A Training Report

Submited to

ATMIYA UNIVERSITY

In partial fulfillment of the requiremens for the degree of

Bachelor of Science in Biotechnology

By

Riya Talati

(2022-2023)

Under the supervision of

Mr. Ketan Patel

In Amul Dairy, Anand

Department of Biotechnology

Atmiya University, Rajkot, Gujarat – 360005

DECLARATION

I hereby declare that the work incorporated in the present Training report Entitled “General Equipment used for production of milk and milk products “is my own work and is original. This Work (in part or in full) has not been submitted to any University for the award of any Degree or a Diploma.

Date :

Student’s signature :

Amul

KAIRA DISTRICT CO-OPERATIVE MILK PRODUCERS' UNION LTD.

No. Admin. II: b-3873

29-Sep-2022

To Whom So Ever It may Concern

This is to certify that **Ms. Riya Vimalbhai Talati** student of B.Sc. Biotechnology from Atmiya University has completed her project training in our organization. The duration of the project training was from 02-09-2022 to 01-10-2022.

She has been a regular and responsible project trainee during the period.

We wish her all the best.

Authorized Signatory

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Index

ACKNOWLEDGEMENT

Thanks God, to the merciful and the passionate, for providing us the opportunity to step in the excellent World of science. To be able to step strong and smooth in this way, we have also been supported and Supervised by many people to would like to express our deepest gratitude.

This work was came out during **02/09/2022** to **01/10/2022** at **KAIRA DISTRICT CO-OPERATIVE MILK PRODUCER'S UNION LTD. ANAND AMUL DAIRY.**

I take this opportunity to thank everyone, who made my training possible. All the people that I have Worked with have contributed to my learning process during this month. I am highly indebted to All the people who have spared their valuable time for my training and help me develop my insight for All the techniques. On the first place I would like to record my gratitude to **Mr.Ketan Patel –** my training guide under Whose supervision, guidance and advice I have completed my training in a successful way.

❖INTRODUCTION

Amul is an Indian dairy co-operative, based at Anand in Gujarat, India. It was founded in 1950 and is managed by Gujarat Co-operative Milk Marketing Federation Limited (GCMMF).

Tribhuvandas Patel spearheaded the white revolution under the guidance of Sardar Patel and Dr.VergheseKurien. As a result, Kaira District Milk Union Limited was formed in 1946. Amulmodelis a three-tier co-operative structure. This structure consists of a dairy cooperative society at the village level affiliated to a milk union the district level that in turn is federated into a milk federation at the state level. Milk collection is done at village dairy society. Milk procurement and processing is done at the district milk union and milk products are marketed at the state milk federation. The structure was evolved at Amul' s initial, solitary diary, later adopted by GCMMF, and thereafter replicated all over the country under the operation flood programme. Itis known as the Amul Model or ' Anand pattern' . The Amul model has helped India to emerge asthe largest milk producer in the world. The birth of Amul began when milk became a symbol ofprotest to stop the exploitation by intermediaries. The Kaira District Cooperative Milk Producer Union Ltd. was founded in 1946 under the inspiration of Tribhuvandas Patel and Sardar Patel and under the guidance and expertise of Dr. VergheseKurien. The dairy started running from 1950.

Currently, the cooperative collects milk from 1196 Village Cooperative societies and 240 milk farms. This cooperative currently handles 31 lakh litres of milk per day in Flush season and 25 lakh litres of milk per day in Lean season. The cooperative runs on the principal of famous Amulpattern- Amul 3-tier system.

This cooperative includes a main plant and satellite plants, which includes:

- Anand Main Plant, Amul Dairy Rd., Anand, Gujarat.
- Mogar Chocolate Plant, Mogar, Gujarat.
- Kheda Satellite Dairy, Gujarat.
- Kanjari Cattle Plant
- Amul Research and development Association, ODE

