

DEHYDRATION OF FRUITS



1.0 INTRODUCTION

The entire North-East region grows many varieties of fruits with certain local specialities. Nagaland is also not lagging behind. Fruits, especially fresh ones, are liked by all but their availability is seasonal. Most of the fruits are available for about 3½ to 4 months every year and hence fruit juice preservation and dehydration techniques are used so that people can enjoy them during off-season as well. Fruit juice concentrates, squashes, nectars etc. are made with the help of juice and certain preservatives. Dehydration is the process by which liquid contents are removed to the maximum by drying process and these dehydrated varieties, when soaked in water, assume the original flavour and taste. This activity can be started in any of the North-East states, Maharashtra, UP, HP, Uttranchal etc and this note considers Manipur as the preferred location.

2.0 PRODUCT

2.1 Applications

Dehydrated fruits or vegetables are becoming popular and consumer acceptance is no more an issue. This profile deals with dehydration of gooseberry and wild apples. These fruits are very popular and grown widely in Nagaland.

2.2 Availability of technology and Compliances

CFTRI, Mysore, has successfully developed the technical know-how. Certification under the FPO as well as PFA Act is mandatory.

3.0 MARKET POTENTIAL

3.1 Demand and Supply

Fruits are liked by people of all age groups and from all walks of life. Their seasonal availability deprives people to enjoy them round the year. Dehydration technique is the

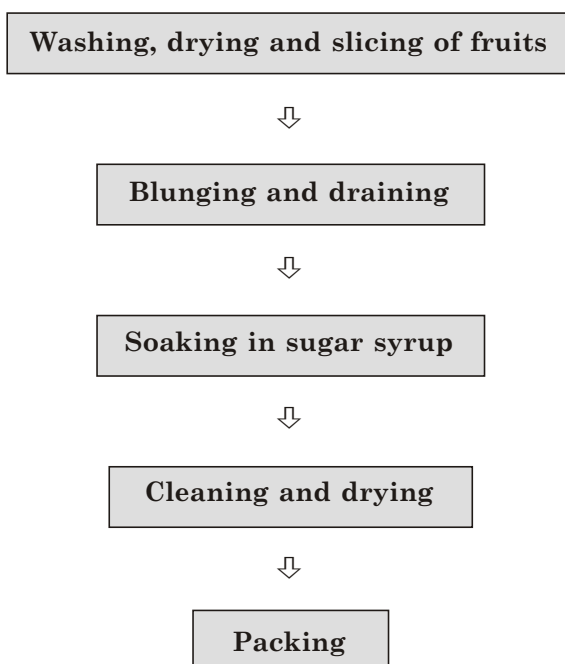
solution by which people are able to enjoy fruits even during off-season. Gooseberry has many medicinal values whereas wild apple is a regional speciality and very much liked in the region. Both products are low cost items and thus are very popular even in rural areas.

3.2 Marketing Strategy

With systematic planning, the product can be sold through retailers round the year. Gooseberries are available from October to February-March whereas wild apples from June-July to October. The promoters should plan marketing network systematically beforehand.

4.0 MANUFACTURING PROCESS

The process of manufacture is simple and standardised. Fruits are completely washed in water, dried and are cut or sliced. Then they are boiled (blunging) for few minutes and water is drained. Then these pieces are soaked in thick syrup of sugar at 30-37 °C for 24 hours. Then they are soaked in higher sugar concentrate (65% to 70%) and about 5% citric acid is added to avoid crystallisation. For proper absorption of sugar syrup, soaking is done for around 30-36 hours. Then fruit pieces are cleaned and dried in tray dryer and then packed in bags of food grade plastic. Weight loss on account of dehydration is around 75%. The Process Flow Chart is as under:



5.0 CAPITAL INPUTS

5.1 Land and Building

There is no need to buy land and then undertake civil work. Instead a readymade shed of around 50 sq.mtrs. may be taken on rental basis.

5.2 Machinery

Rated capacity of 180 tonnes per year would require one electrically-operated dryer which would cost Rs. 100,000/- and eight SS vessels for soaking & boiling, weighing scales, sealing

machine and one gas-fired furnace with burners would need Rs.125,000/-. Thus, total cost of machinery would be Rs.2.25 lacs.

Machines will be available locally or from Industrial Equipments or Archana Machinery Stores of Guwahati.

5.3 Miscellaneous Assets

Other assets like furniture & fixtures, fruit-crates and plastic tubs, storage racks, packing tables etc. would need around Rs.75,000/-.

5.4 Utilities

Power requirement shall be 15 HP whereas water required for production, potable and sanitation purposes would be around 800 ltrs. every day. 4 LPG cylinders shall be required every month.

5.5 Raw and Packing Materials

The most critical material will be fully grown and matured gooseberries and wild apples. They are abundantly grown in forests of Nagaland. Sugar will be available from local market. Plastic bags made from food grade plastics will be required for inner and outer packing.

6.0 Manpower Requirements

Particulars	Nos.	Monthly Salary (Rs.)	Total Monthly Salary (Rs.)
Skilled Workers	1	2,250	2,250
Helpers	3	1,250	3,750
Salesman	1	2,500	2,500
		Total	8,500

7.0 TENTATIVE IMPLEMENTATION SCHEDULE

Activity	Period (in months)
Application and sanction of loan	1.5
Site selection and commencement of civil work	0.5
Completion of civil work and placement of orders for machinery	1.5
Erection, installation and trial runs	0.5

8.0 DETAILS OF THE PROPOSED PROJECT

8.1 Building

A readymade shed of 50 sq.mtrs. is adequate and shall be taken on rental as explained earlier.

