

Red Cow Dairy (P) Ltd.



AN ISO 22000:2018 COMPANY
CIN: U15209WB2003PTC096213

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Ref. No.

Date

Date: 23.01.2023

This is to certify that Mr. Somnath Shee (B.Voc Food Processing Technology) student of Mugberia Gangadhar Mahavidyalaya, Bhupatinagar, Purba Medinipur, W.B. has successfully completed 28 days training from 26.12.2022 to 23.01.2023. conducted at Red Cow Dairy Pvt. Ltd, Jaugram, Purba Bardhaman, W.B. 713166.

We wish him all the success in future.


General Manager

Satyajit Nath



Factories : Vill. : Jaugram, P.O. : Jaugram, P.S. : Jamalpur, Dist. : Burdwan (Purbal), Pin : 713 166
Vill. : Shibaniapur, P.O. : Singli - Shibpur, P.S. : Udaynarayanpur, Dist. : Howrah, Pin. : 711 226
Vill. : Panchghara, P.O. : Panchghara bazar, P.S. : Chanditala, On Durgapur Express Way, Dist. : Hooghly, Pin- 712308

RED COW DAIRY PRIVATE LIMITED

GOPALPUR , JAUGRAM ,PURBA BARADHAMAN ,
713166

RED COW DAIRY



INDUSTRIAL TRAINING REPORT FROM- 26.12.2022
TO 24.01.2023

MUGBERIA GANGADHAR MAHAVIDYALAYA

Bhupatinagar ,purba Medinipur,721425

Department of Nutrition
(B.VOC Food Processing)

Submitted By – *Ayan kanti Panda*

Sanjit Patra

Narugopal Bar

Somnath Shee

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INTRODUCTION:-

With decades of dairy procurement experience right from the grassroots, **Mr. Narayan Majumdar** started his exemplary entrepreneurial journey with Red Cow Dairy, in 1997. He successfully inculcated within the organization his self-belief to excel and ensured commitment to world-class hygiene and quality. His legacy and vision are further accentuated by his son, **Mr. Nandan Majumdar** who is on his way to making Red Cow Dairy more than a milk company with a global presence.

It can always count on Red Cow Dairy for nutrition and great taste.

General Information:-

Full name – “Red cow dairy private limited”.

Address - Gopalpur , Jaugram, Purba Bardhaman, West Bengal , 713166

Brand name – Red cow

Company sub-category – non-govt company

Registration date - 14 may ,2003.

Registrar office city – Kolkata.

ACKNOWLEDGEMENT:-

B.voc Food Processing training is always playing a key role in the succeed of any venture. We express my sincere thanks to **Dr. Swapan kumar Mishra** (Principle of MGM college). **Dr. Apurba Giri** Head of the department (Department of nutrition) in Mugberia Gangadhar Mahavidyalaya, Bhupatinagar. For giving us the opportunity to get trained at the “**Red cow dairy private limited**”.

This training would not have been possible without the permission of the Dairy Incharge of the plant . He helped in providing a free atmosphere to work. We feel to acknowledge our indebtedness and deep sense of gratitude to **Mr. Narayan Majumdar** (owner), **MR. Satyajit Nath** (Maintanance incharge ,G.M), **Mr. Pankaj Jha** (Quality control Incharge , A.G.M),**Mr. Bijan Bishnu**(assistant manager of quality assurance) **Surajit Santra** (Lab incharge), **Debasis chakraborty** (senior Lab Chemist), **Mr. P.K Adbar**(security incharge). We would like to thank everyone for there valuable guidance and kind supervision to out the training .Further on we want to thank the workers of the factory who made the demanding time joyful but always efficient.

MANUFACTURE PRODUCT NAMES:-

1.Milk:-

- (a)Standardised milk (Creamy delight)
- (b)Toned milk (Gold)
- (c)Double toned milk (Regular)

2.Flovour milk :-

- (a)Badam milk
- (b)Mango milk
- (c)Strawberry milk

3.Doi :-

- (a)Amrit doi
- (b)Mishti doi
- (c)Aam doi

4.Paneer :-

- (a)Sterilised paneer
- (b)Vaccum paneer

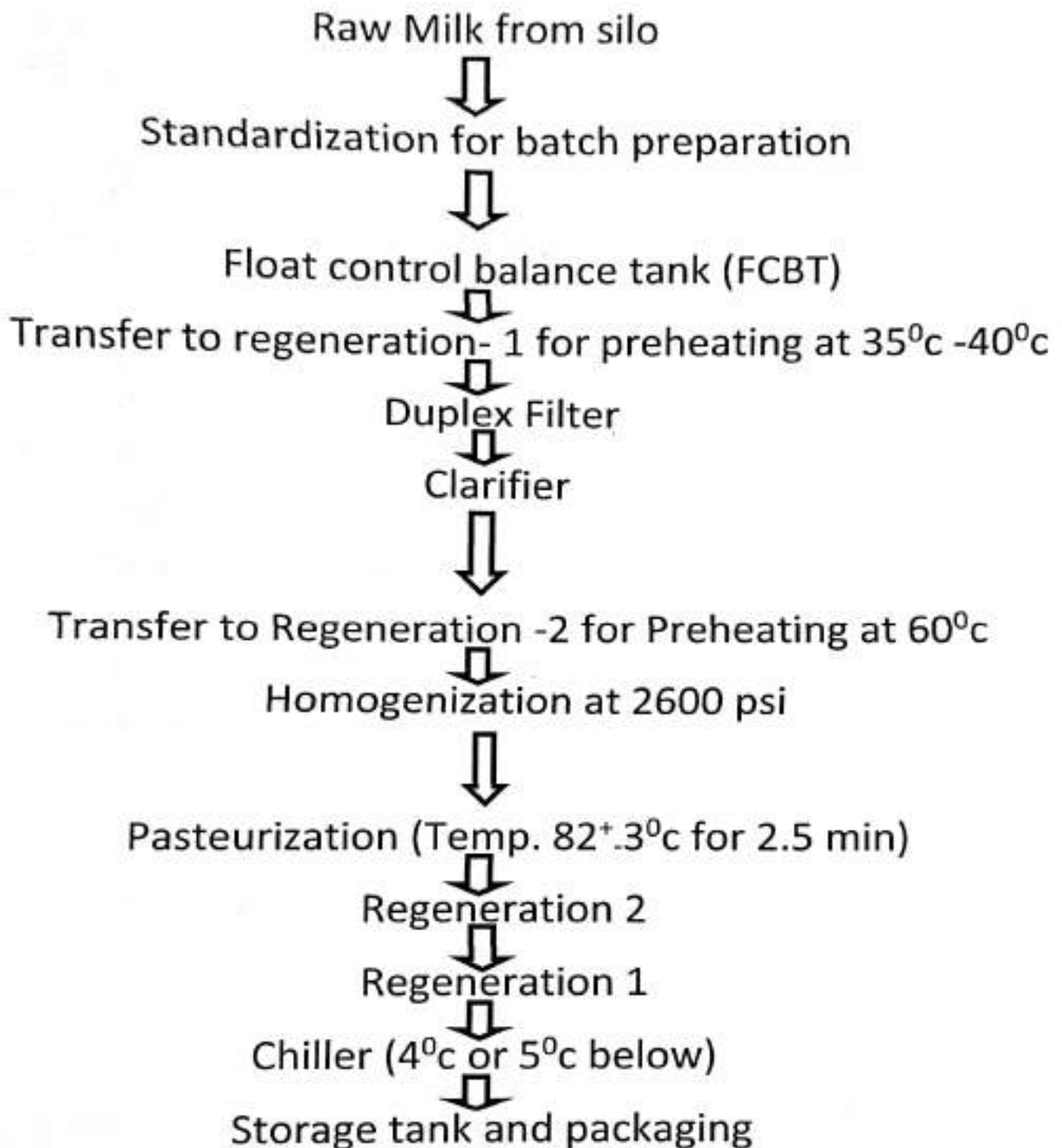
5.Lassi :-

6.Ghee :-

**Tradition of Taste
Promise of Purity
For Two Decades**



Process flow chart of milk:-



Equipment:- Cream Separator, Filter, Pasteurizer, Homogenizer, Vat, Chiller.

Processing of milk:-

After procuring raw milk all necessary test like organoleptic test, platform test, sampling ,weighing testing is done.

