TOMATO PRODUCTS

PRODUCT CODE	:	202402002
QUALITY AND STANDARDS	:	As per Fruit Product Order (FPO), 1955 and PFA,Act 1954. Relevant ISI Specification are: Tomato Juice IS 3881 : 1966 Tomato Ketchup IS 3882 : 1966 Tomato Puree IS 3883 : 1966
PRODUCTION CAPACITY	:	Quantity (per annum): Tomato Juice 24,000 Kg. Tomato Puree 24,000 Kg. Tomato Ketchup 60,000 Kg Value : Rs. 48,72,000
MONTH AND YEAR OF PREPARATION	:	May, 2003
PREPARED BY	:	Small Industries Service Institute 34, Industrial Estate, Nunhai, Agra-282006 Phone No. : 2240545, Fax : (0562) 2240544, 2146122

INTRODUCTION

Tomato, though botanically a fruit for the purpose of trade, is generally considered a vegetable because of the way in which it is consumed. Tomatoes are widely grown in all parts of the world. However, the yield per hectare is the highest (245 tonnes/hect.) in Netherlands. The world average yield of tomato is 23 tonnes per hectare. Indian average yield of tomato is 9.6 tonnes per hectare. Tomato products such as puree, juice, ketchup are commonly used commodities in households, hotels and restaurants. These items are used to enhance the taste of different food products. Tomato puree is used as a substitute of fresh tomato in cooking. Ketchup is a sweeter and diluted version of puree(Pulp). Tomato sauce tastes sweet and sour. Both sauce and ketchup are consumed with food and snacks. Tomato is a valuable raw material used for processed products such as juice, puree, and paste, ketchup/sauce, and canned whole. The recent scientific advances have revolutionised tomato processing industries.

This project profile has been prepared for production of Tomato Juice, Tomato Ketchup and Tomato Puree.

MARKET POTENTIAL

Due to increasing standards of living in the cities and the rapid urbanization taking place in the rural areas,

consumption of tomato based products is expected to go up steadily. At present, the market of ketchup/puree, specially in the urban areas, is dominated by brands likes MEGGI and KISSAN. Some Medium and Small Companies are also engaged in its production. Estimated production of Sauce/Ketchup etc. in North India was around 4000 MT in 1995. The estimated demand for the products for the same period was 10000 MT which is expected to grow upto 12000 MT by 2005 AD. Thus presence of a demand supply gap of 6000 MT can be observed which may reach a figure of 8000 MT in 2005 AD. Thus there is ample scope for a unit to come up in this product sector to cater especially to the semi urban and rural sectors of north India. Tomato processing in India is still not very significant. Recently, there was a steady rise in production due to the entry of multinationals with better market infrastructure and sales promotion campaigns.

With high fluctuation in market prices of fresh tomatoes in the urban market, there are good prospects for tomato juice, and tomato puree in place of fresh tomatoes in household sector. Besides the boom in the food service sector including fast food chain, has widened the demand potential for tomato ketchup and soups.

Experiments have shown that advertisement and publicity have influenced the pattern of consumption of tomato products. Besides, tomato products have good export potential especially in the Middle East.

BASIS AND PRESUMPTIONS

1. The Project Profile has been prepared on the basis of single shift of 8-hrs. a day and 25-working days in a month at 75% efficiency.
2. It is presumed that in the Ist year, the capacity utilization will be 70% followed by 85% in the next year and 100% in the subsequent years.
3. Depreciation on machinery and equipments has been taken @ 10%. Depreciation on office furniture has been taken @ 20% per annum.
4. The rates given for salaries and wages for skilled workers and others are on the basis of the minimum rates in the State of U.P.
5. Interest rate for the fixed and working capital has been taken @ 14% on an average whether financed by the bankers or financial institutions.
6. The margin money required is minimum 30% of the total capital investment.
7. The rental value for the accomodation of office, workshop and other covered area has been taken @ Rs. 20/- per Sq. Mtr.
8. The rates for machinery, equipment and raw materials are those prevailing at the time of preparation of the project profile and are likely to vary from place to place and supplier to supplier. When a tailor made project profile is prepared, necessary changes are to be made.
9. The pay back period may be 5-years after the initial gestation period.
10. The gestation period in implementation of the project may be to the tune of 6 to 9 months which includes making all arrangements, completion of all formalities, market surveys and tie-ups etc. Once all the above

arrangements are made and quality/standards achieved, 100% project capacity may be achieved at the end of three years.

