MILK PROCESSING UNIT

PROMOTER

.....

.....

AT

Plot No..... Khata No.....

Mauza..... Tehsil.....

Block..... District.....

INTRODUCTION

Domestication of cattle occurred 6000 and 10,000 years ago. This is the period when cattle were domesticated and milk was recognized as a staple food and an indicator of wealth. This sector was accorded a status of industry as early as 1850. Milk and milk products like butter, cheese, yoghurt etc moved from farming community use to mass production in an industrial set up. The factory system coupled with improved machinery, transport and storage made this a viable industry. Scientific studies, research and development in this field have also contributed to the tremendous growth of this industry. Improvement in the livestock by good breeding practices has also contributed to the industry's present situation.

India is the world's largest producer and consumer of milk since 1998. In India, the co-operatives and private dairies have access to only 20% of the milk produced. Approximately, 34% of the milk is sold in the unorganized market while 46% is consumed locally. This is in comparison to most of the developed nations where almost 90% of the surplus milk is passes through the organized sector. The milk production has registered a growth rate of 6.28% during 2014-16, which is about 3 times more than the world average growth of 2.2%.Milk production has become a major economic activity amongst rural households and farmers are adopting dairying along with agriculture for augmenting their incomes. About 70 million rural households are engaged in milk production. The small and marginal farmers & landless labourer produce about one to three litres of milk per day and are responsible for production of most of the milk for the country. About 78 percent farmers in India are small and marginal, who own about 75 percent of female bovine but own only 40 percent farm land. Milk contributes to one third of gross income of rural households and in case of landless its contribution is half in their gross income. Milk production in India has increased from 22 million tonne in 1970 to 156 million tonne in 2015-16, which shows a growth of 700 percent during last 46 years. National Bovine Breeding and Dairy Development Programme (NPBBDD) was started in 2014-15 to prepare a comprehensive and scientific programme to meet the increasing demand for milk.

Utilizing the benefits of an integrated sales and distribution system and employing diversified sourcing is the way forward in the sector. The value added dairy industry segment is expected to attract investments and entry of new players in the coming years. Players are emphasizing on offering the consumer better quality differentiated products. Urban as well as Rural consumers are looking for more healthy dairy options in the form of processed milk & milk products. According to National Dairy Development Board (NDDB), demand for milk & milk products is expected to increase at a compound annual growth rate of 5% from 138 MMT in 2014 to 200 MMT in 2022.The move towards value added dairy products offer higher margins than liquid milk for Indian Dairy Industry. According to a report by CARE ratings, the share of value added products in the milk & milk derivatives segment in India is growing at around 25% every year and is expected to grow at the same rate till 2019-2020.Almost 75-80% of the Indian Dairy market is still unorganised and even in the organised sector, large part of the market is occupied by liquid milk. However, there is a clear shift from unorganized to organized industry and also a shift from liquid milk to value added milk products.

The Indian Dairy market is bifurcated as unorganised and organised. In the unorganised dairy market, the milk is sold by means such as milkmen and vendors. These milkmen collect raw milk directly from the farmers and sell in the market. In the organised sector, on the other hand, cooperatives and private dairies set up efficient channel of milk

procurement and distribution. In this manner, raw milk is collected from the farmers, after which it is processed, packed and distributed to various channels. The Indian dairy market was dominated by the unorganised sector, however, due to changing socio-economic patterns the focus is shifting towards developing the organised sector.

The Economic Survey 2015-16 emphasizes that the Indian agricultural system is predominantly a mixed crop-livestock farming system, with the livestock segment supplementing farm incomes by providing employment, draught animals and manure. India ranks first in milk production, accounting for 18.5 % of world production, achieving an annual output of 146.3 million tones during 2014-15 as compared to 137.69 million tonnes during 2013-14 recording a growth of 6.26 %. Whereas, the Food and Agriculture Organization (FAO) has reported a 3.1 % increase in world milk production from 765 million tones in 2013 to 789 million tones in 2014.The per capita availability of milk in India has increased from 176 grams per day in 1990-91 to 322 grams per day by 2014-15. It is more than the world average of 294 grams per day during 2013. This represents a sustained growth in availability of milk and milk products for the growing population Dairying has become an important secondary source of income for millions of rural households engaged in agriculture. The success of the dairy industry has resulted from the integrated co-operative system of milk collection, transportation, processing and distribution, conversion of the same to milk powder and products, to minimize seasonal impact on suppliers and buyers, retail distribution of milk and milk products, sharing of profits with the farmer, which are ploughed back to enhance productivity and needs to be emulated by other farm produce/producers.