The milk is preheated at (35-40⁰c) for efficient filtration and clarification.

Once filtration is done it is immediately cool down to 4⁰c for restrict microbial growth, and storage.

Then the milk will go through PHE at 82⁰c for about 2.5 min holding time to inactivate microorganism present in milk.

Then homogenization break down the fat globules into small particles so that the cream layer can not be form .

The homogenization may be happen in one stages at 2600 PSI .

Then the milk is going through the packaging section and cold storage room which temperature should not exceed 4⁰c.

The transportation media should be insulated or with refrigeration system so that the milk shelf life can be extent .

Standardised, Toned, Double toned milk ingredients and energy value:-

(a) Standardised milk (Creamy delight):-

It consists 4.5% Fat and 8.5% SNF. Now a days it is a very healthy choice for most of people. It is pasteurized and homogenized milk.

Ingredients-

Milk, water, skimmed milk powder, whole milk powder, white butter, cream.

Energy value (79 Kcal)-

Protein- 3.0 gm

Carbohydrate- 4.8 gm

Fat- 4.6 gm



(b) Toned milk (Gold):-

It consists 3.5% Fat and 8.5% SNF. Now a days it is a very healthy choice for most of people. It is pasteurized and homogenized milk.

Ingredients-

Milk, water, skimmed milk powder, whole milk powder, white butter, cream.

Energy value (63.6 kcal)-

Protein- 3.0 gm

Carbohydrate- 4.8 gm

Fat- 3.6 gm



Standardised, Toned, Double toned milk ingredients and energy value:-

(a) Standardised milk (Creamy delight):-

It consists 4.5% Fat and 8.5% SNF. Now a days it is a very healthy choice for most of people. It is pasteurized and homogenized milk.

Ingredients-

Milk, water, skimmed milk powder, whole milk powder, white butter, cream.

Energy value (79 Kcal)-

Protein- 3.0 gm

Carbohydrate- 4.8 gm

Fat- 4.6 gm



(b) Toned milk (Gold):-

It consists 3.5% Fat and 8.5% SNF. Now a days it is a very healthy choice for most of people. It is pasteurized and homogenized milk.

Ingredients-

Milk, water, skimmed milk powder, whole milk powder, white butter, cream.

Energy value (63.6 kcal)-

Protein- 3.0 gm

Carbohydrate- 4.8 gm

Fat- 3.6 gm



(c) Double toned milk (Regular):-

It consist 1.5%Fat and 9.0%SNF . Now a days it is a very healthy choice for most of people. It is pasteurized and homogenized milk.

Ingredients-

Milk, water, skimmed milk powder, white butter, cream.

Energy value (47 kcal)-

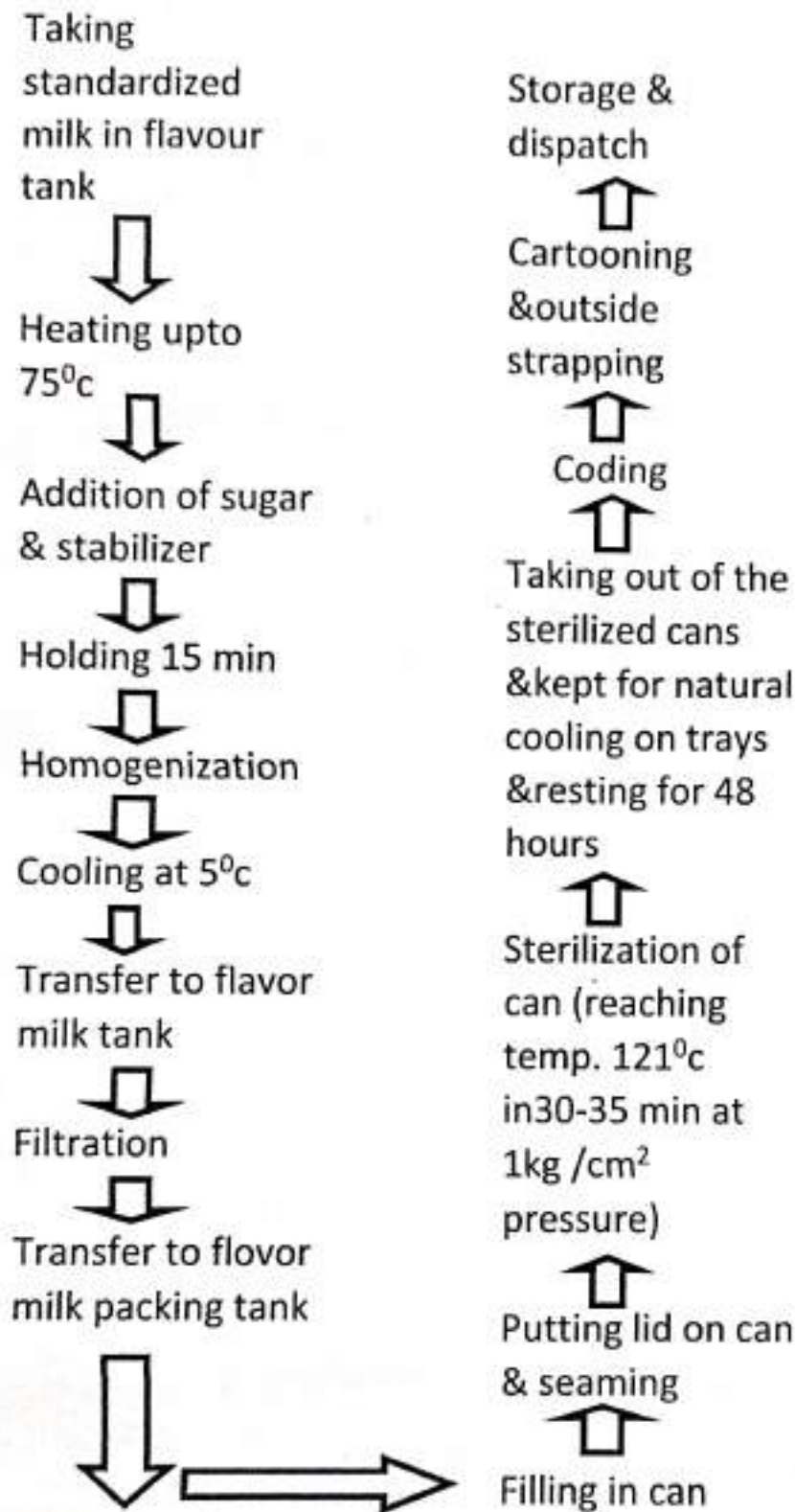
Protein- 3.15 gm

Carbohydrate- 5.15 gm

Fat- 1.55 gm



Process flow chart of Flavour milk :-



Badam ,Mango and Strawberry milk ingredients and nutritional information:-

(a)Badam milk :-

Ingredients-

Double toned milk ,sugar ,milk solids, almonds , saffron ,stabiliser(INS 407) ,added flavours(nature identical flavouring) .

Nutritional information(100ml)-

Energy value- 9.8kcal

Total fat- 2.4gm

Saturated fat- 1.55gm

Trans fat- <0.1gm

Total carbohydrate- 15.41gm

Added sugar – 10.5gm

Protein- 3.21gm



(b)Mango milk:-

Ingredients-

Toned milk ,sugar ,milk solids, stabiliser(INS 407) ,contains permitted synthetic food colours (INS 102,110) and added flavour(nature identical flavouring substances) .

Nutritional information(100ml)-

Energy value- 100kcal

Total fat- 3.15gm

Saturated fat- 2.03gm

Trans fat- <0.1gm

Total carbohydrate- 14.45gm

Added sugar – 9.66gm

Protein- 3.0gm



(c)strawberry milk:-

Ingredients-

Double toned milk , sugar ,milk solids, stabilizer(INS 407),contains permitted synthetic food colours (INS127) and added flavour.

