Red Cow Dairy (P) Ltd.

AN ISO 22000:2018 COMPANY
CIN: U15209WB2003PTC096213

Regd. Office : Nandan Housing Complex
Station Road, Dankuni, Hooghly, Pin : 712 311
Telefax : 03212 230492 | Ph. : 03212 237004
e-mail : redcowdairy@yahoo.com, info@redcowdairy.in
Website : www.redcowdairy.in

Date .....

Ref. No. .....

Date: 23.01.2023

This is to certify that Mr. Ayan Kanti Panda (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

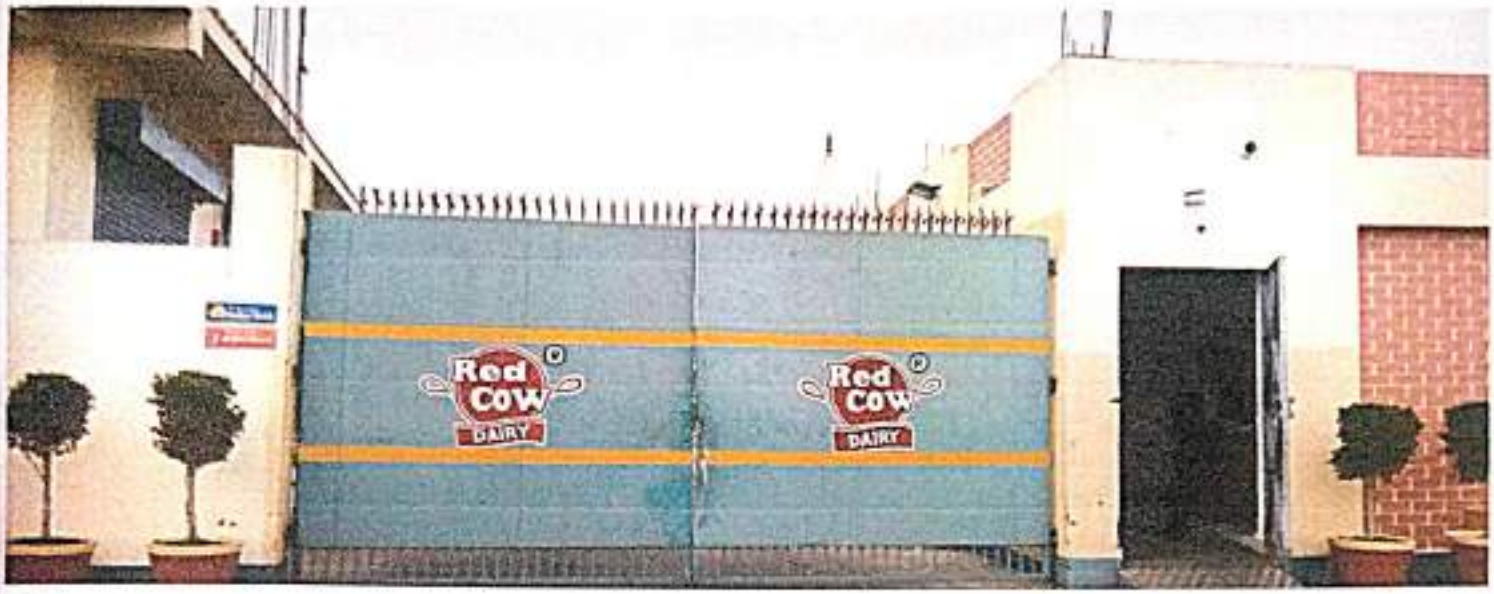
Satyajit Nath

RED COW DAIRY PVT. LTD. JAUGRAM PURBA BARDHAMAN PIN : 713166

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

CONTENT:-

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 :-

Process flow chart of milk:-

Raw Milk from silo

⇩

Standardization for batch preparation

⇩

Float control balance tank (FCBT)

⇩

Transfer to regeneration- 1 for preheating at 35^0c -40^0c

⇩

Duplex Filter

⇩

Clarifier

⇩

Transfer to Regeneration -2 for Preheating at 60^0c

⇩

Homogenization at 2600 psi

⇩

Pasteurization (Temp. $82^{+}.3^0$c for 2.5 min)

⇩

Regeneration 2

⇩

Regeneration 1

⇩

Chiller (4^0c or 5^0c below)

⇩

Storage tank and packaging

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

Processing of milk:-

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

The milk is preheated at (35-40^{0}c) for efficient filtration and clarification.