The latest report by IMARC Group titled *Dairy Industry in India 2018 Edition: Market Size, Growth, Prices, Segments, Cooperatives, Private Dairies, Procurement and Distribution* finds that the Indian dairy market reached value of nearly INR 7,916 Billion in 2017, growing at a CAGR of 13% during 2010-2017. Some of the major factors driving the growth of the Indian dairy market are rising working-population, increasing disposable incomes and health consciousness among the consumers. Additionally, the government is also taking active participation in advancing and promoting dairy farming practices to promote the production and quality of milk. The government organisations such as National Bank for Agriculture and Rural Development (NABARD) offer small scale farmers several subsidies and loans at low interest rates which assist them to set up modern processing plants, upgrade technology, breed good-quality milch animals, etc.

Along with offering profitable business opportunities, the dairy industry in India serves as a tool of socio-economic development. Keeping this in view, the Government of India has introduced various schemes and initiatives aimed at the development of the dairy sector in the country. For instance, the “National Dairy Programme (Phase-I)” aims to improve cattle productivity and increase the production of milk expanding and strengthening and expanding the rural milk procurement infrastructure and provide greater market access to the farmers. On the other hand, the private participation in the Indian dairy sector has also increased over the past few years. Both national and international players are entering the dairy industry, attracted by the size and potential of the Indian market. The focus is being given to value-added products such as cheese, yogurt, probiotic drinks, etc. They are also introducing innovative products keeping in mind the specific requirements of the Indian consumers. These players are also improving their milk procurement network which is further facilitating the development of the dairy industry in India. Looking forward, the market is expected to reach a value of INR 18,599 Billion by 2023, exhibiting a CAGR of around 15% during 2018-2023.

Due to persistent and novel initiatives undertaken by the State government in the Animal Resources Sector, the milk production in Odisha has increased from 45 lakh litres per day in 2009-10 to 56 lakh litres per day in 2017-18, but the total processing in Co-operative & private dairy sector is about 13 lakh liters per day. Odisha has not been in the high bovine population states, however the initiatives of the Government is towards promoting this sector aggressively.

LOCATION

The project is proposed to be established over Plot No.....,Khata No.....,Mauza.....Tehsil.....Block.....District..... The proposed site is well connected with all weather-road and has required infrastructural facilities also. The necessary amenities such as electricity, road network, drainage, water connection etc. is also available.

The location has major milk pockets within a radius of ..... kilometres. Also being in the close proximity of the cities & towns, the site will be most suitable for the project's short and long term objectives.

PROMOTER

The unit is promoted by Sri/Smt.....Address..... ; an eminent business personality in the field of Animal Resources Sector with ample experience in successful establishment and management of Animal Resources Business Units like.....He / She has got experience in marketing of milk & milk products in retail and institutional sectors.

MARKETING:

There is a good demand supply gap for quality milk & milk products; not only in cities like....., but also in the entire state of Odisha. The proposed capacity of the plant is only 10000 litres / day. The target audience would be retail & bulk consumers like hotels, restaurants, hospitals and industrial / office canteens. The marketing strategy would be through wide spread distributor network who in turn would cater to the need of end users. Another channel would be through DSD (Direct Store Delivery) in organised retail stores for further supply to the consumers.

Our survey of surrounding markets has revealed that there is a great demand for can milk by the caterers who organise social functions in a large scale.

COMPETITION:

The major competition in milk sourcing as well as marketing is expected from State run milk federation OMFED & private sector dairies like Pragati milk, Milk mantra etc. The advantage that OMFED has in the market, is that its brand name has been established over past 30 years. OMFED has well established milk routes throughout the State along with distribution channels. Being a State run federation it has strategic outlets in urban and sub-urban areas around the state.

Our USP would be the value for money proposition for the farmers as well as the consumers in order to have a consistent supply chain management. Entire value chain to be taken care of & QA SOP to be followed meticulously in each step starting with the milk producing animals to the end users.

LICENCES & APPROVALS

Required licences & approvals for the project to be in place.

INFRASTRUCTURE

All weather black top road, water supply with OHT, Electrical supply, internal roads, drainage etc. to be in place.

POLLUTION & EMISSION STANDARDS

The process adopted by this project is near waste-less. However, since a large quantity of water will be used for cleaning, disinfection and sanitization, proper waste water handling measures will be adopted including recycling of waste water for sanitization purpose.

No significant emission is caused in the process. However fuel efficient boiler is proposed for the purpose of heating. All electrical motors will comply to ISI standards and with lowest power consumption ratings.

EFFLUENT TREATMENT

ETP (Effluent Treatment Plant) of required capacity to be operational before the commencement of production.

