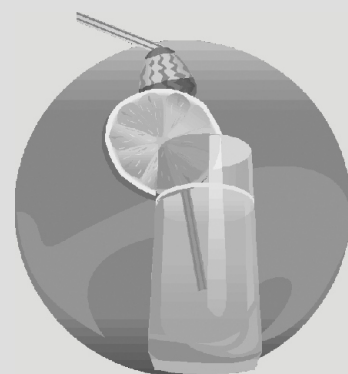


LIME PROCESSING



1.0 INTRODUCTION:

Lime has several uses and products made from it have varied applications. Lime processing utilises each and every portion of lime fruits for high value products, which have a very high market demand. Pectin is used in fruit jams. Lime oil has many uses in cosmetics and pharmaceutical industries. Citric acid has also many applications as food preservative in many food preparations and food processing industries are large consumers. Clarified lime juice is used as health-drink and is mixed in many food preparations. Lime is cultivated in almost all parts of country and the North-East states are not an exception. The note envisages Assam as the preferred location.

2.0 PRODUCTS

As explained earlier, lime is a very versatile product and is used not only in several household preparations but also has many industrial applications in cosmetics, pharmaceutical and food processing industries. This note primarily deals with production of pectin and citric acid.

2.1 Strict adherence to FPO provisions is required.

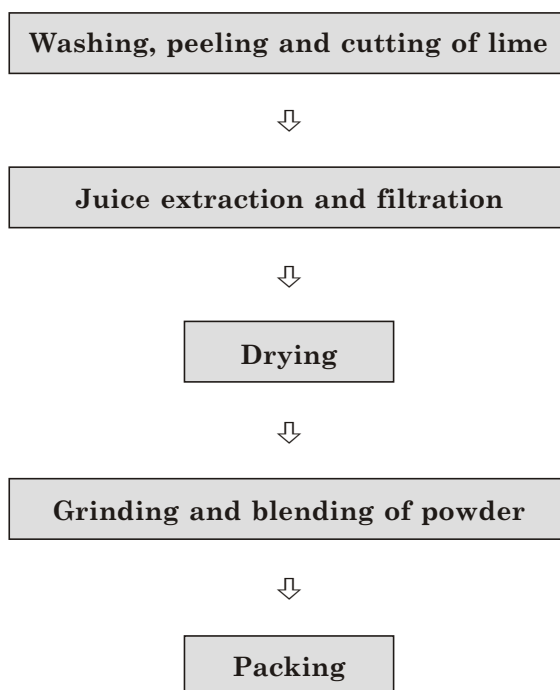
3.0 MARKET POTENTIAL

Human beings have been using lime since many centuries but initially its applications were limited. With the advent of technology, many downstream products are being manufactured with domestic as well as industrial applications. Products like pectin, citric acid, lime oil, lime juice etc. are in vogue. There is a growing market for all these products round the year. The all-important quality of lime is its preservation property. With thrust on industrialisation after independence, industrial applications of lime have got tremendous boost. pectin and

citric acid are two such products, which have witnessed continuous demand during last few decades. There are some established units producing these items but in view of growing demand, there are good prospects for new units as well. Quality, pricing and consistency in supply shall be the critical success determinants.

4.0 MANUFACTURING PROCESS

The manufacturing process is fairly established. Fresh and matured lime fruits are thoroughly washed and peeled before cutting them. Subsequently, juice is extracted from them and seeds are separated. This juice is then kept for about 4 to 6 hours in precipitation tanks and then taken to tray drier for drying. The drying time is about 8 hours. On drying, the powder is ground and blended with certain solvents and chemicals and finally packed. As regards citric acid, juice is filtered and precipitated in tanks. It is then dried in dryer to form crystals. These crystals are pulverized and packed. On an average, the yield is around 90%. The process flow chart is as under:



5.0 CAPITAL INPUTS:

5.1 Land and Buildings

The total built-up area requirement shall be around 600 sq.mtrs. and hence a plot of 1000 sq.mtrs. is suggested. The built-up area would include main factory shed, solvent storage shed and storage and packing facilities. 5000 ltrs. capacity overhead water tank is required. Land may cost Rs.3 lacs whereas the construction cost is estimated to be Rs.16.00 lacs.

5.2 Plant and Machinery

It is proposed to install plant and machinery for total production of 10,000 tons of lime pectin and citric acid considering 300 working days per year with two shift working.