- Amul Virar-Dairy, Virar Mumbai

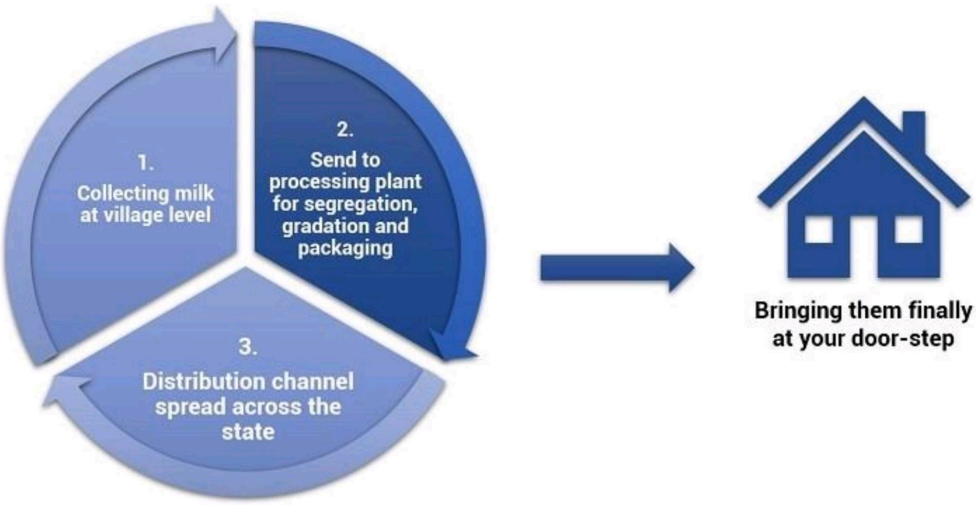
The logo of AMUL is ring of four hands,

encircled by the words KAIRA DISTRICT COOPERATIVE MILK PRODUCER' S UNION LIMITED. The essence of this logo is the co-ordinate effort of four groups of people. The first hand represents milk suppliers, second milk processors, third marketers & fourth consumers respectively. This truly defines the reason behind the success of Amul. It symbolically represents the underlying philosophy of Amul. Amul' s famous slogan, which is now a part of its logo, was created in 1994 by Shri. Kanon Krishna of a Mumbai based advertising agency called Advertising and Sales Promotion (ASP). ' Amul, the taste of India' is the slogan of Amul that lends meaning to the brands never ending commitment to provide quality food and products to the rural man, which he otherwise could not have afforded.

The Anand pattern

UNIQUE THREE TIER PATTERN OF AMUL

The Amul Model of dairy development is a three-tiered structure with the dairy cooperative societies at the village level federated under a milk union at the district level and a federation ofmember unions at the state level.



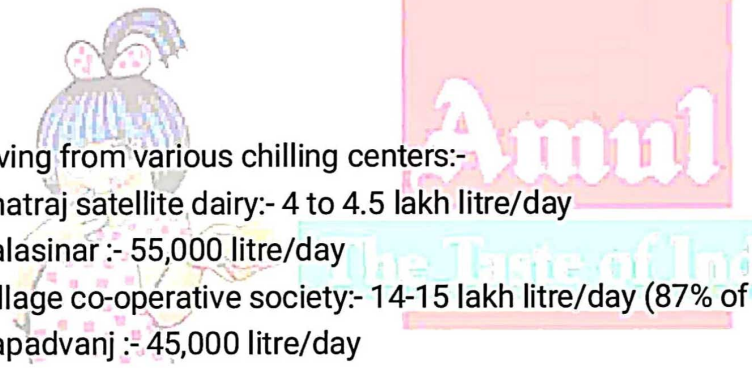
The Amul model has helped India to emerge as the largest milk producer in the world. More than 15 million milk producers pour their milk in 144500 dairy cooperative societies across thecountry. Their milk is processed in 184 District Co-operative Unions and marketed by 22 State Marketing Federations, ensuring a better life for millions

AMUL 3 PROCESSING :RMRD

Amul received milk from 14,000 village cooperative societies. In Amul 3, Milk only received through road milk tankers coming from chilling centers. There are three bays for unloading of milk tankers.

Total storage capacity- 30 Lakh litre/day

Recent handling capacity (Lean season) – 22.5 Lakh litre/day.



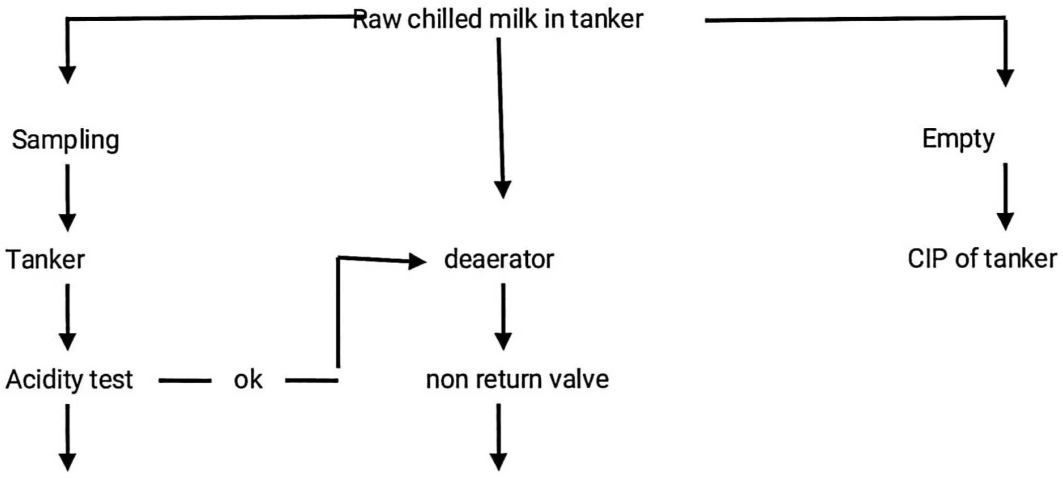
❖ Total receiving from various chilling centers:-

1. Khatraj satellite dairy:- 4 to 4.5 lakh litre/day
2. Balasinar :- 55,000 litre/day
3. Village co-operative society:- 14-15 lakh litre/day (87% of total milk)
4. Kapadvanj :- 45,000 litre/day

Tanker -122 Tankers in flush season (5.5 fat / 8.8 S.N.F) approx.