PLANT AND MACHINERY

The activities involved in the processing of milk & milk products require various types of equipments, instruments & machineries etc. Brief account of the activities in a typical dairy plant is mentioned below:

- Raw milk reception section
- Raw & finished product testing section
- Raw milk chilling & storage section
- Liquid milk processing section
- Liquid milk packing section
- Pouch milk storage section
- Value added products making section
- Value added products storage section
- Utilities section i.e. electrical, water supply, CIP, ETP, Boiler, IBT, Cold Storage, DG set, RMT, IMCU etc.

CHEMICAL TEST PROCEDURE FOR QUALITY ASSURANCE IN DAIRY PRODUCTS

Listed here are the conventional chemical test procedures that are carried out on dairy products to assure quality of the products.

1. Chemical test procedures for determining the C.I.P detergent strength

The purpose of this method is to ensure accurate determination of concentration of detergents used for Cleaning In Place (C.I.P). This work instruction covers the procedure for determination of strength of lye (NaOH) and Nitric acid (NHO_3).

Necessary Apparatus and Reagents

- 50 ml burette
- 10 ml pipette
- Beaker acidity cup
- Phenolphthalein indicator
- N/9 sodium hydroxide
- 1N HCl solution.

Preparation Instructions

- Calculate the acid concentration by multiplying the titer value by the factor 0.233
- To determine the acid strength, titrate the acid sample against 0.1 N NaOH solution until the colour changes from clear to purple
- Calculate the % concentration by multiplying the titre by the factor 0.133
- Record the titer value obtained
- Add 2-3 drops of phenolphthalein indicator and titrate against 0.1 N Hcl solution until the pink colour disappears.
- Draw 3 ml of lye solution using the 10 ml pipette and transfer into a beaker cup
- Fill the 50 ml burette with 0.1N Hcl solution and adjusted to the 0.0ml mark
- To determine lye concentration, titrate the lye sample against 0.1N Hcl

2. Chemical test procedures for determining density of milk

The purpose of this method is to ensure uniform practice in determination of density of both raw and pasteurized milk.

Apparatus/Equipment

- Lactometer jar
- Milk lactometer (with a valid KEBS Calibration certificate).
- Thermometer range 10 -110^{0}C (calibrated)

Preparation Instructions

- Raise the temperature of the milk sample to 40^0 C; keep the sample at 40^{0}C for 5 minutes. During this time, mix the sample by rotating and inverting. Cool to 20^{0}C, mix again.
- Fill the lactometer jar with sample milk and gently insert the lactometer into the milk.
- Wait for at least 2 minutes (until the setup settles) and do not disturb the apparatus.
- Read the density at the level of meniscus formed between the milk and the lactometer stem. At the same time record the milk temperature.

- If the time of taking the reading the temperature was not equal to the calibration temperature, correct the reading by adding the value specified in the table below, which corresponds to hydrometers calibrated at a temperature of 20^0

READING TEMPERATURE IN ^{0}C	CORRECTION FACTOR
22.0	+ 0.0014
21.5	+ 0.0013
21.0	+ 0.0012
20.5	+ 0.0011
20.0	0
19.5	– 0.0009
19.0	– 0.0008
18.5	– 0.0007
18.0	– 0.0006

- Remove the lactometer gently and drain off the milk into a sample bottle.
- Carry out butter fat test on milk.
- Calculation of Total Solids (T.S)
  T.S = {(Corrected Lactometer Reading)/4} + (1.22 x B. Fat) + 0.14
  S.N.F = T.S. – B.F
  T.S. = CLR – 1 (1000 ÷ 4) + (1.2 x B.F) + 0.14
  S.N.F. = T.S. – B.F (Richmond formula for finding S.N.F)
  Normal milk has a density range of 1.027 to 1.033. Anything out of the range most likely indicates #adulteration

3. Resazurin Test

Resazurin test is conducted to ensure milk (pasteurized and raw) has the microbial load within specifications.

Required Equipment and Reagents

- Water bath at 37^0c ±0.5^0c
- Sterile test tubes.
- Sterilized rubber stoppers
- Resazurin solution -0.005% made after every 8 hrs.
- Sterile 1ml pipettes
- Comparator with standard resazurin disc

Preparation Instructions

- Prepare the water bath and set the temperature at 37^0
- Pour out 10mls of milk sample into the sterile test tube (most of them come already calibrated to the 10ml mark)
- Add 1ml of resazurin solution into the contents of the test tube.

- Stopper the test tube with clean, sterilized to avoid any possible contamination.
- Mix the sample gently until the dye is uniformly distributed
- Place the test tube in the water bath at 37^0c and read after 10 min, 30 minutes then 1st, 2ndand 3rd

Acceptable Standards

Only resazurin 5 and 6 after 10 min is acceptable for raw milk, for pasteurized milk only the milk that finishes 3 hrs with the resazurin 6 is acceptable.

Resazurin test is a quick indication of the bacterial load in the milk #milkcontamination

4. Chemical test procedures for determining the acid content in dairy products

Acidity test is carried out to determine the amount of lactic acid in raw and pasteurized milks, fermented milks, and cream.

