

THE UNIVERSITY OF BURDWAN

A REPORT ON VIRTUAL VISIT

@AMUL FOOD INDUSTRY

ORGANISED BY

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REPORT ON VIRTUAL VISIT

Virtual visits are an attractive to cooperate videos and power point presentations. The full screen, high definition ,immersive 360 degree medium is a great experience which keeps people engaged and wanting more. A self-paced online virtual tour is able to reach anyone with a computer or smart phone , through a medium that allows you to control all the variable and linked information. Factory virtual tour are a unique and affordable way .

A.NEEDS OF VIRTUAL VISIT IN HIGHER EDUCATION SYSTEMS:

Virtual field trips allow learners to engage with and to learn about authentic artifacts and to explore places Important to their discipline of study and consistent with their individual learning needs.

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- **During a virtual field trips, students can be guided through museums, historical documents, national monuments and agencies or organizations specific to the course content.**
- **A virtual fields trips can also involve attending an artistic performance and connecting with a leader in field of study.**
- **These fields trips bring the real world perspective to concepts discussed in course text books as well as provide a national and global perspective to the material being studied.**

B. BENEFITS OF VIRTUAL VISIT :-

Real estate virtual tours can bring more exposure to your projects.

1)SAVE MONEY AND TIME :Virtual tour are dynamic ,interactive ,and capable of retaining the attention of the homebuyers within seconds .it can help you to eliminate the time taken for creating complicated processes like developing a blueprint for your

project. Besides , the experts can develop as well as edit the virtual tour real quick and at cost competitive prices.

2) GREATER REACH : Using a virtual self tour to market your real estate projects can help you to get better reach among the customers. These visual are appealing and far more detailed than the sketches of the property.

3) TARGETING POTENTIAL CUSTOMERS: By using virtual tour , they can target specific segments of customers who are really interested in purchasing the property. Besides , a customized approach in developing these virtual tour also increase the chances of sales.

4) EASIER TO GRAB ATTENTION: IN this competitive business environment , it is difficult to retain the attention of the viewer for long time. However ,by creating captivating virtual tours for real estate projects ,you can increase your chance of attracting more customers and keep them

engaged for a longer duration. Besides ,every customer would like to view the final look of their project .so , providing the virtual tour of a property even before its construction will provide you the advantage of finalizing the deal with clients.

5) CREATING FOCUS ON KEY AREAS :It is possible to highlight particular aspects of the project with the help of virtual tours. However , doing this can be a bit trickier on the part of a beginner , which is it is better to rely on a professional in this matter .

6)VISUAL INFORMATION: When you use a virtual tour ,you can present all types of information related to project .

7) GREATER ROI : virtual tour have turned out to be a powerful marketing weapon for real estate companies. These visuals increase the chances of selling the property. You can easily reveal the key selling points of the project by tailoring the features according to the needs of users. These presentations bring a greater ROI for the developer.

C.SYLLABUS' S VISIT PART :

In the syllabus it is given that we should went to visit a food industry (Amul food factory). we created a report on how different foods are being made in the industry, how foods are being preserved and how foods are sanitized . AS this topic is in our syllabus that is why to gather knowledge about this topic.

D.PROBLEMS OF CONDUCTING A VISIT IN PRESENT SITUATIONS:

As the present situations, the risk of getting COVID-19 in crowed and in inadequate ventilation spaces where infected people spent together for a long period of time. These environment where the virus spread through respiratory droplets .it is important to take precaution . if we should visit there are high chance of getting COVID -19 from the infected persons. So ,it is difficult for us to avail any sort of transport like bus, train specially when there is a partial lockdown everywhere .

E.VIRTUAL VISIT HELPS TO COMPLETE PRACTICAL SYLLABUS :

Virtual visit give us an opportunity to connect with people who are involved in practical field in industries (Amul food industry). The people give us a lot of information about the production of food, packaging, manufacturing and distribution of them at schedule places. All these processes include in our syllabus ,so these virtual visit can easily be able to complete our syllabus . virtual visit allow students to conduct experiment by watching videos and presentations. it is best option for present situations.



-: AMUL INDUSTRY :-

• INTRODUCTION:-

Amul, is an Indian dairy cooperative society, based at Anand in the Indian state of Gujrat . Formed in 1946, it is a cooperative brand managed by a cooperative body ,the Gujrat co-operative marketing Federation Ltd(GCMMF). GCMMF , which today is jointly owned by 36 lakh milk producers in Gujrat ,and the apex body of 13 district milk unions , spreads across 13,000 villages of Gujarat. Amul spurred Indian's white revolution, which made the country the world's largest producer of milk and milk producers.

• FOUNDATION DATE AND FOUNDER'S NAME :-

Kaira District milk union limited (later renamed to amul) was founded in 1946 through the efforts of Tribhuvandaspatel. AMUL's foundation was a significant contributor to the white revolution in india. Tribhuvandaspatel under the guidance of sardar Vallabhbhai patel became the founding chairman of the organization and led it until his retirement in 70s.

• **HISTORY OF AMUL JOURNEY:**

Over seven decades ago the life of a farmer in Kaira was very much like that of farmers anywhere else in India. His income was derived almost entirely from seasonal crops. Many poor farmers faced starvation during off-seasons .Their income from milch buffaloes was undependable .The milk marketing system was controlled by contractors and middlemen. As milk is perishable, farmers were compelled to sell their milk for whatever they were offered .Often they had to sell cream and ghee at a throwaway price.

They were in general illiterate. But they could see that the system under which contractors could buy their produce at a low price and arrange to sell it at huge profits was just not fair. This became more noticeable when the Government of Bombay started the Bombay Milk Scheme in 1945. Milk had to be transported 427Kilometres , from Anand to Bombay. This could be done only if milk was pasteurized in Anand.

After preliminary trials, the Government of Bombay entered into an agreement with Polsons Limited to supply milk from Anand to Bombay on a regular basis. The arrangement was highly satisfactory to all concerned – except the farmers. The Government found it profitable; Polsons kept a good margin. Milk contractors took the biggest cut. No one had taken the trouble to fix the price of milk to be paid to the producers. Thus under the Bombay Milk Scheme the farmers of Kaira District were no better off ever before. They were still at the mercy of milk contractors. They had to sell their milk at a price the contractors fixed. The discontent of the farmers grew. They went in deputation to Sardar Patel, who had advocated farmers' co-operatives as early as 1942

Sardar Patel reiterated his advice that they should market their milk through a co-operative society of their own. This co-operative should have its own pasteurization plant.

His advice was that the farmers should demand Permission to set up such a co-operative.

If their demand was rejected, they should refuse to sell their milk to middlemen.

Sardar Patel pointed out that in undertaking such a strike there should be some losses to the farmers as they would not be able to sell their milk for some time. If they were prepared to put up with the loss, he was prepared to lead them. The farmers' deputation readily accepted his proposal.

Sardar then sent his trusted deputy, Mr. Morarjibhai Desai, to Kaira District to Organize milk co-operative – and a milk strike if necessary. Mr. Desai held a meeting in Samarkha village on January 4, 1946. It was resolved that milk producers' co-operative societies should be organized in each village of Kaira District to collect milk from their member-farmers. All the milk societies would federate into a Union which would own milk processing facilities.

The Government should undertake to buy milk From the Union. If this wasn't done, the farmers would refuse to sell milk to any milk contractor in Kaira District.

The Government turned down the demand. The farmers called a 'milk strike'. It lasted 15 days.

Not a drop of milk was sold to the milk merchants. No milk reached Bombay from Anand, and the Bombay Milk Scheme almost collapsed.

After 15 days the milk commissioner of Bombay, an Englishman, and his deputy visited Anand, assessed the situation and accepted the farmers' demand.

This marked the beginning of the Kaira District Co-Operative Milk Producers' Union Limited, Anand. It was formally registered on December 14, 1946. Its objective was to provide proper marketing facilities for the milk producers of the district. The Union began pasteurizing milk in June 1948, for the Bombay Milk Scheme – just a handful of farmers in two village co-operative societies producing about 250 litres a day.

An assured market proved a great incentive to the milk producers in the district. By the end of 1948, 432 farmers had joined village societies, and the quantity of milk handled by the Union had increased to 5000 litres a day. In the early stages, rapid growth brought in its wake serious problems. Their solution provided the stimulus for further growth. For example, as the co-

operative movement spread in the district, it was found that the Bombay Milk Scheme could not absorb the extra milk collected by the Union in winter, when buffaloes yielded an average of 2.5 times their summer yield. Thus by 1953, the farmer-members had no regular market for the extra milk produced in winter. They were again forced to sell a large surplus at low rate to middlemen.

The only remedy was to set up a plant to process the Extra milk into products like butter and milk powder. The logic of this step was readily accepted by the Government of Bombay and the Government of India, except for a few doubting Thomases. The government of India helped the Union to get financial help from UNICEF and assistance from the Government of New Zealand under the Colombo Plan. Technical aid was provided by F.A.O. A Rs.50 – lakh factory to process milk powder and butter was blueprinted. Its foundation stone was laid by the then President of India the late Dr. Rajendra Prasad on November 15, 1954. The project was completed by October 31, 1955, on which day the late Pandit Jawaharlal Nehru, the then Prime

Minister of India, declared it open. The new dairy provided a further fillip to the co-Operative movement among milk producers. The union was thus enabled to organize more village co-operative societies and to handle more and more milk each year.

This event also brought a breakthrough in dairy technology as the products were made processing buffalo milk for the first time in the world. Kaira Union introduced the brand “Amul” for marketing its product range.

The word “Amul” is derived from Sanskrit word ‘Amulya’ which means ‘priceless’ or ‘precious’. In the subsequent years Amul made cheese and baby food on a large commercial scale again processing buffalo milk creating a history in the world.

1964 was the turning point in the history of dairy development programme in India. Late Shri Lal Bahadur Shastri, the then Prime Minister of India who visited Anand on 31s October for inauguration of Amul’s Cattle Feed Plant, having spent a night with farmers of Kaira and experiencing the success wished and expressed to Mr Kurien, then the General Manager of Amul that replicating Amul model through out our country will

bring a great change in the socio-economic conditions of the people. In order to bring this dream into reality, 1965 The National Dairy Development Board (NDDB) was established at Anand and by 1969-70 NDDB came out with the dairy development programme for India popularly known as “Operation Flood” or “White Revolution”. The Operation Flood programme, even today, stands to be the largest dairy development programme ever drawn in the world. This saw Amul as model and this model is often referred in the history of White Revolution as “Anand Pattern”. Replication of “Anand Pattern” has helped India to emerge as the largest milk producing nation in the world.

• AMUL PRODUCTS LIST :-

Looking for wide number of products from Anand milk union limited (amul). There are wide ranges of products are used by millions of homes in india , as it is said rightly as “Taste of india“ . if you are looking for these high quality products , then you have stepped in to the right place , where in you can get to know many products at reasonable price from Amul .various products from amul such as Amul butter , Milk powder , ghee , cheese,

chocolates ,ice cream ,milk can be known here.

It consist of wide ranges of products which are outline below:

- ***Amul bread spreads range***
- ***Amul beverage range***
- ***Amul powder milk range***
- ***Amul pro***
- ***Amul fresh milk range***
- ***Amul cheese range***
- ***Amul cheese range***
- ***Amul cooking range***
- ***Amuldahi range***
- ***Amul mithai***
- ***Amul health drink***
- ***Amul chocolate***
- ***Amul ice cream***
- ***Amul's new products.***

Amul breads spreads:

1) AMUL BUTTER:-

Amul Butter Is Made Up Of Pure Milk Fat. It Consists Of 100g,500g,50g, 20g And 8.1g

Packing. It Can Be Eaten With Bread, Paratha ,Roti ,Nans, And Sandwiches.

2) AMUL LITE:-

Amul lite is a low cholesterol ,low calorie and low fat bread spread. It is available in 100g,500g,and 200g packing. It is been used for topping on paratha ,pav-bhaji ,and for preparation of cakes.

3) DELECIOUS TABLE MARGARINE:-

Delicious table margarine is the substitute of butter. Margarine is prepared from vegetable oils and fats.it contains zero cholesterol and fortified with vitamin A & D. 100g, 500g ,200g tub and single serve pack are available.

AMUL BEVERAGE RANGE:-

1) AMUL KOOL MILK SHAAKE:-

Amulkool milk shake come with four awesome flavor which are banana, mango, strawberry and badam .the price of this is rs.20 for 220 ml can. These are also sold in tetra pack in three flavor i.e. mango , strawberry and banana. The price of this is

rs 15 for 15 for 180 ml tetra brick .it is rich in nutrients and is the healthiest drink against any other soft drinks.

2) AMUL KOOL:-

Amul kool is very tasty and healthy drink and come with five flavor i.e. kesar, elaichi, rose ,mango and strawberry . available in 200ml glass bottle,200ml tetra pack,250 ml can and 1litre tetra pack. Amulkool flavoured bottle milk is similar to this products.

