

CANNING UNIT: CANNED Fruits &Vegetable PRODUCTS, MANGO

1. INTRODUCTION

Canning is an important, safe method for preserving food if practiced properly. The canning process involves placing foods in glass jars or food grade containers and heating them to a temperature that destroys micro-organisms that cause food to spoil. During this heating process air is driven out of the container and as it cools a vacuum seal is formed. This vacuum seal prevents air from getting back into the product bringing with it contaminating microorganisms.

Canning provides a shelf life typically ranging from one to five years, although under specific circumstances it can be much longer. A freeze-dried canned product, such as canned dried lentils, could last as long as 30 years in an edible state. There are two safe ways of processing food, the boiling water bath method and the pressure canner method.

The high percentage of water in most fresh foods makes them very perishable. They spoil or lose their quality for several reasons: growth of undesirable microorganisms such as bacteria, molds, and yeasts; activity of food enzymes; reactions with oxygen and moisture loss. Canning avoids all these four causes to make food safe and healthy.

2. PRODUCTS AND ITS APPLICATION:

Canned and bottled fruit and vegetable products, depending on its form are used for direct consumption or may add to make other food products, e.g., sweetened mango pulp can be used for direct consumption whereas natural mango pulp can be used in making mango drinks, mango jams, mango fruit bars, etc. Lot of categories of canned foods such as: canned fruit pulps, canned brined vegetables, canned curried vegetables, canned sauces, canned pickles, whereas, bottled foods can be produced in same facilities are: jams, pickles, ketchup, sauces, chutneys, dips, etc.

Proposed Capacity & Product-Mix:

It is proposed to have capacity to process 2 tons of mangoes per hour to produce 1 ton of mango pulp per hour. In similar facility, one can produce canned vegetables: brined and curried; and other products as mention in above paragraph. The proposed product-mix can be as follow:

| Sr. No. | Product | TPA |
|----------------|---------------------|------------|
| 1 | Canned Veg. Curried | 900.00 |
| 2 | Pickles | 720.00 |
| 3 | Mango Pulp | 720.00 |
| 5 | Sauces &Chutneys | 720.00 |
| 6 | Canned Veg. Brine | 720.00 |
| | Total | 3,780.00 |

3. DESIRED QUALIFICATION FOR PROMOTER:

The entrepreneur must be aware of market of canned food products as well sourcing of raw materials to be used in making the products. The entrepreneur can hire technocrat for process but must be able to work out product costing as the canned food market is very competitive. A science graduate or technocrat is preferable to run the unit efficiently and economically.

4. INDUSTRY OUTLOOK/ TREND

Fruits and vegetable processing business in India has vast potential due to ample availability of raw materials and government target to reduce drastically the present loss of 30% in storage and transportation. Moreover the demand for canned fruits and vegetables is increasing day by day on account of rise in Per Capita Income, urbanization, lifestyle and growth of organized retailing.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

The food processing industry is one of the largest industries in India & ranks 5th in terms of production, consumption & exports. As per the estimates for FY15, food processing sector stood at USD258 billion. In FY16, food processing industry constituted more than 8 per cent to India's GDP through manufacturing.

India is the world's 2nd largest producer of fruits and vegetables. The government expects the processing in this sector to grow by 25 per cent of the total produce by 2025. In 2015-2016, the total production in horticulture (fruits & vegetables) is estimated at 282.5 million tones. Europe is the largest market for canned fruit and vegetables in the world, representing more than 42% of total world imports.

India's packaged food (including canned foods) market is set to witness a quantum of \$50 billion in 2017. Indian food and retail market is projected to touch US\$ 482 billion from present US \$ 258 billion.

