DEHYDRATED VEGETABLES

1.0 INTRODUCTION

Vegetables are available during specific seasons and they are perishable. Hence, majority of them are not available during off-season. To overcome this problem, dehydration technique has been developed by which vegetables in dehydrated form are preserved for a longer period and are made available during off-season. With this technology, certain high value and popular vegetables can be profitably sold.

2.0 PRODUCTS

2.1 Applications

Dehydration technology is well established and proven. Certain products like green peas, cauliflower, carrots, spinach etc. command good prices during lean and off-season. Onion and garlic powder also has good demand round the year but these products are generally available throughout the year and powder is somehow not favoured by the Indians. Hence, this note does not include onion and garlic powder. This project can be set up in many parts of the country but this note considers Maharashtra as the preferred location.

2.2 Availability of know how, Quality Standards and Compliance

CFTRI, Mysore, has successfully developed the technical know-how. BIS has specified quality standards for different vegetables and depending upon the exact product mix, the promoters may like to adhere to them. Compliance with PFA Act is mandatory.

3.0 MARKET POTENTIAL

3.1 Demand and Supply

Food habits of Indians are such that most of the households prepare vegetables every day. Due to climatic conditions and types of soil, many vegetables are cultivated throughout the year. The major limitation of bulk of the green vegetables is they are grown only during pre-

determined season which lasts for 3-4 months and thus their availability during rest of the months is a major problem. Hence, if they are made available during this period, then they command premium. Green house method enables cultivation of any vegetable during any season but calls for huge investment which affects the economic viability. Dehydration technique is, therefore, preferred.

3.2 Marketing Strategy

With growing incomes, changing lifestyles and hectic daily schedule, market for dehydrated vegetables is growing especially in urban areas. Proper placement of products in the departmental stores, super markets, shopping malls etc. backed-up by publicity is the key to success. It is also possible to have tie-up with exclusive restaurants, star hotels, renowned caterers etc. for regular supplies

4.0 MANUFACTURING PROCESS

This note primarily considers dehydration of cabbage, cauliflower, spinach and carrots. Other suitable vegetables can also be thought of. In case of cauliflowers; they are chopped to make small pieces and washed. Then they are blanched and dried in cold air. Spinach leaves are separated from the stalk, washed and dried in the drier. As regards carrots, they are washed, scrapped and cubed after washing. Cubes are then blanched and dried. These dehydrated vegetables are then packed and stored carefully. Packing is very critical as any fungal growth would damage the product. Process and weight loss varies from vegetable to vegetable but on an average it is 25% as the vegetables are dehydrated. In other words, the input-output ratio is 4:1.

5.0 CAPITAL INPUTS

5.1 Land and Building

The plot of about 500 sq.mtrs. is required as the built-up area requirement will be 220 sq.mtrs. Storage of vegetables would require area of 35 sq.mtrs, whereas packing room and finished goods' godown will occupy about 60 sq.mtrs. Vegetable washing tanks could be constructed adjacent to the raw material godown with asbestos sheets. Main production hall will be of around 100 sq.mtrs. and balance 25 sq.mtrs. could be allotted for office and laboratory. The entire area has to be neat and clean and completely hygienic. Considering price of land @ Rs.400/- per sq.mtr; the total cost of land would be Rs. 2.00 lacs whereas that of civil work it will be Rs.5.50 lacs @ Rs.2500/- per sq.mtr. Construction cost is taken on a higher side as flooring, painting etc. of the building has to be of superior quality to maintain hygienic standards.

5.2 Plant and Machinery

Easy and regular availability of fresh vegetables during each season and nearby urban markets are the critical aspects for arriving at the installed production capacity. For the purpose of this note and with a view to minimising initial capital investment, the rated capacity is taken at 400 tonnes with 2 shift working and 300 working days. For this following machines shall be required.

(Rs. in lacs)

Item	Qty.	Price
Washing tanks with sets of cubers, slicers, etc.	2	1.00
Blanching tank with thermostat control	1	1.50
Stacking trays for vegetables	--	0.30
Pre-cooling facility for vegetables	--	1.75
Vibratory shakers	2	0.60
Fluidized bed dryer to dehydrate vegetables complete with all attachments and electricals	1	4.00
Hot-water boiler with attachments	1	0.70
Automatic form, fill and seal machines complete with attachments	3	2.25
Pin mill with accessories of 50 kgs/hr. capacity	--	3.50
Testing equipments	--	0.75
Electrification	--	1.75
	Total	**18.10**

5.3 Miscellaneous Assets

Other assets like storage racks and bins, aluminium top working tables, exhaust fans, furniture and fixtures, electrical, plastic trays/jars/tubs, office equipments etc. shall be required for which a provision of Rs.1.25 lacs is made.