3) AMUL KOOL KOKO:-

Amul kool koko is a chocolate flavor milk . available in 200 ml glass bottle ,250 ml can and 200 ml tetra pack.

4) AMUL KOOL THANDAI:-

Amul kool thandai is also flavoured milk with flavour of traditional thandai . it is available in 200 ml glass bottle, 200 ml and 1 litre tetra pack.

5) AMUL STAMINA CAN:-

Amul stamina is an energy drink which contains electrolytes ,vitamin C , minerals,

calcium , milk proteins. It is essential for body growth and muscle building. It is available in 200ml tetra pack and 250ml can.

6) AMUL PROFILE BUTTER MILK:-

Amul profile butter milk contains probiotic bacteria which help in improving immunity and digestion .it is natural drink and very good for health.

AMUL POWDER MILK :

1) AMUL MASTI DAHI:-

Masti dahi is made from pasteurized toned milk and no preservatives. It is rich in nutrition as it contains all goodness of milk. It can be consumed directly or can make lassee , dahi rice, dahi wada ,etc

2) Amulsagar skimmed milk

powder: Sagar skimmed milk powder is made from skimmed milk .it is non-fat and rich in protein.

AMUL PRO:

Amul PRO is a malt based milk additive .it is very easy to make and suitable for people of all ages ,especially kids ,who need milk and nutrients .it is to be consumed by adding directly to the hot or cold milk.

AMUL FRESH MILK RANGE:

These are outline below.

- 1) amul fresh milk,***
- 2) amul gold milk,***
- 3) amultaaza double toned milk.***

AMUL CHEESE RANGE:

Amul has variety of ranges and these are outside below

- 1) amul cheese spreads,***
- 2) Amulemmental cheese,***
- 3) Gouda cheese.***

AMUL COOKING RANGE :

- 1) Amul pure ghee :-***

Amul pure ghee is made from fresh cream and it is a loved by all the

consumers which provided strength to human body.

2) Amul ghee:-

Amul ghee is made from fresh cream and it is good source of energy and provides vitality to human body.

3) Amul cooking butter:-

amul cooking butter is used and is preferred by many consumer on a daily basis and is used mainly for cooking ,making sweets , garnishing etc, .it can be spread with bread , paratha ,roti , etc,.

AMUL DAHI RANGE:-

1) AMUL MASTI DAHI:-

Masti dahi is made from pasteurized toned milk and no preservatives. It is rich in nutrition as it contains all goodness of milk. It can be consumed directly or can make lassee, dahi rice, dahiwada ,etc.

2) PRO-BIOTIC DAHI:-

Pro-biotic dahi helps to improve immune function of the body and maintain healthy digestion system. It also helps to build stronger bones and teeth.

AMUL HEALTH DRINK:-

1) Nutramul:

Nutramul is made from malt extracts ,milk solids sugar and cocoa powder .it contains vitamins proteins ,CHO ,and minerals .it is very healthy drink and to be consumed directly adding to milk.

AMUL CHOCOLATES:-

amul chocolates are made from sugar ,cocoa butter, milk solids and chocolate mass.these are made from rich creamy milk and delicious cocoa. Amul chocolate syrup in bottle and jar are available .it can be used on ice cream, cake etc,. amul chocolate has many varieties ,these are --- * amul fruit and nut chocolate congrats pack.

AMUL ICE CREAMS :-

Amul icecream are made from fresh milk and are available in different flavours .it can be used to prepared sundaes, shakes etc,, ice creams are much preferred by kids and also all generations. It is very nice to consumed them during anytime anywhere.

**• OTHER NECESSARY
INFORMATION:-**

Amul is a symbol of many things of the high quality products sold at reasonable prices. Recent new products will launch in is outline below—

- ***Amul avasarkajukatri,***
- ***Amul bhaji pav,***
- ***Amul chocolate cookies,***
- ***Amul fruity breads,***
- ***Amul jeera toast, etc.***

Amul procured 8.5 million liters of milk per day & RS 150 million disbursed in case daily. GCMF is the largest co-operative business of small producers with an annual turnover or RS. 53 billion. The govt. of india has honoured

amul with the “ best of all categories rajiv Gandhi national quality award ” . largest milk handling capacity in asia . largest cold chain network,48 sales offices, 3000 wholesale distributor, 5 lakh retail outlets ,export to 37 countries worth RS. 150 crores ,winner of APEDA award for nine consecutive years 130.

■ **ABOUT AMUL MILK FACTORY:-**

The World Famous Co-Operative Dairy 'Amul' Is One Of The Main Features Of Anand. Amul Is The Biggest Dairy Not Only In India, But In Asia Too. It Is Owned By Thousands Of Small And Medium Farmers. Amul Has Created Revolution. The Experiment Has Led To Small Dairies At District And Village Levels. Other States And Even Many Countries Have Been Inspired By It.

Amul Contributed To The Scientific Education Of Animal Husbandry And Increased Production Of Milk. The Dairy Developed A Plant Of Milk Powder. The Farmers Could Earn More For Their Produce. Lately Amul Entered Into Milk-Chocolate Market Besides Butter, Ghee, Cheese, And Baby Food. It Also Established Veterinary Hospitals, Artificial Insemination Centres For Animals And Hybrid-Cow Breeding Centres At Village Ode. Amul Has Turned Into A Large Complex And The Main Stream Of White Revolution.

ABOUT AMUL MILK BEVERAGES FACTORY :-

The World Famous Co-Operative Dairy 'Amul' Is One Of The Main Features Of Anand. Amul Is The Biggest Dairy Not Only In India, But In Asia Too. It Is Owned By Thousands Of Small And Medium Farmers. Amul Has Created Revolution. The Experiment Has Led To Small Dairies At District And Village Levels. Other States And Even Many Countries Have Been Inspired By It.

Amul Contributed To The Scientific Education Of Animal Husbandry And Increased Production Of Milk. The dairy industry is one of the most advanced food sectors regarding the application of novel technologies to process milk-based products which are important for human health because they are rich in fatty acids, proteins (casein and albumin), lactose, minerals, and vitamins. Due to the increasing consumption of milk products, different types of fermented milk such as yogurt, kefir, koumiss, chal, kurut, airag, whey beverages, ymer, cuajada, shubat, labneh, suusac, kulenaoto, obtaining from buffalo, goat, sheep, camel, yak, or mare milk, are manufactured throughout the world

- **INFRASTRUCTURE** :- ***Lauding The Finance Minister Nirmala Sitharaman's Announcements On Animal Husbandry Sector***

Under The Atmanirbhar Bharat Abhiyan Made On Friday, Dairy Major Amul Stated That Financial Outlay For Dairy Infrastructure Would Help Add About Five Crore Litres Of Extra Milk Processing Capacities In The Country.

R S Sodhi, Managing Director Of Amul Marketer - Gujarat Cooperative Milk Marketing Federation (Gcmmf) Stated That The Finance Minister Has Made An Important Announcement Of ₹15,000 Crore Dairy Infrastructure Fund For The Establishment Of Supply Chain And Dairy Plants For Enhancing The Dairy And Milk Processing Capacity. "With This Fund, We Can Build Around 45 Crore Litres Of Extra Capacities. Extra Capacity In The Organised Sector Means, More Jobs, More Livelihood, Especially In Rural India. This Five Crore Litre Will Provide A Livelihood To Approx 30 Lakh People In Rural India. This Is Much Required When Hundreds Of Thousands Of People Have Migrated Back To Rural India From The Urban Centres," Sodhi Said In A Video Message. The Infrastructure Pivoted Around Planning To Have Control Over The Supply Chain And Introducing It-Based Solutions Across All Stages Of Production To Better Manage Inventory. The Key Objective Was To Ensure Flexibility And Scalability Across The Complex Chain. The Supply Chain Of Amul Consists Of Farmers Who Produce Milk From Their Cattle. The Farmers Are Organized Into Cooperatives Called Village Cooperative Societies (Vcs). These Vcs Supply Milk To Thirteen Different Dairy Cooperatives, Called Unions, Of Which Amul Is One. The Milk Or Milk Products Made At These

Unions Are Supplied To The Gujarat Cooperative Milk Marketing Federation (Gcmmf). The Gcmmf Is The Marketing Entity For The Products Of All The Unions In The State Of Gujarat. Gcmmf Has 42 Regional Distribution Centers In India, Serves Over 500,000 Retail Outlets And Exports To More Than 15 Countries. All These Organizations Are Independent Legal Entities Yet Loosely Tied Together With A Common Destiny. The Ultimate Goal Of The Gcmmf Is To Benefit The Farmers Through This Hierarchical Supply Chain That Includes Different Kinds Of Entities Ranging From Small Suppliers To Large Fragmented Markets. The Success Of Amul Can Be Attributed To The Quality Of Products, The Economic Pricing And The Belief That It Has Instilled In Its Customers.

■ **MODERN EQUIPMENTS :-**

Dairy Machinery Encompasses And Describes A Wide Range Of Machine Types That Are Involved In The Production And Processing Of Dairy Related Products .

Dairy Processing Machine Types Can Include Homogenizer, Separator (Milk), Batch Mixers, Continuous Freezers, Aseptic, UHT& ESL Filling & Process Machinery, Butter & Cheese Processing & Packing, CIP And Washing, Non Aseptic Filling Machines, Ageing Vats, Batch Freezers, Batch Pasteurisers, Ice Cream Filling Machines, Ice Cream Fruit Feeders, Ice Cream Ripple Machines, Mixers, Emulsifiers, Cutters, Pasteurisers, Separators, Bactofuge And Clarifier Packing Machines .Etc.,.

- ***HOMOGENIZER :-Process Of Reducing A Substance, Such As The Fat Globules In Milk, To Extremely Small Particles And Distributing It Uniformly Throughout A Fluid, Such As Milk. ... The Process Involves Forcing The Milk Through Small Openings Under High Pressure, Thus Breaking Up The Fat Globules.***
- ***SEPARATOR:-A Separator Is A Centrifugal Device That Separates Milk Into Cream And Skimmed Milk. Separation Was Commonly Performed On Farms In The Past. Most Farmers Milked A Few Cows, Usually By Hand, And Separated Milk.***

Some Of The Skimmed Milk Was Consumed While The Rest Was Used To Feed Calves And Pigs. Enough Cream Was Saved To Make Butter, And The Excess Was Sold. Today, Milk Is Separated In Industrial Dairies. Sufficient Cream Is Returned To The Skimmed Milk Before Sale.

- **CONTINUOUS FREEZER :-By Scraping Frozen Mix From The Inside Of A Drum And Pumping Air Into The Mix As It Freezes, A Continuous Freezer Improves Heat Transfer And Allows For Higher Volumes Of Air In The Mix. This Process Produces A Continuous Stream Of Ice Cream Or Dessert And Allows Accurate Control. Continuous Freezers May Be Connected To An Ingredient Feeder Or Fruit Feeder Which Allows Controlled Inclusion Of Fruit And Other Ingredients Into The Mix Prior To Freezing.**
- **AUTOMATIC MILK RECEIVING :-The New And Automated Milk Receiving Equipment Ensures To Keep All Beneficial Aspects Of Milk. It Contains Filter And Determine Volume And Cools Down Milk Quick To 4 °c.**
- **AUTOMATIC FILLING MACHINE:-The Automatic Filling Machines Are Useful For Milk And Some Other Liquid Dairy Products. They Produce Different Types Of Cups, Plastic Bags And Box-Filling Machines For The Customers According To Their Demand.**

- **MILK PASTEURIZER:-** *The Milk Pasteurizer Is Useful For Pasteurization That Is Essential To Increase Milk Safety By Process Of Heat Treatment. Pasteurization Increases Quality Of Dairy Products By Wipe Out Spoilage Germs And Enzymes That Supply To The Reduced Excellence And Ridge Life Of Milk.*
- **Milk Receiving Tanks:-** *The Tanks Are Useful For Receive And Store Raw Milk That Keeps The Reliability And Poverty Of Milk. Tanks Are Made From Stainless Steel That Are Designed And Make With High Quality And Excellence.*
- **PROCESSING OF MILK :-** *How Milk Is Made Depends On A Number Of Different Technologies - All Designed To Make The Process More Efficient. Cows Are Milked Using Vacuum Cups Which Are Attached To The Cow's Teats. The Milk Is Sent Through Stainless Steel Pipes To Large Refrigerated Vats, Then Stored At 5°C Or Less. Within 48 Hours, Milk Is Taken In Tankers To A Milk Factory Where It's Pasteurised And Homogenised.*
- **PASTEURISATION:-** *This Technique Heats Milk To 72°C For No Less Than 15 Seconds, Then Cooled Immediately To Destroy Any Harmful Bacteria And Micro-Organisms. This Also Extends The Shelf Life.*

- **HOMOGENISATION**:-Milk Is Put Under Pressure Through Fine Nozzles, Which Evenly Disperses Fat Globules. This Stops The Cream Separating And Rising To The Top, Allowing A More Consistent Texture And Taste. Some Manufacturers Produce Unhomogenized Milk For People Who Prefer The Cream To Separate And Rise To The Top Of The Bottle.

