

PROJECT PROFILE

ON

PROCESSING OF JACK FRUIT

Month & Year
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**PREPARED BY
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B-22, INDUSTRIAL ESTATE
CHENNAI-600032**

Supported by

PROCESSING OF JACK FRUIT

1. Introduction

Around 320 million numbers of jack fruit is produced in Tamil Nadu and Kerala every year. At an average weight of 5 kilograms a piece, the total quantity is estimated at 1.5 million tons. Much of the product is wasted. The project aims to utilise the resources mainly raw and ripe fruit and convert them into a more acceptable product. The products that are being considered for processing and as a result of value addition are:

- Jack fruit jam from ripe fruit
- Jack chips from tender raw fruit
- Enrobed jack from the dried ripe fruit

2. Market

The major market outlets are the “ A” and “B” class stores. The product also finds placement in self service counters and departmental stores. Bakeries can also sell the product..

3. Packaging

- Jams are packed in 200 gram polyethylene cups.
- Jack chips are packed in 50 grams, 100 grams and multiples thereof in polypropylene or laminated polyester-poly pouches.
- Enrobed jack is packed in laminated polyester-poly pouches.

4. Production capacity

- The plant will be in operation for one shift a day. The product mix would be as follows:
 - 200 kilograms of jam from one tonne of the ripe fruit.
 - 200 kilograms of chips from 800 kilograms of the raw fruit.
 - 100 kilograms of enrobed jack titbits from 250 kilograms of the ripe fruit.
- The time period required for achieving full capacity utilization is one year.

5. Sales revenue

- With an ex-factory selling price at Rs. 70.00 per kilogram of jams, and Rs. 70.00 per kilogram each for titbits and chips, the total sales revenue would be Rs. 105.00 lakhs per annum.

6. Production process outline.

Jack fruit is a highly fibrous fruit. It has a thick wasted skin enclosing seeded fruit pods to which also adhere lots of fibrous tissue. Peeling and cleaning of the fruit to make it fit for processing is a difficult laborious process. Careful investigation reveals that the recovery of juice from the fruit that could be used for processing into jams is a maximum extent of 10% of the weight of the fruit. Thus a fruit weighing 5 kilograms yields about 500 grams of the juice that can be converted into jams.

The second aspect is the strong flavour of the fruit that makes it unpalatable. The flavour has to be removed to a large extent by exhaustion during the process. After extraction of the juice and pulp in the pulper, the extracted mass is taken to the kettle where it is cooked under the influence of jacketed steam. Sugar is then added in desired quantities and the mass further cooked with constant stirring till a thick fluid mass is formed with a reading of 65 to 70 degrees brix on the brix meter. After cooking, the required quantities of citric acid, pectin, flavours (cardamom) and colours are added and the mass stirred thoroughly. The mass after homogenous mixing is emptied into steel containers from where they are poured into cups of 200 grams capacity. On cooling, the jam sets. The cup is sealed after placing a foil paper at its top. The cup is covered with a lid, and placed in cartons, strapped prior to dispatch.

For production of chips, tender raw fruit is taken. After removing the fibrous matter, the slices are dried in the tray drier. After drying, they are fried in the thermostat frier, shaken to remove excess oil and dusted with salt and spices before being packed in the packing machine.

For production of enrobed jack titbits, the ripe fruit is cut into small squares of uniform size. They are then dipped into a vessel containing sugar or

jaggery solution with the former highly concentrated at 70 to 75 degrees brix.

The titbits are dried in the tray drier and packed in the packing machine.

7. Quality specifications

Jams

- A certificate of approval for production has to be obtained under the Fruit Products Order (FPO)
- The minimum soluble solids shall be 68%.
- The minimum fruit pulp content shall be 45%.
- When raspberries and strawberries are used, the minimum quantities shall be 25%.
- Only sugar, dextrose, invert sugar, liquid glucose, either singly or in combination can be used as sweetening agents.
- Jams shall not contain tartaric acid, agar or gelatin.
- The product should be free from mold and fungal growth.
- It should be free from any fermented odour, coliforms, salmonella and streptococci bacteria.
- If dried fruits are used, they shall be declared on the label.
- It can contain permitted flavours, colours and preservatives.

Chips

- Acidity of oil used as oleic acid - maximum 0.12%
- Peroxide value of oil used - nil.

8. Pollution control measures

Not necessary as there are no pollutants or effluents. However, the peel and seeds of fruits processed have to be disposed off carefully failing which it could pollute the surrounding areas on fermentation, yielding a foul odour.

9. Energy conservation measures

Common measures will do.