To install the above mentioned production capacity of lime products per year, following machinery are required costing Rs.71.50 lacs. (Rs. in lacs)

Particulars	Amount
Fruit Washing Machine	2.00
Peeling Machines Nos.2	4.25
Basket Centrifuge Nos.3	1.50
Hydraulic Press Nos.6	11.00
Juice extractor Nos.2	5.50
Precipitation Tanks (1000 Lts) (Nos.4)	5.50
Teflon Coated Centrifuge (Citric Acid)	1.50
Evaporated Pan/Kettle	1.25
Filters Nos.2	1.50
Tray Drier (45 trays)	3.50
Multimill for grinding	2.00
Vaccum filtration Plant	5.00
Solvent Recovery Plant	2.00
Lime Cutter (Automatic)	2.00
Steam distillation unit	1.50
Vaccum Evaporator (citric Acid)	2.50
Ribbon blender, filter press etc	4.00
Electrification D.G.Set 200 KVA	15.00
Total	71.50

5.3 Miscellaneous Assets

Some other assets like furniture and fixtures, storage facilities, working tables, etc. would cost Rs. 5.00 lacs.

5.4 Utilities

The total power requirement shall be 100 HP whereas water required every day shall be 5000 ltrs. Proper arrangements need to be made.

5.5 Raw Materials

The main raw material required is lemon. The state of Assam cultivates more than 10,000 tonnes of lime fruits every year with Bongaingon and Barpeta districts being the main cultivators. Likewise, Manipur also produces around 6000 tonnes of lime fruits every year. Thus availability should not be a problem but the unit can enter into a contract with lime fruit cultivators to ensure timely and adequate quantity. Other materials required shall be alcohol, solvent, chemicals, etc. and shall be available locally. Packing material like polythene bags, HDPE barrels, labels etc. shall be needed for which prior proper arrangements are advisable.

6.0 MANPOWER REQUIREMENTS:

Particulars	No	Monthly Salary (Rs.)	Total Monthly Salary (Rs.)
Machine Operators	2	3,500	7,000
Skilled Workers	4	2,500	10,000
Semi-skilled Workers	4	1,750	7,000
Helpers	6	1,250	7,500
Clerk	1	2,500	2,500
Salesman	1	2,500	2,500
		Total	36,500

7.0 TENTATIVE IMPLEMENTATION SCHEDULE

Activity	Period (in months)
Application and sanction of loan	2
Site selection and commencement of civil work	2
Completion of civil work and placement of orders for machinery	6
Erection, installation and trial runs	2

8.0 DETAILS OF THE PROPOSED PROJECT

8.1 Land and Building

(Rs. in lacs)

Particulars	Area (Sq.Mtrs)	Cost
Land	1,000	3.00
Building	600	16.00
	Total	19.00

8.2 Plant and Machinery

The total cost of machinery is estimated to be Rs.71.50 lacs, as explained earlier.

8.3 Miscellaneous Assets

The provision for miscellaneous assets of Rs. 5.00 lacs shall be adequate as explained earlier.

8.4 Preliminary and Pre-Operative Expenses:

The registration charges, establishment expenses, trial run expenses, interest during implementation etc would be around Rs.8 lacs.

8.5 Working Capital Requirement

At 60% utilisation in the first year, the total working capital needs shall be as under:

(Rs. in lacs)

Particulars	Period	Margin	Total	Bank	Promoters
Stock of Raw and Packing Materials (except Lime)	½ Month	30%	2.90	2.00	0.90
Stock of Finished Goods	½ Month	25%	10.00	7.50	2.50
Receivables	½ Month	25%	11.50	8.60	2.90
Working Expenses	1 Month	100%	1.50	--	1.50
		Total	25.90	18.10	7.80

8.6 Cost of the Project and Means of Financing

(Rs. in lacs)

Items	Amount
Land and Buildings	19.00
Plant and Machinery	71.50
Miscellaneous Assets	5.00
Preliminary and Pre-operative Expenses	8.00
Contingencies @ 10% on land and building and machinery	11.00
Working Capital Margin	7.80
Total	122.30
Means of Finance	
Promoter's Contribution	36.30
Bank Loan/ Financial Institutions	86.00
Total	122.30
Debt Equity Ratio	2.37 : 1
Promoters Contribution	30%

Financial assistance in the form of grant is available from the Ministry of Food Processing Industries, Govt. of India, towards expenditure on technical civil works and plant and machinery for eligible projects subject to certain terms and conditions.

9.0 PROFITABILITY CALCULATIONS

9.1 Production Capacity and Build-up

The installed production capacity of the proposed unit would be 10,000 MTA lime products in 300 working days of 16 hours. The capacity utilization of 60% and 75% is envisaged during the first two years.