Today's Farm Technology, Cattle Management And Factory Methods Allow For Greater Consistency Of Milk, And Milk Composition Can Be Adjusted For Year-Round Consistency. Milk Composition Is Standardised So Elements Like Fat Content Are Made Consistent No Matter The Season Or Breed Of Cow The Milk Comes From.

- **CENTRIFUGAL SEPARATION** :-This Removes Some Or All Of The Cream To Make Reduced-Fat, Low-Fat Or Skim Milk. Skim Milk Solids Can Be Added Back To Improve The Test And Texture, And Increase Nutrients Like Protein And Calcium.
- **ULTRAFILTRATION**:-This Moves Milk Across A Membrane Under Moderate Pressure, Which Holds Back Protein, Fat Globules, And A Large Amount Of Calcium Complexes .
Water And Lactose (The Sugar In Milk) Pass Through, Leaving Behind A Very Protein And

Calcium-Rich Product. The Fat Content Can Be Adjusted To Suit Consumer Preference.

- **REVERSE OSMOSIS** :- ***This Is Very Similar To Ultrafiltration , But The Membrane Holds Back Most Of The Milk Solids And Only Lets Water Pass Through. Lactose Remains In The Product. There Is No Impact On Flavour.***
- **ULTRA OSMOSIS**:- ***This Is A Combination Of Ultrafiltration And Reverse Osmosis, But It Holds Back Milk Solids And Allows Both Water And Salt To Pass Through.***
- **SPRAY DRYING**:- ***This Removes Water From Milk In Order To Make Powdered Milk Products. Milk's Nutritional Value Remains The Same.***
- **PERMEATE**:- ***Permeate Is A Technical Term Which Applies To All Membrane Filtration Processes Used Across Food Production And Other Industries. For Example, When Producing Apple Juice The Fruit Is Put Through A Similar Filtration Process Where Permeate Is The Clear Juice We End Up Buying And Consuming.***

In Milk Processing, The Word "Permeate" Does Not Refer To Anything Added Which Was Not Already Part Of Milk.

▪ **PROCESS OF MILK BEVERAGES**:-

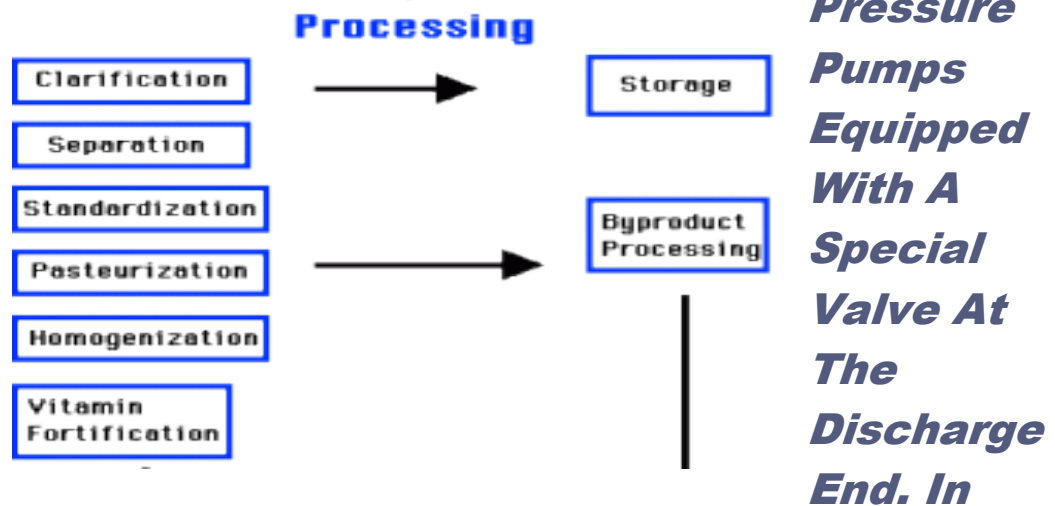
The Production Of Beverage Milks Combines The Unit Operations Of Clarification, Separation (For The Production Of Lower Fat Milks),

Pasteurization, And Homogenization.

The Process Is Simple, As Indicated In The below.

- **CLARIFICATION :-** Clarification Is The Process Of Subjecting Milk To A Centrifugal Force In Order To Eliminate The Finer But Heavier Particles From Milk, Somatic Cells , Dust Particles ,Etc.
- **SEPARATION :-** In Dairy Industry , The Process Of Separation Into Cream And Skim Milk Is Known As Separation . Cream Comprises Of Fat Concentrate In Milk. Milk Fat Can Be Removed In The Form Of Cream And The Remaining Portion Is Serum Referred To As Skim Milk. The Skim Milk Is Used To Make Milk Beverages.
- **Pasteurization :-** Pasteurization Is A Process In Which Packaged And Non Packaged Foods Are Treated With Mild Heat , Usually To Less Than 100^o C To Eliminated Pathogens And Extend Shelf Life. The Process Is Intended To Destroyed Or Deactivated The Enzymes That Contribute The Spoilage Or Risk Of Disease .

- **HOMOGENIZATION:-** *The Process Is Simple, the Homogenizers Are Heavy-Duty High-*



Milk Production, Homogenizers Are Designed To Break Up Fat Globules From Their Normal Size Of Up To 18 Micrometres To Less Than 2 Micrometres In Diameter (A Micrometre Is One-Millionth Of A Metre). Hot Milk (With The Fat In Liquid State) Is Pumped Through The Valve Under High Pressure, Resulting In A Uniform And Stable Distribution Of Fat Throughout The Milk. The Benefits Of Homogenization For Milk Include A Whiter Appearance, Richer Flavour, More Uniform Viscosity, Better “Whitening” In Coffee, And Softer Curd Tension (Making The Milk More Digestible For Humans).

■ MILK PACKAGING :-

All Milk Packaging Must Meet Strict Requirements For Food Safety. Out Of The Many Types Of Packaging, Only Certain Ones Can Be Used For Each Type Of Milk Product. Powdered Milk Doesn't Have The Same Storage Requirements As Liquid Milk, And 2-Percent Milk Is Stored Differently Than Evaporated Milk. One Thing All Kinds Of Milk Packaging Share Is The Necessity Of Maintaining The Freshness And Protecting The Flavours Of The Milk Product.

- **PAPER BASED:-***Cartons Made From Wax Or Plastic Coated Paper Board Are Probably One Of The Most Widely Known Types Of Milk Packaging. From School Cafeterias To Home Kitchens, Milk Cartons Are Easily Stored In The Refrigerator To Keep Liquid Milk Fresh Longer And Come In A Variety Of Sizes. Another Paper-Based Package Is A Cardboard Box, Which Is Used For Dry Milk Powder.*

Paper-Based Packaging is lightweight and Low Cost, but it's Susceptible to Moisture and Tearing.

- **PLASTIC*****:-Another Common Packaging Material For Milk Is Plastic. Whether Used For Jugs In Various Sizes Or Made Into Packets, Plastic Is Used To Hold Fresh And Pasteurized Milk. Some Of The Drawbacks Of Plastic Containers Include Becoming Fragile At Low Temperatures And Melting At High Temperatures.***
- **GLASS*****:-A Lot Of Times, When People Think Of Glass Milk Packaging, They Think Of The Days Of Milkmen Delivering Fresh Dairy Goods In Glass Bottles To The Door Early In The Morning In. Glass Bottles Are Still Used Today By Some Dairy Manufacturers, Although They Aren't As Widely Used As Plastic Or Paper-Based Packaging. While Glass Is Heat Resistant, It Is Also Heavy And Fragile.***
- **METAL*****:-Both Aluminium And Tin Are Used To Make Cans For Milk Products, Such As Evaporated Milk And Sweetened Condensed Milk. Some Of The Advantages To Using Metal Packaging Are The Strength Of The Material, Grease-Proof Qualities, And The Barrier Properties. One Draw back Nonaluminum Is Its Vulnerability To Acids. Tin Tends To Be Heavy And Expensive.***

- **WOOD:-***Barrels Made From Wood Are Used For Bulk Packaging Of Such Milk Products As Sweetened Condensed Milk And Buttermilk. Wooden Barrels Must Meet High Requirements For Quality To Avoid Tainting The Milk And Are Sometimes Coated With Wax Or Plastic To Make The Barrel Waterproof. Milk Can Be Frozen And Thawed Without Causing Harm To The Liquid Itself. When Any Food Is Not Consumed Fresh, The Quality Will Decrease.*
- **TIN:-***Use An Electric Mixer To Dissolve The Crystals That Form During The Freezing Process. You Can Also Thaw Milk In Cold Water, But Be Sure To Put It In The Refrigerator When Its Half Thawed.*

▪ **PRESERVATIVE TECHNIQUES :-**

- **THERMISATION :-***It Is The Most Commonly Used Method Used For Milk Preservation By Heating The Milk At A Mild Temperature At 57 – 68 °C For 15 – 20 Seconds And Rapidly Cooling At <6 °C. This Method Is Effective Against Spoilage-Causing Bacteria However It Doesn't Eliminate The Pathogens Such As L. Monocytogenes . The Main Objective Of Thermisation Is To Reduce The Growth Of Psychrotrophic Bacteria And Extend The Shelf-Life Of Milk.*

- **PASTEURIZATION:-***Pasteurization Is A Method Of Food Preservation That Involves The Application Of Heat, Usually Below 100° At A Certain Time. It Aims To Reduce The Number Of Viable Pathogens And Spoilage-Causing Microorganisms. Four Common Types Of Milk Pasteurization Vary With Temperature And Time The Milk Is Held At That Temperature.*
 - **Vat Pasteurization/Low Temperature:-***Long-Time Pasteurization In Which The Milk Is Heated At 63°C For 30 Min.*
 - **High Temperature/Short Time (Htst):-***In Which, The Milk Is Heated At 72°C For 15 S.*
 - **Ultra-Pasteurization (Up):-***In Which The Milk Is Heated At 138°To 150° C For One Or Two Seconds*
 - **Ultra-High-Temperature (Uht):-***In Which The Milk Is Heated At 280° F For Only Two Seconds.*

The Objective Of Pasteurization Are:

To Destroy Pathogenic Organisms Present In Milk .

To Ensure The Quality Of Milk And Milk Products.

To Destroy The Unwanted Organisms Present In Milk And Milk Products.

- **DEHYDRATION:-***It Is Defined As The Process Of Removal Of Water Normally Present In Milk By The Application Of Heat Under Controlled*

Conditions By Evaporation. In This Method, The Water Activity Of Milk Is Reduced To Prevent The Growth Of Spoilage-Causing Microorganisms.

The Objective Of This Methods Are:

To Reduce The Growth Of Spoilage-Causing And Pathogenic Organisms And Extend The Shelf-Life Of Milk.

To Reduce The Volume And Weight Of Milk Without Compromising The Nutritive Value.

The Methods Of Dehydration Used In Milk Preservation Are:

- ***Spray-Drying******:-In This Process, The Pre Concentrated Liquid Food Is Dispersed Into A Stream Of Hot Gas That Results In Evaporation Of Water Content Resulting In Instantaneous Drying.***
- ***Drum Drying******:- In This Process, The Pre-Concentrated Product Is Applied As A Thin Film On The Outer Surface Of An Internally Heated Rotating Metal Drum.***
- ***Fluid Bed Drying******:- Processing Involves Drying, Cooling, Agglomeration, Granulation, And Coating Of Particulate Materials. The Gas (Usually Air) Is Passed Through A Product Layer Under Controlled***

Velocity Conditions To Create A Fluidized State.

MILK BEVERAGE PACKAGING :-

Milk Is The Best Example Of A Food Product That, Due To Processing Technology, Packaging Material And Method, Is Able To Extend Its Shelf Life From Hours Into Weeks And Months .The First Packaging Of Milk Came With The Introduction Of Sterilised Milk Processing, In Which The Glass Bottle Formed An Integral Part. The Glass Bottle As The Retail Package For Milk Was Used Until The 1930s, At Which Time Waxed Paper Was Introduced. The Development And Introduction Of Plastic Materials, Both Alone And In Combination With Paper, Resulted In A Wide Range Of Containers Suitable For Dairy Products Packaging.