5.4 Utilities

Power requirement shall be 50 HP whereas water required for washing of vegetables and for potable and sanitary purposes will be 2000 ltrs. per day.

5.5 Raw Material

The all-important raw material will obviously be fresh vegetables. Hence, the location of the project has to be nearer to vegetable growing areas. Depending upon the availability of vegetables during different seasons, the product-mix may change. Likewise the prices of raw materials would also change depending upon the exact product mix and crop pattern. Even at 100% capacity utilisation, the monthly requirement of different vegetables, considering an average process and weight loss of 50% ,will be about 25 tonnes. This is not a very large quantity. Prices of vegetables vary and the product-mix may also change according to quantum of crop and consumer preferences. Hence, it is not feasible to arrive at variety-wise vegetables required every month and their individual prices. Therefore, average price of each vegetable is taken at Rs.4,000/- per ton. The all important packing materials will be plastic bags made from suitable grade plastic, corrugated boxes, box strapping, labels etc.

6.0 MANPOWER REQUIREMENTS

Particulars	Nos.	Monthly Salary (Rs.)	Total Monthly Salary (Rs.)
Machine Operators	4	2,500	10,000
Skilled Workers	4	2,000	8,000
Semi-skilled Workers	4	1,500	6,000
Helpers	6	1,250	7,500
Laboratory Technician	1	2,500	2,500
Salesmen	2	2,750	5,500
Clerk	1	2,500	2,500
		Total	**42,000**

7.0 TENTATIVE IMPLEMENTATION SCHEDULE

Activity	Period (in months)
Application and sanction of loan	2
Site selection and commencement of civil work	1
Completion of civil work and placement of orders for machinery	4
Erection, installation and trial runs	1

8.0 DETAILS OF THE PROPOSED PROJECT

8.1 Land and Building

Particulars	Area (Sq.Mtrs)	Cost (Rs.)
Land	500	2,00,000
Building	220	5,50,000

8.2 Plant and Machinery

The plant with rated annual capacity of 150 tonnes would cost Rs.18.10 lacs as explained earlier.

8.3 Miscellaneous Assets

A provision of Rs. 1.25 lacs will be adequate under this head as mentioned earlier.

8.4 Preliminary & Pre-operative Expenses

There will be many expenses under this category like registration charges, market survey expenses, scrutiny fee of the financial institution, pre-production administrative overheads including salaries, travelling, interest during construction and implementation period, trial run expenses and so on. Hence, a provision of Rs.2.50 lacs is made.

8.5 Working Capital Requirement

As against rated capacity of 150 tonnes per year, capacity utilisation of 60% is assumed in the first year. At this activity level, the project would require working capital of Rs.5.80 lacs as worked out herebelow.

(Rs. in lacs)

Particulars	Period	Margin	Total	Bank	Promoters
Stock of Packing Materials	1 Month	25%	0.40	0.30	0.10
Stock of Finished Goods	½ Month	25%	1.40	1.05	0.35
Receivables	1 Month	25%	3.00	2.25	0.75
Working Expenses	1 Month	100%	1.00	--	1.00
		Total	**5.80**	**3.60**	**2.20**

Stock of raw materials/vegetables are not considered, as with proper arrangements, there is no need to have more than 2 or 3 days' stock and it may also be possible to get credit of about a week.

8.6 Cost of the Project and Means of Financing

(Rs. in lacs)

Item	Amount
Land and Building	7.50
Plant and Machinery	18.10
Miscellaneous Assets	1.25
P&P Expenses	2.50
Contingencies @ 10% on Land, Building and P&M	2.55
Working Capital Margin	2.20
Total	**34.10**
Means of Finance	
Promoters' Contribution	10.10
Loan from Bank/FI	24.00
Debt Equity Ratio	1.82 : 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 plant will be 400 tonnes per year whereas capacity utilisation of 60% is assumed in the first year and second-year onwards it is restricted to 75%.

9.2 Sales Revenue at 100%

As explained in earlier chapters, there will not be exact sales-mix every month. It will vary according to the availability of vegetables and their prices and consumer demand or preferences. A firm tie-up with a large buyer may also change the sales mix. Hence, average price realisation is taken at Rs. 50,000/- per ton or Rs.50.00 lacs per year.

