

## CASEIN FROM MILK

### 1. INTRODUCTION:

Casein is the major protein in cows' and buffalo' milk, and comprises about 80 % of the total protein content of which the rest, some 20 %, are the whey or serum proteins. Casein is a mixture of phospho-proteins found in milk to the extent of about 3%. It contains all of the common amino acids and is high in the essential ones. The caseins are of Alpha, beta, gamma and K are in the order of decreasing mobility at pH 7.0.

Commercial casein is made from skim milk by one of two general methods – precipitation by acid or coagulation by rennet. As much of the fat, whey proteins, lactose and minerals as possible must be removed by multistage washing in water, as they reduce the quality of the casein as well as its keeping quality. Dried, properly produced casein has a relatively good keeping quality and is used mainly in the food and chemical industries.

### 2. PRODUCTS AND ITS APPLICATION:

Casein can be produced in various grades for different applications by precipitation from the skimmed milk with dilute Sulphuric acid, Hydrochloric acid or Lactic acid. Lactic Casein or Lactic acid Casein is the product of natural self-souring, although this is normally promoted by inoculating skin milk lactobacillus. It is used in paints, paper coating, paper cones, adhesives, rubber chemicals, leather, textile auxiliaries and pharmaceuticals. Rennet Casein is produced by Rennet process that is precipitated by the enzyme Rennet. Rennet Casein is Calcium Caseinate, which has high ash content and is primarily used by the food industries and is not used in adhesives

Product Mix & Product Capacity 1 ton/day				
SRN	Product	Cap. Kg/Day	Wkg Days	TPA
1	Rennet Casein	1,000.00	150	150.00
2	Lactic Acid Casein	1,000.00	90	90.00
3	Sulphuric Acid Casein	1,000.00	45	45.00
4	Fat Free Casein	1,000.00	15	15.00
			300	300.00

### **3. DESIRED QUALIFICATION FOR PROMOTER:**

The entrepreneur must be aware of processing and marketing of casein. Besides that he must be able to judge the quality of all inputs and finished products.

### **4. INDUSTRY OUTLOOK/ TREND**

India is world largest producer of milk. Production of milk is growing at the rate of 4% per annum. However, government has plan to double the milk production by 2022 by applying scientific methods in animal husbandry, improved cattle feed and better veterinary services. This will result in increased availability of milk which can be converted in to products like casein. The application and demand for casein are growing at faster rate due to higher growth of food processing industries and specialty chemicals.

### **5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:**

The market for casein is very wide and potential. It is estimated for period of 2016-2026 has projected that the global market for casein will surpass US\$ 1 Billion in revenues by 2026. Global Micellar Casein Market to Grow at a 5.9% CAGR Through 2026

### **6. RAW MATERIAL REQUIREMENTS:**

<b>Sr. No.</b>	<b>Raw Material</b>	<b>Qty. in MT</b>
1	Skimmed Milk	8,400.00
2	Rennet	3.00
3	Lactic Acid	1.80
4	Sulphuric Acid	0.90
5	Misc. Additives	1.30
	<b>Total</b>	<b>8407.00</b>

### **7. MANUFACTURING PROCESS:**

Skim milk, normally pasteurized at 72 °C for 15 – 20 seconds, is used for the production of rennet casein, as well as other types of casein. Small amounts of fat are detrimental to

the quality. It is therefore important that the milk has been separated efficiently. Renneting takes place with the help of the enzyme chymosin in the rennet. The milk is heated for a short period of time and then cooled to about 30 °C. Then the rennet is added. A gel forms after 15 – 20 minutes. It is cut and the coagulum is stirred while being heated to about 60 °C. The high temperature is needed to deactivate the enzyme. Cooking time is around 30 minutes.

## 8. MANPOWER REQUIREMENT:

### Manpower Requirements

Sr. No.	Category	Persons
1	Technical Staff	5
2	Adm. Staff	4
3	Marketing Staff	4
4	Labour	16
	Total	29

## 9. IMPLEMENTATION SCHEDULE:

Project Stages	MONTHS									
	1	2	3	4	5	6	7	8	9	10
Purchase of Land	■	■	■							
Completion of Building		■	■	■						
Ordering of Machinery	■	■	■							
Delivery of Machinery		■	■	■						
Term/Wkg. Loan Sanction		■	■	■						
Installation of Machinery				■	■					
Commissioning of Plant					■	■				
RM/Inputs Procurement					■					
Manpower Appointments					■					
Commercial Production							■			

## 10. COST OF PROJECT:

### COST OF PROJECT

Sr. No.	Costing Heads	Qty.	Rate/Unit	Rs. Lakh
1	Land in Sq. M. + Expn.	1,000	1,000.00	10.00
2	Building in sq. m.	700	9,000.00	63.00
3	Plant & Machinery			103.98
	<b>Total</b>			<b>176.98</b>

**11. MEANS OF FINANCE:**

Sr. No.	Means Heads	Rs. Lakhs
1	Promoters Capital	44.23
2	Term Loan	82.74
3	MFPI Subsidy	50.00
	<b>Total</b>	<b>176.98</b>

