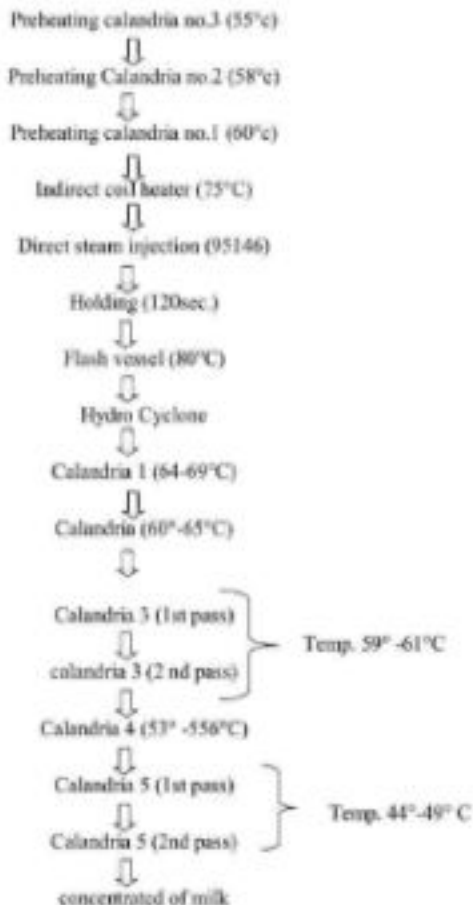
• Two powder production units:

1. 10 TDP
2. 30 TDP

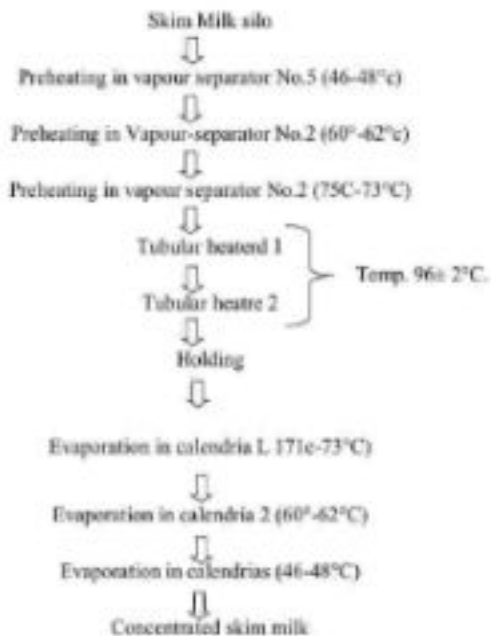
Flow Chart

- 1) Evaporator 30 TDP-SMP

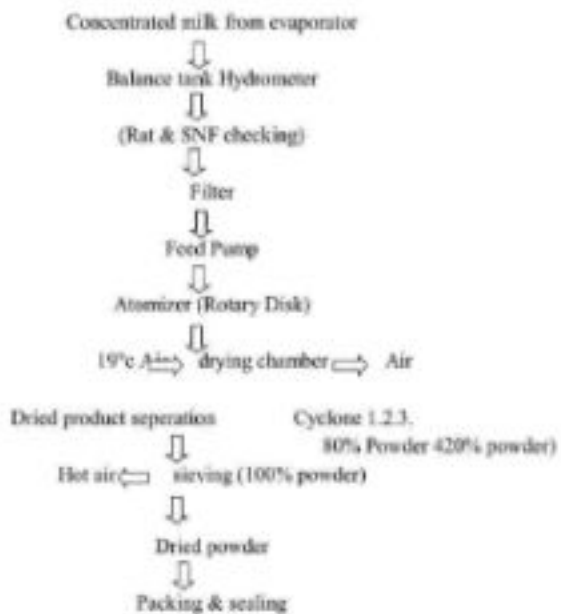




2) 10 TDP-SMP



3) SPRAY DRYING:



➤ **Packaging of powder:**

Feeling of powder is carried out in a separate room in craft papers bags at a temperature of 35-4°C the size of CP, (craft paper) during Reeling sample is taken at regular interval of half an hour to check its moisture sediment, bulk density etc. the filled bags are stored at room temperature in finished goods store.