8.2 Machinery

The total cost of machinery would be around Rs.2.25 lacs as discussed earlier.

8.3 Miscellaneous Assets

A provision of Rs.75,000/- is required as mentioned earlier.

8.4 Preliminary & Pre-operative Expenses

Pre-production expenses like establishment, registration and administrative charges, travelling, interest during implementation, trial runs etc. would call for expenditure of Rs.40,000/-.

8.5 Working Capital Requirements

Actual capacity utilisation in the first year is assumed to be 60% and at that level, the working capital needs would be as under:

(Rs. in lacs)

Particulars	Period	Margin	Total	Bank	Promoters
Stock of Finished Goods	1 Month	25%	0.50	0.38	0.12
Receivables	1 Month	25%	0.75	0.57	0.18
Working Expenses	1 Month	100%	0.25	--	0.25
		Total	1.50	0.95	0.55

8.6 Cost of the Project & Means of Financing

(Rs. in lacs)

Item	Amount
Building	Rental
Machinery	2.25
Miscellaneous Assets	0.75
P&P Expenses	0.40
Contingencies @ 10% on Machinery	0.25
Working Capital Margin	0.55
Total	4.20
Means of Finance	
Promoters' Contribution	1.30
Term Loan from Bank/FI	2.90
Total	4.20
Debt Equity Ratio	2.23 : 1
Promoters' Contribution	31%

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 & Build-up

As against the processing capacity of 180 tonnes, actual utilisation is considered to be 60% in the 1st year and 75% thereafter.

9.2 Sales Revenue at 100%

Processing of 180 tonnes would yield dehydrated gooseberries and wild apples of 45 tonnes. Considering selling price of Rs.35,000/- per ton, the annual income would be Rs.15.75 lacs.

9.3 Raw & Packing Materials at 100%

(Rs. in lacs)

Product	Qty. (Tonnes)	Price/Ton (Rs.)	Value
Gooseberries	90	2,250	2.02
Wild Apples	90	2,250	2.02
Sugar	-	-	1.90
Packing Material	--	--	1.00
		Total	6.94

9.4 Utilities

Requirements are discussed earlier. Annual cost would be Rs.75,000/-.

9.5 Selling Expenses

A sufficient provision of sales value every year would take care of expenses like selling commission, transportation and publicity.

9.6 Interest

Interest on term loan of Rs. 2.90 lacs is taken at 12% assuming repayment in 3 years including a moratorium period of 6 months and on working capital from bank it is computed @ 14% per annum.

9.7 Depreciation

It is calculated on WDV basis @ 10% on building and 20% on machinery and miscellaneous assets.

10.0 PROJECTED PROFITABILITY

(Rs. in lacs)

No.	Particulars	1st Year	2nd Year
A	Installed Capacity	----- 180 Tonnes -----	
	Capacity Utilisation	60%	75%
	Sales Realisation	9.50	11.90
B	Cost of Production		
	Raw and Packing Materials	4.15	5.20
	Utilities	0.45	0.57
	Salaries	1.02	1.15
	Stores and Spares	0.09	0.15
	Repairs & Maintenance	0.15	0.24
	Selling Expenses	1.35	1.70
	Administrative Expenses	0.30	0.45
	Total	7.51	9.46
C	Profit before Interest & Depreciation	1.99	2.44
	Interest on Term Loan	0.29	0.16
	Interest on Working Capital	0.14	0.18
	Depreciation	0.48	0.39
	Profit before Tax	1.08	1.71
	Income-tax @ 20%	--	0.34
	Profit after Tax	1.08	1.37
	Cash Accruals	1.56	1.76
	Repayment of Term Loan	0.55	1.10

11.0 BREAK-EVEN ANALYSIS

(Rs. in lacs)

No	Particulars	Amount	
[A]	Sales		9.50
[B]	Variable Costs		
	Raw and Packing Materials	4.15	
	Utilities (70%)	0.32	
	Salaries (70%)	0.70	
	Stores & Spares	0.09	
	Selling Expenses (70%)	0.95	
	Admn. Expenses (50%)	0.15	
	Interest on WC	0.14	6.50
[C]	Contribution [A] - [B]		3.00
[D]	Fixed Cost		1.80
[E]	Break-Even Point [D] ÷ [C]		60%

12.0 [A] LEVERAGES

Financial Leverage

$$= \text{EBIT/EBT}$$

$$= 1.15 \div 1.08$$

$$= 1.40$$

Operating Leverage

$$= \text{Contribution/EBT}$$

$$= 3.00 \div 1.08$$

$$= 2.78$$

Degree of Total Leverage

$$= \text{FL/OL}$$

$$= 1.40 \div 2.78$$

$$= 0.50$$

[B] Debt Service Coverage Ratio (DSCR)

(Rs. in lacs)

Particulars	1st Yr	2nd Yr	3rd Yr
Cash Accruals	1.56	1.76	2.00
Interest on TL	0.29	0.16	0.07
Total [A]	1.85	1.92	2.07
Interest on TL	0.29	0.16	0.07
Repayment of TL	0.55	1.10	1.25
Total [B]	0.84	1.26	1.32
DSCR [A] ÷ [B]	2.20	1.52	1.57
Average DSCR	----- 1.77 -----		

[C] Internal Rate of Return (IRR)

Cost of the project is Rs. 4.20 lacs.

(Rs. in lacs)

Year	Cash Accruals	24%	28%	32%
1	1.56	1.26	1.22	1.18
2	1.76	1.14	1.07	1.01
3	2.00	1.05	0.95	0.87
4	2.26	0.96	0.84	0.74
	10.12	4.41	4.08	3.80

The IRR is around 26%.