Nutritional information(100ml)-

Energy value- 89kcal

Total fat- 2.1gm

Saturated fat- 1.36gm

Trans fat- <0.1gm

Total carbohydrate- 13.85gm

Added sugar – 8.5gm

Protein- 3.2gm



Process flow chart of Amrit Doi (sour):-

Taking standardized milk in doi tank

Heating at $90 \pm 2^{\circ}\text{C}$ & hold for 30 min



Cooling to 42°C



Transfer milk to inoculation tank



Addition of culture & mixing for 15 min



Transfer to cup filling machine
balance tank



Pouch, cup filling, sealing, coding &
transfer to incubation room in
perforated tray



Incubation at $42 \pm 2^{\circ}\text{C}$ till desired
acidity & body are achieved



Transfer to blast chamber at
 $2 \pm 2^{\circ}\text{C}$ for 2 hour



Cartooning



Transfer to cold storage at 4°C



Dispatch

Processing of Amrit Doi (sour):-

After processing raw milk it is use to contain in a MST (milk storage tank) the temperature should be below 4°c .

Then the milk will go through PHE (plate heat exchanger) for pasteurization ($82^{\circ}\text{c}/2.5$ min) and homogenization .

Homogenised and pasteurized milk is contained into DT (doi tank).

In DT(doi tank) milk temperature should be below 4°c to retard bacterial growth.

Then the culture is added in milk and stirring about 15 min properly.

Then the prepared milk will release for packaging .An acidity test should be done to ensure the quality of doi. Acidity must not exceed (0.5-0.72).

Then the packed product introduced to the incubation room at temperature of ($42-46^{\circ}\text{c}$) for about (2-3hour).Where the proper texture of doi will arise.

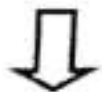
After that the packed pouch or cup of doi in transfer to blast room where the temperature should be ($5-7^{\circ}\text{c}$).

At final they are transfer to cold storage room where the temperature should below $4-5^{\circ}\text{c}$.

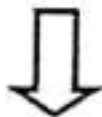
Then according to ned dispatch have been done.

Process flow chart of Mishti Doi :-

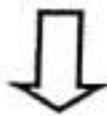
Sterilize glass bottle with media by autoclaving at 115-120⁰c for 15 min



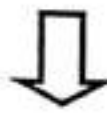
Cool down the temp of media at 44⁺.2⁰c



Incubate to prepare to prepare mother culture at 44⁺.2⁰c till desired body are achieved



Storage at below 5⁰c and use with in 7 days



To prepare M-2 culture,sterilized ss can with media by autoclaving at 115-120⁰c for 15 min



Cool down the temp of media at 44⁺.2⁰c



Incubate to prepare M-2 culture at 44⁺.2⁰c till desired body are achieved



Storage at 4⁰c and use within 3 days

Taking standardize milk in cup doi milk storage tank



Heating at 90⁺.2⁰c &hold for 30 min



Cooled down to 44⁺.2⁰c and addition of caramel colour



Transfer milk to inoculation tank



Addition of M-2 culture 2.5% at 44⁺.2⁰c & mixing for 15 min



Transfer to cup filling machine balance tank



Cup filling,sealing,coding &transfer to incubation room in perforated crate



Incubation at 44⁺.2⁰c till desired acidity & body are achieved



Transfer to blast chamber at 2⁺.2⁰c for 2 hour



Cartoning



Transfer to cold storage at below 5⁰c



Dispatch



Processing of Mishti Doi :-

After procuring milk should be contain in MST where below 4°c temperature maintained.

Then PHE will heated the milk at 82°c for about 2.5 min .
Mishti doi should not be homogenized.

When the milk will arrive in DT(doi tank) the primery standardization for sampling.

In mishti doi tank final standardization have been done.Then the milk is heated at 90°c temperature for about 1-2 hour.

Then the lab report final the batch accuracy. After decreasing temperature at 65°c caramel is added for flavour the doi.

There after the temperature should be decrease to 42°c by chiller and transfer to inoculation tank.

Then the culture is added and let it mixing finely for about 15 min and dispatch for packaging.

After packaging it should be transfer to incubation room at 42°c about 2-3 hour for proper texture.

Then transfer to the blast room (temp $5-7^{\circ}\text{c}$) and transfer for cold storage at ($2-3^{\circ}\text{c}$).

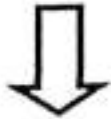
Finally dispatch have been done according to need.

Process flow chart of Aam doi :-

Sterilize glass bottle with media by autoclaving at 115-120⁰c for 15 min



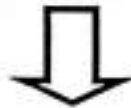
Cool down the temp of media at 44⁺.2⁰c



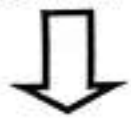
Incubate to prepare to prepare mother culture at 44⁺.2⁰c till desired body are achieved



Storage at below 5⁰c and use with in 7 days



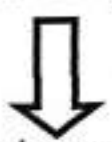
To prepare M-2 culture.sterilized ss can with media by autoclaving at 115-120⁰c for 15 min



Cool down the temp of media at 44⁺.2⁰c



Incubate to prepare M-2 culture at 44⁺.2⁰c till desired body are achieved

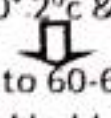


Storage at 4⁰c and use within 3 days

Taking standardize milk in cup doi milk storage tank



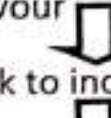
Heating at 90⁺.2⁰c & hold for 30 min



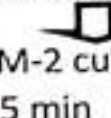
First cooling to 60-65⁰c & added mango pulp 5.0%and hold for 15 min



Cooled down to 44⁺.2⁰c and addition of colour & flavour



Transfer milk to inoculation tank



Addition of M-2 culture 2.5% at 44⁺.2⁰c & mixing for 15 min



Transfer to cup filling machine balance tank



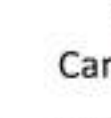
Cup filling,sealing,coding &transfer to incubation room in perforated crate



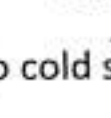
Incubation at 44⁺.2⁰c till desired acidity & body are achieved



Transfer to blast chamber at 2⁺.2⁰c for 2 hour



Cartoning



Transfer to cold storage at below 5⁰c



Dispatch



Processing of Aam doi :-

After procuring milk it is transfer to the MST where the temperature should be 4°c .

Then the milk transfer through PHE where it is pasteurized at 90°c .There is no homogenization is needed .

Then the milk transfer to the DT (doi tank) then to mishti tank where final standardization will done.

Then heating the batch at 90°c and holding the the batch around 1-2 hour.

Then decrease the temperature to $65^{+}.2^{\circ}\text{c}$ and adding pulp ,mango flavour and colour mix finely.

Decrease the temperature to at $42^{+}.2^{\circ}\text{c}$ and put into inoculation tank .

After adding culture and packaged it is transfer to the inoculation tank where temperature is $42^{+}.2^{\circ}\text{c}$.

Then incubation at $42^{+}.2^{\circ}\text{c}$ for about 2-3 hour.

After lab report tranfer to the blast room where temperature should be $5-7^{\circ}\text{c}$ and then cold storage $2-3^{\circ}\text{c}$ and dispatch is done.

Amrit ,Mishti and Aam doi ingredients and nutritional information:-

(a)Amrit doi:-

Ingredients-

Pasteurised toned milk ,water, milk solids and active lactic culture .

Nutritional information (100gm)-

Energy-62gm

Protein-3.7gm

Carbohydrate-5gm

Fat-3gm

Calcium-168mg



(b)Mishti doi:-

Ingredients-

Pasteurized standardized milk, sugar ,milk solids , water, active lactic culture.

Nutritional information (100gm)-

Energy-157gm

Protein-4.0gm

Carbohydrate-24.5gm

Fat-4.5gm

Added sugar-18.0gm

Calcium-175mg



(c)Aam doi:-

Ingredients-

Pasteurized standardized milk, sugar, milk solids, water, mango pulp 5% and active lactic culture.

Nutritional information (100gm)-

Energy-157gm
Protein-4.0gm
Carbohydrate-24.5gm
Fat-4.5gm
Added sugar-17gm
Calcium-175mg



Process flow chart of panner :-

Transfer raw milk to heating vat from raw milk silo /MST



Heating at $90 \pm 0.2^{\circ}\text{C}$ and circulation in heating vat



Holding for 10 mins & cooling to $85-87^{\circ}\text{C}$ (addition of 0.35%-0.4% GDL soln)



Coagulation & keeping for 15 min



Separation of chhana



Taking out chhana in pans



Transfer to pressing machine & pressing for 10-15 min



Removing muslin cloth & dipping chhana block in chilled water containing 0.15% NaCl 2hour (water, salt mixing brinesoln)



Place on SS plates & covered with dry muslin cloth



Transfer to cold room for hardening for 2 hours to over night



Transfer to machine for cube cutting

Processing of paneer :-

After processing raw milk transfer to the MST . After transfer from the MST the milk heated upto 90°C and holding upto 5-7 minute into the vat with agitate.