Raw material requirements:

| Sr. No. | Raw Material | Qty. in MT |
|---------|---------------------|------------|
| 1 | Mangoes | 1,440 |
| 2 | Other Fruits | 200 |
| 3 | Vegetables | 810 |
| 4 | Sugar | 72 |
| 5 | Citric Acid | 5 |
| 6 | Acetic Acid | 2 |
| 7 | Spices | 10 |
| 8 | Preservatives, etc. | 0.50 |
| 9 | Salt | 5 |
| | Total | |

6. MANUFACTURING PROCESS:

Canned Mango Pulp and Other Products:

Fully ripe mangoes are subjected to first thorough washing followed by inspection and cutting simultaneously. Mangoes are cut longitudinally manually and then conveyed to pulping unit through bucket elevator. Generally two stage pulping unit is used in the most of canning plant to crush mangoes into pulp. Skins and stones are separated in pulping unit and are collected from different chutes. Fibrous pulp produced in first stage is further refined to remove fibers from it. Thus prepared pulp is collected in dosing or collection tank. It is then pumped into a standardization tank where if necessary, sugar, citric acid, etc. are added to get required brix and acidity. The standardized pulp is then pasteurized and pumped to break-pressure tank of filling station. The pulp is filled into pre-sterilized OTS cans of required size through rotary can filling machine. Cans are then seamed, sterilized in retorts and cooled in a water tank before labeling and packing.

Vegetables-In-Brine & Curried Vegetables:

Fresh vegetables and pulses delivered at the site are first wash thoroughly to remove dust, dirt, stones etc. Some vegetables are needed to be cut or trim before further processing. Peas, gram beans and rajma need to be de-hulled. Also, vegetables are subjected to slicing or cutting into cubes, shreds, etc., either manually or mechanically. Potatoes, carrots, etc. are subjected to abrasive peeling for removal of outer skins. Thus prepared vegetables and pulses are cooked together in a steam jacketed pan. Gravy for vegetables is prepared from chopped tomatoes, butter, yoghurt, garlic etc. in a separate pan. Both are mixed and then other ingredients like salt, spics, oils etc., are added. Thus prepared curried vegetables and pulses are then filling into pre-sterilized OTScans up to required quantity. Cans are seamed and sterilized in a retort. Hot cans are cooled and labeled.

7. MANPOWER REQUIREMENT:

| Manpower Requirements | Persons |
|-----------------------|---------|
| Technical Staff | 11 |
| Adm. Staff | 8 |
| Marketing Staff | 15 |
| Labour | 90 |
| Total | 124 |

8. IMPLEMENTATION SCHEDULE:

| Project Stages | Months | | | | | | | | | |
|---------------------------|-------------|-------------|-------------|-------|--------|--------|-----|-------|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Purchase of Land | Yellow | Yellow | Yellow | | | | | | | |
| Completion of Building | Green | Green | Green | Green | Green | Green | | | | |
| Ordering of Machinery | Light Green | Light Green | Light Green | | | | | | | |
| Delivery of Machinery | | | | Red | Red | Red | | | | |
| Term/Wkg Loan Sanction | | Blue | Blue | Blue | Blue | | | | | |
| Installation of Machinery | | | | | Orange | Orange | | | | |
| Commissioning of Plant | | | | | | | Red | Red | | |
| RM/Inputs Procurement | | | | | | Purple | | | | |
| Manpower Appointments | | | | | | Blue | | | | |
| Commercial Production | | | | | | | | Green | | |

9. COST OF PROJECT:

Cost Of Project

| No. | Costing Heads | Qty. | Rate/Unit | Rs. Lakh |
|-----|------------------------|-------|-----------|---------------|
| 1 | Land in Sq. M. + Expn. | 1,500 | 1,000.00 | 15.00 |
| 2 | Building in sq. m. | 1,500 | 9,000.00 | 135.00 |
| 3 | Plant & Machinery | | | 149.97 |
| | Total | | | 299.97 |

10. MEANS OF FINANCE:**Means of Finance**

| Sr. No. | Means Heads | Rs. Lakhs |
|---------|-------------------|---------------|
| 1 | Promoters Capital | 74.99 |
| 2 | Term Loan | 174.98 |
| 3 | MFPI Subsidy | 50.00 |
| | Total | 299.97 |

11. WORKING CAPITAL CALCULATION:**Working Capital Calculation**

| Particulars | Total Amount | Stock Period Days | Value of Stock Period | Promoter Margin | Promoter Share | Bank Borrowings |
|------------------|-----------------|-------------------|-----------------------|-----------------|----------------|-----------------|
| Raw Material | 460.60 | 15 | 23.03 | 0.60 | 13.82 | 9.21 |
| Packing Material | 1,202.44 | 30 | 120.24 | 0.75 | 90.18 | 30.06 |
| Work in Process | 2,086.77 | 3 | 20.87 | 0.40 | 8.35 | 12.52 |
| FP Stock | 2,250.00 | 15 | 112.50 | 0.40 | 45.00 | 67.50 |
| Bills Receivable | 2,250.00 | 15 | 112.50 | 0.40 | 45.00 | 67.50 |
| Working Expense | 25.00 | 30 | 2.50 | 1.00 | 2.50 | 0.00 |
| Total: | 8,274.81 | | 391.64 | | 204.85 | 186.79 |