Once filtration is done it is immediately cool down to 4^{0}c for restrict microbial growth, and storage.

Then the milk will go through PHE at 82^{0}c 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 4^{0}c.

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

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

(a) Standardised milk (Creamy delight):-

It consist 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 consist 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,Doubal toned milk ingredients and energy value:-

(a) Standardised milk (Creamy delight):-

It consist 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 consist 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 :-

Taking standardized milk in flavour tank

⇩

Heating upto 75^0c

⇩

Addition of sugar & stabilizer

⇩

Holding 15 min

⇩

Homogenization

⇩

Cooling at 5^0c

⇩

Transfer to flavor milk tank

⇩

Filtration

⇩

Transfer to flovor milk packing tank

⇩ → Filling in can

⇧

Putting lid on can & seaming

⇧

Sterilization of can (reaching temp. 121^0c in30-35 min at 1kg /cm^2 pressure)

⇧

Taking out of the sterilized cans &kept for natural cooling on trays &resting for 48 hours

⇧

Coding

⇧

Cartooning &outside strapping

⇧

Storage & dispatch

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⁺.2⁰c & hold for 30 min

⇩

Cooling to 42⁰c

⇩

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⁺.2⁰c till desired acidity & body are achieved

⇩

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

⇩

Cartooning

⇩

Transfer to cold storage at 4⁰c

⇩

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 4^0c.

Then the milk will go through PHE (plate heat exchanger) for pasteurization (82^0c/2.5 min) and homogenization .

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

In DT(doi tank) milk temperature should be below 4^0c 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 (42-46^0c) 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 (5-7^0c).

At final they are transfer to cold storage room where the temperature should below 4-5^0c.

Then according to ned dispatch have been done.

Process flow chart of Mishti Doi :-

Sterilize glass bottle with media by autoclaving at 115-120°c for 15 min

⇩

Cool down the temp of media at 44°.2°c

⇩

Incubate to prepare to prepare mother culture at 44°.2°c till desired body are achieved

⇩

Storage at below 5°c and use with in 7 days

⇩

To prepare M-2 culture. sterilized ss can with media by autoclaving at 115-120°c for 15 min

⇩

Cool down the temp of media at 44°.2°c

⇩

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

⇩

Storage at 4°c and use within 3 days

Taking standardize milk in cup doi milk storage tank

⇩

Heating at 90°.2°c &hold for 30 min

⇩

Cooled down to 44°.2°c and addition of caramel colour

⇩

Transfer milk to inoculation tank

⇩

Addition of M-2 culture 2.5% at 44°.2°c & 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°.2°ctill desired acidity & body are achieved

⇩

Transfer to blast chamber at 2°.2°c for 2 hour

⇩

Cartoning

⇩

Transfer to cold storage at below 5°c

⇩

Dispatch

Processing of Mishti Doi :-

After procuring milk should be contain in MST where below 4^0c temperature maintained.

Then PHE will heated the milk at 82^0c 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 90^0c temperature for about 1-2 hour.

Then the lab report final the batch accuracy. After decreasing temperature at $65^{+}.2^0$c caramel is added for flavour the doi.

There after the temperature should be decrease to 42^0c 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 $42^{+}.2^0$c about 2-3 hour for proper texture.

Then transfer to the blast room (temp 5-7^0c) and transfer for cold storage at (2-3^0c).