9.3 Raw Materials Required at 100%

(Rs. in lacs)

Product	Qty. (Tonnes)	Rate/Ton (Rs)	Value
Vegetables	400	3,000	12.00
Packing Materials	-	-	2.50
		Total	**14.50**

9.4 Utilities

Total annual expenses at 100% activity level under this head are expected to be Rs. 3.00 lacs.

9.5 Interest

Interest on term loan of Rs. 24.00 lacs is calculated @ 12% per annum assuming repayment in 6 years including a moratorium period of 1 year. Interest on working capital assistance from bank is taken at 14% per annum

9.6 Depreciation

It is computed on WDV basis and rates assumed are 10% on building and 15% on plant and machinery and miscellaneous assets.

10.0 PROJECTED PROFITABILITY

(Rs. in lacs)

No.	Particulars	1st Year	2nd Year
A	**Installed Capacity**	**--- 400 Tonnes ---**	
	Capacity Utilisation	60%	75%
	Sales Realisation	30.00	37.50
B	**Cost of Production**		
	Raw and Packing Materials	8.70	10.90
	Utilities	1.80	2.25
	Salaries	5.04	5.70
	Stores & Spares	0.54	0.66
	Repairs & Maintenance	0.60	0.76
	Selling and Distribution @ 7.5%	2.25	2.80
	Administrative Expenses	0.66	0.80
	Total	**20.94**	**23.87**
C	**Profit before Interest & Depreciation**	**10.41**	**13.63**
	Interest on Term Loan	2.64	2.11
	Interest on Working Capital	0.50	0.63
	Depreciation	3.35	2.86
	Profit before Tax	3.92	8.03
	Income-tax @ 20%	0.80	1.60
	Profit after Tax	3.12	6.43
	Cash Accruals	6.47	9.29
	Repayment of Term Loan	--	4.40

11.0 BREAK-EVEN ANALYSIS

(Rs. in lacs)

No	Particulars		Amount
[A]	**Sales**		**37.50**
[B]	**Variable Costs**		
	Raw Materials	10.90	
	Utilities (60%)	1.57	
	Salaries (50%)	3.93	
	Stores & Spares	0.66	
	Selling Expenses (65%)	1.96	
	Administrative Expenses (30%)	0.40	
	Interest on Working Capital	0.63	**20.05**
[C]	**Contribution [A] - [B]**		**17.45**
[D]	**Fixed Cost**		**9.42**
[E]	**Break-Even Point (D ÷ C)**		**53%**

12.0 [A] LEVERAGES

Financial Leverage

= EBIT/EBT

= 7.06 ÷ 3.92

= 1.80

Operating Leverage

= Contribution/EBT

= 16.10 ÷ 3.92

= 4.11

Degree of Total Leverage

= FL/OL

= 1.80 ÷ 4.11

= 0.44

[B] Debt Service Coverage Ratio (DSCR)

(Rs. in lacs)

Particulars	**1st Yr**	**2nd Yr**	**3rd Yr**	**4th Yr**	**5th Yr**	**6th Yr**
Cash Accruals	6.47	9.29	10.12	11.12	12.34	13.74
Interest on TL	2.64	2.11	1.71	1.19	0.66	0.21
Total [A]	**9.11**	**11.40**	**11.83**	**12.31**	**13.00**	**13.95**
Interest on TL	2.64	2.11	1.71	1.19	0.66	0.21
Repayment of TL	--	4.90	4.90	4.90	4.90	4.90
Total [B]	**2.64**	**7.01**	**6.61**	**6.09**	**5.56**	**5.11**
DSCR [A] ÷ [B]	**3.45**	**1.62**	**1.79**	**2.02**	**2.31**	**2.56**
Average DSCR	**---------- 2.28 ----------**					

[C] Internal Rate of Return (IRR)

Cost of the project is Rs.34.10 lacs.

(Rs. in lacs)

Year	Cash Accruals	16%	18%	20%
1	6.47	5.58	5.48	5.39
2	9.29	6.90	6.67	6.45
3	10.12	6.49	6.16	5.86
4	11.12	6.14	5.74	5.36
5	12.34	5.87	5.39	4.96
6	13.76	5.64	5.09	4.61
	63.10	**36.62**	**34.53**	**32.63**

The IRR is around 18%.

Some of the machinery suppliers are

1. M/s.G.R. Engg. Works Pvt Ltd, Worli, Mumbai 400 018
2. M/s.Raylon Metal Works, JB Nagar, Andheri (E), Mumbai 400 059
3. M/s. Laxicon Engg, Sita Bardi, Nagpur 440 012
4. Techno Equipments, 31, Parekh Street, Girgaum, Mumbai-400004