10. Land and construction cost for the proposed unit

The proposed unit is to be set up in a leased area. The total area required is 2000 square feet as described below:

| SI | Description | Sq. feet |
|-----------|--------------------------------|-------------|
| 1 | Processing area | 700 |
| 2 | Raw material store | 200 |
| 3 | Packing material store | 200 |
| 4 | Finished goods store | 200 |
| 5 | Laboratory space | 100 |
| 6 | Baby boiler area | 200 |
| 7 | Machinery spares room | 100 |
| 8 | Administration room | 100 |
| 9 | Toilet and miscellaneous space | 200 |
| 10 | Total | 2000 |

Lease rent – Rs. 6.00 per square foot; Total rent for the month – Rs. 12000

Lease advance – Rs. 40000

11. Costing of machinery and equipment

| SI | Description | Rs. lakhs |
|----|---|--------------|
| 1 | Jams | |
| A | Stainless steel working tools | 0.100 |
| B | Juice extractor or pulper | 0.353 |
| C | Steam jacketed kettle | 0.650 |
| D | Stirrer with motor and gear box | 0.350 |
| E | Bottle washing machine | 0.306 |
| F | Stainless steel working tables | 0.667 |
| G | Baby boiler and accessories | 1.250 |
| 2 | Jack fruit chips | |
| A | Thermostat fryers | 0.360 |
| B | Coating pan | 1.250 |
| 3 | Enrobed Jack Tidbits | |
| A | Coating pan | Listed above |
| B | Tray drier with two trolleys and 72 trays | 1.600 |
| C | Packing machine | 1.650 |
| 4 | Total cost of machinery | 8.533 |
| 5 | Laboratory equipment | 0.500 |

| | | |
|---|--|--------------|
| 6 | Total cost of machinery and equipment | 9.033 |
|---|--|--------------|

12. Project cost

| SI | Description | Rs. lakhs |
|-----------|-------------------------------------|------------------|
| 1 | Land | On lease |
| 2 | Civil works | On lease |
| 3 | Plant machinery | 8.533 |
| 4 | Laboratory equipment | 0.500 |
| 5 | Transport vehicle (Tata Ace) | 3.760 |
| 6 | Pollution control equipment | 0.000 |
| 7 | Energy conservation equipment | 0.000 |
| 8 | Cost of power connection | 0.250 |
| 9 | Cost of electrification | 0.500 |
| 10 | Erection and commissioning | 0.850 |
| 11 | Cost of machinery spares | 0.250 |
| 12 | Cost of office equipment | 1.000 |
| 13 | Deposits if any | 0.400 |
| 14 | Company formation expenses | 0.100 |
| 15 | Gestation period expenses | 0.500 |
| 16 | Sales tax registration expenses | 0.100 |
| 17 | Initial advertisement and publicity | 5.000 |
| 18 | Contingencies | 0.250 |
| 19 | Working capital margin money | 3.000 |
| 20 | Total | 24.993 |

13. Working capital requirements per month

a. Salaries and wages

| SI | Description | No of persons | Total salary / month (Rs. lakhs) |
|-----------|---------------------------------|----------------------|---|
| 1 | Production Manager (female) | 1 | 0.150 |
| 2 | Supervisor cum chemist (female) | 1 | 0.100 |
| 3 | Skilled workers | 1 | 0.060 |
| 4 | Unskilled workers | 3 | 0.120 |
| 5 | Packing workers | 2 | 0.080 |
| 6 | Administrative staff | 1 | 0.100 |
| 7 | Driver | 1 | 0.070 |
| 8 | Total | 10 | 0.680 |

b. Raw material requirement per month

| SI | Description | Qty (kgs) | Rate / kg (Rs) | Value (Rs. lakhs) |
|----|---------------------------------|-----------|----------------|-------------------|
| 1 | Jack Fruit Jam | | | |
| A | Jack fruit | 3500 | 10.00 | 0.350 |
| B | Sugar | 2000 | 24.00 | 0.480 |
| C | Pectin, flavours, preservatives | 105 | 120.00 | 0.126 |
| 2 | Jack Fruit Chips | | | |
| A | Raw Jack Fruit | 4000 | 10.00 | 0.400 |
| B | Oil | 1200 | 80.00 | 0.960 |
| C | Salt and spices | 100 | 40.00 | 0.040 |
| 3 | Enrobed tidbits | | | |
| A | Ripe Jack Fruit | 2000 | 10.00 | 0.200 |
| B | Jaggery, Sugar | 1300 | 24.00 | 0.312 |
| C | Cardamom green | 2 | 300.00 | 0.006 |
| 4 | Total raw material | | | 2.874 |

c. Packaging material requirement per month

| SI | Description | Qty | Rate / unit (Rs) | Value (Rs. lakhs) |
|----|--|-----------|------------------|-------------------|
| 1 | Jack fruit jam | | | |
| A | Primary packing material – 200 ml cups with foil and lid | 25250 nos | 3.00 | 0.757 |
| B | Cartons and straps | 1010 nos | 40.00 | 0.404 |
| 2 | Jack fruit chips | | | |
| A | Primary packing film | 200 kgs | 132 | 0.264 |
| B | Cartons and straps | 1010 nos | 40.00 | 0.404 |
| 3 | Enrobed Tidbits | | | |
| A | Primary packing film | 100 kgs | 132.00 | 0.132 |
| B | Cartons and straps | 505 nos | 40.00 | 0.202 |
| 4 | Total packing material | | | 2.163 |