12. LIST OF MACHINERY REQUIRED:

| Sr. No | Equipments | Cap. | Qty. |
|--------|-------------------------------------|---------|------|
| | Preparatory Section | | |
| 1 | F&V Washer with Blower/Conveyor | 2 TPH | 1 |
| 2 | Leafy Vegetable Washer | 1 TPH | 1 |
| 3 | Three Way Inspection Conveyor | 2 TPH | 1 |
| 4 | Bi-Furcation Chute | 2 TPH | 1 |
| 5 | Abrasive Peeler for Root Vegetables | 500 KGH | 1 |
| 6 | De-watering Centrifuge/Belt | 500 KGH | 1 |
| 7 | Inspection Belt | 500 KGH | 1 |
| 8 | Bucket Elevator | 2 TPH | 1 |
| 9 | Fruit Halving Machine | 2 TPH | 1 |
| 10 | Cut F&V Conveying Belt | 2 TPH | 1 |
| | | | |

| Lemon Juice Extraction Section | | | |
|---------------------------------------|-----------------------------|----------|---|
| 11 | Lemon Juice Extractor | 2 TPH | 1 |
| 12 | SS 316 Collection Tank | 500 lit | 1 |
| 13 | Pumping Unit | 500 LPH | 1 |
| 14 | Duplex Strainer | 500 LPH | 1 |
| 15 | SS 316 Collection Tank | 500 lit | 1 |
| 16 | Pumping Unit | 500 LPH | 1 |
| 17 | Juice Clarifier | 500 LPH | 1 |
| 18 | SS 316 Juice Holding Tank | 1000 Lit | 1 |
| 19 | Plate Heat Exchanger | 500 LPH | 1 |
| 20 | Vacuum Pan SS 316 with Pump | 500 LPH | 1 |

| Sr. No. | Equipments | Cap. | Qty. |
|--|-----------------------------------|--------------|-------------|
| Lemon Oil Extraction Section | | | |
| 21 | Peel Oil Extractor SS 316 | 500 LPH | 1 |
| 22 | Pumping Unit | 500 LPH | 1 |
| 23 | Duplex Filter/Pressure Filter | 500 LPH | 1 |
| 24 | SS 316 Collection Tank | 500 lit | 1 |
| 25 | Centrifuge Separator | 1500 LPH | 1 |
| 26 | Pumping Unit | 500 LPH | 1 |
| 27 | SS 316 Collection Tank | 100 Lit | 1 |
| Tropical F&V Processing Section | | | |
| 28 | Pulping Unit Two Stage | 2 TPH | 1 |
| 29 | SS 304 Collection Tanks | 500 Lit | 1 |
| 30 | Pumping Unit | 500 LPH | 1 |
| 31 | Standardization Tanks | 500 lit | 1 |
| 32 | Hot Break System for Tomato | 1000 LPH | 1 |
| 33 | Fruit Crusher SS 304 | 1000 LPH | 1 |
| 34 | WN Screw Pump | 1000 LPH | 1 |
| 35 | SS 316 Collection Tank | 500 Lit | 2 |
| Utility & Other Equipments | | | |
| 36 | Steam Boiler & Pipelines/Fittings | 2 TPH | 1 Lot |
| 37 | Effluent Treatment Plant | 20 KL/Day | 1 Lot |
| 38 | Electrification, DG Set, | for 200 | 1 Lot |

| | | | |
|----|------------------------------|------------|-------|
| | Transformer | hp | |
| 39 | Material Handling Equipments | As reqd. | 1 Lot |
| 40 | Laboratory Equipments | As reqd. | 1 Lot |
| 41 | RO Plant | 10K lit/hr | 1 Lot |
| 42 | Working Platform | As reqd. | 1 Lot |
| 43 | Waste Conveyors | As reqd. | 1 Lot |
| 44 | Canning Equipments | As reqd. | 1 Lot |
| 45 | SS Pipeline and Fittings | As reqd. | 1 Lot |
| 46 | SS Inspection Tables | As reqd. | 1 Lot |
| 47 | SS Trolleys | As reqd. | 1 Lot |
| 48 | SS Scoopers | As reqd. | 1 Lot |
| 49 | SS Jugs (2 Lit) | As reqd. | 1 Lot |