Then decrease the temperature to 85°C and mixed GDL solution ($3.904 \text{ gm}/1100 \text{ L water}$).

The plunging a agitation will go on until coagulation started.

Strain the coagulant portion with hygienic cloth and put into texture box.

Give pressure ($1.5\text{kg}/\text{cm}^2$) by pressure machine to remove moisture.

Then devide the chhana block to increase surface area.

Then tipped into water $3-4^{\circ}\text{C}$ for about 2-3 hour .

After that transfer it to the cold storage room for about (1-2 hour) at 5°C .

Then packaging should by done by sterilized and removing air by vacuum packaging .

Then the final product dispatch according to need.

Process flow chart of sterilized paneer:-

Transfer Raw milk to Heating Vat from Raw Milk Silo



Heating at $90 \pm 2^\circ\text{C}$ and circulation in heating vat



Gradual Cooling to $85-87^\circ\text{C}$ (Addition of 0.35% 0.4% GDL Soln)



Coagulating & keeping for 15 min



Separation of Chhana



Taking out Chhana in pans



Transfer to Pressing Machine & pressing for 10-15 min (pressure 6Kg)



Removing Muslin cloth & dipping chhana block in chilled water containing 0.15% NaCl 'min.2hr (water, salt mixing)



Place on SS plates in crates & covered with dry Muslin cloth



Transfer to Cold room for hardening for 2hrs to overnight



Transfer to Machine for cube Cutting



Dispatch



Store in cool dry place



Put in CBB & strapping



Put plastic lid on top side of the can



Labeling & printing



Cooling at ambient temperature



Dipping of sealed can in SS tank containing flowing normal water for cooling



Reaching temp. $117^\circ\text{C} \pm 2^\circ\text{C}$ in 15-20mins & kept for at least 15 mins at $1\text{Kg}/\text{cm}^2$ pressure



Seaming the tin container with lid



Filling the can with 1.25-1.5% brine solution at $75^\circ\text{C} \pm 5^\circ\text{C}$ (water, salt mixing brinesoln)



Sorting & Pouring paneer cube in tin container

Process flow chart of vacuum paneer:-

Transfer Raw milk to Heating Vat from

Raw Milk Silo

Heating at $90 \pm 2^\circ$ and circulation in heating vat

Gradual Cooling to $85-87^\circ\text{C}$ (addition of 0.35%-0.4%GDL soln)

Coagulating & keeping for 15 min

Separation of Chhana

Taking out Chhana in pans

Transfer to Pressing Machine & pressing for 10-15 min (pressure 6Kg)

Removing Muslin cloth & dipping chhana block in chilled water containing 0.15% NaCl min 2hr (water, salt mixing)

Place on SS plates in crates & covered with dry Muslin cloth

Transfer to Cold room for hardening for 2hrs to overnight

Transfer to Machine for cube Cutting

Dispatch

Storing in deep freeze at -5°C

Vacuum packing

Sterilized, vacuum paneer ingredients and nutritional information:-

(a) sterilized paneer:-

Ingredients-

Milk solids, citric acid/INS- 575, common salt and water.

Nutritional information (100 gm)-

Energy value- 257 kcal
Milk Fat- 20.8 gm
Milk Protein- 15.5 gm
Carbohydrate- 1.02 gm
Calcium- 208 mg
Phosphorus- 138 mg
Sodium- 152 mg



(b) vacuum paneer:-

Ingredients-

Milk solids, citric acid/INS- 575, common salt, and water.

Nutritional information (100 gm)-

Energy value- 307kcal
Milk Fat- 25 gm
Milk Protein- 18 gm
Carbohydrate- 1.5 gm
Calcium- 600 mg
Vitamin A- 300 mcg



Process flow chart of Lassi:-

Taking Standard and Pasteurized Milk in Dol setting tank



Heating at $42 \pm 0.2^\circ\text{C}$



Inoculation at $42 \pm 0.2^\circ\text{C}$ & mixing for 15-30mins



Holding to develop the desired acidity (0.8-0.9)



Breaking the curd with agitator (sugar syrup mixing)



Heating the mixture at $70 - 75^\circ\text{C}$



Homogenization & cooling at 6°C



Flavour Addition & flavour, colour



Transfer to packing machine balance tank



Transfer Poly film to packing area



Filling the film on the packing machine



Coding



Pass through UV light



Vertical Sealing



Inject lassi through filter



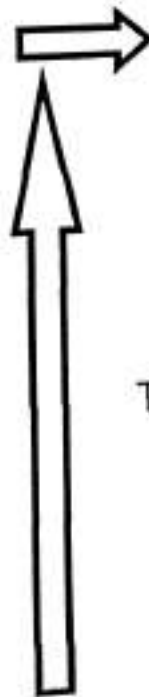
Horizontal Sealing



Transfer to cold store in crates



Storage & dispatch below 6°C



Lassi production:-

Lassi is a popular traditional dahi based drink. Lassi is blend of yogurt, water, spices and sometimes fruit.

Equipment:- Multipurpose vat, over head tank, Pouch shilling machine, Cold Store.

Lassi ingredients and nutritional information:-

Ingredients-

Toned milk dahi (milk solids and active culture), sugar and water, contains permitted stabilizer (INS 466) and added nature identical flavouring substances.