Finally dispatch have been done according to need.

Process flow chart of Aam doi :-

Sterilize glass bottle with media by autoclaving at 115-120^{0}c for 15 min

Cool down the temp of media at 44$^+$.2^{0}c

Incubate to prepare to prepare mother culture at 44$^+$.2^{0}c till desired body are achieved

Storage at below 5^{0}c and use with in 7 days

To prepare M-2 culture. sterilized ss can with media by autoclaving at 115-120^{0}c for 15 min

Cool down the temp of media at 44$^+$.2^{0}c

Incubate to prepare M-2 culture at 44$^+$.2^{0}c till desired body are achieved

Storage at 4^{0}c and use within 3 days

Taking standardize milk in cup doi milk storage tank

Heating at 90$^+$.2^{0}c &hold for 30 min

First cooling to 60-65^{0}c & added mango pulp 5.0%and hold for 15 min

Cooled down to 44$^+$.2^{0}c and addition of colour & flavour

Transfer milk to inoculation tank

Addition of M-2 culture 2.5% at 44$^+$.2^{0}c & 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$^+$.2^{0}ctill desired acidity & body are achieved

Transfer to blast chamber at 2$^+$.2^{0}c for 2 hour

Cartoning

Transfer to cold storage at below 5^{0}c

Dispatch

Processing of Aam doi :-

After procuring milk it is transfer to the MST where the temperature should be 4^0c .

Then the milk transfar through PHE where it is pasteurized at 90^0c .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 90^0c and holding the the batch around 1-2 hour.

Then decrease the temperature to $65^{+}.2^0$c and adding pulp ,mango flavour and colour mix finely.

Decrease the temperature to at $42^{+}.2^0$c and put into inoculation tank .

After adding culture and packaged it is transfer to the inoculation tank where temperature is $42^{+}.2^0$c .

Then incubation at $42^{+}.2^0$c for about 2-3 hour.

After lab report tranfer to the blast room where temperature should be 5-7^0c and then cold storage 2-3^0c and dispatch is done.

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

(a)Amrit doi:-

Ingredients-

Pasteurised toned milk ,water, milk soilds 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

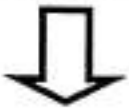
Heating at 90°.2°C and circulation in heating vat

Holding for 10 mins & cooling to 85-87°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 90^0c and holding upto 5-7minute into the vat with agitate.

Then decrease the temperature to 85^0c and mixed GDL solution (3.904 gm/1100 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 (1.5kg/cm^2) by pressure machine to remove moisture.

Then devide the chhana block to increase surface area.

Then tipped into water 3-4^0c for about 2-3 hour .

After that transfer it to the cold storage room for about (1-2 hour) at 5^0c.

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 ±2°C and circulation in heating vat

⇩

Gradual Cooling to 85-87 °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

⇨

Sorting & Pouring paneer cube in tin container

⇧

Filling the can with 1.25-1.5% brine solution at 75°C. 5°C (water, salt mixing brinesoln)

⇧

Seaming the tin container with lid

⇧

Reaching temp. 117°C ±2°C in 15-20mins & kept for at least 15 mins at 1Kg/cm² pressure

⇧

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

⇧

Cooling at ambient temperature

⇧

Labeling & printing

⇧

Put plastic lid on top side of the can

⇧

Put in CBB & strapping

⇧

Store in cool dry place

⇧

Dispatch

Process flow chart of vacuum paneer:-

Transfer Raw milk to Heating Vat from Raw Milk Silo

⇩

Heating at 90 ±2° and circulation in heating vat

⇩

Gradual Cooling to 85-87 °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 ⇨ Vacuum packing