- Bajaj Processpack Limited
B-136, Sector-63, Noida-201001, Uttar Pradesh
Noida - 201301,
Uttar Pradesh
- Rinac India Limited
No.-5, SaraswathiNivas, Ulsoor,
Bangalore -560008,
Karnataka

13. PROFITABILITY CALCULATIONS:

| No. | Particulars | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|----------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| A | Gross Sales | 1575 | 1800 | 2025 | 2025 | 2025 |
| | Less: | | | | | |
| 1 | Raw Materials, Rs. 1/lit | 322.42 | 368.48 | 414.54 | 414.54 | 414.54 |
| 2 | Packing Material | 841.708 | 961.952 | 1082.196 | 1082.196 | 1082.196 |
| 3 | Fuel | 60.48 | 69.12 | 77.76 | 77.76 | 77.76 |
| 4 | Power | 47.04 | 53.76 | 60.48 | 60.48 | 60.48 |
| 5 | Manpower | 143.6292 | 162.0432 | 180.4572 | 180.4572 | 180.4572 |
| 6 | Sundry Expenses | 17.5 | 20 | 22.5 | 22.5 | 22.5 |
| 7 | Interest on Term Loan | 14.7 | 16.8 | 18.9 | 18.9 | 18.9 |
| 8 | Interest on WC Loan | 21 | 24 | 27 | 27 | 27 |
| 9 | Repairs & Maintenance | 7 | 8 | 9 | 9 | 9 |
| B | Production Cost | 1475.477 | 1684.155 | 1892.833 | 1892.833 | 1892.833 |
| C | Gross Profit (A-B): | 99.5228 | 115.8448 | 132.1668 | 132.1668 | 132.1668 |
| | Taxes @ 30% | 29.85684 | 34.75344 | 39.65004 | 39.65004 | 39.65004 |
| | Net Profit | 69.66596 | 81.09136 | 92.51676 | 92.51676 | 92.51676 |

Note: The profitability basis and projections are indicative and on approximate basis only.

14. BREAKEVEN ANALYSIS:

| Particulars | Rs. In lakhs |
|----------------------------|--------------|
| Break Even Point | |
| Annual Fixed Cost x100/ | 40.85 |
| Annual Fixed Cost + Profit | |

15. CRITICAL FACTORS FOR THE PROJECT:

- The plant site must have proximity to required quality raw materials because of very perishable nature, if possible with cold storage facilities and easy accessibility through roads.
- Branding is possible in canned mango pulp, pickles, chutneys, sauces, dips, ketchup, etc. need sizeable investment in promoting the products as well in creating distribution network.

- Doing B2B business or contract manufacturing (co-packer) is preferable provided such contracts are available as well required quality of infrastructure is available.
- Waste disposal and waste utilization need proper attention to avoid pollution law conflicts as well good revenue generation.
- Skilled manpower, abundant water of required quality, internet accessibility, good roads and market assessment are key critical factors.

16. STATUTORY/ GOVERNMENT APPROVALS

There is statutory requirement of FSSAI license for setting up of food processing industry. Moreover, MSME& GST registration, IEC Code for Export of end products and local authority clearance may be required for Shops and Establishment, for Fire and Safety requirement and registration for ESI, PF and Labour laws may be required if applicable. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

Organic fruits and vegetables demand is growing world over. Promoter may think of canning organic fruits and vegetables. For this purpose backward integration can be done by growing required raw materials. Forward integration is also possible by doing IQF and frozen fruits and vegetables for local and export market.

18. TRAINING CENTERS/COURSES

For food processing industry training and short term courses are available at Indian Institute of Food Processing Technology, Thanjavur, Tamil Nadu and Central Food Technological Institute, Mysore, Karnataka and 'Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.'

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.