Equipments and reagents

- 50 ml burette (with 0.1ml calibrations)
- N9 NaOH
- Beaker
- 10 ml pipette
- Phenolphthalein indicator – 2.5%

Instructions

- Fill the burette to the mark. Remove with tissue any NaOH at the tip of the burette.
- Using a blowout pipette take 10 ml of the milk sample and transfer into the beaker
- Add 2-3 drops of phenolphthalein indicator into the sample
- Mix the indicator into the sample gently
- Titrate the sample quickly and continuously until the first permanent faint pink colour appears and persist for at least 1 sec.
- Read off the volume of sodium hydroxide used and divide by 10 to get the percentage acidity, which is expressed as percentage lactic acid.

  N/B: Natural acidity in fresh milk is due to presence of phosphates, calcium, and carbon dioxide. Developed acidity is a result of microbial activity.

  Natural acidity in fresh milk is due to presence of #phosphates, #calcium, and carbon dioxide

5. Chemical test procedures for determining sediment content

Sediment test is conducted to check the amount of solid dirt in raw and pasteurized milk

Equipments and Reagents

- sediment tester
- thermometer (range 10 -110^0C)
- sediment test discs
- distilled water
- standard sediment grading chart

Preparation Instructions

- Take a ½ litre of milk sample and adjust the temperature to 40^0c and then cool to 20^0c
- Clean the sediment tester thoroughly with filtered water
- Place a clean filter pad, with the name of the supplier into position.
- Put the ½ litre milk sample into the tester and let all the milk pass through the sediment disc/ pad.
- Remove the filter pad and place it on a clean surface (parchment paper) to dry in a dust free environment for at least 10 minutes.
- Grade the milk using the standard grading card

6. Hydrogen Peroxide Test

Conducted to check presence of hydrogen peroxide in Milk

Equipment/Apparatus

Hydrogen Peroxide Test Strips/ Sticks

Preparation Procedure

Dip the mashed part of the strip in a sample of milk

Observations/Results

Colour change to blue indicates presence of hydrogen peroxide. If colour does not change then hydrogen peroxide is not present in the milk sample

7. Clot on Boiling (CoB) Test

This test is conducted to check the stability of milk proteins, whether it can withstand heat treatment

Equipment/Apparatus

- A pair of tongs
- A suitable aluminum or stainless container
- Bunsen Burner

Test Procedure

- Put a sample of milk in an aluminum container
- Heat the milk sample over the flame of the Bunsen burner

Results/Observations

- If the milk clots, it is COB positive (cannot withstand heat treatment).
- If it does not clot, then it is said to be COB negative

8. Butterfat Content Testing (Gerber Method)

Gerber butterfat test is conducted on milk to determine the amount of butterfat it contains

Apparatus/Equipment and Reagents

- Butyrometer (Dr. N. Gerber 0 – 8%)
- 10.94 ml bulb pipette
- Self-heating centrifuge at 65^0C (1100 – 1200rpm)
- Automatic dispensers for 1ml – amyl alcohol
- Automatic dispensers for 10ml – sulphuric acid

- Sulphuric Acid (1.815 – 1.820 g/ml at 20^0C) – Corrosive!
- Amyl Alcohol (0.810 – 0.815 g/ml at 20^0C)

Preparation Procedure

- Dispense 10 ml of sulphuric acid via an automatic dispenser in to the butyrometer. (Avoid wetting the neck of the butyrometer)
- Pipette 10.94 ml of well mixed milk sample at room temperature and put it into the butyrometer gently along the side of the butyrometer so as to avoid mixing the milk with acid (Avoid wetting the neck of the butyrometer)
- Add 1 ml of Amyl Alcohol. (Avoid wetting the neck of the butyrometer)
- Cork the butyrometer, shake and keep inverting the butyrometer until a deep chocolate color is observed.
- Put the butyrometer in the centrifuge at 65^0C and spin for 5 min
- Read the results and record.

9. Chemical test procedures for determining butter moisture content

This test is used to determine the moisture content in butter by evaporation method

Apparatus/Equipment

- A pair of tongs
- Kohman cup
- Bunsen burner
- Weighing balance
- Spatula

Preparation Procedure

- Weigh the Kohman cup and record the weight – A
- Weigh 10 g of butter (from the centre of the sample) in to the Kohman cup – B
- Heat the sample on a burner swirling to avoid charring until all the moisture escapes. When the bubbling stops and colour changes to golden brown, stop heating – C
- Allow the cup to cool to the original temp
- After cooling the sample is reweighed – D
- The difference in weight is the moisture content

  For instance; say, Weight of Kohman cup – A = 40g

  Weight of sample = 10g

  Weight of cup + butter sample – B = 50g

  Weight of cup + sample after heating and cooling –D = 48.4g

  Moisture content = B – D ÷ 10 x 100

  = 50 – 48.4 ÷ 10 x 100

  = [1.6 x 100]/10

  Moisture content = 16%

10. Peroxidase Test

This test is conducted to verify the effectiveness of high temperature (>80^0 c) pasteurization of cream and milk used to make fermented milk products.