11. To run the unit throughout the year, other fruit products such as squashes and juices can be prepared with addition of a few machinery and equipments.

IMPLEMENTATION SCHEDULE

The implementation of the project includes various jobs/exercises such as procurement of technical know how, transfer of technology, market surveys and tie-ups, preparation of project report, selection of site, registration, financing of project, procurement of machinery and raw materials etc., recruitment of staff, erection/ commissioning of machines, trial production and commercial production etc. Project implementation will take a period of 8 months from the date of approval of the scheme. Break-up of activities, with relative time for each activity is shown below:

Activity	*Period (In Months)*
1. Scheme Preparation and approval	0-1 month
2. SSI Provisional Registration	1-2 months
3. Sanction of loan and FPO licence etc.	2-5 months
4. Clearance from State Pollution Control Board	3-4 months
5. Placement of order for machinery and delivery	4-5 months
6. Installation of machines	6-7 months
7. Power Connection	6-7 months
8. Trial run	7-8 months
9. Commercial Production	9 months onwards

TECHNICAL ASPECTS

Process of Manufacture

Special varieties of tomatoes like scarlet globe, early red bonny best, pondrosa, seoux, pasaruby, marglobe, etc. are suitable for preparation of processed products of tomato.

Tomato Juice

Fully ripe well developed colour tomatoes are washed, trimmed, steamed, crushed in a crusher or cut into pieces with knives. The crushed pieces are heated in the steam jacketted kettle till they become quite soften. The heated tomatoes are passed through the pulping machine using a fine mesh sieve to separate juice from seeds and the skin. The sugar and salt @ 1% is added and heated to 85-90ºC. The hot juice is then filled in bottles, sealed immediately and processed sterlised in boiling water for about 30 minutes and cooled.

Tomato Puree

The juice obtained as above is concentrated under vacuum to about 9% to 12% total solids so as to get tomato puree. The product is filled in bottles, crown corked and processed in boiling water for 30 min. and cooled.

Tomato Ketchup

The juice obtained as above is concentrated with spices, salt, sugar, etc. The spices like cloves, cardamom, pepper, cinnamon and other ingredients etc. are tied loosely in a muslin cloth and placed in boiling juice in steam Jacketted Kettle. The sugar, salt and

vinegar or acetic acid, etc. are added later on.

Generally concentration is done three-fold. It is concentrated to 28 to 30% solids in which 12% are tomato solids. The final product could be preserved by addition of sodium benzoate @ 750 ppm. The tomato ketchup is filled hot into clean, dry bottles, crown corked and processed in boiling water for 30 minutes and cooled at room temperature.

Quality Control and Standards

The manufacture of processed fruits and vegetables is controlled by the Fruit Products Order (FPO), 1955 of the Govt. of India. The Fruit Products Order, 1955 is mandatory for tomato products. The tomato products should conform to specifications laid down in FPO.

The FPO specifications are as follows:

i) Tomato Juice: 5% total solids.

ii) Tomato Puree: 9% total solids. Sodium Benzoate 250 ppm

iii) Tomato Ketchup: 25% total solids. Acidity: 1.0% Sodium Benzoate: 750 ppm

The Bureau of Indian Standards has laid down the following specifications for tomato products:

i) Tomato Juice: IS:3881:1966.

ii) Tomato Ketchup: IS:3882:1966.

iii) Tomato Puree: IS:3883:1966.

Now in this era, the entrepreneurs may adopt HACCP and ISO 9000 certification.

Pollution Control

There is no major pollution problem associated with the project. However, material waste (skin, seeds, etc.) are the main effluents for which the provision of treatment has been made in the profile. The entrepreneurs may however, contact the concerned State Pollution Control Board for detailed guidance in the matter. Minimum height of shed will be maintained and exhaust fans should be installed for removing congestion with proper ventilation, removal of cokes fumes etc. are to be maintained as per FPO guidelines.