Nutritional information (100gm)-

Energy value- 92kcal

Fat- 1.8gm

Protein- 2.6gm

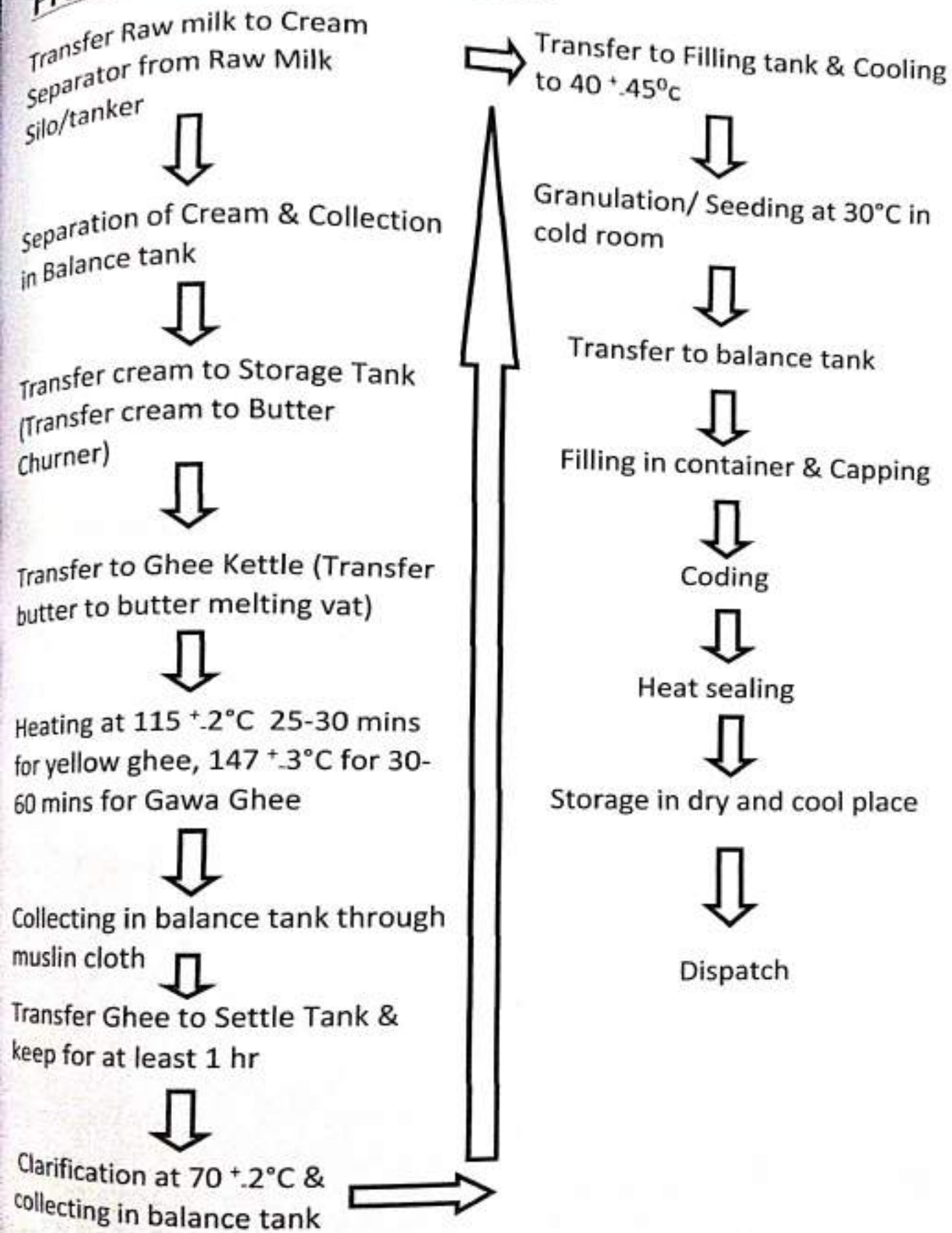
Total carbohydrate- 16gm

Added sugar- 12gm

Calcium- 125mg



Process flow chart of Ghee:-



Ghee production:-

Ghee may be defined as clarified butter fat prepared chiefly from cow or buffalo milk.

According to the PFA rules (1976) Ghee is pure clarified fat derived solely from milk or from dahi (cooking) butter or from cream to which no colouring matter is added.

To structure colour of Ghee depend on the quality of butter. As a brown colour and oily texture and cooked flavour and present test.

Equipment:- Cream separator, Multipurpose vat, Batch cooling Machine, Clarifier, Batch coding machine, Ghee container, Weighting machine, Packing machine.

Ghee ingredients and nutritional information:-

Ingredients-

Milk fat/whey fat.

Nutritional information (14 gm)-

Energy- 126kcal

Total fat- 14gm

Saturated fat-9.1gm

Cholesterol- 28mg

Trans fat- 0gm

protein- 0gm

Packing section:-



Equipment:- Over head tank, Packaging machine, crate washer, crate conveyor, chiller, cold storage.

Machine control switch:- vertical switch, Horizontal switch, injection, clutch and breaker, auto, VFD, Pouch pull, Milk increase and decreases switch.

Testing for Milk Packaging:- Drop test, Temperature, weight, date and price check.

Flow chart of Packaging:-

Issuing Packaging material to Packaging area



Poly film fitting In the Packaging machine



Coding



Passing through UV lit



Vertical sealing



Horizontal sealing & Pouch



Transfer to cold storage
In crates



dispatch
↑
storage at 5⁰c



Quality control (lab tests):-

Quality control a process that helps a company make sure it crates quality products and that salt and management alike make minimal mistake Quality at milk basically depended on fat, SNF, density and acidity.

Various taste conducted for different product:-

❖ Milk test:-

1. Fat Test:- Fat is esteemed by Garber method.

Equipment:- Pipette, Butyrometer, Centrifuge, Lock stopped, Pin, Acid till measure (10 ml) .

Reagent:- 90% H_2SO_4 (Garber Reagent), Milk (10.75 ml), 1 ml Isoamyl alcohol.

Process:-

10 ml Garber reagent (90% H_2SO_4) in butyrometer.



10.75 ml milk sample



1 ml Isoamyl alcohol



Shaking



Centrifuge for 5 min

2. Acidity of milk:-

Equipment:- Beaker, pipette (2ml)

Raw materials:- Milk(10ml), Water(10ml)

Reagent:- 10 drops, Phenolphthalein, 2ml 0.1(N) NaOH.

Process:-

10 ml milk and 5ml distilled water



3-5 drops phenolphthalein



Titration with 2ml 0.1(N) NaOH until the light pink colour appear

Calculation:- %acidity = reading \times 0.09

3. **lactometer reading**:- A lactometer is used to find out the amount of water in the milk. It works on the principle of specific gravity of milk. The reading on the meter indicates how pure/impure the milk.

When the lactometer reading taken at 27°C is the corrected lactometer reading (CLR). If the temperature decreases or increases then we should add or subtract simultaneously and multiply by 0.33.

4. **SNF Calculation** :-

$$\text{SNF \%} = (\text{fat \%} + \text{CLR}) / 4 + 0.44$$

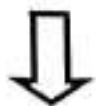
5. **Protein**:-

Equipment:- Pipette (2 ml), Beaker.

Reagent:- Phenolphthalein, saturated Potassium oxalate, Formalin.

Process:-

Take 10 ml milk in a beaker



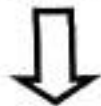
Add 3 to 4 drops Phenolphthalein



Add 0.4ml Potassium oxalate and hold for 3 min



Titrate by 0.1(N) normal NaOH & light pink colour appeared



Add 2 ml formalin (colour disappear)



Titrate with NaOH (0.1 N) and take reading colour appear

Protein = reading \times 1.7

6. ADULTERATION:-

Adulteration Test Done for raw milk:-

- Sugar Test
- Salt Test
- Urea Test

- Starch Test
- Neutralizer Test
- Ammonia Test
- Glucose Test
- Formalin Test
- Nitrate Test
- Detergent Test

Adulteration:-

Adulterant means any material which is or could be employed for making the food unsafe or sub-standard or misbranded or containing extraneous matter.

Adulterated food is dangerous because it may be toxic and can affect Health and it could deprive nutrients essential for proper growth and development.

Adulteration of milk reduces the quality of milk and can even make it Hazardous. Adulterations like salt, sugar, Ammonia, vegetable oil which increase the fat, SNF etc Of milk .

➤ Sugar Test:-

- 1ml Milk
- Take 1ml sugar solution (0.5% resorcinol 35% CL)
- Shake the test tube properly
- Boil for 4 to 5 minutes
- If red colour appeared, test is positive

➤ Salt Test:-

- Take 1ml 0.1 (N) silver nitrate in test tube
- 2 to 3 drops potassium chromate
- 3 ml milk
- Shake the test tube properly
- If the yellow colour appears the test is positive

➤ Urea Test:-

- Take 2 ml urea solution (Para diethyl amino Benzaldehyde)
- Take equal amount of milk
- Shake the test tube properly
- If yellow colour appears test is positive.

➤ Starch Test:-

- Take 3 ml milk
- Boil the milk
- Then cool it
- Add 2 to 3 drops Iodine sol (1%)
- Shake it properly if Blue colour appeared the test is positive.

➤ Neutralizer Test:-

- 2 ml milk sample

- 2 ml alcoholic solution (60% Ethyl Alcohol + 1% Rosalic acid)
- Shake it properly if pink colour appears the test is positive.

➤ Ammonia Test:-

- Pipette 5 ml of suspected Milk sample into a test tube
- Add 1ml of Nessler's Reagent
- Mix the contents of the tube thoroughly
- Observe and note the colour.
If Yellow in brown appeared test is positive.

➤ Detection of Glucose :-

- Take 1 ml milk in a test tube
- Add 1ml of Barford's reagent & Mix
- Heat the Mixture for extract 3 min in a boiling water bath
- Cool rapidly & add 1 ml of Phosphomolybdic reagent
If Deep Blue colour indicates Glucose

❖ Doi test:-

1. Fat test of doi:-

Equipment:- Butyrometer, Centrifuge, Stopper

Reagent:- 90% H_2SO_4 , Isoamyl alcohol

Raw material:- Doi

Process:-

10 ml 90% H_2SO_4 in butyrometer



10.75 gm doi in butyrometer



Add 1 ml Isoamyl alcohol and lock it with stopper shake completely



Centrifuge for 5 min and note the fat%

2. Acidity of dahi:-

Equipment:- Beaker, Magnetic stare, Pipette.

Raw material:- distilled water, Dahi.

Reagent:- Phenolphthalein indicator, NaOH

Process:-

Take 10 gm of dahi in a 100 ml beaker



Add 20 ml distilled water and 8 -10 drops of Phenolphthalein and one magnetic bar

↓

place in magnetic stir and titrate with 0.1(N) NaOH until obtained and note the volume of NaOH

Calculation:- $\text{Acidity}\% = \frac{\text{Volume of N/10 NaOH} \times 0.9}{\text{Weight of doi}}$

3. Total solid Test:-

Equipment:- Aluminium Petridis, desiccator, lacto win, Weight machine.