Apparatus/Equipment and Reagents

- Red and blue litmus paper,
- Test tubes (medium size),
- Stop watch,
- Water bath at 80^0C
- 1n Hcl in pipette or dropping bottle,
- 1% NaOH in pipette or dropping bottle,
- 2% H_2O_2 in pipette or dropping bottle,
- 2% paraphenylenediamine in pipette or dropping bottle.
- Keep reagents in cold storage

Preparation Procedure

0.2% H_2O_2 for Storch's test: Dilute 7 ml of 3% hydrogen peroxide solution (Ph.Nord III, 1963,p.302) with 98 ml of distilled water. Stabilize with 0.1 ml concentrated sulphuric acid. Store in amber bottle. Will keep several months if stored in a cool place.

2% Paraphenylenediamine: Dissolve 2g paraphenylenediamine (for analysis) in 100 ml of cold distilled water by shaking filter. Store in amber bottle. Will keep one week. A precipitate will occur in course of one to two days, which should be filtered off.

The principle involved here:

Raw milk contains an enzyme, milk peroxidase, which can accelerate the oxidation process of the hydrogen peroxide. The peroxidase enzyme is destroyed by heating. At 80^0c the enzyme will become inactive in $2^1/_2$ seconds. At higher temperatures the inactivation will take shorter time, at lower temperatures it will take longer.

Test procedure

Whole milk. Approximately 5 ml of milk is tested with litmus paper in a test tube. If the reaction of the milk is not about neutral, pH is adjusted with 0.1N Hcl or 1%NaOH. Add one drop of 0.2% H_2O_2 and 2 drops of paraphenylenediamine. Shake, check the time it takes for the blue colour to appear using a stopwatch.

Testing Cream. The procedure remains the same as for whole milk.

Interpretation

1. 1 second = Instantaneous intense blue colour which turns dark blue in 30 seconds indicates 100% raw milk or inadequately pasteurized milk to which more than 20% of raw milk has been added, or milk which has only been heated to approximately 73 – 74^0c in the pasteurizer for $2^1/_2$ seconds.
2. 2.5 – 10 seconds = Lighter blue colour appearing in the course of 5 – 10 seconds, assuming a dark blue colour in 30 seconds, but lighter than described under 1, indicates inadequately pasteurized milk to which 4 – 20% of raw milk has been added or milk which has only been heated to 74^0c – 75^0c in the pasteurizer for $2^1/_2$
3. 15 – 20 seconds = Faint grayish colour appearing in 15 – 20 seconds, assuming a faint grey-blue tint in 30 seconds, lighter than described under 2, indicates adequately

pasteurized milk/ cream to which 2 – 3% raw milk/ cream has been added, or milk/ cream which has only been heated to 75 – 77^{0}c in the pasteurizer for 2$^1/_2$ seconds.

4. 20 – 25 seconds = Slight greyish tint appearing in 20 – 25 seconds, assuming a light grey colour in 30 seconds, indicates adequately pasteurized milk to which 1 – 2% raw milk/ cream has been added or milk/ cream which has been heated to 77^0 – 78^{0}c in the pasteurizer for 2$^1/_2$ seconds.

5. No colour developing within 30 seconds indicates properly pasteurized milk/ cream (addition of less than 0.5% raw milk/cream cannot be demonstrated with Storch's test).

Any colouring after 30 seconds is of no significance. Adequately pasteurized milk/ cream will always colour after prolonged standing owing to spontaneous oxidation of the paraphenylenediamine.

#Peroxidase test is an effective method of determining the effectiveness of #pasteurization

11. Viscosity Test Procedure

Conducted on milk and milk products to check consistency/viscosity

Required Apparatus

A rheometer would be ideal. In its absence, however, use the following:

- Viscometer stand
- Viscometer
- Timing device (stop watch)
- Sample (100ml)
- Apertures (3mm and 5.5mm)
- Beaker

Test Procedure

- Clamp the viscometer to the stand at a fixed height.
- Select the aperture that is appropriate for the sample to be tested and screw it to the viscometer.
- Adjust, as necessary, the temperature of the sample. (20^{0}c – 25^{0}c)
- Place a beaker beneath the viscometer.
- Hold the aperture with the index finger.
- Fill sample into the viscometer cup.
- Remove the finger allowing the sample to flow, simultaneously switch on the stop watch.
- Record the time taken for the sample to cross the bottom mark.
- For improved assurance and precision, perform three tests, record the results from all three, and use the average as a best estimate of actual viscosity.
- Clean the viscometer immediately after each use.