70 Tankers in lean season (5.0 fat / 7.9 S.N.F) (22,000 to 25,000 liter per tanker)

❖ PROCESS FLOW DIAGRAM OF AMUL 3 (four receiving lines)



Sour milk tank

Ghee section

pesilec continuous mass meter

Chiller

Buffalo tank

Sludge treatment tank

clarifier

Heating to 600^{0}c

Cooling to 10^{0}c

Industrial casein

raw milk silo (4-5^{0}c)

balance tank of pasteurizer

Regeneration 1(55-59^{0}c)

Bactofugal

Pre heating (62^{0}c)

Skimmed milk

Seperator

cream

Online standardization (ALFAST)

cream buffer tank

Homogenization

(1 stage - 130-150 kg/cm^2

2 stage – 60 kg/cm^2)

Standardization milk

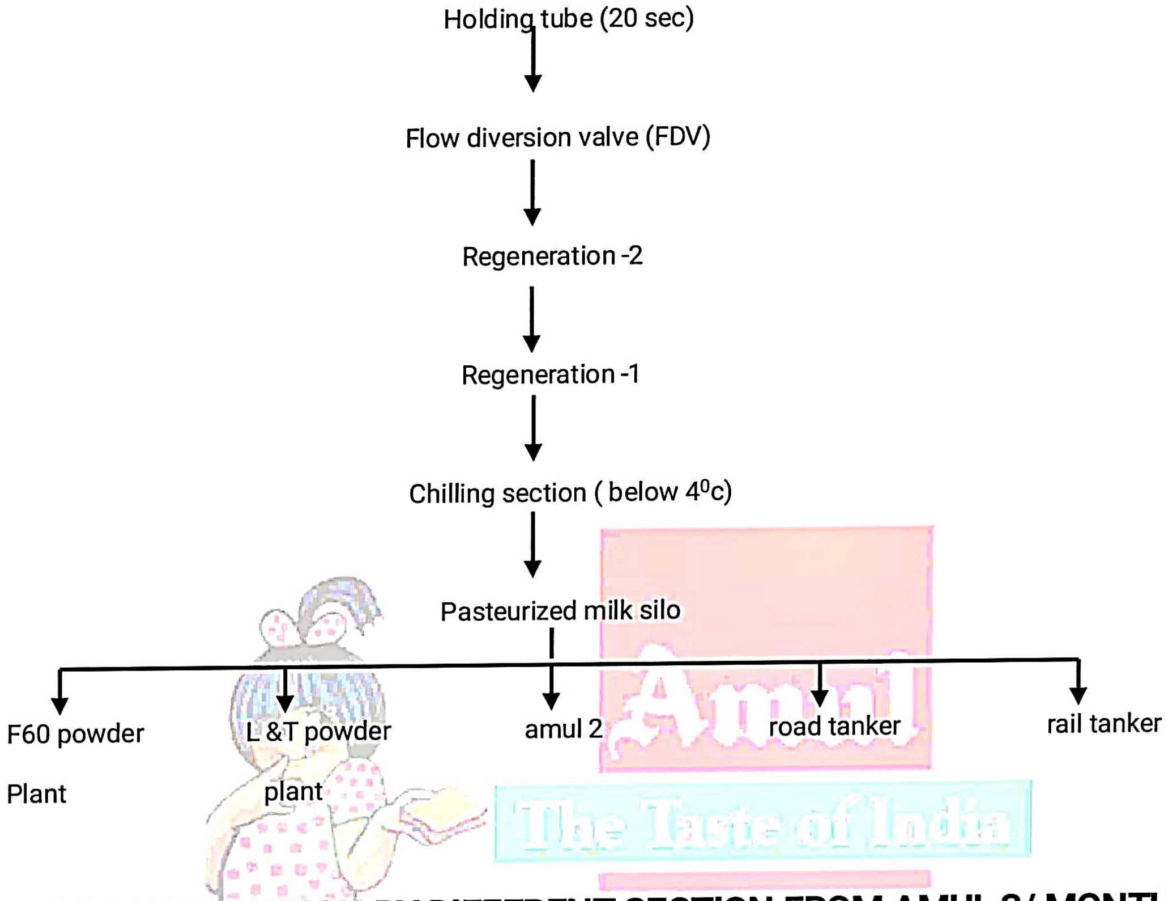
balance tank

Regeneration 2 (65-70^{0}c)

cream pasteurizer (90^{0}c)

Heating section (78^{0}c)

cream silo



➢ MILK UTILIZATION BY DIFFERENT SECTION FROM AMUL 3/ MONTH:-

- Amul 2 & F60:- 55%
- Amul 3 powder plant: 30%
- Market Milk: - 1%
- Tea Special: 2%
- Amu Tazza: 2%
- Amul Gold: -3%
- Amul Flavoured Milk: -1%
- Cream: - 6%

➢ Specification for milk & milk products:-

Type of milk & milk product	Cream Fat %	Fat % ratio or % F/SNF ratio	Product Code
Tonned milk	42.0	3.55	22
Double tonned milk	42.0	1.60	23
Market milk	42.0	4.60	24
High fat milk	42.0	6.60	26
Whole milk (Gold)	42.0	6.10	28
Total remix	42.0	-	33
Skimming	42.0	0.05	36
Whole milk powder	42.0	37.50:1 F/SNF	42
Amulya milk	42.0	33.30:1F/SNF	43
Amulya spray milk	42.0	30.00:1F/SNF	48
IMF – I	42.0	55.50:1F/SNF	44
IMF – II	42.0	31.40:1F/SN	45

GHEE SECTION

INTRODUCTION:-

❖ Amul has a well laid out Ghee Section just besides processing section of Amul 2. It has got all facilities of white butter melting, sour Cream or curd churning, Ghee Processing and Storage.