Raw material:- Doi and Hot water

Process:-

Take the weight empty dish (w_1)



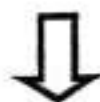
Take 2gm of Doi into the and weight (w_2)



Mix the Doi properly by adding hot water



Place the dish in lacto win till proper drying



Cool in desiccator and weight (w_3)

Calculation:- $\text{total solid}\% = \frac{w_3 - w_1}{w_2 - w_1} \times 100$

Paneer Test:-

1. Fat test of paneer-

Equipment:- Centrifuge, Butyrometer.

Reagent:- Isoamyl alcohol, Garber acid.

Raw material:- Paneer(3gm), Hot water.

Process:-

Take 3gm(approx) paneer in butyrometer

↓
7.5 ml Hot water

↓
Add 10 ml Garber acid(H_2SO_4)

↓
1 ml isomyl alcohol and shaking

↓
Centrifugation for 5 min and after take reading

2. Acidity of paneer:-

Equipments:- Beaker, Pipette, weight machine, magnetic Stirrer.

Reagent:- NaOH(1N), HCl(1N), Phenolphthalein

Process:-

Weight of Paneer 2gm (Approx)

↓
Add 20ml Hot water (5+10+5 ml)



Paste properly & take it Beaker



Mixed by Magnetic stirrer



Add 5 drops Phenolphthalein & 3ml NaOH 0.1(N)



Titrate with 1(N) HCL & take reading

Calculation:- $\frac{(3 - \text{Reading}) \times 0.9}{\text{Weight of sample}}$

Weight of sample

Observation:- paneer is good bellow 7 and paneer is bad above 7.

3.Total solid test of paneer:-

Equipment:-aluminum Petridis, dedicator, weight machine, lacto win, Glass rod.

Raw material:-Paneer and hot water

Process:-

Weight in aluminum dish(w_1)



Paneer 2 gm (approx) in aluminum dish

Paste by glass rod and add 4 ml hot water (approx)



Lacto win (to remove moisture)



After brown color it take desecrator



Then take weight of aluminum dish (w_3)

Calculation:-

$$\frac{W_3 - W_1}{\text{Weight of sample}} \times 100$$

Weight of sample

❖ Ghee test:-

1. Fat test of ghee:-

Equipment:- Centrifuge, Butyrometer.

Reagent:- Isoamyl alcohol, Garber acid.

Raw material:- sample of ghee.

Process:-

Add 10 ml Garber acid (H_2SO_4)



Take required ghee sample in butyrometer



1 ml isoamyl alcohol and shaking

Centrifugation for 5 min and after take reading

2. RM Value (Reichert Meissel):-

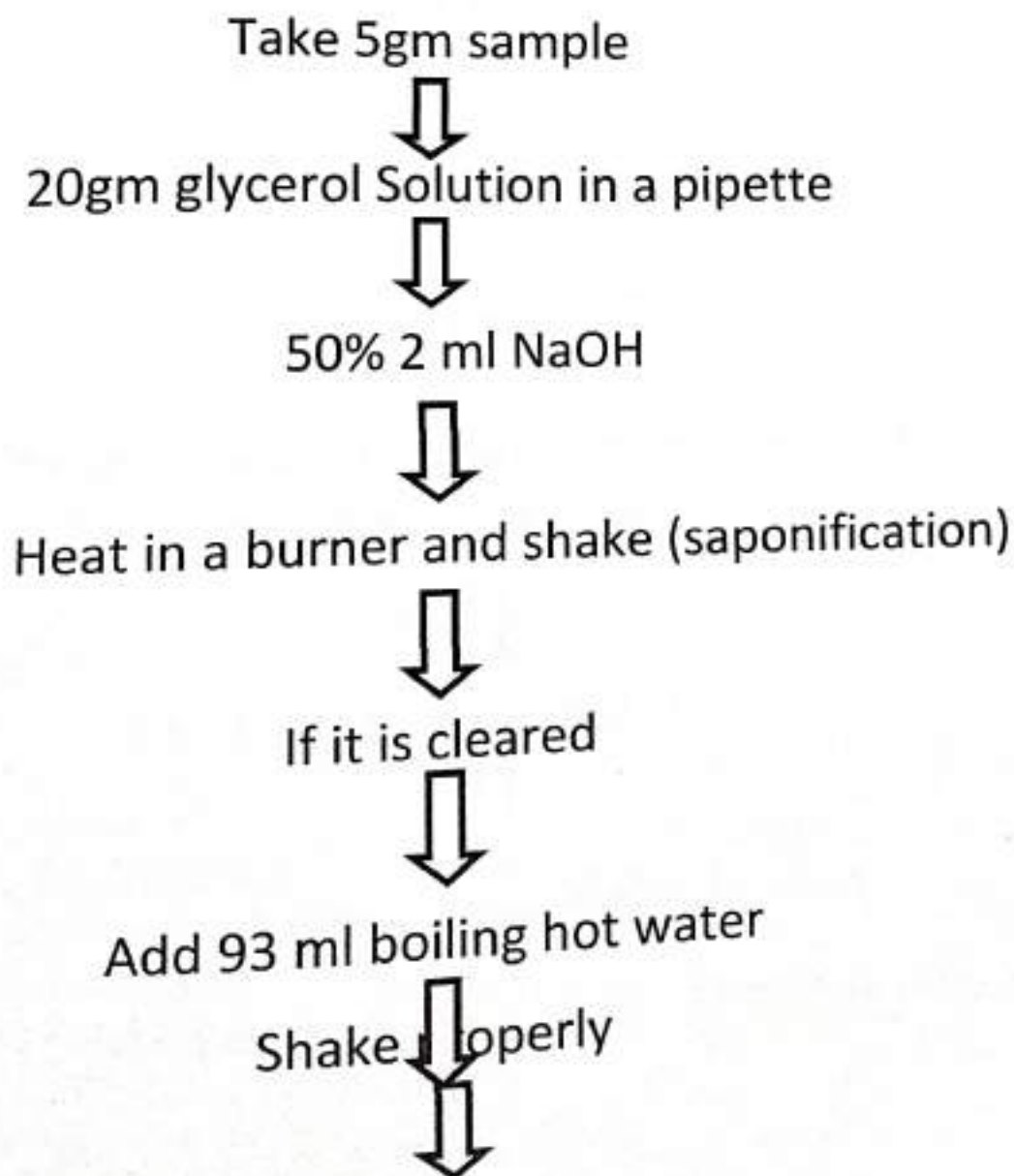
We Check the purity of ghee by RM value

Equipment:- pipette, Bunsen Burner, Steel heat, Volumetric flask

Raw material:- Ghee

Reagent:- Glycerol, NaOH, Distilled water, H_2SO_4 , Phenolphthalein

Process:-



Add 50 ml 2.5% H_2SO_4



Colour change (milky white colour)



Join Glass bounds give in a volumetric flask



Collect the distillate in another volumetric flask



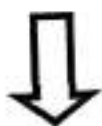
19 to 21 minute heat



Cold 10 minute



Filter by weight men filter paper (separate soluble and insoluble particle)



5 to 6 drops Phenolphthalein



Titrate with NaOH

Calculation:- RM value = $\frac{1.1 \times \text{Volume of NaOH}}{x 5}$

❖ Microbial test:-

1. MBRT Test (Methylene Blue dye reduction test) :-

Methylene Blue Dye Reduction Test, commonly known as MBRT test is used as a quick method to assess the microbiological quality of raw and pasteurized milk.

Equipment:- sterile test tube & micro pipette, Hot water bath.

Reagent:- Methylene blue solution (800ml hot water + 1 methylene blue tablet).

Raw material :- Milk

Process:-

Take 1ml milk in a test tube



1 ml methylene blue



Cork plugging



Hot water bath at 37⁰c

Observation :-

Class I-excellent = Not discolourise in 8 hour.

Class II-Good = discolourise in less than 8 hour but not less than 6 hour.

Class III-Fair = Discolourise in less than 6 hour but not less than 2 hour.

Class IV-Poor = Discolourise in less than 2 hour

Cleaning in place (CIP):-

CIP system means 'Cleaning in place' on important operation in food or dairy section to remove the adhere organic components through acid alkali and hot water remaining and to ensure prevention for micro biological hazard.