Quality control

Milk Quality control and Assurance is extremely important for the dairy industry. It is the are of various tests to ensure that milk products are safe, healthy and meet the standards for chemical compositions, purity and levels of bacteria and other micro-organisms.

It protection consumers, and the health of products and ensure that producers are able to sell products at fair prices.

Test performed in Quality control

1) Methylene Blue Reduction Test (MBRT): The length of the time taken by milk to decolorize methylene blue solution is a fairly good measure of its Bacterial count and hence its hygiene and Keeping quality.

Methylene Blue solution: standard solution of Methylene Blue thiocyanate tablets in 200 cm³ of cold water, sterile, glass- distilled water in a sterile flask The stock solution is further diluted to make volume 800 cm³ of sterile glass-distilled water.

Interpretation:

The sample which shows complete decolourization of blue colour on incubation for 30 min. or less shall not suitable for acceptance.

2) Phosphatase test:

The test is used to judge the efficiency of pasteurization and to test whether the test treatment subjected to the carried out. The treated milk is to the phosphates, presence or which helps to indicates absence of phosphates enzyme. Pathogens likely to be present in milk are killed at temperature lower than the required destroying the enzyme Hence negative phosphate test ensures milk free from pathogens. In this test, milk is added to a suitably buffered solution of disodium p-nitrophenyl phosphate, which is readily hydrolyzed by the enzyme phosphatase to form p-nitrophenol which is yellow AT in no alkaline condition. solution.

3) Acidity test

The titrable acidity test is employed to ascertain - if milk is of such a high acidity as to reduce its stability, keeping quality and heat stability. method erasures the This titration buffering capacity of milk and not true acidity. The test analyses the amount of alkali, which is required to change pH milk from its initial value of about 6.6 to 6.8 pH - of color change of phenolphthalein added to milk indicate the end point.

4) Determination of Fat by Gerber Method:

The Gerber method is a primary and chemical test to determine the fat content of substance, most commonly milk. In this method the milk II fat is separated from proteins by adding sulphuric acid. The separation is facilitated by using isoamyl alcohol and centrifuges the fat content is read directly via a special calibrated butyrometer.

Process-

Sulphuric acid (10 cm³) + milk (10.75 m³) + isoamyl alcohol (1 m³).

Take solution in butyrometer tube and set in centrifuge for 3 min

Initial temperature of butyrometer tube: 70-75°C

Estimated fat content after centrifuging: 6.6%

Lab instruments at Quality control

A) Milkoscan :

In this device, 14 types of tests are performed in 30 min.

Analyses fat, SMF, protein, Lactose, total solids, Lactic acid, Glucose, Urea, citric acid, casein, FFA and Galactose in milk

B) Moisture Balance

Estimate moisture content of milk and milk products.

C) sodium analyser

- i) Analyses sodium content of milk
- ii) Estimates salt content in table butter.
- iii) Detects adulteration test in milk.
- iv) Analyses the residue remaining in tanks.

D) Density meter:

Detection density of any liquid sample.

E) Incubators:

Used to incubate media for initiating bacterial growth.

F) Laboratory centrifuge :

Used to separate components in a solution (separation of fat from milk).

➤ Microbiology Lab

Since milk & milk products, are extremely susceptible to microbial contamination, during their production & processing it's become necessary to assess the microbial quality of this product in a quality control lab. As bacterial load in function, as well as their number, a programmed for controlling the total bacterial load of milk & dairy product must include metabolic activity test (indirect test) as well as test involving the enumeration of bacteria or tests for presence & absence of specific pathogenic organism (Direct test) routinely used methods in quality control laboratories are - of the species of bacteria

Standard Plate Count (SPC):-

Purpose-

This test is used for estimating the number of in milk can B viable microorganisms present milk products. Their number be counted only by preparing appropriate dilutions. This is used for assessing hygienic quality of production, - processing, handling & also helps in the predicting shelf life of dairy products.