❖ Ghee is manufactured mainly by Pre-Stratification Method from White Butter manufactured in Butter section. When curd is received in dairy or when fat is separated from sour milk or sour cream, it is churned to make White Butter. This White Butter is heat clarified to make Ghee for local market.

❖ The Ghee manufactured from white butter is only preferred for export purpose. In this section, AGMARK Special Grade (Red Label) Ghee is prepared. The production capacity of Ghee section is 16 to 18 TPD (Avg. production 8-10 TPD).

➢ **SPECIFICATIONS OF GHEE:-**

CHARACTERISTICS	AGMARK SPECIFICATIONS	FSSAI SPECIFICATIONS
Fat	Min 99.97	-

White butter ghee is used for export.

Brown ghee is made for west Bengal.

➢ FLOW CHART FOR GHEE PREPARATION:-

White butter

↓

Melt in melting vat (no of vat 2)

(capacity of vat 1500 kg and 2250 kg/ batch)(110^0c)

↓

Pre-stratification tank (no of tank 2)

Capacity 3KL & 5 KL

↓

Serum seperator → butter milk

↓

Pure fat

Fat is heating in cattle

↓

White ghee – 110-115^0c (45 min)

Brown ghee – 143-145^0c (30 min)

↓

Filter (300 mesh)

↓

Settling tank (3h)

↓

Clarification

1- 100 micron
2- Normal clarifier
3- 5 micron

↓

300 mesh naylone filter

↓

Wt. of product	Wt. of packing material (gm)	Net wt. limit (gm)	Gross wt. limit (gm)
200 ml (182 gm)	2.9	Min. – 181 Max.- 183	Min. – 183 Max.- 185
500 ml (454 gm)	4.5	Min. – 452 Max.- 456	Min. – 452 Max.- 456
1 lit.(906gm)	8.5	Min. – 904 Max.- 908	Min. – 912 Max.- 916
500 ml (454 gm)	Empty Tin -7.325 Bottom – 16.5	Min. – 452 Max.- 456	Min. – 526 Max.- 530
1 lit.(906 gm)	Empty Tin -7.325 Bottom – 16.5	Min. – 904 Max.- 908	Min. – 1018 Max.- 1022
2 lit. (1.8 kg)	Empty Tin- 168 Bottom – 30.58	Min. – 1810 Max.- 1814	Min. – 2009 Max.- 2013
5 lit. (4.530 Kg)	Empty Tin – 344.5 Bottom – 59.11	Min. – 4528 Max.- 4532	Min. – 4932 Max.- 4936
15 kg	Empty Tin - 32.5 Bottom – 30.5	Min. – 14.998 Max.- 15.9662	Min. – 15.962 Max.- 15.966

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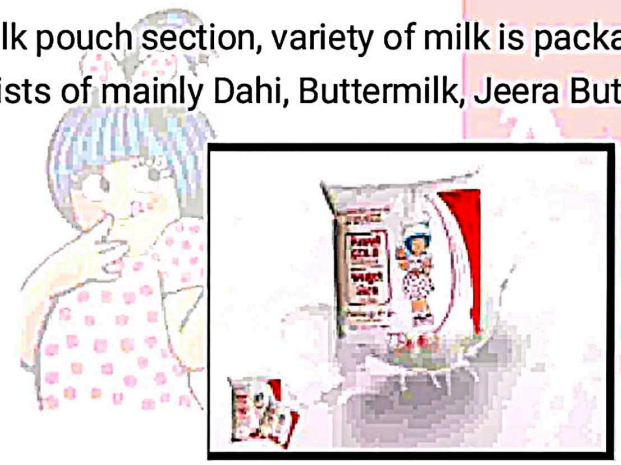
MILK POUCH SECTION

In Amul 2 Milk pouch section, variety of milk is packaged in different LLDPE packs. Dahi section consists of mainly Dahi, Buttermilk, Jeera Buttermilk processing and its packing



➢ Flow Chart for Milk pouch packing:-

Milk (Amul-2 & Amul-3)

↓

Horizontal milk storage tank

↓

Overhead tank of FFS packing machine

↓

Pouches → Milk damaged Pouches

↓

Crates

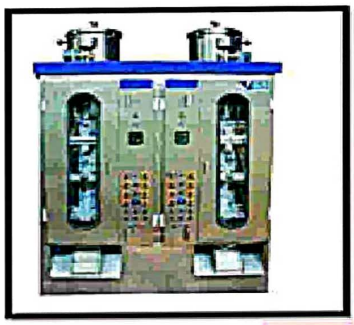
↓

Cold storage room (<5° C)

↓

Dispatch

Cut open & Milk Reprocess



➢ FFS MACHINE:-

FFS no.			Capacity
1	1 Lit (2 bowl)	Twin head Vertical sealing temp: 140oC Horizontal sealing temp: 160oC	75 pouches/min/head
2	500ml (2 bowl)		70 pouches/min/head
3	200 and 225 ml (2 bowl)		75 pouches/min/head
4	1 lit (2 bowl)		60 pouches/min/head
5	Lit (1 bowl)		40-45/min
6	6 lit (1bowl)		40-45/min