- **GLASS BOTTLE:-The Shelf-Life Of Bottled Fluid Milk Is Reported To Average Between 10 And 21 Days When Stored At 4-8°C. The Shelf Life Varies Depending On Raw Milk Quality, Processing Conditions, Microbial Growth, Packaging Materials, Exposure To Light And Temperature Abuse**
- **PLASTIC LAMINATE:-The Most Popular Material In Current Use For Fresh Yogurt Is Thermoformed TiO₂ Pigmented High Impact**

Polystyrene (Ps-Hi), With Either An Aluminium Foil/Plastic Laminate Or A Paper/Plastic Laminate Heat-Seal Lid Or Closure. For Pasteurised, Spoonable Yogurt Products, Barrier Laminated Materials Are Desirable If A Long Shelf-Life Is Needed.

- **PE-HD BOTTLES:-Drinking-Yogurt Products Are Packaged In Pe-Hd Bottles Sealed With Either Aluminium Foil Laminate Heat-Seal Closures, Or With Pe-Ld Caps. Bottles Made From Other Plastics (E.G. Pet) May Also Be Used. For Long-Life, Heat-Treated Drinking-Yogurt Products, Composite Materials Made With: Plastic/Alu-Foil/Paperboard With Good Water Vapour, O₂, And Light Barrier Properties Are Also Often Used.**

Different Types Of Packaging Concepts Are Also Required.

TRANSMISSION RATES:-Permeability To O₂, Co₂, And Water Vapour Transmission Rates For Packaging Films Are Among The Most Essential Factors In Determining The Package Atmosphere Composition, Which May Influence The Product's Deterioration Rate¹².

Modified Atmosphere Packaging (Map):-MAP Can Be Applied To Dairy Products To Control Some Of The Associated Fungal Problems And Extend Their Shelf Life. The Applied Gas Compositions For Packaging Of Dairy Products Can Vary From 10% To 100% Co₂, Balanced With N₂ As An Inert Filler Gas, Preventing Package Collapse As A Result Of Co₂ Solubilisation.

Subsequently, The Co₂ Is Able To Interchange Dynamically Between The Product And The Headspace Gas. The Degree Of This Exchange Is Expected To Depend On Material Properties, Co₂ Solubility Demands For Longer Shelf Life And Wider Distribution Of Dairy Products Have Resulted In The Development Of Processes And Packaging Concepts That Increase The Shelf Life Of These Products In Cold Chain Distribution.

▪ IMPORTANCE OF MAINTAINING GOOD HYGIENE IN DAIRY PLANTS:-

Milk Is A Perishable Food Product And Easily Falls Prey To Microbial Contamination & Increased PH Levels. This Causes Dairy Products To Diminish In Quality And Taste If Proper Hygiene Measures Are Not Taken In Manufacturing And Storage Conditions.

Maintaining Good Hygiene Is Crucial For The Dairy Industry To:

- ***Minimise Or Prevent Contamination Caused Due To Entry Of Pathogens And Bacteria From Unhygienic Milking Procedures, Equipment, Milk Contact Surfaces, Handlers, Storage Or Packaging Conditions.***
- ***Ensure Highest Standards Of Food Safety And Improved Compliance With Regulatory Practices Defined For The Dairy Industry***
- ***Provide Only Highest Quality And Safe Dairy Products For End Consumers***

Key Hygiene Practices For The Dairy Industry Outlined Here Are Important Guidelines To Maintain High Levels Of Hygiene Across All Steps Of Dairy Production.

1. Milk Production Hygiene:-Cutting-Edge

Automated Milk Production Techniques Are Fast Replacing Manual Milking Processes In Top-Notch Dairy Farms. However, Proper Hygiene Training Should Be Imparted To Everyone Involved In The Milking Process Because The Two Primary Contamination Sources Here Are Equipment Used And Handlers.

Uphold Superior Hygiene Standards in The Milking Process Through The Use Of Modern Equipment And Advanced Milking Monitoring Measures

Prevent Contamination Through Mastitis By Proper Use Of The Milking Machinery And Avoiding Over Milking

In-Depth Training Is Important To Help Maintain Highest Levels Of Personnel Hygiene

2. Dairy Plant Hygiene;-

Effective Cleaning And Sanitisation Play An Integral Role In Preserving Mandatory Hygiene Measures In Dairy Processing Plants. Plant Hygiene Typically Comprises Of Three Segments – Processing Hygiene, Equipment Hygiene And Personnel Hygiene.

Lack Of Knowledge Pertaining To Equipment Handling Or Functioning Of Machineries Is One Of The Key Reasons Causing Bacterial Contamination In Milk And Other Dairy Products. To Prevent This, It Is Crucial To Impart Proper Training And Ensure Routine Monitoring Of The Equipments' Working Performance. Lubricant Contamination Should Also Be Prevented.

Not Adhering To Equipment Cleaning & Sanitisation Standards Can Also Result Into Contamination Through Harmful Substances Such As Milk Residues, Allergens, Microorganisms Or Chemical Residues. Therefore, Comprehensive Cleaning And Sterilisation Of Equipment Should Be Undertaken After Milk Processing

Only Non-Corrosive, Industry-Approved Detergents And Disinfectants Should Be Used

Maintain Optimal Drainage System In The Processing Area And Ensure Abundant Water Supply For Effective Cleaning

Using Automatic Can Washer Can Help Prevent Milk Surface Contamination

The Plant Floor Should Be Built From Kota Or Mandara Tiles, While The Dock Should Be Covered With Iron Grid Tiles. Ensure Regular Scrubbing And Cleaning Of The Floor For Optimum Hygiene

Maintaining Good Personal Hygiene Is Also Important To Produce High-Quality, Contaminant-Free Dairy Products. People Working In The Plant Unit Should Enclose Themselves In Clean & Sterilised Workwear, Including Face Masks, Hair Caps And Gloves. Reinforced Safety Boots Or Shoes Should Also Be Used.

Refrain Wearing Jewellery Or Cosmetics Inside The Production Facility

3. Personnel Hygiene:-

Do You Know That Human Beings Are The Biggest Source Of Dirt, Dust And Contamination In A Dairy Plant, Affecting Quality & Safety Of The Final Product? Keeping This Mind, Modern Dairy Farms And Production Plants Should Implement Stringent Personnel Hygiene Guidelines As Mentioned Herewith:

Thoroughly Wash Hands Using A High-Quality Disinfectant Or Hand-Care Product Before And After Leaving The Milk Processing Or Production Unit. Every Time The Hands Become Soiled, They Should Be Cleaned Properly Before Getting Back To The Work Area. Finger Nails Should Be Cut Short And Clean. Do Not Use Perfumed Hand Soaps Or Lotions. Hands Must Be Properly Sanitised For Critical Production Areas.

Any Cut Or Open Sore Must Be Reported To The Medical Centre And Covered By A Band-Aid Type Coloured Dressing

Implement Use Of Hygienic And Sterilised Clothing In Dairy Plant To Prevent Product Contamination. The Workwear Should Not Be Worn When Away From The Production Facility Or Into The Toilet, Smoking Room Or Canteen. Proper Design Of Hygiene Clothing Is Essential To Prevent The Skin From Coming Into Contact With The Products.

Wearing Hand Gloves Is Mandatory When Handling Or Packaging The Dairy Products. Feet Should Be Properly Covered With High-Quality, Disposable Shoe Caps.

Dairy Plants Should Also Give Utmost Importance To Effective Workwear Laundry. State-Of-The-Art Laundry Facility And Compliance With Highest Standards Of Hygiene Is Vital For Safe, Sanitised And Reusable Clothing

4. Dairy Waste Water Hygiene:-

1. Lack Of Proper Measures To Manage Dairy Waste Water Is A Primary Cause Of Unhygienic Work Conditions And Spreading Of Contaminants Through Various Sources. At The Same Time, Most Dairy Farms And Production Plants Do Not Have Sufficient Supply Of Clean & Impurity-Free Water For Rigorous Cleaning And Sanitisation Purposes. To Maintain Proper Hygiene And Stay Compliant To Regulatory Standards, It Is Important For Dairy Plants To Implement Effective Measures For Treating Dairy Waste Water. Some Of These Methods Are Aerobic Treatment, Biological Filtration And Activated Sludge.

▪ ABOUT AMUL BUTTER FACTORY:-

The Amul Butter Factory Is The Largest Butter Making Factory In India . To Make

High Quality Butter Product, Amul Factory Collect Milk Everyday From 3 Million Milk Producers Spread Across 1000 Village In India .During Receiving The Milk From Village Society , The Stric Quality Of Milk . About 20 Million Liters Of Milk Is Collected From Village By A Special Designed Tanker . The Milk Sample Taken From Each Tank Immediately . While The Milk Are Identified As Good Quality , While The Milk Are Granted To Unload . Then The Milk Is Send To Butter Plant For Pretreatment . The Automatic Plant Required 3 Million Liters Of Milk Daily . The Milk Is Controlled Through Computer . The Butter Is Made In The Amul Factory Without Any Human Touch . The Amul Butter Factory Has Their Own Laboratory Where The Quality Of Butter Are Checked Before Packaging. The Amul Butter Products Are Certified By ISO And This Is A Good Achievement .

▪ AMUL CHEESE FACTORY:-

From 1946, amul has been serving in india and even outside of the india. Amul “the taste of india” the largest producer of vegetable cheese in the world. The amul cheese factory provided many variety of cheese such as chadar, cheese cube, cheese slices, cheese block. Pizza cheese(mozzarella) etc. about 200 varieties of cheese are produced by amul cheese factory. About 3.5 million liter of milk are collected from milk producer spreads across the india . the quality of cheese will be good when the quality of milk will be good . many dairy company produced cheese but amul is sure used good quality of milk to produced cheese. Everyday lac of liters of milk are collected through special tanker and monitor the quality through the computer. And this take few minutes . once the quality is proved the milk is ready to go for making cheese. The amul cheese factory are controlled by a group of people. The cheese are made fully through technologically without any

human touch. The people of amul factory are very hygienic . the plant staff have to go a air chamber before entry into the plant .

▪ INFRASTRUCTURE OF BUTTER :-

The runaway success of the brand, Amul, is one of the best case studies about the product, pricing, positioning and delivery. 'Amul' is derived from the Sanskrit word Amulya which means 'priceless'.

Amul is also the acronym for Anand Milk Union Ltd. Amul butter has lived up to its name for sure. Such has been the growth and popularity of the brand, Amul, that it has become synonymous with butter.

The brand, which has given MNCs a run for their money, has a long history to it. It is also interesting to note that a co-operative movement has come one of the best examples of brand building. Amul, as a brand, presents a case of effective and smart communication. It also exemplifies the power

of good and deep-rooted distribution as well as value for money.

Amul butter is processed at eight plants. With 48 sales offices, 3000 distributors and 2.5 lakh outlets, it has a robust marketing network. It is also exported to over 30 countries, including the U. S.

Amul butter accounts for over 90 percent of the Rs. 500 crore domestic market (2005). Clearly, it has the infrastructure that is needed for an organization of its size and ind. The history of Amul can be traced to December 1946, when some dairy farmers under the legendary leadership of Tribhuvandas Patel registered the Kaira District Co-operative Milk Producers' Union.

The Father of the White Revolution in India, Verghese Kurten Joined the Union as General Manager in 1950. In 1957, Kaira Co- operative registered the brand 'Amul'. In 1973, The Gujarat Co-operative Milk Marketing Federation was set up, and today it is the country largest dairy marketing

organization. The co-operative movement not only assured good returns to farmers but also provide consumers with quality products under the brand names of Amul and Sagar. To make it distinctive from the butter available in the market those days, and also to convey the message that Amul butter was produced using buffalo milk, additional colour was added to it.

The Amul girl, a bubbly mischievous little girl with an orange face, blue hair and polka dots on her frock, has been the Amul mascot since 1966. Amul campaigns were all light-hearted advertising with hard-sell. Amul was the market leader all over India, barring Bombay.

Hence, in 1966 the Amul account was given to Advertising and Sales Promotion Company with the simple brief: "Dislodge 'Poison' from its 'premier brand' position in Bombay'.

Poison butter was started by Pestonjee Edulji in 1926. The 'utterly butterly delicious' campaign was started after research in early 1966 had found that 50

percent of Bombay cites had not tasted Amul butter. This hinted at a lack of awareness.

The media, because of lack of colour printing facility, offered little help as a vehicle for advertising. They searched for a vehicle that could allow them a large impact. It as noticed that Just one hoarding at Bombay Kemps Korner used to give Air India a lot of publicity mileage. So they decided: Why not try something like the Air India campaign? They had a media plan that included about 17 hoardings. Bus panels were also used effectively. Justification for hoarding and bus panels as media the clock as different from the frequency of the calendar in the case of the press. ‘ The hoardings and bus panels also offered them the choice of colour.

The campaign was a roaring success. It gave Amul a strong foothold in the market. It was also the first ad that used outdoor so intensively, with hoardings, bus panels and posters. The path-breaking ‘utterly butterly delicious’ campaign (created by Advertising and Sales Promotion Company established

the fact that Amul is not as expensive as consumers think. And since then Amul was on the road to success Poison dairy lost its supremacy in Bombay.