9.2 Sales Revenue at 100% Capacity

(Rs. in lacs)

Product	Qty. Tonnes	Selling Price Per/Ton(Rs.)	Value
Pectin	3500	8000	280.00
Citric Acid	4500	3000	135.00
Lime Juice	1000	8000	80.00
		Total	495.00

9.3 Raw and Packing Materials Required at 100%

(Rs. in lacs)

Product	Quantity (Tonnes)	Rate per Ton	Value
Lemon Fruits	10,000	3,000	300.00
Alcohol, Solvents, Chemicals	--	--	24.00
Cost of Packing Materials @ 500/Ton	--	--	45.00
		Total	369.00

9.4 Utilities

The annual cost of utilities at 100% activity level would be Rs.8.00 lacs per year.

9.5 Interest

Interest on term loan of Rs. 86 lacs has been calculated @ 14% per annum assuming repayment in 6 years including a moratorium period of 1 year, whereas interest on working capital would be 14% per annum.

9.6 Depreciation

It has been calculated on WDV basis @ 10% on building and 15% on machinery and other assets.

10.0 PROJECTED PROFITABILITY

(Rs. in lacs)

No	Particulars	1st Year	2nd Year
A	Installed Capacity	----10,000 MTA ----	
	Capacity Utilisation	60%	75%
	Sales Realisation	297.00	371.25
B.	Cost of Production		
	Raw and Packing Materials	221.40	276.75
	Utilities	4.80	6.00
	Salaries	4.38	5.25
	Stores and Spares	3.60	4.50
	Repairs and Maintenance	4.00	4.75
	Selling Expenses @ 5%	14.85	18.56
	Administrative Expenses	3.00	3.60
	Total	256.03	319.41
C.	Profit before Interest & Depreciation	40.97	51.84
	Interest on Term Loan	10.92	9.28
	Interest on Working Capital	2.53	3.16
	Depreciation	13.07	11.19
	Net Profit	14.45	28.21
	Income Tax @ 20%	2.90	4.61
	Profit after Tax	11.55	22.60
	Cash Accrual	24.62	33.79
	Repayment of Term Loan	--	15.60

11.0 BREAK-EVEN POINT ANALYSIS

(Rs. in lacs)

No.	Particulars	Amount
A	Sales	297.00
B	Variable Cost	
	Raw and Packing Materials	221.40
	Utilities (70%)	3.36
	Salaries (70%)	3.07
	Stores and Spares	3.60
	Selling Expenses (70%)	10.39
	Administrative Expenses (50%)	1.50
	Interest on working capital	2.53
	Total	245.85
C	Contribution	51.15
D.	Fixed Cost	31.70
E.	Break Even Point (D÷C)	61%

12.0 [A] LEVERAGES

Financial leverage:

= EBIT/EBT

= 27.90 ÷ 14.45

= 1.93

Operating Leverage:

= Contribution / EBT

= 51.15 ÷ 14.45

= 3.54

Degree of Total Leverage:

= FL/OL

= 1.93 ÷ 3.54

= 0.54

[B] Debt Service Coverage Ratio (DSCR)

(Rs. in lacs)

Particulars	1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr
Cash Accruals	24.62	33.79	35.65	38.2	41.27	44.16
Interest on Term Loan	10.92	9.28	7.09	4.91	2.73	1.51
Total (A)	35.54	43.07	42.74	43.11	44.00	45.67
Interest on Term Loan	10.92	9.28	7.09	4.91	2.73	1.51
Repayment of Term Loan	--	17.20	17.20	17.20	17.20	17.20
Total (B)	10.92	26.48	24.29	22.11	19.93	18.71
DSCR (A) ÷ (B)	3.25	1.62	1.76	1.94	2.20	2.44
Average DSCR	----- 2.20 -----					

[C] Internal Rate of Return (IRR)

Cost of the project is Rs. 122.30 lacs.

(Rs. in lacs)

Year	Cash Accruals	16%	18%	20%	24%	28%	32%
1	24.62	21.22	20.85	20.51	19.84	19.23	18.66
2	33.79	25.11	24.26	23.45	21.96	20.61	19.40
3	35.64	22.85	21.70	20.64	18.68	17.00	15.50
4	38.20	21.09	19.71	18.41	16.16	14.25	12.57
5	41.27	19.64	18.04	16.59	14.07	12.01	10.32
6	44.16	18.11	16.34	14.79	12.14	10.02	8.35
	217.68	128.02	120.90	114.39	102.85	93.12	84.80

The IRR is around 17%.

Some of the machinery suppliers are

1. Engineer's Overseas Corpn Pvt Ltd, Raja Santosh Road, Kolkata
2. Punjab Engineering Works, Ramkrishna Samadhi Road, Kolkata
3. Industrial Equipments, Guwahati
4. Buhler(Indai) Pvt. Ltd. 13-D, KAIDB Industrial Area, Attibele, Bangalore-562107.
Tel No. 27820000