12. Brix Determination

Measures the refractive index of milk and milk products

Requirements

- Plastic pipette
- Refractometer
- Soft tissue
- Sample (0.1ml)
- Distilled water

Procedure

- Press the ON/ OFF key.
- Using a plastic pipette, fill the sample well with distilled water.
- Press the ZERO key.
- Gently absorb the water with a soft tissue.
- Using a plastic pipette, drip sample (0.1ml) onto the prism surface.
- Press the READ key. Measurement is displayed in units of percentage BRIX.
- Remove sample from the sample well by absorbing on a soft tissue.
- Using a plastic pipette, rinse prism and sample well with distilled water. Wipe dry.

13. Homo-Efficiency (H.E) chemical test procedures

To determine the measure of creaming of fresh milk after pasteurization

Equipment/Apparatus

1. Refrigerator
2. Measuring cylinder (200 – 250ml)
3. Apparatus for butter fat determination
4. Suitable pipette

Test Procedure

1. Place 200 – 250mls of pasteurized milk in measuring cylinder for a minimum of 12 hours in a refrigerator.
2. Without disturbing the sample, draw 10% milk from the top of the cylinder.
3. Mix thoroughly and determine the butter fat content of the above sample and call it, A.
4. Mix thoroughly the remaining milk sample and determine its butterfat content, B.

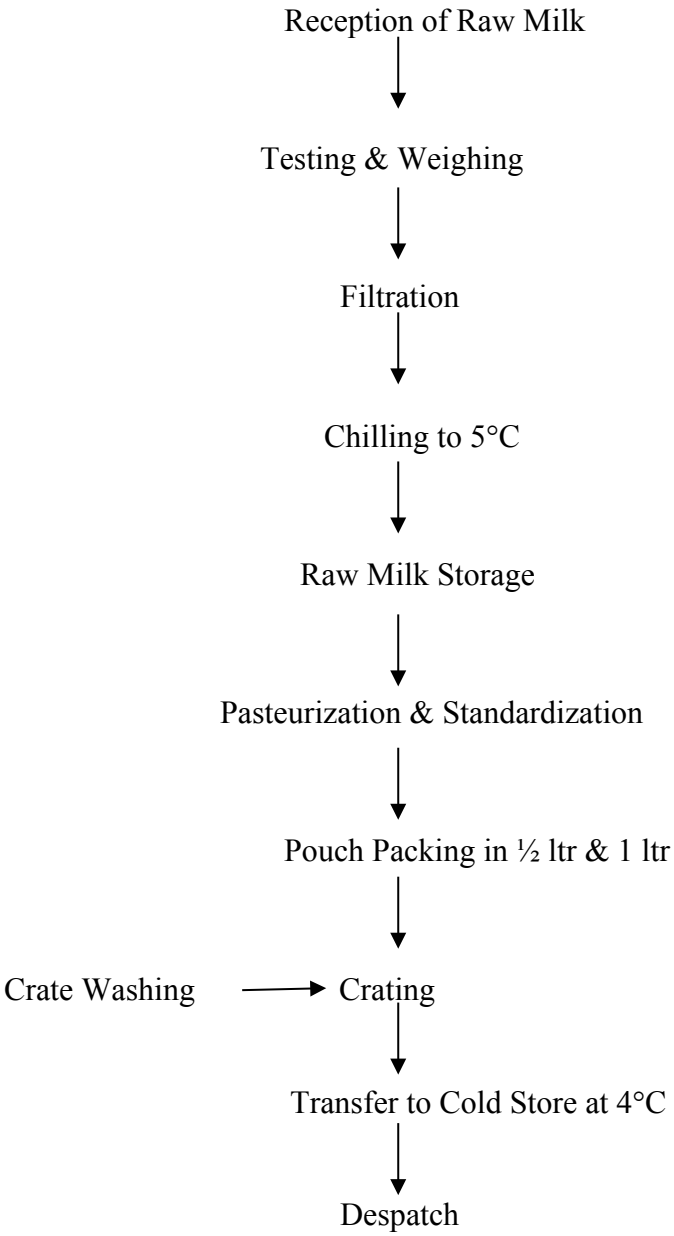
H.E = 100 – {[(Butterfat in A) – (Butterfat in B)]/Butterfat in B} x 100

Interpretation of results

Reading	Observation
96 – 100%	Very good quality milk
90 – 95%	Good quality milk
< 90%	Poor quality milk

PROCESS FLOW

The process charts given below will explain the steps involved in making pouched milk.