Many other butter brands entered the market, but none was able to get ar. significant market share. Amul's brute dominance created a big entry barrier for others.

Such was the dominance that eve-companies like the Swiss airy major Nestle had to make a hasty retreat from the domestic market. Even today, Amul hoardings continue to dot the skies, with smart spoof ads on topical issues. And being ahead of others in creating interesting tag lines was its strength. After the Ambani break-up, Amul hoardings read 'share the bread: equally. The success of Bunty aur Bubbly was captured in 'Bun, tea and buttery. Amul's spoof ads are much like R. K.

Laxman's 'common man' cartoons. The Amul hoarding campaigns are also in the Guinness Records for being the longest running

advertising campaigns – for over four decades. Amul ads have become a mirror of life, reflecting the myriads of festivals, cricket events and even politics! It is not mere smart communication that has led to the runaway success of the brand.

Distribution and value for money seem to be the major strengths on which the brand's popularity rests. About 12 lakh units of butter (all packs put together) are sold daily. They need to ensure that the same quality product is available to a consumer at his nearest outlet and in the pack sizes required by him.

■ INFRASTRUCTURE OF CHEESE:-

Cheese Is A Fermented Food Derived From The Milk Of Various Mammals. Since Humans Began To Domesticate Milk-Producing Animals Around 10,000 B.C. , They Have Known About The Propensity Of Milk To Separate Into Curds And Whey. As Milk Sours, It Breaks Down Into Curds, Lumps Of

Phosphoprotein, And Whey, A Watery, Grey Fluid That Contains Lactose, Minerals, Vitamins, And Traces Of Fat. It Is The Curds That Are Used To Make Cheese, And Practically Every Culture On Earth Has Developed Its Own Methods, The Only Major Exceptions Being China And The Ancient Americas.

The First Cheeses Were "Fresh," That Is, Not Fermented. They Consisted Solely Of Salted White Curds Drained Of Whey, Similar To Today's Cottage Cheese. The Next Step Was To Develop Ways Of Accelerating The Natural Separation Process. This Was Achieved By Adding Rennet To The Milk. Rennet Is An Enzyme From The Stomachs Of Young Ruminants—A Ruminant Is An Animal That Chews Its Food Very Thoroughly And Possesses A Complex Digestive System With Three Or Four Stomach Chambers; In The United States, Cows Are The Best Known Creatures Of This Kind. Rennet Remains The Most Popular Way Of "Starting" Cheese, Though Other Starting Agents Such As Lactic Acid And Various Plant Extracts Are Also Used.

By A.D. 100 Cheese Makers In Various Countries Knew How To Press, Ripen, And Cure Fresh Cheeses, Thereby Creating A Product That Could Be Stored For Long Periods. Each Country Or Region Developed Different Types Of Cheese That Reflected Local Ingredients And Conditions. The Number Of Cheeses Thus Developed Is Staggering. France, Famous For The Quality And Variety Of Its Cheeses, Is Home To About 400 Commercially Available Cheeses.

The Next Significant Step To Affect The Manufacture Of Cheese Occurred In The 1860s, When Louis Pasteur Introduced The Process That Bears His Name. Pasteurization Entails Heating Milk To Partially Sterilize It Without Altering Its Basic Chemical Structure. Because The Process Destroys Dangerous Micro-Organisms, Pasteurized Milk Is Considered More Healthful, And Most Cheese Is Made From Pasteurized Milk Today.

The First And Simplest Way Of Extending The Length Cheese Would Keep Without Spoiling Was Simply Ageing It. Aged Cheese Was Popular From The Start Because It Kept Well

For Domestic Use. In The 1300s, The Dutch Began To Seal Cheese Intended For Export In Hard Rinds To Maintain Its Freshness, And, In The Early 1800s, The Swiss Became The First To Process Cheese. Frustrated By The Speed With Which Their Cheese Went Bad In The Days Before Refrigeration, They Developed A Method Of Grinding Old Cheese, Adding Filler Ingredients, And Heating The Mixture To Produce A Sterile, Uniform, Long-Lasting Product. Another Advantage Of Processing Cheese Was That It Permitted The Makers To Recycle Edible, Second-Grade Cheeses In A Palatable Form.

Prior To The Twentieth Century, Most People Considered Cheese A Specialty Food, Produced In Individual Households And Eaten Rarely. However, With The Advent Of Mass Production, Both The Supply Of And The Demand For Cheese Have Increased. In 1955, 13 Percent Of Milk Was Made Into Cheese. By 1984, This Percentage Had Grown To 31 Percent, And It Continues To Increase. Interestingly, Though Processed Cheese Is Now Widely Available, It Represents Only One-Third Of The Cheese Being Made Today. Despite The Fact That Most Cheeses Are

Produced In Large Factories, A Majority Are Still Made Using Natural Methods. In Fact, Small, "Farmhouse" Cheese Making Has Made A Comeback In Recent Years. Many Americans Now Own Their Own Small Cheese-Making Businesses, And Their Products Have Become Quite Popular, Particularly Among Connoisseurs

■ **EQUIPMENTS USED IN BUTTER PREPARATION**

➤ **AUTOMATIC BACTERIA CLARIFIER:**A

Clarifier Is Generally Used To Remove Solid Particulates Or Suspended Solids From Liquid For Clarification And/Or Thickening. Concentrated Impurities, Discharged From The Bottom Of The Tank Are Known As Sludge, While The Particles That Float To The Surface Of The Liquid Are Called Scum.

➤ **SEPARATOR:** Separator Removes Extra Fat From The Milk.

CHURNER :*A Butter Churn Is A Device Used To Convert Cream Into Butter. This Is Done Through A Mechanical Process, Frequently Via A Pole Inserted Through The Lid Of The Churn, Or Via A Crank Used To Turn A Rotating Device Inside The Churn.*

METAL DETECTOR :A Metal Detector Is An Instrument That Detects The Presence Of Metal Nearby. Metal Detectors Are Useful For Finding Metal Inclusions Hidden Within Objects, Or Metal Objects Buried Underground.

▪ ***EQUIPMENTS USED IN CHEESE PREPARATION:***

- ***AUTOMATIC BACTERIA CLARIFIER:It Filtered Bacteria From The Milk.***
- ***SEPARATOR:It Removes The Extra Fat From The Milk.***
- ***METAL DETECTOR: It Checks The Cheese Blocks To Purity.***
- ***CONVEYOR :TheMain Purpose Of A Conveyor System Is To Move Objects From One Location To Another.ConveyorSystems Save Time When Transporting Items From One Location To Another.***
- ***SPIRAL COOLER: In Spiral Cooler Cheese Blocks , Cheese Cubes Are Cooled At 4-6° C.***

BUTTER PROCESSING:-

➤ **MILK & CREAM :-** *Collected From Cows. Butter Can Also Be Produced From The Milk Of Buffalo, Camel, Goat, Ewe, And Mares. Cream Is Separated From The Milk. The Cream Can Be Either Supplied By A Fluid Milk Dairy Or Separated From Whole Milk By The Butter Manufacturer. The Cream Should Be Sweet (Ph Greater Than 6.6), Not Rancid, Not Oxidized, And Free From Off Flavors. The Cream Is Pasteurized At A Temperature Of 95°C Or More To Destroy Enzymes And Micro-Organisms.*

➤ **RIPENING :-**

Sometimes, Cultures Are Added To Ferment Milk Sugars To Lactic Acid And Desirable Flavor And Aroma Characteristics For Cultured Butter. This Is More Common In European Butters.

AGING:-

Cream Is Held At Cool Temperatures To Crystallize The Butterfat Globules, Ensuring

Proper Churning And Texture Of The Butter. In The Aging Tank, The Cream Is Subjected To A Program Of Controlled Cooling Designed To Give The Fat The Required Crystalline Structure. As A Rule, Aging Takes 12 - 15 Hours. From The Aging Tank, The Cream Is Pumped To The Churn Or Continuous Buttermaker Via A Plate Heat Exchanger Which Brings It To The Requisite Temperature.

CHURNING :-

Cream Is Agitated, And Eventually Butter Granules Form, Grow Larger, And Coalesce. In The End, There Are Two Phases Left: A Semisolid Mass Of Butter, And The Liquid Left Over, Which Is The Buttermilk.

DRAINING & WASHING:-

Thus The Cream Is Split Into Two Fractions: Butter Grains And Buttermilk. In Traditional Churning, The Machine Stops When The Grains Have Reached A Certain Size, Whereupon The Buttermilk Is Drained Off. With The Continuous Buttermaker The Draining Of The Buttermilk Is Also Continuous.

After Draining, The Butter Is Worked To A Continuous Fat Phase Containing A Finely Dispersed Water Phase. It Used To Be Common Practice To Wash The Butter After Churning To Remove Any Residual Buttermilk And Milk Solids But This Is Rarely Done Today. This Washing Process Would Ensure That All The Butter Milk Is Washed Out Of The Butter. Otherwise The Butter Would Not Keep And Go Rancid.

SALTING & WORKING:-

Salt Is Used To Improve The Flavor And The Shelf-Life, As It Acts As A Preservative. Further, The Butter Is Worked To Improve Its Consistency.

PACKING & STORAGE:-

The Butter Is Finally Patted Into Shape And Then Wrapped In Waxed Paper And Then Stored In A Cool Place. As It Cools, The Butterfat Crystallizes And The Butter Becomes Firm. Whipped Butter , Made By Whipping Air Or Nitrogen Gas Into Soft Butter Is Intended To Spread More Easily At Refrigeration Temperatures.

A.

■ **MANUFACTURING PROCEDURE OF CHEESE :-**

The Temperatures, Times, And Target Ph For Different Steps, The Sequence Of Processing Steps, The Use Of Salting Or Brining, Block Formation, And Aging Vary Considerably Between Cheese Types. The Following Flow Chart Provides A Very General Outline Of Cheese Making Steps. The General Processing Steps For Cheddar Cheese Are Used For Illustration.

Agrilearner: The Times, Temperatures, And Target Ph Values Used For Cheddar Cheese Will Depend On Individual Formulations And The Intended End Use Of The Cheese. These Conditions Can Be Adjusted To Optimize The Properties Of Cheddar Cheese For Shredding, Melting, Or For Cheese That Is Meant To Be Aged For Several Years.

➤ **STANDARDIZE MILK:-**

Milk Is Often Standardized Before Cheese Making To Optimize The Protein To Fat Ratio To Make A Good Quality Cheese With A High Yield

➤ **PASTEURIZE/HEAT TREAT MILK:-**

Depending On The Desired Cheese, The Milk May Be Pasteurized Or Mildly Heat-Treated To Reduce The Number Of Spoilage Organisms And Improve The Environment For The Starter Cultures To Grow. Some Varieties Of Milk Are Made From Raw Milk So They Are Not Pasteurized Or Heat-Treated. Raw Milk Cheeses Must Be Aged For At Least 60 Days To Reduce The Possibility Of Exposure To Disease Causing Microorganisms (Pathogens) That May Be Present In The Milk.

➤ **COOL MILK:-**

Milk Is Cooled After Pasteurization Or Heat Treatment To 90°F (32°C) To Bring It To The Temperature Needed For The Starter Bacteria To Grow. If Raw Milk Is Used The Milk Must Be Heated To 90°F (32°C).

➤ **INOCULATE WITH STARTER & NON-STARTER BACTERIA AND RIPEN:-**

The Starter Cultures And Any Non-Starter Adjunct Bacteria Are Added To The Milk And

Held At 90°F (32°C) For 30 Minutes To Ripen. The Ripening Step Allows The Bacteria To Grow And Begin Fermentation, Which Lowers The Ph And Develops The Flavor Of The Cheese.

➤ **ADD RENNIN AND FORM CURD:-**

The Rennin Is The Enzyme That Acts On The Milk Proteins To Form The Curd. After The Rennin Is Added, The Curd Is Not Disturbed For Approximately 30 Minutes So A Firm Coagulum Forms.

➤ **CUT CURD AND HEAT:-**

The Curd Is Allowed To Ferment Until It Reaches Ph 6.4. The Curd Is Then Cut With Cheese Knives Into Small Pieces And Heated To 100°F (38°C). The Heating Step Helps To Separate The Whey From The Curd.

➤ **DRAIN WHEY:-**

The Whey Is Drained From The Vat And The Curd Forms A Mat.

➤ **TEXTURE CURD:-**

The Curd Mats Are Cut Into Sections And Piled On Top Of Each Other And Flipped Periodically. This Step Is Called Cheddaring. Cheddaring Helps To Expel More Whey, Allows The Fermentation To Continue Until A Ph Of 5.1 To 5.5 Is Reached, And Allows The Mats To “Knit” Together And Form A Tighter Matted Structure. The Curd Mats Are Then Milled (Cut) Into Smaller Pieces.