Recipe for Final Product

	Soup	Ketchup	Sauce
Tomato Juice (Hot)	2 5 Kg.	10 Kg	10 Kg.
Onion (chopped)	20 gm.	118 gm.	100 gm.
Garlic (chopped)	2 gm.	10 gm.	10 gm.
Headless Clove	1 gm.	5 gm.	4 gm.
Small Cardamom	1 gm.	2 gm.	1 gm.
Black Pepper	1 gm.	2 gm.	1 gm.
Cuminseed	1 gm.	2 gm.	1 gm.
Mace	1 gm.	1 gm.	1 gm.
Cinnamon	1 gm.	5 gm.	4 gm.
Sugar	200 gm.	583 gm.	748 gm.
Salt	20 gm.	92 gm.	110 gm.
Red Chilli Powder	2 gm.	2 gm.	5 gm.
Glacial Acetic Acid	4 ml.	23 ml.	20 ml.
Sodium Benzoate	0.85 gm.	3.7 gm.	4.29 gm.
Final Batch Weight	1 Kg.	4.2 Kg.	4.85 Kg.

Production Capacity (per annum)

Tomato Juice		24,000 Kg.
Tomato Puree		24,000 Kg.
Tomato Ketchup		60,000 Kg.
	Total	Rs. 48,72,000

Motive Power 15 K.W.

Energy Conservation

The following steps may be taken for the conservation of energy:

1. Machinery and equipment parts, which are revolving and reciprocating should be properly, lubricated from time to time with suitable lubricant oil.
2. Layout of the unit should be in such a way that no back tracking of material is there.
3. All electric switches may be turned off, when not required.
4. The entire transmission belt will be tightened before starting the work wherever applicable.
5. As far as possible solar energy and day light will be used keeping all the other lights off.
6. As far as possible inductive load of motor will be reduced and high power factor be used with the aid of capacitors of appropriate sizes.

FINANCIAL ASPECTS

A. Fixed Capital

i) Land and Building	Amount (In Rs.)
Land and Building (rented) @ Rs 20 Sq. meter p.m. Covered Area 150 Sq. meters	3,000

ii) Machinery and Equipment

Sl. No.	Description	Qty.	Amount (In Rs.)
	(a) Production Unit		
1.	Steam boiler 150 kg/hr.	1	1,20,000
2.	Washing machine (Rotary rod Washer equipped with spray arrangement, collection tank, etc.) with 10 HP motor	1	90,000
3.	S.S. tilting type steam jacketted kettle of cap. 100 gallons	1	60,000
4.	S.S. tilting type steam jacketted Vacuum kettle of cap. 100 gallons	1	70,000
5.	Pulper cap. 1/2 ton per hr. with 3 HP motor	1	40,000
6.	Exhaust and processing tank	1	25,000
7.	Pasteuriser tank (500 lit. cap.)	1	15,000
8.	Bottle washing machine with two heads complete with 1/4 HP motor	1	15,000
9.	Vacuum filling machine (cap. 10 to 15 bottles/minute)	1	18,000
10.	Water storage tank cap. 500 lit. (HDPE)	4	2000
11.	Misc. equipment such as buckets, cutting and peeling knives, etc.	L.S.	10,000
12.	Weighing balance 500 gm to 5 kg capacity	1	5,000
13.	Crown cork machine	1	3,000
14.	Weighing Scales platform type	1	15,000
15.	Working Tables Al Top	4	32,000
16.	Laboratory Equipment (brix meter, etc.)	1 set	20,000
17.	Pollution Control Equipment	L.S	60,000
18.	Office furniture and fixtures		10,000
19.	Electrification and installation charges @ 10%		40,000
	Total		6,50,000
iii)	Pre-operative Expenses		20,000
	Total Fixed Capital (ii+iii)		6,70,000

B. Working Capital (per month)

(i) Staff and Labour

Sl. No.	Designation	Salary	Total (In Rs.)
	(a) Administrative and Supervisory		
i)	Production Manager	6000	6,000
ii)	Store-keeper	4000	4,000
iii)	Accountant	3000	3,000
iv)	Salesman	3000	9,000
v)	Peon/Watchman	2000	2,000
vi)	Sweeper	1500	1,500
	(b) *Technical*		
i)	Food Technologist	5000	5,000
ii)	Supervisor	4000	4,000
iii)	Foreman/Mechanic	3000	3,000