**12. WORKING CAPITAL CALCULATION:**

Particulars	Total Amount	Stock Period Days	Value of Stock Period	Promoter Margin	Promoter Share	Bank Borrowings
Raw Material	847.00	15	42.35	0.60	25.41	16.94
Packing Material	25.00	30	2.50	0.75	1.88	0.63
Work in Process	969.19	3	9.69	0.40	3.88	5.82
FP Stock	1,071.00	15	53.55	0.40	21.42	32.13
Bills Receivable	1,071.00	15	53.55	0.40	21.42	32.13
Working Expense	25.00	30	2.50	1.00	2.50	0.00
<b>Total:</b>	<b>4,008.19</b>		<b>164.14</b>		<b>76.50</b>	<b>87.64</b>
Loan + Promoter	164.14					13.15

**13. LIST OF MACHINERY REQUIRED:**

Sr. No.	Equipments	Qty.
	<b>Preparatory Section</b>	
1	Skimmed Milk Storage Tanks	2
2	Skimmed Milk Pasteurizer	1
3	Casein Making Vats	2
4	pH Control	1
5	Washing Tanks	2
6	Decanters	2
7	Casein Collection Tanks	1
8	Tray Dryers	4
9	Pulveriser	1
10	Vibro Sifter	1
11	Packing & Bagging Machine	
	<b>Utility &amp; Other Equipments</b>	
12	Steam Boiler & Pipelines/Fittings	1 Lot
13	Effluent Treatment Plant	1 Lot

14	Electrification, DG Set, Transformer	1 Lot
15	Material Handling Equipments	1 Lot
16	Laboratory Equipments	1 Lot
17	RO Plant	1 Lot
18	Working Platform	1 Lot
19	SS Pipeline and Fittings	1 Lot
	<b>Total:</b>	

- IDMC Limited  
Plot no. 124-128,  
GIDC Estate, GIDC,  
VitthalUdyognagar INA,  
Gujarat
- YSM Biotech International  
UL 30, EF3 Mall, Plot No. 12, Sector 20 A  
Sector - 20 A  
Faridabad - 121001 Haryana,

#### 14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
<b>A</b>	<b>Gross Sales</b>	<b>749.7</b>	<b>856.8</b>	<b>963.9</b>	<b>963.9</b>	<b>963.9</b>
	Less:					
1	Raw Materials, Rs. 1/lit	592.9	677.6	762.3	762.3	762.3
2	Packing Material	17.5	20	22.5	22.5	22.5
3	Fuel	4.41	5.04	5.67	5.67	5.67
4	Power	0.84	0.96	1.08	1.08	1.08
5	Manpower	39.8424	44.9504	50.0584	50.0584	50.0584
6	Sundry Expenses	4.2	4.8	5.4	5.4	5.4
7	Interest on Term Loan	6.951	7.944	8.937	8.937	8.937
8	Interest on WC Loan	9.205	10.52	11.835	11.835	11.835
9	Repairs & Maintenance	7	8	9	9	9
<b>B</b>	<b>Production Cost</b>	<b>682.8484</b>	<b>779.8144</b>	<b>876.7804</b>	<b>876.7804</b>	<b>876.7804</b>
<b>C</b>	<b>Gross Profit (A-B):</b>	<b>66.8516</b>	<b>76.9856</b>	<b>87.1196</b>	<b>87.1196</b>	<b>87.1196</b>
	Taxes @ 30%	20.05548	23.09568	26.13588	26.13588	26.13588
	Net Profit	46.79612	53.88992	60.98372	60.98372	60.98372

Note: The profitability basis and projections are indicative and on approximate basis only.

## **15. BREAKEVEN ANALYSIS:**

<b>Particulars</b>	<b>Rs in Lakhs</b>
Break Even Point	
Annual Fixed Cost x100/	46.44
Annual Fixed Cost + Profit	

## **16. CRITICAL FACTORS FOR THE PROJECT:**

- Availability of required quantity of skimmed milk in nearby area of plant location is must.
- Identifying end users of products before setting-up the plant.
- Availability of skilled manpower, accessibility to roads and identification of right quality additives suppliers.

## **17. STATUTORY/ GOVERNMENT APPROVALS**

There is statutory requirement of FSSAI license for setting up of food processing industry. Moreover, MSME& GST registration, IEC Code for Export of end products and local authority clearance may be required for Shops and Establishment, for Fire and Safety requirement and registration for ESI, PF and Labour laws may be required if applicable. Entrepreneur may contact State Pollution Control Board for consent and permission to treat and dispose of the liquid effluent. Casein production is highly polluting activity and therefore while selecting location utmost care must be taken by the promoter.

## **18. BACKWARD AND FORWARD INTEGRATION**

As part of backward integration promoter may think of creating facilities for milk processing to make milk products such as butter, cream, cheese, yogurt etc. there is no possibility of forward integration.

## **19. TRAINING CENTERS/COURSES**

For food processing industry training and short term courses are available at Indian Institute of Food Processing Technology, Thanjavur, Tamil Nadu and Central Food Technological Institute, Mysore, Karnataka, National Dairy Research Institute, Haryana and National Dairy Development Board, Anand. Udyamimitra portal ( link : [www.udyamimitra.in](http://www.udyamimitra.in) ) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

**Disclaimer:**

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.