⇧

Storing in deep freeze at – 5°C

⇧

Dispatch

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 al 42 ⁺.2°C

⇩

Inoculation at 42 ⁺.2°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°C

⇩

Homogenization & cooling at 6°C

⇩

Flavour Addition & flavour, colour

⇩

Transfer to packing machine balance tank

⇨

Inject lassi through filter

⇩

Horizontal Sealing

⇩

Vertical Sealing

⇩

Pass through UV light

⇩

Coding

⇩

Filling the film on the packing machine

⇩

Transfer Poly film to packing area

⇩

Storage & dispatch below 6°c

⇩

Transfer to cold store in crates

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:-

Transfer Raw milk to Cream Separator from Raw Milk Silo/tanker

⇩

Separation of Cream & Collection in Balance tank

⇩

Transfer cream to Storage Tank (Transfer cream to Butter Churner)

⇩

Transfer to Ghee Kettle (Transfer butter to butter melting vat)

⇩

Heating at 115 $^{+}$.2°C 25-30 mins for yellow ghee, 147 $^{+}$.3°C for 30-60 mins for Gawa Ghee

⇩

Collecting in balance tank through muslin cloth

⇩

Transfer Ghee to Settle Tank & keep for at least 1 hr

⇩

Clarification at 70 $^{+}$.2°C & collecting in balance tank

⇨

Transfer to Filling tank & Cooling to 40 $^{+}$.45°C

⇩

Granulation/ Seeding at 30°C in cold room

⇩

Transfer to balance tank

⇩

Filling in container & Capping

⇩

Coding

⇩

Heat sealing

⇩

Storage in dry and cool place

⇩

Dispatch

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 t e 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 decrees 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

⇨ storage at 5^0c

⇧

dispatch

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

   ⇩

   1ml 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 dops phenolphthalein

⇩

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

Calculation:- %acidity = reading× 0.09

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

When the lactometer reading taken at 27^0c is the corrected lactometer reading (CLR).If the temp decrease or increase then we should add or subtract simultaneously and multiply 0.33.

4. **SNF Calculation :-**

SNF % = (fat % + 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× 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)
- Sake 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
- Sake 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
- Sake the test tube properly
- If yellow colour appears test is positive.

Starch Test:-

- Take 3 ml milk
- Boil the milk
- Ten cool it
- At 2 to 3 drops Iodine sol (1%)
- Sake 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)
- Sake 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 stair and titrate with 0.1(N) NaOH until obtained and note the volume of NaOH

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

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

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 an 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:- $\frac{w_3 - w_1}{\text{Weight of sample}} \times 100$

❖ 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:-

Take 5gm sample

⇩

20gm glycerol Solution in a pipette

⇩

50% 2 ml NaOH

⇩

Heat in a burner and shake (saponification)

⇩

If it is cleared

⇩

Add 93 ml boiling hot water

Shake properly

⇩

⇩

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= $\frac{1.1 \times \text{Volume of NaOH}}{} \times 5$

Weight of Ghee

❖ **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 37^0c

Observation :-

Class I-excellent = Not discolourise in 8 hour.

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

Class III-Fair = Discolourise in less than 6 hour but not less then 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)

Importence:-

- 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- $90^{0}C$

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^{0}C to 90^{0}C.

Dissolve mineral salts and prevent the pathogenic microorganisms growth.

Caustic:-

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

Temperature 85^{0}C to 90^{0}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