ASSUMPTIONS

No of Working days/year	353
No of Shifts/day	2
Working hours/Shift	8
Processing for Shift (Ltrs)	5000

SALES AT 100% CAPACITY PER ANNUM

(Rs. In lakhs)

Sl.No	Item	Qty/day	UoM	Qty/annum	Rate / Ltr	Revenue
1)	Pasteurized Milk	10000	Ltr	3,530,000	36.00	1,270.80
						1,270.80

COST OF PRODUCTION

Sl.No	Item	Qty/day	UoM	Qty/Annum	Rate/Ltr	Expenses
1)	Raw milk	10204	Ltr	3,602,041	26.10	940.13
2)	Collection Centre exp.	10204	Ltr	3,602,041	0.90	32.42
3)	Transportation upto Plant	10204	Ltr	3,602,041	0.50	18.01
						990.56

CONSUMABLES, PACKING MATERIALS & OTHER EXP.

Sl.No	Item	Qty/day	UoM	Qty/Annum	Rate /Ltr	Expenses
1)	Chilling expenses	10204	Ltr	3,602,041	0.50	18.01
2)	Processing charges	10204	Ltr	3,602,041	0.85	30.62
3)	Packaging Film	10000	Ltr	3,530,000	1.20	42.36
4)	Marketing & Transportation	10000	Ltr	3,530,000	1.35	47.66
						138.64

MAN POWER REQUIREMENT

Sl.No	Position	No	Salary/Month	Salary(P.A)
1	Manager	1	25000	3.00
2	Plant Supervisor	2	9000	2.16
3	Machine Operator	2	8000	1.92
4	Unskilled/Semi Skilled Worker	10	6500	7.80
5	Laboratory Asst	1	10000	1.20
6	Electrician/Plumber	1	10000	1.20
7	Accounts/Stores	2	10000	2.40
8	Drivers	5	9000	5.40
9	Messengers	1	5000	0.60
10	Machine Operator at collection centre	4	7000	3.36
11	Security	7	6500	5.46
12	Marketing Executive	3	8000	2.88
				37.38

POWER & FUEL

1	**ELECTRICITY**		
	63KVA X 0.75PF X 0.9PF X24 Hrs X 300Days =	367416	Units P.a
	Add: Lighting Factor	3600	Units P.a
	Total	371016	Units P.a
	Rate per Unit Rs.	5.00	
	Total Rs.	1855080	
	Rs. In lakhs		18.55
	Diesel 200 Ltr Per Month @ Rs.80/-		1.92
	Total Cost of Power & Fuel		20.47

COST OF THE PROJECT **(Rs in Lakh)**

PARTICILARS

				(Rs.)	
1) **LAND :**					
a)Factory Land (915 Decimal)	1	No	592900	592900	5.93
2) **CIVIL WORKS:**	Qty	U/M	Rate/Rs		
a) Plant Building - RCC	1600	Sqft	1000	1600000	
b) Plant Building - ACC	5125	Sqft	700	3587500	
c)ETP Platform, DG Room, Control Panel, Boiler Room, Water Supply Room etc	LS			750000	
d)Site Development, Land Scalping,Internal roads etc	LS			300000	
e)Compound Wall	LS			400000	
f)Gate with structure	LS			80000	
g)Security House	LS			100000	68.18
3) **PLANT & MACHINERY:**					
A) Milk Collection & Testing Section-					
a)Bulk Milk Cooler-5000 Ltr MOC:SS304 2.5mm with dimple sheet	1	Liter		862500	
b)Milk Can-40 Ltr Capacity	100	Liter		402500	
c)Milk Testing Equipments & Accessories	1	Set		283998	15.49
B) Milk Reception Section:-					
a)Weighing Bowl Cap-500Kg S.S304 MOC:SS 304 02mm	1	No	149500	149500	
b)Duplex Filter S.S304 MOC:SS 304 02mm	2	Nos	9775	19550	
c)Dump TankCap-1000 Ltr S.S 304 MOC:SS304 2mm	1	No	97750	97750	
d)Milk Chiller Cap-5 Kl (Alfa LavalPlates SS 316)	1	No	201250	201250	
e)Can Scrubber MOC:SS 304	1	No	172500	172500	
f)Can Tipping Bar MOC :SS 304	1	No	5750	5750	
g)Can Drip Saver MOC:304	1	No	40250	40250	
h)Roller Conveyor MOC:MS	1	No	55200	55200	7.42
C) Milk Chilling, Processing, Packaging & Storage Section:-					
a)Milk Pasteurizer S.S 316 Cap-1 kl with all fittings & control panel	1	No	977500	977500	
b)Milk Homogenizer Cap-1 kl	1	No	747500	747500	
c)Cream Separator Cap-1 kl	1	No	373750	373750	
d)Milk Storage Tank Cap-5 kl (Double Partition)	2	No	632500	1265000	
e)Cream Balance Tank 100 ltr	1	No	28750	28750	
f)Cream Chiller 1 kl	1	No	74750	74750	
g)Line Filter	1	No	9775	9775	