Grand total raw + packaging material - Rs 5.037 lakhs

d. Utilities per month

| SI | Description | Rs. lakhs |
|-----------|------------------------------------|------------------|
| 1 | Power 1000 kwh @ Rs. 5.50 per unit | 0.055 |
| 2 | Water | 0.050 |
| 3 | Boiler fuel | 0.250 |
| 4 | Total utilities | 0.355 |

e. Contingent expenses per month

| SI | Description | Rs. lakhs |
|-----------|---|------------------|
| 1 | Rent for processing shed | 0.120 |
| 2 | Postage and stationery | 0.010 |
| 3 | Telephones, fax etc. | 0.050 |
| 4 | Consumable stores | 0.020 |
| 5 | Repairs and maintenance | 0.070 |
| 6 | Local transports, loading and unloading | 0.100 |
| 7 | Advertisement and publicity @ 5% of sales | 0.400 |
| 8 | Insurance | 0.008 |
| 9 | Sales expenses @ 1% of sales | 0.080 |
| 10 | Miscellaneous expenses @ 1% of sales | 0.080 |
| 11 | Trade incentives @ 2% of sales | 0.160 |
| 12 | Taxes @ 4% | 0.320 |
| 13 | Total contingent expenses | 1.418 |

f. Total working capital requirement per month

| SI | Description | Rs. lakhs |
|-----------|-------------------------------------|------------------|
| 1 | Salaries and wages | 0.680 |
| 2 | Raw material and packaging material | 5.037 |
| 3 | Utilities | 0.355 |
| 4 | Contingent expenses | 1.418 |
| 5 | Total | 7.490 |

14. Means of finance

| SI | Description | Rs. lakhs |
|----|------------------------------|-----------|
| 1 | Total Project Cost | 24.993 |
| 2 | Equity | 8.248 |
| 3 | Debt | 16.745 |
| 4 | Working capital margin money | 3.000 |

15. Financial analysis

| SI | Description | Rs. lakhs |
|----|--|---------------|
| 1 | Total recurring cost per year | 89.880 |
| 2 | Depreciation on land and building | 0.000 |
| 3 | Depreciation on machinery and vehicle | 1.196 |
| 4 | Depreciation on furnaces | 0.000 |
| 5 | Depreciation on moulds and fixtures | 0.020 |
| 6 | Depreciation on office equipment | 0.100 |
| 7 | Interest on long term loan @ 13.5% | 2.260 |
| 8 | Interest on short term borrowings@ 13.5% | 0.606 |
| 9 | Total cost of production | 94.062 |

16. Turnover per year

| SI | Item | Qty | Rate/unit (Rs) | Total Rs. lakhs |
|----|------------------|------------------|----------------|-----------------|
| 1 | Jack Fruit jam | 60000 kgs | 70.00 | 42.00 |
| 2 | Jack fruit chips | 60000 kgs | 70.00 | 42.00 |
| 3 | Enrobed tidbits | 30000 kgs | 70.00 | 21.00 |
| 4 | Total | 15000 kgs | | 105.00 |

17. Viability analysis

| SI | Description | Value |
|----|--|--------|
| 1 | Net profit before income tax (Rs. lakhs) | 10.938 |
| 2 | Net profit ratio | 10.4% |
| 3 | Internal rate of return | 18.6% |
| 4 | Break even percentage | 44% |
| 5 | Debt service coverage ratio | 2.016 |

List of machinery suppliers for processing of Jack Fruit

1. Geeta Food Engineering, Plot No. C - 7 / 1, TTC Industrial Area, Pawana MIDC, Thane - Belapur Road, Behind Savita Chemicals, Navi Mumbai 400705. Maharashtra.; Tel: 022 - 27906450; Fax: 022 – 27906451
2. Agaram Industries, 126, Nelson Road, Aminjikarai, Chennai, 600029, ; Tel: 044-23741413; Fax: 044-23741529
3. Royal Scientific Industries, T.S.74A, SIDCO Industrial Estate, Ekkatuthangal, Chennai. 600097., Tel: 044-22254749
4. Heat and Control (S) Pvt. Ltd., E-2, 3rd Avenue, Anna Nagar, East, Chennai. 600102., Tel: 044-26212943