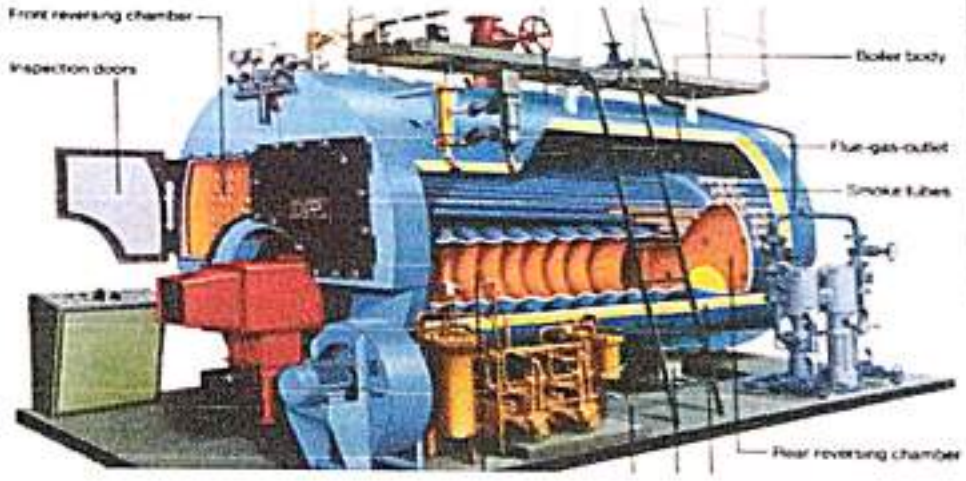
5.Non-return valve

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/ cm^2

Oil used :- disel 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 compresser-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 litters
  Uses- To separate oil particle and gas from discharge tube and drained oil. Discharge the hot gas to condenser.
- **Condenser:-**
  Capacity- 50000 litters
  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°c - 4°c

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

Air compressor:-

Collect air from air filter

⇩

Suction valve (low pressure)

⇩

Air compressor

⇩

Discharge valve (High pressure)

⇩

One way valve

⇩

Condenser

⇩

Water filter

⇩

Receiver Storage

⇩

Air compressor room

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 ,NH_3 etc.