1. Return CIP (occurred in silo, pipeline, Raw milk tank, curd & paneer pipe line)
2. Line CIP (occurred in pasturizer, homogenizer, chiller, packaging machine)

Importance:-

- CIP system cleans the interior surface of pipelines, vessels, filters process equipment.
- The chemical used in CIP system remove organic component ie. Protein and fat and also dissolve the sticky mineral salt and water.
- Acid acts as solvent for fat particle adhered, which prevent the micro bacterial growth and dissolve milk stone.
- Alkali act detergent and fat and sugar from pipeline.

Procedure:-

Hot Soft water:-

Temp- 90°C

Running time-20-25 minutes

To remove fats and adhere with pipeline and clean the bacterial growth.

Nitric Acid:-

Dilute- 0.8%-1 % strength, running time-20-25 min.
Temperature 85°C to 90°C.

Dissolve mineral salts and prevent the pathogenic microorganisms growth.

Caustic:-

Dilute- 0.8%-1% strength, Running time-20-25 min.

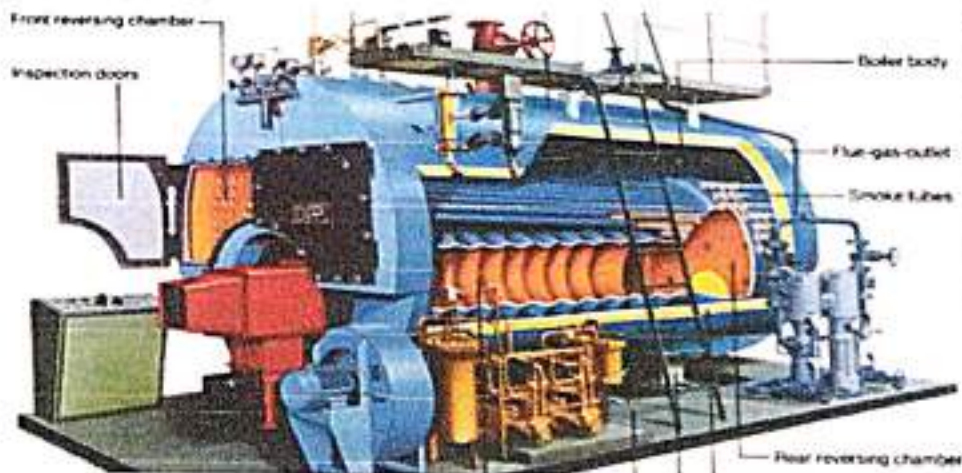
Temperature 85°C to 90°C and remove organic i.e. protein and fat .

Normal soft water:- removes dissolves and residues chemical com.

Boiler:-

A **boiler** (HFB) is usually a closed vessel made of steel. Boiler, also called Steam Generator, apparatus designed to convert a liquid to vapour. In a conventional steam power plant, a boiler consists of a furnace in which fuel is burned, surfaces to transmit heat from the combustion products to the water, and a space where steam can form and collect. Mainly 9 Mounting fittings are require and essential to boiler –

1. Main steam stop valve
2. Pressur guage
3. Safty valve (2 nos)
4. Water lable indicator and guage glass
5. Non-return valve
6. Air-relise valve
7. Blow down valve
8. Fuseble plug or lead plug
9. Muveray



Capacity:- A. Steam boiler (disel)- 300 kg /hr

B. Steam boiler (1,2 no)- 3 ton/hr & 3 no- 10 ton/hr

Type of boiler:- Fire tube steam boiler

Input and output of boiler:- Water , oil and steam

Working Pressure:- 16 kg/ cm²

Oil used :- diesel oil

Use of water:- Soft water (pH – 7-8, Hardness – 2-5 ppm).

Refrigeration:-

The refrigeration cycle starts and ends with the compressor. The refrigerant flows into the Compressor where it is compressed and pressurised. At this point, the refrigerant is a hot gas. The refrigerant is then pushed to the Condenser which turns the vapour into liquid and absorbs some of the heat.

- **Compressor:-**

Capacity-42 ton

Motor:-75H

No of compressor-4

Uses-Low temp low pressure vapor are compressed to high temp high pressure gas.

- **Oil separator:-**

No of oil separator -4

Capacity-50-60 liters

Uses- To separate oil particle and gas from discharge tube and drained oil. Discharge the hot gas to condenser.

- **Condenser:-**

Capacity- 50000 liters

No of condenser -2

Uses-The hot gas from compressor is cooled by water surrounding temp. In the tube.

- **Receiver(ammonia):-**

Capacity- 500kg

No of receiver- 1

Uses- Used to store the liquid refrigerant with inlet and outlet valves.

- **Evaporator:-**

No of evaporator-2

Uses- The liquid refrigerant are boiled and produced by extracting latent heat of vaporization from the outside of the evaporator coil.

- **Ice bank tank(IBT):-**

Capacity-10000 c.cc

No of IBT- 4

Uses-Ice manufactured by chilling the water.

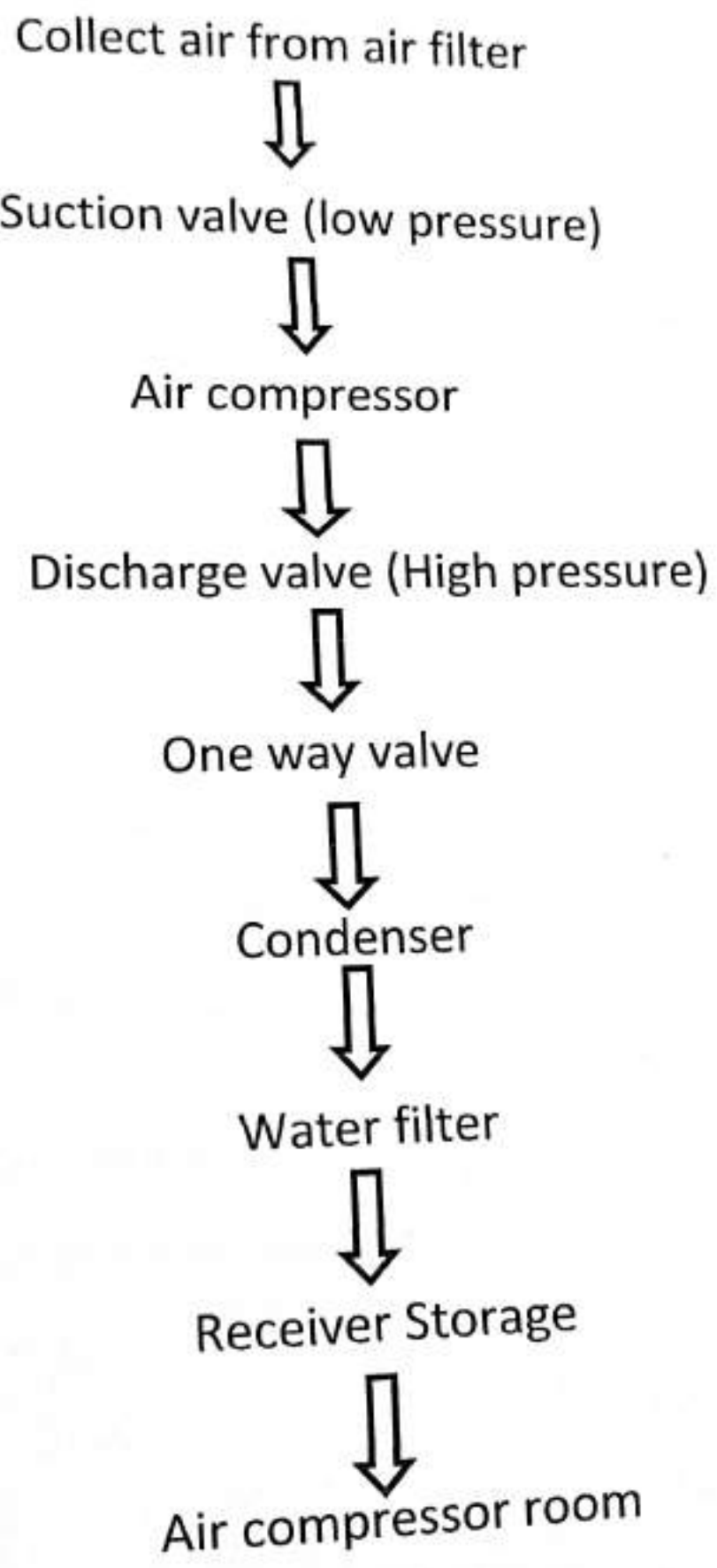
Cold room:-

Consistent and adjustable temperature within all of our cold storage units to keep our dairy product at the optimum level, as well as protecting products from harmful bacteria that may affect its quality ,to allow for the lasting preservation of our product and effective in reducing the amount of waste.