➢ AMUL PASTEURIZED MILK STANDARDS:

Pouch	Empty wt of pouch(gm)	Length	Thickness	Weight range

200 ml	1.55	114mm	50-55u	209-212
225ml		135mm	50-55u	236-240
500m	2.4	155mm	50-55u	518-531
1 lit	4.2	235mm	60u	1035-1040
6 lit	26	440mm	110u	6206-6208

Sr.No	**Milk**	**Fat (%)**	**SNF (%)**	**Specific gr.**
1	Amul shakti (Pasteurized standardized milk)	4.55 – 4.60 4.60 (GCMMF)	8.60 – 8.70 8.60 (GCMMF)	1.030
2	Tea Special milk (Pasteurized, std., homogenized)	4.55 – 4.60	8.60 – 8.70	1.030
3	Amul Gold milk (Pasteurized full cream)	6.05 – 6.10	9.10 – 9.15	1.030
4	Amul Taaza (Pasteurized Tonned milk)	3.5 – 3.55	8.60 – 8.65	1.031

Shelf life: 48hr from the date of packing if kept under refrigeration below 8^0 C

❖ BUTTERMILK:-

Buttermilk is a liquid left behind after churning of butter out of cream.
It is prepared in Amul- 2 It is standardized & packed in pouch. It has a fat of minimum 1.0%, total solid 6 - 7% and acidity 0.39 to 0.41%.

➢ Operation:-

- Buttermilk from butter section of Amul-3 for pasteurization at 72- 75 0C for 18sec is sent to buttermilk tanks in Amul-2 Section.
- In buttermilk tank, the standardized & pasteurized mixture is heated 39-41^0 C.
- DVS Culture is added & is inoculated at 1% buttermilk quantity.
- Keep on checking Acidity every 3hrs. Once the Acidity reaches 0.350 %, chilling takes place till the temperature is dropped to 9 ^{0} C & then sample is tested in quality analysis laboratory for total solids (T.S).
- The buttermilk is sent for pouch packing via pipelines.
- Packing is done at temperature less than 8 0C. Leaked pouches are stored to temperature less than 5^0 C and dispatched after storing for at least 1-2 hours in cold store at minimum 5^0 C.

➢ FLOW CHART FOR CULTURED BUTTERMILK:-

Buttermilk from butter section

↓

Pasteurization (75 – 77^0 C, 16 sec)

↓

Buttermilk silos (2 silos, Cap-50,000 L)

↓

Standardization (In silo)

↓

Pasteurization (40^0 C)

↓

Silos(for jeera BM jeera 0.4% and salt 0.5%)

↓

Culture addition in silo (DVS culture @ 1% of buttermilk)

↓

Acidity maintaining (0.35%)

↓

Chiller (10^0 C)

(To chill BM, circulate in silo to chiller till 10oC obtain)

↓

Sampling from silo to check TS

↓

Packaging

↓

Cold storage (<5^0)

➢ SPECIFICATION OF BUTTERMILK:

Sr.No	Parameters	Specification
1	Temp. of dispatch	Not more than 8^0 C
2	Acidity (%) LA	0.35 - 0.45 %
3	Fat (%)	Min. 1.00
4	SNF	Min 5.5%
5	Total solids	Min. 6.5
6	Organoleptic Test (OT)	Fresh, free from any off flavor
7	Specific gravity	1.020

Shelf life: 48hr from the date of packing if kept under refrigeration below 8^0 C.

Dahi section

Dahi is the fermented milk product produced by bacterial fermented of milk.

Capacity: 6000 kg/day

➢ Masti Dahi:-

- Pasteurized homogenized milk having fat 4.5% is taken.
- It is then standardized to 3.2% to 3.3% fat & SNF 11.1% to 11.2% by addition of skimmed milk or SMP.
- It is then pasteurized at 90^0 C for 10 min.
- Pasteurized mixture is then chilled to 42-44^0 C.
- It is then transferred to vat, where DVS culture is added with agitation (15-20 min). DVS culture used for making masti dahi is RST 744.90 units and CHN11:10 units per 1000 lit of milk.
- Then it is packed in pouch & cup & put in crate.
- It is then incubated for 42^0 C-43^0 C for3hrs.
- Keep on checking acidity every 3hrs. Once the acidity reached to 0.6 – 0.7% LA. It is transferred to cold store (8^0 C) where it is kept for 24 hrs.
- After 24 hrs acidity reaches to 0.8% - 0.9 % LA & the Masti Dahi is ready for dispatch. It is stored in cold storage at below 5^0 C.

➢ Amul Lite Dahi

- Amul lite Dahi manufacturing process is same as that of Masti Dahi;
- The difference is in its standardization.In case of Amul lite dahi, pasteurized

milk is

standardized to 0.5% fat.

