

# **CANNING UNIT: 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	1,440.00
2	Other Fruits	200.00
3	Vegetables	810.00
4	Sugar	72.00
5	Citric Acid	5.00
6	Acetic Acid	2.00
7	Spices	10.00
8	Preservatives, etc.	0.50
9	Salt	5.00
	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										
Completion of Building										
Ordering of Machinery										
Delivery of Machinery										
Term/Wkg Loan Sanction										
Installation of Machinery										
Commissioning of Plant										
RM/Inputs Procurement										
Manpower Appointments										
Commercial Production										

## 9. COST OF PROJECT:

### Cost Of Project

No.	Costing Heads	Qty.	Rate/Unit	Rs. Lakh
1	Land in Sq. M. + Expn.	1,500.00	1,000.00	15.00
2	Building in sq. m.	1,500.00	9,000.00	135.00
3	Plant & Machinery			149.97
	<b>Total</b>			<b>299.97</b>

**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
	<b>Total</b>	<b>299.97</b>

**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
<b>Total:</b>	<b>8,274.81</b>		<b>391.64</b>		<b>204.85</b>	<b>186.79</b>

**12. LIST OF MACHINERY REQUIRED:**

Sr. No	Equipments	Cap.	Qty.
	<b>Preparatory Section</b>		
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

Sr. No.	Equipments	Cap.	Qty.
	<b>Lemon Juice Extraction Section</b>		
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
	<b>Lemon Oil Extraction Section</b>		
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
	<b>Tropical F&amp;V Processing Section</b>		
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
	<b>Utility &amp; Other Equipments</b>		
36	Steam Boiler & Pipelines/Fittings	2 TPH	1 Lot
37	Effluent Treatment Plant	20 KL/Day	1 Lot
38	Electrification, DG Set, Transformer	for 200 hp	1 Lot

Sr. No.	Equipments	Cap.	Qty.
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
<b>A</b>	<b>Gross Sales</b>	<b>1575</b>	<b>1800</b>	<b>2025</b>	<b>2025</b>	<b>2025</b>
	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>B</b>	<b>Production Cost</b>	<b>1475.477</b>	<b>1684.155</b>	<b>1892.833</b>	<b>1892.833</b>	<b>1892.833</b>
<b>C</b>	<b>Gross Profit (A-B):</b>	<b>99.5228</b>	<b>115.8448</b>	<b>132.1668</b>	<b>132.1668</b>	<b>132.1668</b>
	Taxes @ 30%	29.85684	34.75344	39.65004	39.65004	39.65004
	<b>Net Profit</b>	<b>69.66596</b>	<b>81.09136</b>	<b>92.51676</b>	<b>92.51676</b>	<b>92.51676</b>

The proposed unit will have the production capacity of 3780 MT per year. The unit cost of power is taken at Rs. 8. The depreciation on building is taken at the rate of 5% whereas for plant and machinery it is at 10%.

The average sales price of canned product is taken at the rate of Rs.59,500 per MT for proposed project.

### 14. BREAKEVEN ANALYSIS:

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

## **15. 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.

## **16. 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.

## **17. 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.

Udyamimitraportal ( link : [www.udyamimitra.in](http://www.udyamimitra.in) ) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

### **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.