i)Cold Room Size:10' x 15' x 12'	1	No	747500	747500	
j)Curd Making System	1	No	143750	143750	
k)Culture Tank Cap-500 ltr	1	No	97750	97750	
l)Curd PouchPacking M/C (Single Head)	1	No	327750	327750	
m)Milk Pouch Packing M/C (Double Head)	1	No	672750	672750	
n)Khoya Bhatti Cap-120 ltr	1	No	155250	155250	
o)Paneer Pressing M/C Single Head	1	No	126500	126500	57.48
D) Utility Section					
a)Boiler Cap-300 Kg (Non IBR) with Chimney	1	No	258750	258750	
b)Refrigeration Unit Capacity -5 TR	1	No	258750	258750	
c)Electricity Panel	1	No	207000	207000	
d)CIP System	1	No	287500	287500	
e)ETP System Cap-10 kl	1	No	557750	557750	
f)Milk Pump 1 HP	1	No	20850	20850	
g)Pipe Line, Bend, Union, Valve, Clamp etc.	LS		259750	259750	
h)Loading, Unloading & Transportation of plant and machineries	LS		300000	300000	
i)Plant Erection and Commissioning	LS		250000	250000	24.00
E) ELECTRICITY SUPPLY:					
a)HT Line, DP mounted SS, Transformer, Fittings and Commissioning	LS		675000	675000	
b)Panel Room, Internal Connectivity, Fittings etc	LS		200000	200000	8.75
F) POWER BACK-UP:					
Diesel Generator set-63 KVA with accessories	1	No	463590	463590	4.64
PRELIMINARY & PRE-OP.EXPS					
IDC				174375	
Processing Fees				50000	
Establishment & other expenses for 3 months				180000	
Misc. Expenses				122000	5.26
WORKING CAPITAL MARGIN					18.78
					210.00

MEANS OF FINANCE:

Term Loan at ROI of 10%-repayable in 28 equal Quarterly installments	139.50
Promoter's Contribution/Equity	70.50
Total project cost	**210.00**
Debt/Equity	**1.98**
Promoter's contribution	**34%**

PROFITABILITY AND VITAL FINANCIAL PARAMETERS

Year	**1st Yr.**	**2nd Yr.**	**3rd Yr.**	**4th Yr.**	**5th Yr.**	**6th Yr.**	**7th Yr.**	**8th Yr.**
Capacity Utilization (%)	**80%**	**85%**	**90%**	**90%**	**90%**	**90%**	**90%**	**90%**
Months of Operation	**6**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
Sales	508.32	1,080.18	1,143.72	1,143.72	1,143.72	1,143.72	1,143.72	1,143.72
Raw Mat. & Pr. Exp.	479.52	1,016.08	1,074.08	1,074.08	1,074.08	1,074.08	1,074.08	1,074.08
Depreciation	10.42	19.46	16.90	14.70	12.81	11.19	9.80	8.60
Cost of Production	489.95	1,035.55	1,090.98	1,088.78	1,086.89	1,085.27	1,083.88	1,082.68
Gross Profit	18.37	44.63	52.74	54.94	56.83	58.45	59.84	61.04
Selling & Other Admn. Exps	4.50	8.75	10.35	10.35	10.35	10.35	10.35	10.35
Interest on Term Loan	6.98	12.70	10.71	8.72	6.73	4.73	2.74	0.75
Interest on Working Capital	2.40	4.80	4.80	4.80	4.80	4.80	4.80	4.80
Profit before Tax	4.50	18.38	26.88	31.07	34.95	38.56	41.95	45.14
Provision for Tax	0.00	3.01	5.56	6.82	7.98	9.07	10.08	11.04
Net Profit after Tax	4.50	15.36	21.31	24.25	26.96	29.49	31.86	34.10
Gross Profit on Sales	3.61%	4.13%	4.61%	4.80%	4.97%	5.11%	5.23%	5.34%
Net Profit on Sales	0.88%	1.42%	1.86%	2.12%	2.36%	2.58%	2.79%	2.98%
Break Even Point								
At Utilized Capacity		65%	52%	44%	37%	31%	25%	19%
At Installed Capacity		55%	47%	40%	34%	28%	22%	17%
DSCR		1.46	1.60	1.66	1.74	1.84	1.96	2.10
AVRAGE DSCR		1.74						
IRR		26%						

DISCLAIMER

The project report is advisory in nature & APICOL assumes no techno-financial liability for the use of this report by anybody for whatsoever purposes.