Steps of water treatment:-

1.Coagulation and flocculation

2.Sedimentation

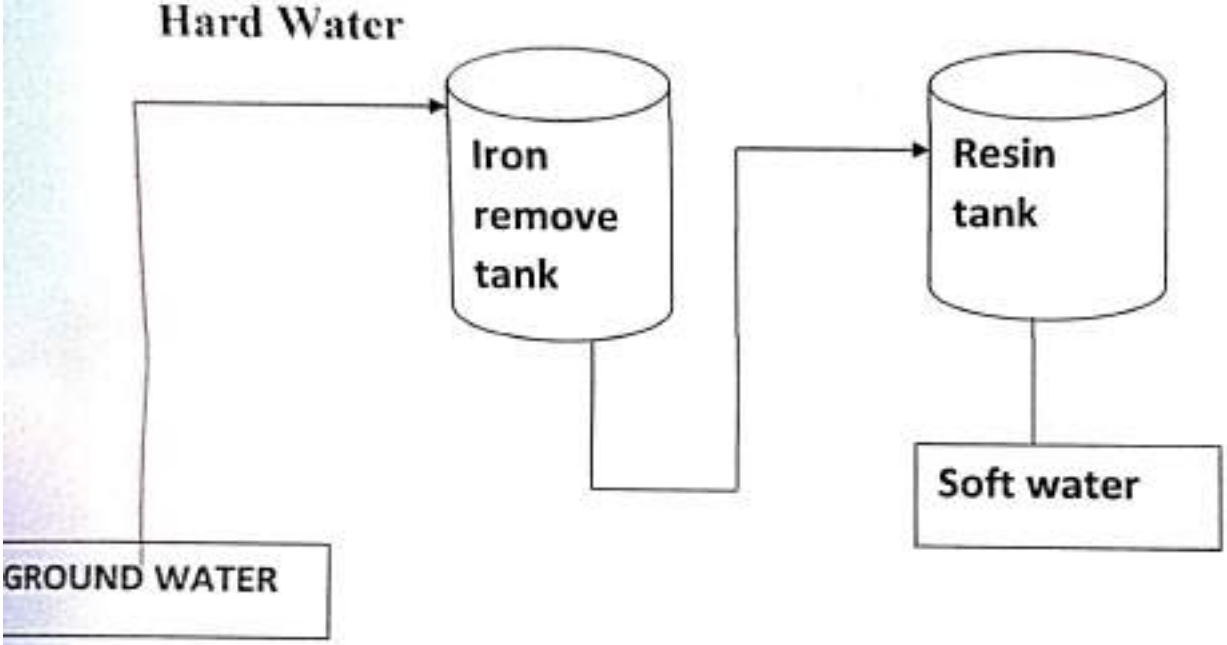
3.Filteration

4.Disinfection

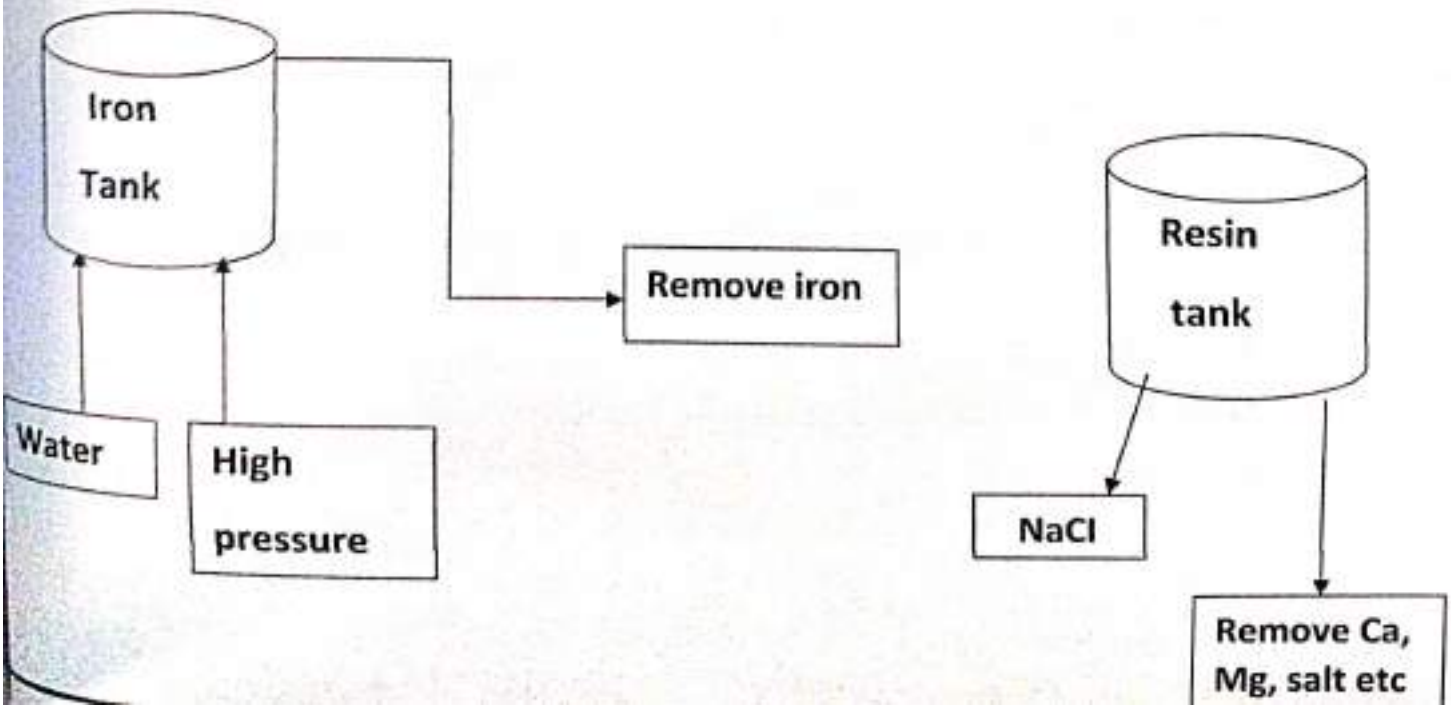
Contamination water ,including sanitary activity ,reaches (20-50%) is condition clean.

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.