- Amul misti dahi rate of sugar addition 18% and sealing temp 35^0 C

➢ FLOW CHART FOR DAHI:-

Milk in to standardize tank

↓

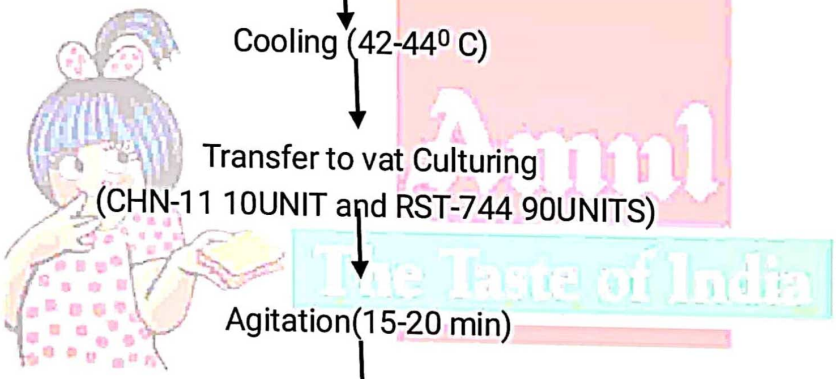
Standardization

↓

PHE(90^0 c/10min)

↓

Cooling (42-44^0 C)



↓

Transfer to vat Culturing
(CHN-11 10UNIT and RST-744 90UNITS)

↓

Agitation(15-20 min)

↓

Pouch packing

↓

Incubation room

↓

Acidity is checked at every 3hrs (Acidity reached at 0.4-0.55 LA)

↓

Transfer to Cold Store (temp-8^0 C, 24hrs) After 24hrs Acidity should be 0.8 – 0.9% LA Storage

↓

(below 5^0 C) & Dispatch

Butter

The utterly butterly delicious butter of Amul is one of the most popular product of Amul dairy along with the famous butter girl. The cream obtained from process section is fully utilized for butter making. Butter section is very important as it handles fat, which is the costliest constituent. It sold under the brand name of "AMUL". The section is completely computerized and is equipped with most modern imported equipment. Amul White and Table Butter is exported to USA and Middle Eastern countries. Amul Table Butter maintains AGMARK standards.

➢ HISTORY

Since 1945, Amul has been manufacturing its world-class butter.

Timeline goes by: -

- ❖ 1945 - First Wooden Butter churn
- ❖ 1955 - Drum Butter churn
- ❖ 1963- Top Butter churn
- ❖ 1982- Continuous Butter Making Machine
- ❖ 1996- Till now- Automatic Continuous Butter Making Machine

➢ PRODUCT VARIETY: -

Product Name	**Amul Butter**
Description	Amul Butter (Made of pure milk FAT)
Packing	500g, 200g 400g tin, 100g, 20g, 10g Blister,15kg white butter

➢ PRODUCT SPECIFICATIONS: -

Characteristics	FASSAI STANDARD	AGMARK STANDARD
Moisture %	Max. 16	Max. 16
Fat %	Min. 80	Min. 80
Curd / SNF %	Max.1.5	Max.1.5
Salt %	Max. 3	Max. 3
Acidity % as per lactic acid	-	0.15

FLOW CHART

2nd Washing
Working Under Vacuum (450-500 Mm Hg)
(Moisture 15.6%)

↓

Blender (17-30 Rpm)

↓

Butter Silo(3T)

↓

Packaging lines
[100gm,
20gm,
500gm,
400gm Tin pack,
10gm blister pack,
200gm]

↓

Primary Packaging
Vegetable Parchment Paper,
Tin For 400 Gm And
Pvc For Blister Pack)

↓

Secondary Packaging

↓

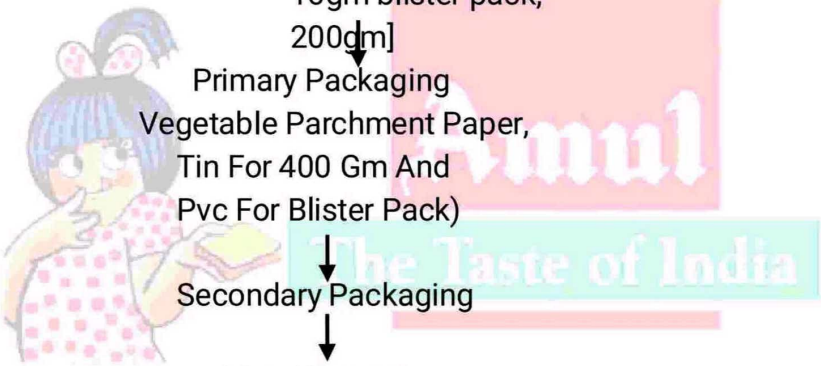
Metal Detector

↓

CBX

↓

Storage At 4° C



❖ **MANUFACTURING PROCESS: -**

- The cream for manufacturing Butter is receiving from Amul-3 and Amul-2 processes while standardization of milk. The milk fat will be separated at above 60° C; the centrifugal cream separators in line with milk pasteurizer separate this as cream.
- The cream thus separated is pasteurized and then pumped by positive displacement pump to the Cream Buffer Tank and then to the Cream Silo.
- After ageing at 8° C for 24 hours cream is pumped to Cream Chilling Unit in the butter section.