➤ **DRY SALT OR BRINE:-**

For Cheddar Cheese, The Smaller, Milled Curd Pieces Are Put Back In The Vat And Salted By Sprinkling Dry Salt On The Curd And Mixing In The Salt. In Some Cheese Varieties, Such As Mozzarella, The Curd Is Formed Into Loaves And Then The Loaves Are Placed In A Brine (Salt Water Solution).

➤ **FORM CHEESE INTO BLOCKS:-**

The Salted Curd Pieces Are Placed In Cheese Hoops And Pressed Into Blocks To Form The Cheese.

➤ **STORE AND AGE:-**

The Cheese Is Stored In Coolers Until The Desired Age Is Reached. Depending On The Variety, Cheese Can Be Aged From Several Months To Several Years.

➤ **PACKAGE:-**

Cheese May Be Cut And Packaged Into Blocks Or It May Be Waxed.

■ **BUTTER PRESERVATIVE:-**

Butter Preservation And Its Shelf Life Butter Produced By Farmers In The Study Areas At Different Seasons And Occasions Were Either Sold Or Preserved And Stored In Different Forms. During Dry Season, Non-Fasting And Different Festivals, Butter Had High Demand; Thus More Of It Is Sold; But Only Small Proportion Is Preserved. But, At Wet Season And Fasting Time, As Butter Demand Is Relatively Low, More Of Butter Produced Is Preserved And Stored In Different Forms. Therefore, Producers Commonly Preserve Butter In The Form Of Traditional Ghee (100%) And Mixing With Spices (98.33%);

Which Is Done By Mixing Fresh Butter With Powdered Spices. While, Less Than Half Of The Respondents Use Melting Butter (29.17%); Which Is Done By Melting Butter On Slow Fire Until Foaming Stops, Cooled Overnight And Made Free Of Excess Water And Any Residual Matter. Relatively, The Less Commonly Used Technique (11.67%) Was Salting Butter (Table 16), Which Is Done By Thoroughly Mixing Fresh Butter With Salt. This Salted Butter Can Be Sold And Also Used For Further Processing. Traditional Ghee Is Done By Boiling Butter Contained In A Clay Pot Or Pan On A Slow Fire Until Foaming Stops Along With Adding Powdered Spices, After Which The Pan Is Removed From The Fire To Cool And Sieve With “Qaancaa”, A Byproduct Obtained During “Enset” Processing. For Traditional Ghee Making, Fresh Butter, Spiced Butter, Melted And Salted Butter Are The Bases. The Same Techniques Of Butter Preservation Were Reported By Bangladesh (2002) In East Wollega Zone Of Oromia Region. Spiced Butter And Traditional Ghee Are Alternative

Methods Of Butter Preservation Techniques In North Western Ethiopia

FOOD PLANT SANITATION AND HYGIENE:-

Milk Is A Perishable Food Product And Easily Falls Prey To Microbial Contamination & Increased Ph Levels. This Causes Dairy Products To Diminish In Quality And Taste If Proper Hygiene Measures Are Not Taken In Manufacturing And Storage Conditions.

Maintaining Good Hygiene Is Crucial For The Dairy Industry To:

- Minimise Or Prevent Contamination Caused Due To Entry Of Pathogens And Bacteria From Unhygienic Milking Procedures, Equipment, Milk Contact Surfaces, Handlers, Storage Or Packaging Conditions**
- Ensure Highest Standards Of Food Safety And Improved Compliance With Regulatory Practices Defined For The Dairy Industry**

- **Provide Only Highest Quality And Safe Dairy Products For End Consumers**

II. Key Hygiene Practices For The Dairy Industry Outlined Here Are Important Guidelines To Maintain High Levels Of Hygiene Across All Steps Of Dairy Production

1. Milk Production Hygiene:-Cutting-Edge Automated Milk Production Techniques Are Fast Replacing Manual Milking Processes In Top-Notch Dairy Farms. However, Proper Hygiene Training Should Be Imparted To Everyone Involved In The Milking Process Because The Two Primary Contamination Sources Here Are Equipment Used And Handlers.

Uphold Superior Hygiene Standards In The Milking Process Through The Use Of Modern Equipment And Advanced Milking Monitoring Measures

Prevent Contamination Through Mastitis By Proper Use Of The Milking Machinery And Avoiding Over Milking

In-Depth Training Is Important To Help Maintain Highest Levels Of Personnel Hygiene

2. Dairy Plant Hygiene;-

Effective Cleaning And Sanitisation Play An Integral Role In Preserving Mandatory Hygiene Measures In Dairy Processing Plants. Plant Hygiene Typically Comprises Of Three Segments – Processing Hygiene, Equipment Hygiene And Personnel Hygiene.

Lack Of Knowledge Pertaining To Equipment Handling Or Functioning Of Machineries Is One Of The Key Reasons Causing Bacterial Contamination In Milk And Other Dairy Products. To Prevent This, It Is Crucial To Impart Proper Training And Ensure Routine Monitoring Of The Equipments' Working Performance. Lubricant Contamination Should Also Be Prevented.

Not Adhering To Equipment Cleaning & Sanitisation Standards Can Also Result Into Contamination Through Harmful Substances Such As Milk Residues, Allergens, Microorganisms Or Chemical Residues. Therefore, Comprehensive Cleaning And Sterilisation Of Equipment Should Be Undertaken After Milk Processing

Only Non-Corrosive, Industry-Approved Detergents And Disinfectants Should Be Used

Maintain Optimal Drainage System In The Processing Area And Ensure Abundant Water Supply For Effective Cleaning

Using Automatic Can Washer Can Help Prevent Milk Surface Contamination

The Plant Floor Should Be Built From Kota Or Mandara Tiles, While The Dock Should Be Covered With Iron Grid Tiles. Ensure Regular Scrubbing And Cleaning Of The Floor For Optimum Hygiene

Maintaining Good Personal Hygiene Is Also Important To Produce High-Quality, Contaminant-Free Dairy Products. People Working In The Plant Unit Should Enclose Themselves In Clean & Sterilised Workwear, Including Face Masks, Hair Caps And Gloves. Reinforced Safety Boots Or Shoes Should Also Be Used.

Refrain Wearing Jewellery Or Cosmetics Inside The Production Facility

3. Personnel Hygiene:-

Do You Know That Human Beings Are The Biggest Source Of Dirt, Dust And Contamination In A Dairy Plant, Affecting Quality & Safety Of The Final Product?

Keeping This Mind, Modern Dairy Farms And Production Plants Should Implement Stringent Personnel Hygiene Guidelines As Mentioned Herewith:

Thoroughly Wash Hands Using A High-Quality Disinfectant Or Hand-Care Product Before And After Leaving The Milk Processing Or Production Unit. Every Time The Hands Become Soiled, They Should Be Cleaned Properly Before Getting Back To The Work Area. Finger Nails Should Be Cut Short And Clean. Do Not Use Perfumed Hand Soaps Or Lotions. Hands Must Be Properly Sanitised For Critical Production Areas.

Any Cut Or Open Sore Must Be Reported To The Medical Centre And Covered By A Band-Aid Type Coloured Dressing

Implement Use Of Hygienic And Sterilised Clothing In Dairy Plant To Prevent Product Contamination. The Workwear Should Not Be Worn When Away From The Production Facility Or Into The Toilet, Smoking Room Or Canteen. Proper Design Of Hygiene Clothing Is Essential To Prevent The Skin From Coming Into Contact With The Products.

Wearing Hand Gloves Is Mandatory When Handling Or Packaging The Dairy Products. Feet Should Be Properly Covered With High-Quality, Disposable Shoe Caps.

Dairy Plants Should Also Give Utmost Importance To Effective Workwear Laundry. State-Of-The-Art Laundry Facility And Compliance With Highest Standards Of Hygiene Is Vital For Safe, Sanitised And Reusable Clothing

4. Dairy Waste Water Hygiene:-

Lack Of Proper Measures To Manage Dairy Waste Water Is A Primary Cause Of Unhygienic Work Conditions And Spreading Of Contaminants Through Various Sources. At The Same Time, Most Dairy Farms And Production Plants Do Not Have Sufficient Supply Of Clean & Impurity-Free Water For Rigorous Cleaning And Sanitisation Purposes. To Maintain Proper Hygiene And Stay Compliant To Regulatory Standards, It Is Important For Dairy Plants To Implement Effective Measures For Treating Dairy Waste Water. Some Of These Methods Are Aerobic Treatment, Biological Filtration And Activated Sludge.

ABOUT ICE CREAM FACTORY:-

Amul Ice Cream Was Launched On 10th March , 1996. In Gujrat. The Portfolio Consisted Of Impulse Products Like Sticks Cones Cups As Well As Take Home Packs And Institutional Packs .Amul Ice Cream Was Launched On The Platform Of " Real Milk".Real Ice Cream Given That It Is A Milk Company And The Wholesomeness Of Its Products Given It A Competitive Advantage In 1997 , Amul Ice Creams Entered Mumbai Followed By Chommsasi In 1998 And Kolkata And Delhi In

2002 .Nationally It Was Rolled Out Across The Country In 1999. It Has Combated Competition Like Wall . Mother Dairy And Achieved The No 1 Position In The Country.

■ **ABOUT AMUL CHOCOLATE FACTORY:-**

AMUL Dairy is a great place to visit for all the chocolate lovers out there, to witness the process that goes behind making chocolate. For all those who wish to see what goes on behind making one of the most loved things in the world, Amul allows visitors into its factory at Anand. One can see through all the stages of chocolate production, right from the earliest of stages to packaging. The Factory has a museum known as [AMUL Co-operative Museum](#) which is an exhibition, tracing down the storied past of one of the country's greatest institutions. The most fascinating thing in the factory is the large tanks that hold the ingredient to prepared chocolate with .

■ **INFRASTRUCTURE OF ICE CREAMS**

FACTORY:-with the experience of more than three decades they have established as a renowned as a manufacturers and suppliers of the wide variety of ice cream and candies. They are well equipped with state of art infrastructure which comprises of inventory and ware houseing unit, processing units, packaging units ,control units and many others. Owning with various high end machinery installed at plant , we have various facilities such as hardening room with low temperature , continuous freezing

,automatic filling of packets and various others facilities.

■ **INFRASTRUCTURE OF CHOCOLATE :-**

In India, they are also the names of varieties of dark chocolate launched by the Gujarat Co-operative Milk Marketing Federation (GCMMF), widely known as Amul.

it was born in 1973, with GCMMF's flagship dairy, Kaira Milk Union, better known as Amul Dairy, in Anand, Gujarat, setting up a 200 metric tonne per month plant. At the time, the plant was considered modern, with the latest machines being imported for the various processes involved in chocolate-making.

Amul did attempt a comeback briefly in the early 2000s when it launched the Chocozoo variant — assorted animal-shaped milk chocolates targeted again at children. There were also launches in the gifting arena, with Amul Relish and some variants in chocolate bars. But these didn't last long.

The plain dark chocolate was quickly followed by variants such as Tropical Orange, Mystic Mocha and Bitter Dark Chocolate. The last had an unusually high cocoa content of 75 per cent.

“We have an internal team in the chocolate business that keeps researching innovative products. The team not only decided on premiumising chocolate by launching dark variants but also research global trends,” says Sodhi. The team found that none of the major retail

chocolate brands in the country had launched country-origin variants of dark chocolate.

In mid-2016 Amul's board approved a Rs 2-billion expansion of the chocolate plant. An extension of the existing plant on the 22-acre campus in Mogar village, 15 km from the flagship Amul milk and butter plant in Anand, the expanded plant is technologically on par with the country's leading chocolate makers. Prime Minister Narendra Modi inaugurated the 4,400 sq m plant on September 30; the new multi-storied structure now literally eclipses the 2,700 sq m old plant.

While Amit Vyas, managing director of Amul Dairy, doesn't cite numbers, factory staff estimate that the number of employees at the new plant are about one-fifth of the old. But, at 1,000 tonnes per month, the new plant has five times more capacity.

The old and new plants stand in stark contrast to each other. The former buzzes with manpower and analog machines, emanating the strong buttery smell of cocoa beans and chocolate at different stages of production. At any given point of time, there are roughly 100 people at work in the old plant. Right from pouring cocoa beans into filters and roasters to packaging, human intervention is unavoidable here.

But move to the multi-storied plant and it's a new world. Massive automated machines equipped with software panels populate most of the occupied space. One worker says the capacity can be easily doubled and yet leave enough room for gully cricket within the premises!

"The old plant is based on conventional dry mixing or batching system where one has to manually weigh and

prepare batches of raw materials to be fed into the machines at regular intervals. At the new plant, the technology is different and requires liquid mixing. The raw material inputs are entirely automated and is a continuous process. This brings down costs substantially,” says Vyas. He estimates that power costs alone are down by 20-25 per cent.

