



# STARCH FROM TAMARIND SEEDS

## 1.0 INTRODUCTION

Tamarind trees are grown almost in all parts of the country with states like Karnataka, Orissa, Uttar Pradesh, Madhya Pradesh and Tamil Nadu being the major cultivation centres. Tamarind fruits are used for edible purposes and seeds are generally thrown away. These seeds could be used for producing starch which is used for sizing in textile industry and as a general adhesive material. This is one of the cheapest available non-edible starch. Production process is simple and easy and no special skills are required. It is necessary that adequate arrangements for procurement of tamarind seeds are made. The preferred locations are Bihar, Orissa, Uttar Pradesh, MP, TN and Karnataka.

## 2.0 PRODUCT

Starch made from tamarind seeds is non-edible. These seeds are generally thrown away and hence their use results in substantial value-addition. Yield from seeds is about 60%.

2.1 Compliance under the PFA Act is compulsory

## 3.0 MARKET POTENTIAL

Starch made from tamarind seeds is considered to be the cheapest non-edible starch with many industrial applications. Tamarind fruits are used for edible purposes and seeds are wasted. Processing of these seeds results in substantial value-addition. This starch is used by textile units and industries manufacturing starch based adhesives. Plywood industry is yet another bulk consumer. Thus, this product has growing market and with the anticipated growth in textile and plywood industry in coming years, demand is bound to go up.

#### 4.0 MANUFACTURING PROCESS

Tamarind seeds are roasted in oil-fired roaster and then they are decorticated to remove skin. Seeds are then broken into small pieces in a grinder. These broken pieces are finally pulverised to make starch. Starch is packed in polythene lined gunny bags. The yield is around 60%.

#### 5.0 CAPITAL INPUTS

##### 5.1 Land and Building

A readymade shed of around 125 sq.mtrs. can accommodate production area as well as storage and packing departments. Cost of such a shed is assumed to be Rs. 3.00 lacs.

##### 5.2 Machinery

Production capacity of processing 75 tonnes seeds every month or 900 tonnes per year with double shift working and 300 working days would require following machines.

Item	Qty.	Price (Rs.)
Oil-fired Roaster complete with accessories and electrical	1	85,000
Decorticator	1	30,000
Elevator with conveyer	1	60,000
Beater type pulveriser with cyclone separator, dust collector and electric motor	1	1,20,000
Weighing-scales, miscellaneous tools, storage drums etc.	--	25,000
	<b>Total</b>	<b>3,20,000</b>

##### 5.3 Miscellaneous Assets

Some other assets like furniture and fixtures, storage facilities, plastic tubs etc. shall be required for which a provision of Rs.40,000/- is made.

##### 5.4 Utilities

Power requirement shall be 50 HP whereas daily water requirement would be 750 ltrs. Roaster will need oil as fuel.

##### 5.5 Raw and Packing Materials

The most critical material would be tamarind seeds. Monthly requirement at 100% utilisation would be 75 tonnes which is not a small quantity. Hence, it is necessary that proper survey is undertaken and firm arrangements are made before finalising location of factory. Starch is packed in polythene-lined new gunny bags.

## 6.0 MANPOWER REQUIREMENTS

Particulars	Nos.	Monthly Salary (Rs.)	Total Monthly Salary (Rs.)
Skilled Workers	2	2,500	5,000
Semi-skilled Workers	2	1,750	3,500
Helpers	4	1,250	5,000
Salesman	1	2,500	2,500
		<b>Total</b>	<b>16,000</b>

## 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 Building

A readymade shed admeasuring to about 125 sq.mtrs. would be adequate and it may cost Rs.3.00 lacs as stated before.

### 8.2 Machinery

An expenditure of Rs.3.20 lacs is estimated towards the required equipments as explained earlier.

### 8.3 Miscellaneous Assets

An amount of Rs.40,000/- would take care of other support assets as stated earlier.

### 8.4 Preliminary & Pre-operative Expenses

A provision of Rs.50,000/- is made towards certain pre-production expenses like establishment, registration, administrative and travelling charges, interest during implementation, trial run expenses etc.

## 8.5 Working Capital Requirements

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

(Rs. in lacs)

Particulars	Period	Margin	Total	Bank	Promoters
Stock of Raw and Packing Materials	1 Month	30%	1.70	1.20	0.50
Stock of Finished Goods	½ Month	25%	1.20	0.90	0.30
Receivables	1 Month	25%	2.40	1.80	0.60
Other Expenses	1 Month	100%	0.40	--	0.40
		<b>Total</b>	<b>5.70</b>	<b>3.90</b>	<b>1.80</b>

## 8.6 Cost of the Project & Means of Financing

(Rs. in lacs)

Item	Amount
Building	3.00
Machinery	3.20
Miscellaneous Assets	0.40
P&P Expenses	0.50
Contingencies @ 10% on Building and Plant & Machinery	0.60
Working Capital Margin	1.80
<b>Total</b>	<b>9.50</b>
<b>Means of Finance</b>	
Promoters' Contribution	2.85
Term Loan from Bank/FI	6.65
<b>Total</b>	<b>9.50</b>
Debt Equity Ratio	2.33 : 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 & Build-up

As against the rated processing capacity of 900 tonnes, utilisation in the first year is assumed to be 60% and thereafter 75%.