There the temperature of cream is adjusted to the required churning temperature (9-11° C) of
continuous butter making machine

- (CAPACITY – 5000 KG/HR, 2500 KG/HR & 1250 KG/HR).
- Salt dosing is done by Salt Dozer @ 10 – 110 lit. / Hr. Annatto colour is added to brine @2.5%,

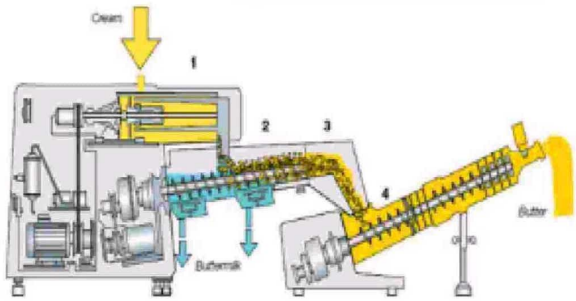
the strength of brine being 70-80%. This is prepared in a tank and fed to CBMM using a reciprocating pump. Working of butter is done in blender under vacuum. Butter is then collected
in butter silo of 3 MT capacities. Butter is pumped into hoppers of packaging machines.

- The white butter is packed in 15 kg blocks. It is utilized in ghee section for making ghee

and also sent to other co-operatives for the same purpose. White butter has a shelf life of 60
days at 0° C or below & table butter has a shelf life of 12 months at refrigerated storage.

The butter is kept in cold store for minimum 5 days before dispatch, during which a sample of the lot is analysed by QC lab.

➢ CONTINUOUS BUTTER MAKING MACHINE (CONTIMAB MC119)



Used for manufacturing table butter.

- ❖ PRINCIPLE THEORY:- CHURNING OR FROTHING
- ❖ PROCESS :- CONTIMAB PROCESS

QUALITY ASSURANCE LABORATORY

In Amul, there are mainly 4 laboratories:

- ❑ Laboratory : Amul-2
- ❑ Reception Laboratory : Amul-3
- ❑ Central Laboratory
- ❑ Microbiology Laboratory

- In the Reception Laboratory of Amul-2, mainly the quality of Raw Milk, Flavoured Milk and Dried Milks, Ghee are tested.
- In the Reception Laboratory of Amul-3 include analysis of raw milk as well as Pasteurized Milk is done.
- The Central Laboratory is the main laboratory where all the in process checks finished product analysis, packaging tests, and water analysis is done.
- In microbiology Lab all microbial analysis as well as plant hygiene tests are done.

❖ AMUL 2 LABORATORY

Amul 2 consists of two labs:

1. Lab for Reception:

This lab is mainly used for the pricing of milk. Every village society sent a sample of their milk with the milk tanker. These samples are tested here for fat & SNF using milkoscan & on that basis pricing is done. A SMS showing % fat & SNF & amount of their milk is sent to that village society immediately after testing. If they have any doubt regarding to their sample they can report within 24 hrs. After 24 hrs samples will be discarded.

2. LAB FOR POWDER, FLAVOURED MILK AND GHEE:

- In this lab they also keep the records of average weight of milk pouches & flavour milk cans.
- pH of flavour milk is checked using the pH meter.
- Acidity & alcohol test is done of milk sample from the batch taken for preparation of flavour milk.
- Moisture of powder checked using Moisture analyzer.
- Clarity of ghee is observed after melting on hot plate. If there is any ghee residue that batch will be reprocessed

Method of sampling:

- The sample is taken from mixed milk after cans are tipped in the weighing tank.
- Weighing is done by in built balance in the tub and is a computerised function record storage function against Cow or Buffalo or Mixed Milk, Name of the Region, Weight of milk received from that region.
- Mobile app and Intranet system send report of received milk to Accounts section and Reception Lab.
- The corvettes contain 2-3 ml Potassium dichromate for preserving milk sample till analysing.
- Record is kept for security and verification purpose in case claims arise from society or others.

Amul 2 Reception lab process:

❖ Sample milk tray is kept in water bath for 10 minutes to check if any milk clots on boiling and to kill the bacteria before sending to the milkoscan.

❖ If curdles, not sent for Milkoscan. If not, milkoscan tests Fat, SNF, Protein and Lactose

AMUL 3 RECEPTION LABORATORY :

Amul-3 testing lab is a reception laboratory; therefore, platform tests are performed here to for

acceptance or rejection of the raw milk.

Adequacy of pasteurization of pasteurized milk is also checked here.

After arrival of milk tanker first of sampling is done & following parameters are checked

for acceptance or rejection:

❖ Temperature: should be below 10° C.