For this, Amul will bank upon a bunch of professionals in its chocolate division who continue to research new variants. So far, Amul has not hired a single independent chocolatier. “Our marketing team itself has been doing the research and we are going pretty well,” Sodhi says.

■ **EQUIPMENTS USED IN ICECREAM**

PREPARATION:-

- **CONVEYOR:-** The Main Purpose Of A Conveyor System Is To Move Objects From One Location To Another. Conveyor Systems Save Time When Transporting Items From One Location To Another.
- **HARDENING TUNNEL:-** It Helps To Get A Former Shape.
 - **FMT** :In Flavour Mixing Tank Fruit Pulps And Flavors Are Added.
 - **NOZZLE:** Which Move Up And Down In A Rhythm And Are Sink With Cup's Movement. **Circular Stainless Steel Machine** : The Circular Machine Has A External Cooling System Which Cools Around -35to -40°C .
 - **HOLDER:** Pick Up The Wooden Stick And Insert Them In Semi Frozen Mixture.

- **ANCILLARY TANK:** *Chocolate Prepared For Dubbing Using High Quality Coco Powder.*
- **METAL DETECTOR:** *Which Keeps A Watch For Material ' S Impurities.*

■ **MODERN EQUIPMENT FOR CHOCOLATE FACTORY:-**

1) **SUGAR GRINDING MACHINE:-**

All Kinds Of Chocolate Are Made Of Granulated Sugar, With A General Content Of About 50%. By Grinding Granulated Sugar Into Powder, The Product Structure Will Become Delicate And Smooth, At The Same Time, It Also Affects The Taste And Sweetness Of Chocolate To A Certain Extent.

2) **CHOCOLATE MELTING TANK:-**

Cocoa Liquor, Cocoa Butter And Cocoa Butter Substitutes Are Solid At Room Temperature. Before Feeding, They Need To Be Melted Then They Can Be Mixed For Refining. Sugar Grinder And Melting Tank Belong To The Pretreatment Of Raw Materials Before Mixing.

3) **CHOCOLATE CONCHING REFINING MACHINE:-**

In Chocolate Production, Ingredient Conching Is The Basic Production Link. Fine Grinding Makes All Kinds Of Materials Mix Evenly And Reduces The Fineness Of Materials. The Average Fineness Can Reach 20um, Which Makes The Taste Delicate And Lubricated. The Refining Time Is Generally 16-22 Hours.

4) **CHOCOLATE STORAGE TANK:-**

It Is Mainly Used For Heat Preservation Storage Of

Chocolate Slurry After Fine Grinding To Meet The Technological Requirements Of Chocolate Production And To Meet The Needs Of Continuous Production.

5) ***CHOCOLATE TEMPERING MACHINE:-***

The Purpose Of Temperature Regulation Is To Make Cocoa Butter Crystallize Into Stable Beta Crystals In Slurry And Express Them In Black Luster. The Second Is To Prolong The Shelf Life Of Products.

6) ***CHOCOLATE MOULDING LINE:-***

Modern Chocolate Casting Is Completed By Continuous Moulding Line. It Is A Fully Automated Chocolate Production Line With Complete Cycle. It Can Be Used For Pouring Monochrome, Bicolor And Sandwich Chocolate.

The Chocolate Moulding Machine Also Has The Functions Of Automatic Baking, Automatic Pouring And Full Vibration. It Has The Advantages Of Wide Template, Low Labor Intensity, Convenient Operation And Maintenance, Simple And Reliable Movement, Etc. Chocolate Moulding Machine Is An Important Device For Chocolate Factory.

7) ***CHOCOLATE PACKAGING MACHINE:-***

Choose The Appropriate Chocolate Packaging Machine According To The Requirements. After That, The Finished Chocolate Products Can Enter The Market From The Factory.

■ ***THE MANUFACTURING PROCESS OF ICE CREAMS :-***

Although Ice Cream Is Available In A Variety Of Forms, Including Novelty Items Such As Chocolate-Dipped Bars

And Sandwiches, The Following Description Applies To Ice Cream That Is Packaged In Pint And Half-Gallon Containers.

- **BLENDING THE MIXTURE:-**

The Milk Arrives At The Ice Cream Plant In Refrigerated Tanker Trucks From Local Dairy Farms. The Milk Is Then Pumped Into 5,000 Gal (18,925 l) Storage Silos That Are Kept At 36°F (2°C). Pipes Bring The Milk In Pre-Measured Amounts To 1,000 Gal (3,785 l) Stainless Steel Blenders. Pre-measured Amounts Of Eggs, Sugar, And Additives Are Blended With The Milk For Six To Eight Minutes.

- **PASTEURIZING TO KILL BACTERIA:-**

The Blended Mixture Is Piped To The Pasteurization Machine, Which Is Composed Of A Series Of Thin Stainless Steel Plates. Hot Water, Approximately 182°F (83°C), Flows On One Side Of The Plates. The Cold Milk Mixture Is Piped Through On The Other Side. The Water Warms The Mixture To A Temperature Of 180°F (82°C), Effectively Killing Any Existing Bacteria.

- **HOMOGENIZING TO PRODUCE A UNIFORM TEXTURE:-**

By The Application Of Intensive Air Pressure, Sometimes As Much As 2,000 Pounds Per Square Inch (141 Kg Per Sq Cm), The Hot Mixture Is Forced Through A Small Opening Into The Homogenizer. This Breaks Down The Fat Particles And Prevents Them From Separating From The Rest Of The Mixture. In The Homogenizer, Which Is Essentially A High-Pressure Piston Pump, The Mixture Is Further Blended As It Is Drawn Into The Pump Cylinder On The Down Stroke And Then Forced Back Out On The Upstroke.

- **COOLING AND RESTING TO BLEND FLAVORS:-**

The Mixture Is Piped Back To The Pasteurizer Where Cold Water, Approximately 34°F (1°C), Flows On One Side Of The Plates As The Mixture Passes On The Opposite Side. In This Manner, The Mixture Is Cooled To 36°F (2° C). Then The Mixture Is Pumped To 5,000 Gal (18,925 l) Tanks In A Room Set At 36°F (2°C), Where It Sits For Four To Eight Hours To Allow The Ingredients To Blend.

- **FLAVORING THE ICE CREAM:-**

The Ice Cream Is Pumped To Stainless Steel Vats, Each Holding Up To 300 Gal (1,136 l) Of Mixture. Flavorings Are Piped Into The Vats And Blended Thoroughly.

- **FREEZING TO SOFT-SERVE CONSISTENCY:-**

Now The Mixture Must Be Frozen. It Is Pumped Into Continuous Freezers That Can Freeze Up To 700 Gal (2,650 l) Per Hour. The Temperature Inside The Freezers Is Kept At -40°F(-40°C), Using Liquid Ammonia As A Freezing Agent. While The Ice Cream Is In The Freezer, Air Is Injected Into It. When The Mixture Leaves The Freezer, It Has The Consistency Of Soft-Serve Ice Cream.

- **ADDING FRUIT AND SWEETENED CHUNKS:-**

1. If Chunks Of Food Such As Strawberry Or Cookie Pieces Are To Be Added To The Ice Cream, The Frozen Mixture Is Pumped To A Fruit Feeder. The Chunks Are Loaded Into A Hopper At The Top Of The Feeder. Another, Smaller Hopper, Fitted With A Starwheel, Is Located On The Front Of The Feeder. An Auger On The Bottom Of The Machine Turns The Hoppers So That The Chunks Drop Onto The Starwheel In Pre-Measured Amounts. As The Mixture Passes Through The Feeder, The Starwheel Pushes The Food Chunks Into The Ice Cream. The Mixture Then Moves To A Blender Where The Chunks Are Evenly Distributed.

- **PACKAGING AND BUNDLING THE FINISHED PRODUCT:-**

Automatic Filling Machines Drop Preprinted Pint Or Half-Gallon-Sized Cardboard Cartons Into Holders. The Cartons Are Then Filled With Premeasured Amounts Of Ice Cream At The Rate Of 70-90 Cartons Per Hour. The Machine Then Places A Lid On Each Cartons And Pushes It Onto A Conveyer Belt. The Cartons Move Along The Conveyer Belt Where They Pass Under A Ink Jet That Spray-Paints An Expiration Date And Production Code Onto Each Carton. After The Imprinting, The Cartons Move Through The Bundler, A Heat Tunnel That Covers Each Cup With Plastic Shrink Wrapping.

- **HARDENING:-**

Before Storage And Shipping, The Ice Cream Must Be Hardened To A Temperature Of -10°F (-23°C). The Conveyer System Moves The Ice Cream Cartons To A Tunnel Set At -

30°F (-34°C). Constantly Turning Ceiling Fans Create A Wind Chill Of -60°F (-5 1°C). The Cartons Move Slowly Back And Forth Through The Tunnel For Two To Three Hours Until The Contents Are Rock Solid. The Cartons Are Then Stored In Refrigerated Warehouses Until They Are Shipped To Retail Outlets.

■ ***PROCESSING OF CHOCOLATE :-***

B. STEP 1: CLEANING:-

The Process Of Making Chocolate Starts With The Cocoa Beans Being Passed Through A Machine That Removes Dried Cocoa Pulp, Pieces Of Pod And Other Extraneous Material. The Beans Are Carefully Weighed And Blended According To Specifications. Finally, The Last Vestiges Of Wood, Jute Fibres, Sand, And Even The Finest Dust Are Extracted By Powerful Vacuum Equipment. The Separated Cocoa Bean Husks Are Passed On To The Chemical Industry Which Extracts Valuable Compounds.

C. STEP 2: ROASTING:-

To Bring Out The Characteristic Chocolate Aroma, The Beans Are Roasted In Large Rotary Cylinders. Depending Upon The Variety Of The Beans And The Desired End Result, The Roasting Lasts From 30 Minutes To Two Hours At Temperatures Of 250 Degrees Fahrenheit And Higher. As The Beans Turn Over And Over, Their Moisture Content Drops, Their Color Changes To A Rich Brown, And The Characteristic Aroma Of Chocolate Becomes Evident. Although All Steps Are Important, Proper Roasting Is One Of The Keys To Good Flavor.

D. STEP 3: SHELL REMOVAL:-

The Cocoa Beans Are Cooled Quickly And Their Thin Shells, Which Have Become Brittle By Roasting, Are Removed. A

Giant Winnowing Machine That Passes The Beans Between Serrated Cones So They Are Cracked Rather Than Crushed. In The Process, A Series Of Mechanical Sieves Separate The Broken Pieces Into Large And Small Grains While Fans Blow Away The Thin, Light Shell From The Meat Or "Nibs." Here's Where The First Secrets Of The Chocolate Manufacturer Comes In. The Nibs Are Blended, Combining As Many As 8-10 Varieties. It Is Control Of These Subtle Mixtures That Maintain Constant Quality And Brings Out The Flavor Of Each Particular Variety Of Chocolate.

E. STEP 4: NIBS ARE GROUND:-

The Nibs, Which Contain About 53 % Cocoa Butter, Pass Through Refining Mills And Are Ground Between Large Grinding Stones Or Heavy Steel Discs Creating A Cocoa Paste. The Paste Is Subjected To Hydraulic Pressure, And The Cocoa Butter Flowing Out Is A Pure And Valuable Fat With A Marked Aroma; After Filtering And Purifying It Looks Very Much Like Ordinary Butter.

The Cocoa Butter Has Important Functions. It Not Only Forms Part Of Every Recipe, But It Also Later Gives The Chocolate Its Fine Structure, Beautiful Lustre And Delicate, Attractive Glaze. The Heat Generated By Grinding Causes The Cocoa Butter Or Fat To Melt And Form A Fine Paste Or Liquid Known As Chocolate "Liquor". When The Liquid Is Poured Into Molds And Allowed To Solidify, The Resulting Cakes Are Unsweetened Or Bitter Chocolate.

Fun Fact: Liquid Chocolate Can Be Converted To Hundredweight Blocks For Storage

F. STEP 5: COCOA IS SEPARATED FROM COCOA BUTTER:-

Up To This Point, The Manufacturing Of Cocoa And Chocolate Is Identical. The By-Product Of Cocoa, Cocoa Butter, Is The

Essential Component Of Chocolate... About 25% Of The Weight Of Most Chocolate Bars. To Make Cocoa Powder Chocolate Liquor Is Pumped Into Hydraulic Presses Weighing Up To 25 Tons, And When The Pressure Is Applied, 80% Cocoa Butter Is Removed. The Fat Drains Away Through Metallic Screens As A Yellow Liquid, And Then Is Collected For Use In Chocolate Manufacturing. Cocoa Butter, Unique Among Vegetable Fats, Is A Solid At Normal Room Temperature And Melts At 89 To 93 Degrees Fahrenheit... Just Below Body Temperature. With Proper Storage Conditions, Cocoa Butter Can Be Kept For Years Without Spoiling.