### 9.2 Sales Revenue at 100%

Assuming selling price of Rs.9000/ton and yield of 60%, total sales revenue at 100% utilisation would be Rs. 48.60 lacs.

### 9.3 Raw and Packing Materials Required at 100%

(Rs. in lacs)

Product	Qty. (Tonnes)	Price/Ton (Rs.)	Value
Tamarind Seeds	900	3500	31.50
Chemicals	--	--	0.90
Polythene-lined Jute Bags	11000 Nos	Rs.16/- per Piece	1.76
		<b>Total</b>	<b>34.16</b>

### 9.4 Utilities

Annual cost of utilities like power, water and fuel for roaster at 100% utilisation would be Rs. 90,000/-.

### 9.5 Interest

Interest on term loan of Rs.6.65 lacs is computed @ 12% per annum considering complete repayment in 4 years including a moratorium period of 1 year and on working capital from bank it is calculated @ 14% per annum.

### 9.6 Depreciation

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

## 10.0 PROJECTED PROFITABILITY

(Rs. in lacs)

No.	Particulars	1st Year	2nd Year
<b>A</b>	<b>Installed Capacity</b>	<--- 900 Tonnes --->	
	Capacity Utilisation	60%	75%
	Sales Realisation	29.15	36.45
<b>B</b>	<b>Cost of Production</b>		
	Raw and Packing Materials	20.50	25.62
	Utilities	0.54	0.68
	Salaries	1.92	2.25
	Stores and Spares	0.18	0.30
	Repairs & Maintenance	0.30	0.42
	Selling and Admn. Expenses @ 5%	1.45	1.82
	<b>Total</b>	<b>24.89</b>	<b>31.09</b>
<b>C</b>	<b>Profit before Interest &amp; Depreciation</b>	<b>4.26</b>	<b>5.36</b>
	Interest on Term Loan	0.72	0.54
	Interest on Working Capital	0.56	0.70
	Depreciation	1.02	0.84
	Profit before Tax	1.96	3.28
	Income-tax @ 20%	0.40	0.65
	Profit after Tax	1.56	2.63
	Cash Accruals	2.58	3.47
	Repayment of Term Loan	--	2.00

## 11.0 BREAK-EVEN ANALYSIS

(Rs. in lacs)

No	Particulars	Amount	
<b>[A]</b>	<b>Sales</b>		<b>29.15</b>
<b>[B]</b>	<b>Variable Costs</b>		
	Raw and Packing Materials	20.50	
	Utilities (70%)	0.38	
	Salaries (70%)	1.34	
	Stores & Spares	0.18	
	Selling & Admn Expenses (50%)	0.72	
	Interest on WC	0.56	<b>23.68</b>
<b>[C]</b>	<b>Contribution [A] - [B]</b>		<b>5.47</b>
<b>[D]</b>	<b>Fixed Cost</b>		<b>3.51</b>
<b>[E]</b>	<b>Break-Even Point [D] ÷ [C]</b>		<b>64%</b>

## 12.0 [A] LEVERAGES

Financial Leverage

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

$$= 3.24 \div 1.96$$

$$= 1.65$$

**Operating Leverage**

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

$$= 5.47 \div 1.96$$

$$= 2.79$$

**Degree of Total Leverage**

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

$$= 1.65 \div 2.79$$

$$= 0.59$$

## [B] Debt Service Coverage Ratio (DSCR)

(Rs. in lacs)

Particulars	1st Yr	2nd Yr	3rd Yr	4th Yr
Cash Accruals	2.58	3.47	3.87	4.14
Interest on TL	0.72	0.54	0.30	0.12
<b>Total [A]</b>	<b>3.30</b>	<b>4.01</b>	<b>4.17</b>	<b>4.26</b>
Interest on TL	0.72	0.54	0.30	0.12
Repayment of TL	--	2.20	2.20	2.25
<b>Total [B]</b>	<b>0.72</b>	<b>2.74</b>	<b>2.50</b>	<b>2.37</b>
<b>DSCR [A] ÷ [B]</b>	<b>4.58</b>	<b>1.45</b>	<b>1.67</b>	<b>1.79</b>
<b>Average DSCR</b>	----- <b>2.37</b> -----			

**[C] Internal Rate of Return (IRR)**

Cost of the project is Rs. 9.50 lacs.

(Rs. in lacs)

<b>Year</b>	<b>Cash Accruals</b>	<b>16%</b>	<b>18%</b>	<b>20%</b>
1	2.58	2.22	2.19	2.15
2	3.47	2.58	2.49	2.41
3	3.87	2.48	2.36	2.24
4	4.14	2.29	2.14	2.00
	<b>14.06</b>	<b>9.57</b>	<b>9.18</b>	<b>8.80</b>

The IRR is around 17%.

**Some of the machinery suppliers are:**

1. D.P. Pulveriser Works, 12, Nagindas Master Road, Fort, Mumbai 400 023
2. B.Sen Barry & Co, 65/11, Rohtak Road, Karol Bagh, New Delhi - 110005
3. Lylapur Engg Co, PB. NO. 8, Gaziabad, UP
4. Gardener's Corp. 158, Golf Links, New Delhi - 110003