❖ Smell: should be free from taints or abnormal smell.
❖ Visual inspection: should be absence of abnormality.
❖ Taste: pleasant

Sr. No	Test	Procedure	Interpretation
1	Acidity	10 ml milk + 5 drops of phenolphthalein indicator. Titrate against N/9 NaOH till faint pink colour appears. Acidity = Titre value × 0.1% as LA.	It should not exceed 0.15% LA
2	MBRT test	Take 10 ml milk + 1 ml methylene blue dye in a test tube. Close it with rubber cock & put it into water bath at 37^0 C. Check at 15 min intervals & note downthe time taken to reduce the dye.	This test is used to check the bacterial load in the milk. If milk ishaving high bacterial count the dye will reduce in lesser time & vice versa
3	Phosphatase test	Take 1 ml milk + 5 ml test solution in a test tube, put it in water bath at 370C for 30min. If yellow colour appears this test is +ve & white colour remains means test is – ve.	This test is used to check the adequacy of pasteurization in milk.
4	COB	Approx 5 ml milk sample taken in test tube & boiled for 2 min in a water bath. Then it is observer for any precipitated particles.	It is a quick test to determine developed acidity and suitability of milk for processing. Milk should not be curdle upon heating
5	Alcohol test	Take 2 ml milk + 2ml alcohol (68% conc.). Mix vigorously & check the	If there is no flakes of curd the test is – ve. The milk that is used to

		curdling on the test tube.	make flavor milk should be alcohol – ve
6	Fat (Gerber method)	Take a butyrometer add 10 ml H2SO4 92% conc.) + Few drops of water + 10.75 ml milk + 1ml amyl alcohol. Centrifuge at 1100 rpm for 5min	It should be around 4% for cow mil& 6% for buffalo milk. This method is also used to standardize the milkoscan.
7	SNF	It is measured by gravimetric method. SNF% = TS% – Fat%	It is around 9%
8	Milkoscan	The constituents of milk like fat, SNF, Lactose, sucrose, FPD, etc. can directlybe known by using Milkoscan.	

Bactoscan-

Bactoscan is used to determine the total bacterial load in the raw milk sample. It employs the useof ethlylene bromide red dye (fluorescent dye) to stain or highlight the bacteria the filler used top allows the bacterial cell (0.2-10 micron size) to pass through and all other cells are filtered. The highlighted bacterial cells are thus obtained in the filtrate and the amount of light (blue) scattered from their cell gives the bacterial load. The count is obtained as individual bacterial count (IBC) can be considered as colony forming unit.

Central Laboratory:

In the central lab all the finished products are tested for their parameters using different methods. In addition to that water analysis, strength of soda & acid, packaging material tests are also done.

➢ Test for Butter:

SR.NO.	TEST	PROCEDURE	INTERPRETATON
1	Moisture	Take 10g of butter in aluminum dish. Heat the dish on electric hot plate with constant strring. Curd at the bottom has attained the characteristics slightly brown colour. Allow the cup to cool in desiccator. When cooled place the cup on the balance Moisture content = (wt before heating – wt a after heating) /(wt a a before heating)	16%(max
2	Salt	ake 10 g of sample in a beaker.100 ml distilled water, heat it. Add into sample & mix it well. Take 10ml sample & titrate with 0.1N AgNO3 with K2CrO4indicator.	3%(max

		Salt = titre value*mol.wt of AgNO3*100/ wt of butter	
3	Curd	Take 10gm sample. Melt it. Give 3 wash of petroleum ether. Dry it in oven 1 hr & weigh.	1.5%(max
4	Fat	Fat =100 – Moisture – Salt – Curd	80%(min
5	Colour index	Automatic(conica Minolta machine	YI of TB – NLT38 YI of WB- NMT 17

➢ TEST FOR GHEE:

SR.NO.	TEST	PROCEDURE	INTERPRETATION
1	Baudouin test	Take 5ml ghee in test tube. Add equal quantity of concentrated HCl. Add furfural solution, Mix it well. Observe	This test should be – ve
2	FFA content	Take 9.4 ml ghee in conical flask. Add 50 ml neutralized spirit & plug it by cotton. Put on hot place / boiling. Cool at room temperature. Titration against 0.1 N NaOH &	Special grade: 1.4% FFA(max) General Grade: 2.5% FFA(max) Standard Grade : 3.0% FFA(max)
		Observe light pink colour and note the reading FFA % = Titrate value × 0.3	

➢ TEST FOR BUTTERMILK AND DAHI :

Sr.No.	TEST	PROCEDURE	INTERPRETATION
1`	TS	Take 10 gm of Buttermilk in a plate & place it in a Hot air oven at 100^0c until constant wait attains.	Buttermilk - 5.5-6%
2	Acidity	10 ml Buttermilk/Dahi + 5 drops of phenolphthalein indicator. & Titrate against N/9 NaOH till faint pink colour appears Acidity = Titre value× 0.1 % as lactic acid	Buttermilk - 0.35 to 0.40 Dahi - 0.8 to 0.9
3	Fat	Gerber method	Butter milk – 1.0 to 1.1% Dahi – 3.3 to 3.5
4	SNF	SNF% = TS%-Fat%	Butter milk – 4.5 to 5% Dahi – 11 10 12%

Objective of the study

- To know about production and manufacturing of milk .
- To know about the function carried out in various department in Amul Dairy.
- To study about the products of the Dairy .
- To study the structure of various department and it's function in this organization.

The AMUL captured the 60% of the market, Mother Dairy captured 30% and 10% are the remaining brands. The customers are loyal towards Anil products and demand of Amul products is also good in the market. But in some area Mother Dairy try to capture Amul customers by providing schemes and freezers to the retailer, so that the retailers sells Mother Dairy products. Due to high demand of Ammal pouch dahi and buttermilk retailers are bound to keep Amul products. The company should work on their distribution network and on the replacement policies of the expired and defected products. There should be a proper grievance handling process so that the relationship between retailers distributors remain good.