- Cold storage temperature = $3^{\circ}\text{c} - 4^{\circ}\text{c}$

- There are 5 cold storage (storing milk, panner, doi, lassi)

Air compressor:-



Effluent treatment plant (ETP):-

Every industry effluent treatment plant must treat effluent for this purpose in their own industry through effluent treatment plant.

Before discharging treated effluent onto land or into any surface water body. Industries must comply with the effluent discharge standards normal.

The biological oxygen demand (BOD) represent the amount of dissolved oxygen consumed by biological organisms when they decompose organic matter in water .

The chemical oxygen demand (COD) is amount of oxygen consumed when the water sample is chemically oxidise.

What ever is the law ,the parameter tested at ETP plant inlet point should be tasted at ETP outlet point to access if the water quality after treatment expected is achieved ,PH ,colour , temperature ,COD and BOD ,heavy metals ,NH₃ etc.

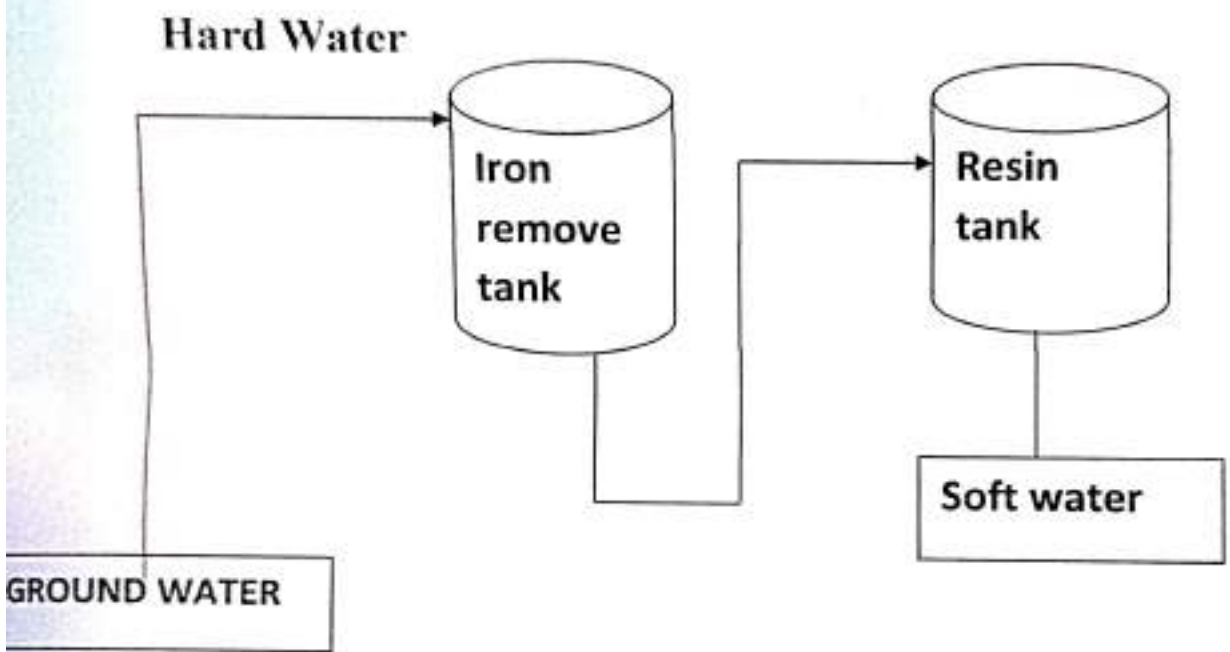
Steps of water treatment:-

- 1.Coagulation and flocculation
- 2.Sedimentation
- 3.Filteration
- 4.Disinfection

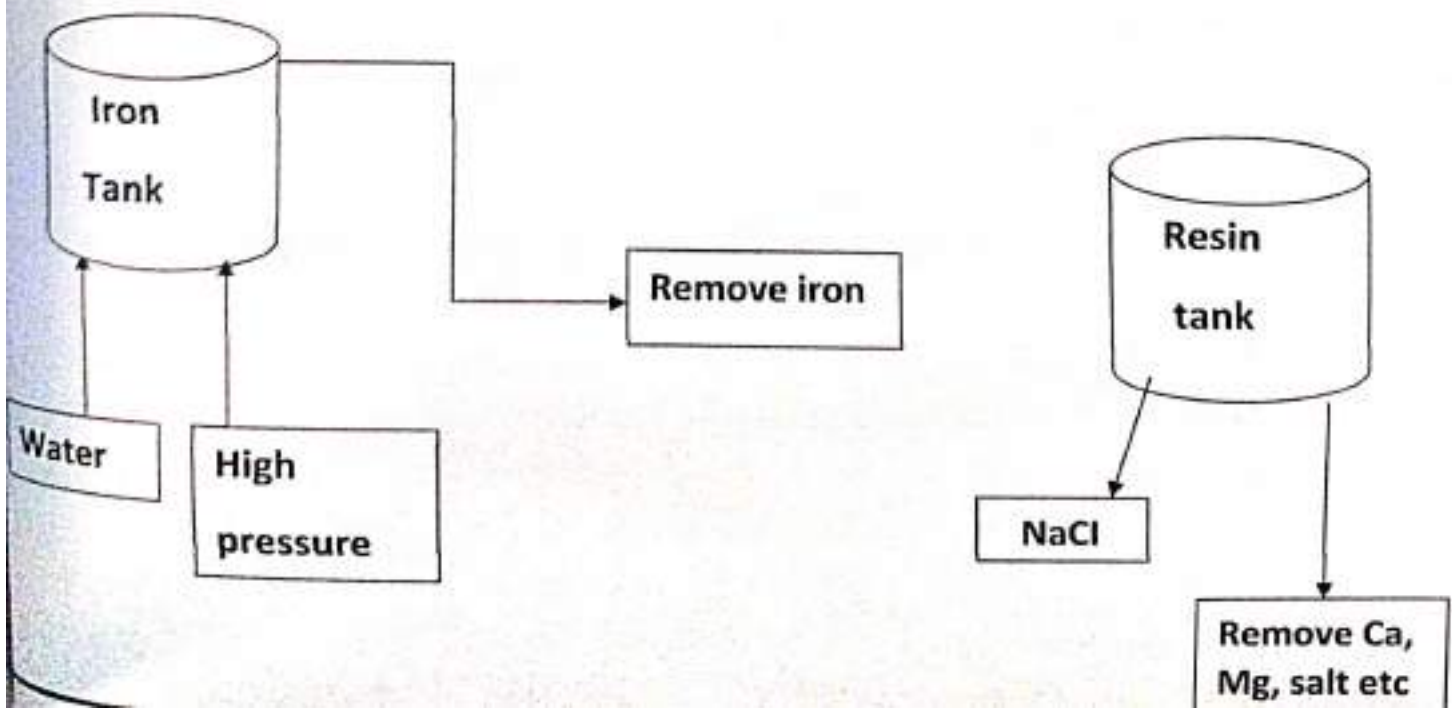
Contamination water ,including sanitary activity ,reaches (20-50%) is condition clean.

It has been estimated that the amount of water west is approx 2.5 times higher then that of processed milk in unit of volume.

Water Treatment



To clean the iron tank & resin tank



Conclusion:-

After undergoing a successful training for a period of 1 month.

We have gathered many valuable experiences and a proper knowledge about dairy industry. We have observed each every section like-

1. RMRD (raw milk reception dock) section
2. Milk processing
3. Production and Packaging
4. Quality control Lab
5. C.I.P System
6. Boiler System
7. Refrigeration System
8. Operation maintenance system

We learn a lot from the official and the stuffs and such a nice experience will help us in future. Also we will try to implement them in future.

Lastly, Many healthy thanks to **“RED COW DAIRY PRIVATE LIMITED”** . It's such a nice industrial experience.