The "Cake" Which Is Left May Eventually Be Made Into Cocoa Powder By Being Further Crushed, Milled And Finely Sifted. Three Or Five Vertically Mounted Steel Rollers Rotate In Opposite Directions. Under Heavy Pressure, They Pulverize The Tiny Particles Of Cocoa And Sugar Down To A Size Of Approx. 30 Microns. (One Micron Is A Thousandth Part Of A Milli Meter!)

Most Manufacturers Add Non-Fat Milk, Flavors, Sugar And Other Ingredients. The Resulting Product Will Contain Between 10 And 22% Cocoa Butter. In The "Dutch" Process, Cocoa Is Treated With An Alkali And Develops A Slightly Milder Flavor, And Has A Darker Appearance. The Alkali Acts As A Processing Agent Rather Than As A Flavor Ingredient.

Fun Fact: Formulas For Blending Beans, Conching Techniques And Time Intervals, Temperatures And Proportions Of Ingredients Are Secrets

G. STEP 6: OTHER INGREDIENTS ARE ADDED TO THE CHOCOLATE LIQUOR:-

Milk Chocolate Is Made By Adding Milk, Sugar, Cocoa Butter And Other Ingredients To The Bitter Chocolate Liquor. At This Point, Chocolate Is Prepared In According To Individual Recipes. The Blending Of The Various Types Of Cocoa Pastes

And Other Ingredients Determine The Ultimate Taste. The Ingredients Go Into A Mixer With Rotating, Kneading Arms Until The Result Is A Homogeneous, Paste-Like Mixture With A Pleasant Taste, But It Still Feels Gritty To The Palate.

H. STEP 7: CONCHING MACHINES

KNEAD THE CHOCOLATE PASTE:-

This Process Develops Flavors And Changes The Texture During Controlled Temperatures. It's The Last And Most Important Refining Process, Which Allows The Separate Flavors Of The Individual Ingredients To Combine. Conches [The Paddles Of The Early Machines Resembled Conch Shells] Are Equipped With Heavy Rollers That Plow Back And Forth Through The Chocolate Paste, Anywhere From A Few Hours To Several Days. Contemporary Technologies Can Grind The Chocolate Particles Extremely Fine, Which Can Reduce Conching Times. Swiss And Belgian Chocolates, Are Conched As Much As 96 Hours. Some Chocolates Are Not Conched At All, Or For Only 4 To 12 Hours.

Under Regulated Speeds And Temperatures, These Rollers Can Produce Different Degrees Of Agitation And Aeration To Create Distinct Chocolate Flavors. The Process Can Eliminate Any Remaining Bitterness By Aerating The Chocolate And Expelling Volatile Acids. Additional Cocoa Butter And Lecithin Are Added Which Help To Achieve The Characteristic Velvet Smoothness. And As The Ultimate Homogeneity Of The Ingredients Is Developed, A Soft Film Of Cocoa Butter Begins To Form Around Each Of The Extremely Small Particles. The Chocolate No Longer Seems Sandy, But Dissolves Meltingly On The Tongue. It Has Attained The Outstanding Purity Which Gives It Its Reputation. The Last Stage Of Conching Swiss Or Belgian Chocolate Is A Magnificent Sight... Huge Paddles Rolling Slowly Through Great Vats Of Chocolate, Smooth And Creamy And Thick.

I. STEP 8: CHOCOLATE IS TEMPERED BY HEATING, COOLING & REHEATING:-

This Thickens The Chocolate And Imparts The Right Flow Properties For Filling The Moulds. This Complex Operation Is Performed In The Tempering Plant And Is Necessary To Give The Final Chocolate Product A Delicate Composition, A Uniform Structure And A Well-Rounded Flavor. The Storage Life Is Also Increased In This Way.

The Still Warm Conched Chocolate Is Placed In A Tempering Machine So That It Can Be Slowly And Steadily Cooled. Cooling Chocolate At A Fixed Rate Keeps The Flavor From Being Compromised, And Prevents Separation When The Chocolate Is Poured Into Bar Molds .Proper Tempering Also Results In A Silky Sheen And Crisp "Snap" When Broken... Another Sign Of A Superior Quality Chocolate Bar. The Tempered Chocolate Is PoredIntoMolds Of Many Sizes, From Individual Sized Bars To A Ten Pound Blocks Used By Confectionery Manufacturers.

J. STEP 9: LIQUID CHOCOLATE IS TEMPORARY STORED:-

A Necessary Step, Conches Are Always Filled With The Largest Amounts Of Chocolate For Efficiency, The Molding Machines Can Only Accept Small Amounts Of Chocolate Paste At One Time, In Order To Shape It Into Bars, Chocolates And Other Products. Chocolate Is Frequently Shipped In A Liquid State To Other Food Manufacturers, Or It Can Be Stored For Short Periods Of Time. For Longer Periods, It Is Solidified, Usually In The Form Of Hundredweight Blocks. These Blocks Must Be Reheated Before Further Processing So That They Liquefy Again.

Automation Has Moved In On The Chocolate

Industry. Computers Are Carefully Programmed To Control And Coordinate The Entire Chocolate Making Process. Every Single Stage Of Production Can Be Checked Electronically.

▪ **PRESERVATION OR STORAGE OF CHOCOLATE :-**

Chocolate Is Very Sensitive To Temperature And Humidity. Ideal Storage Temperatures Are Between 15 And 17 °C (59 And 63 °F), With A Relative Humidity Of Less Than 50%. If Refrigerated Or Frozen Without Containment, Chocolate Can Absorb Enough Moisture To Cause A Whitish Discoloration, The Result Of Fat Or Sugar Crystals Rising To The Surface. Various Types Of "Blooming" Effects Can Occur If Chocolate Is Stored Or Served Improperly.

Chocolate Bloom Is Caused By Storage Temperature Fluctuating Or Exceeding 24 °C (75 °F), While Sugar Bloom Is Caused By Temperature Below 15 °C (59 °F) Or Excess Humidity. To Distinguish Between Different Types Of Bloom, One Can Rub The Surface Of The Chocolate Lightly, And If The Bloom Disappears, It Is Fat Bloom. Moving Chocolate Between Temperature Extremes, Can Result In An Oily Texture. Although Visually Unappealing, Chocolate Suffering From Bloom Is Safe For Consumption And Taste Unaffected. Bloom Can Be Reversed By Re Tempering The Chocolate Or Using It For Any Use That Requires Melting The Chocolate.

Chocolate Is Generally Stored Away From Other Foods, As It Can Absorb Different Aromas. Ideally, Chocolates Are Packed Or Wrapped, And Placed In Proper Storage With The Correct Humidity And Temperature. Additionally, Chocolate Is Frequently Stored In A Dark Place Or Protected From Light By Wrapping Paper. The Glossy Shine, Snap, Aroma, Texture, And Taste Of The Chocolate Can Show The Quality And If It Was Stored Well.

▪ **ADDITIVES AND PRESERVATIVES USED
IN ICE-CREAM MANUFACTURE FOR
PRESERVATION :-**

As Ice Creams Move Down The Scale From Premium, Getting Lower In Fat And Incorporating More Air, Ingredients Are Added To Make Up For The Loss Of Creamy Texture, Rich “Mouth Feel”, And To Help Keep All Of The Extra Air Whipped Up.

Some Ice Creams Contain Sodium Citrate To Decrease The Tendency Of Fat Globules To Coalesce, And To Decrease Protein Aggregation. This Results In A “Wetter” Ice Cream. The Citrates And Phosphates Are Both Used For This Effect. Calcium And Magnesium Salts Have The Opposite Effect, Making A “Dryer” Ice Cream

Guidelines For The Storage Of Ingredients And Supplies Of Ice Creams.

● **WHIPPED ICE-CREAM MIX:-**

Sterilized Liquid Mix (Commonly Referred To As UHT Mix) . Stable At Room Temperature (When Unopened) .Store In A Clean, Dry Place . Keep Out Of Direct Sunlight And Once Opened, Keep Refrigerated ($\leq 5^{\circ}\text{C}$)

Pasteurized Liquid Mix (Commonly Referred To As Fresh Mix) Keep Refrigerated ($\leq 5^{\circ}\text{C}$) At All Times

Do Not Freeze Prior To Use Powdered Mix Stable At Room Temperature . Once Mixed With Drinking Water, Store Under Refrigerated Conditions ($\leq 5^{\circ}\text{C}$)

- **SCOOP ICE-CREAM:-**

Deep Freezers Should Operate At A Temperature Which Maintains The Ice-Cream At -18°C Except For Deep Freezers Used To Serve Ice-Cream. These Deep Freezers Should Maintain The Ice-Cream At -12°C And It Is Recommended That This Storage Is For Not More Than One Week

- **DRY INGREDIENTS:-**

Stable At Room Temperature. Store In A Clean, Dry Place .Prevent Contamination From Foreign Objects, Dust, Water, Pests Etc.

** The Storage Instructions, I.E. The Storage Conditions And Storage Period, Specified By The Manufacture Time Should Be Followed At All Times.*

FOOD SANITATION AND HYGIENE FOR ICE CREAM:-

1. PERSONAL HYGIENE:-Personal Hygiene Is Important In Preventing The Spread Of Bacteria.

- Good Hygiene Practices For Ice Cream Food Handlers

- *Be Clean And Tidy.*

- *Clean Protective Clothing, E.G. Apron Or Overall Should Be Worn Where Appropriate.*

This Is Particularly Advisable In Businesses Serving Large Quantities Of Ice-Cream,

E.G. Ice-Cream Parlours.

Please note that:

- *Protective clothing should not be worn outside the food handling area*

- *Personal garments should not be worn over the protective clothing*

- *Keep hair clean and neat and where appropriate, wear hats/hair nets which effectively contain the hair.*

- *Keep finger nails short and clean.*

- *Cover cuts, sores or grazes with a coloured waterproof dressing.*

- *Do not smoke, consume food, chew gum, lick your fingers, cough or sneeze where ice-cream is being prepared or served.*
- *Do not serve ice-cream if you are suffering from diarrhoea , vomiting, jaundice, fever.*

2. Good Hygiene Practices:- *Good hygiene practices start with the correct positioning of the ice-cream machine and the ice-cream cabinet.*

These should be sited indoors away from direct sunlight, heat and draughts, e.g. away from open doors, windows or air conditioning outlets .Good hygiene practices are required by the food handler from the time of intake of the ingredients/supplies to the time of serving..

3. Cleaning :-

Cleaning is very important as it removes the dirt and food particles which allow bacteria to grow. Cleaning should be carried out using a designated bucket or a designated sink (cleaning should not be carried out in

the wash-hand basin). The following tables (5-9) deal with general cleaning, cleaning of ice-cream machines and cleaning of utensils used during the serving of scoop ice-cream.

III. 4 STEPS TO MAINTAIN GOOD HYGIENE IN A CHOCOLATE FACTORY:-

Hygiene is a very important aspect to maintain in a chocolate factory in the Middle East. The reason goes beyond getting certified and building a good reputation. It is a matter of protecting people's health through a clean, hygienic environment. Here are some ways to maintain a good hygiene in your chocolate factory:

- ***PROVIDE CONSTANT MAINTENANCE OF FOOD EQUIPMENT AND INFRASTRUCTURES:-***

All the equipment used in your chocolate production must be regularly audited and any sign of deterioration must be directly fixed. Accordingly, if the broken part can be repaired without being taken away from the production zone, a delicate work and a placement of an isolation screen are required

- ***ARRANGE A SAFE WORKING ENVIRONMENT AWAY FROM CONTAMINATIONS.***

The reputation of the factory (and the brand) will be damaged if one little thing gets developed into an undesirable way. Therefore, all tools that might get in touch with any ingredient must be sanitized.

- **KEEP INSECTS AWAY WITH CONSTANT USE OF PEST CONTROL PRODUCTS.**

Food factories, especially chocolate ones, attract insects through the odors. These places are seen as a fine habitat for bugs to have water, food and shelter. For this reason, inspectors should permanently visit your factory to determine the danger and remove it.

- ***IMPOSE HYGIENE POLICY ON ALL YOUR EMPLOYEES AND VISITORS:-***

The chocolate production areas must be free of contaminations. For this reason, clear rules must be set for anyone willing to enter this zone. Staffs working close with chocolate are bound to take more serious precautions. Every step they make must be safe.

CONCLUSION:-

For this survey we can achieve a knowledge about amul . The processing, packaging , labelling , storage and distribution of amul dairy products that we can know.

from the survey it was found that the awareness level among customers is high but the market share is comparatively low. The customer is buying of amul milk because of its brand name and it's taste.