Material required

- i) Standard Plate count Agar
- ii) Dilution blank
- iii) Sterile phosphate buffer.

Procedure

A) Mix: the sample For milk mix the & preparation of dilution :

sample thoroughly. Take 1 ml of sample with a sterile pipette & transfer it to first dilution tube (9ml) Allow about 3 sec for the pipette to drain & gently blowout the last drops. Rotate the test tube between palms of hand to complete the mixing. This makes a dilution of 1:10 Transfer 1 ml of the first dilution into another 9 ml. dilution blank to

get 100 dilutions. Similarly prepare a series of dilution as required using fresh pipette. Pour each successive dilution.

B) Preparation. Using a incubation of plates :

Fresh pipette transfer 1 ml of each required dilution into sterile petri dishes in duplicates. Allow 3 sec. for the pipette to drain, touch the top of pipette to a dry place in the petri dish to drain out the last drops. To each plate add 10-15ml of std. plate count agar previously sterilized & cool to 45 mix contents of the plates thoroughly while the medium is still liquid, by gently rotating & tilting petri dishes & allow agar to cool & set. Invert the plates & incubate at 37°C for 48 hrs.

C) Counting the Colonies:

Remove the plates after 48 hrs. & select the pairs of plates having colonies between 30-300 on each plate count the number of colonies with the aid of colony counters & tally counter. Determine the average of the counts in the two plates & multiply this by the dilution factor. Express result as SPC per ml or gm of Sample.

2] Coliform Count :-

Purpose -

The presence of E coli or any other indicative of infection, or is contamination of faecal origin These are destroyed at normal pasteurization of milk. This test is indicator of degree of unhygienic practices during production, processing storage of milk & milk production

Material required -

i) Violet Red Bile Agar (VRBA)

Procedure

Prepare dilution procedure blank as described for of SPC. Intendence 1ml. of the Sample solution of required dilution into sterile plates. Add to each plate 10-20ml. of VRBA previously melted & cooled to 42-44°C. Mix the tilting & rotating content

thoroughly by the dish. After mixture has solidified, distribute additional 3-4 ml of the medium, completely over the surface of the solidified medium, thus inhibiting surface colony formation. Invert & incubate plates at 37°C for 19-24 hrs. Count dark red colonies measuring at least 0.5mm or over in diameter compute coli form count per ml/g from dilution used

3] Yeast & Mold Count:-

Purpose -

The total bacterial count is used in determining the general condition surrounding the manufacturing & handling of milk product. Yeast & mold count is an important handling concentrated fat a better indicator from the environment & storage of high & acidic product.

Material required

- i) Dehydrated potato dextrose agar
- ii) Dilution blank
- iii) sterile tartaric acid solution (10%)

Procedure

Prepare dilution blank as described for procedure of SPC. Introduce 1 ml. of the sample solution of required dilution into duplicate petri dishes plating Cool the potato dextrose agar media to 50-55°C & adjust the pH 3.5 by adding 10% solution of sterile tartaric acid (1ml in to 0 ml) mix gently the media & mix well by rotation of the plates. Allow the media to cool & set. Invert & incubate the plates at 21-25°C for 5 days. If molds grow first develop be incubated number of plates & mold into large colonies, plates may for 3 days only count the yeast & compute the colonies per mold colonies in the number of yeast ml/g of the sample

Conclusion :

- i) The wide variety of milk products are produced to bring the variation in diet.
- ii) They process the milk in order to improve their keeping quality, their texture, taste and appearance.
- iii) The dairy industry is rapidly progressing as these dairy products are not only good in taste or appearance but they also provide high nutritive value.
- iv) Proper maintenance of man power and machinery, proper or limited production, hygienic Condition, fluent availability of large market and accessibility by large customers is the main backbone for the success of "Kolhapur Zilla Sahakari Dahi Utpadak Sangh Ltd, Kolhapur.

The training at Gokul was amazing and great

Experience. I got to have practical as well as

Theoretical about the various products. Apart from a good learning experience, I also had a golden opportunity to work for the plant. -- Overall I had a great experience and I look Forward to work for them in future.