Sl. No.	Designation	Qty.	Total (In Rs.)
iv)	Skilled Worker/Boiler man	3000	9,000
v)	Helper	1200	3,600
	Total		50,100
	Perquisites @ 15%		7,515
	Total		57,615
	Or Say		57,600

(ii) Raw Material

Description	Qty.	Rate (In Rs.)	Total (In Rs.)
Tomatoes	25000 Kg	4 Kg	1,00,000
Sugar	1000 Kg	15 Kg	15,000
Common Salt	500 Kg	5 Kg	2,500
Spices, garlic, ginger, etc.	L.S.	—	10,000
Colour	L.S.	—	1,000
Sodium benzoate	10 Kg	150	1,500
Glass bottle (1 kg. capacity)	6000	5	30,000
Glass bottle (500 gm cap.)	6000	4	24,000
Crown caps	12000	0.25	3,000
Plastic caps	12000	0.50	6,000
Label straps	12000	0.50	6,000
Corrugated box	1200	6	7,200
Breakage of bottles, caps, etc.	L.S.	—	2,000
Cleaning powder	L.S.	—	2,000
Miscellaneous			20,000
	Total		2,30,200

(iii) Utilities	Amount (In Rs.)
Power	
Total connected load including light assuming 8 hours operation	15 KW
Consumption per hour @ 2.75 = 8×15×25×2.75	8,250
Water (10,000 Ltrs. day)	500
Boiler fuel	3,000
Total	11,750

(iv) Other Contingent Expenses	Amount (In Rs.)
1. Postage and Stationery	2,000
2. Advertisement and Publicity, Legal Fee etc.	7,000
3. Telephone	1,000
4. Repair and Maintenance	2,000
5. Transportation	10,000
6. Rent	3,000
7. Consumable	2,000
8. Sales Expenses	4,000
9. Insurance	2,000
10. Miscellaneous Expenses	2,500
Total	35,500

(v) Total Recurring Expenditure	Amount (In Rs.)
1 Salary and Wages	57,600
2. Raw Material	2,30,200
3. Utilities	11,750
4. Other Contingent Expenses	35,500
Total	3,35,050
Say	3.35 lakhs

vi) Working Capital (for 3 months) Rs. 10,05,000

C. Total Capital Investment

	Amount (In Rs.)
i) Fixed Capital	6,70,000
ii) Working Capital (for 3 months)	10,05,000
Total	16,75,000

MACHINERY UTILIZATION

In case of tomato products, the bottleneck operation is preparation of tomato juice. Efforts should be made that all machinery and equipments are properly serviced at regular intervals for maximum utilisation of machines as the process involves some manual operations also. It is expected that during

first year machinery utilization will be 70% with 85% during second year to be followed by 100% in subsequent years.

FINANCIAL ANALYSIS

1. Cost of Production (per annum)	Amount (In Rs.)
Total Recurring Cost per year	40,20,000
Depreciation on machinery and equipment @ 10%	60,000
Depreciation of office equipment and furniture @ 20%	2,000
Interest on total capital investment @ 14%	2,34,500
Total	43,16,500

2. Turn-over (per month)

Assuming 50% product of Tomato Juice from the raw tomato, the juice produced is 12,500 kg. out of which 2000 Kg. juice is sold in the form of Tomato Juice and 2500 Kg. tomato juice to form 2000 Kg. of tomato puree and the rest 8000 Kg. juice is again boiled and processed to produce 5000 kg. tomato ketchup.

Item	Bottle cap.	Per month	Per annum	Rate (In Rs.)	Total (In Rs.)
Tomato Juice	1 kg	1000	12000	30	3,60,000
-do-	500 gm	2000	24000	17	4,08,000
Tomato Puree	1kg	1000	12000	38	4,56,000
-do-	500 gm	2000	24000	22	5,28,000
Tomato Ketchup	1 kg	2500	30000	48	14,40,000
-do-	500 gm	5000	60000	28	16,80,000
			Total		48,72,000

So Net Sales
(turn over) (per year)= Rs. 48,72,000

3. Net Profit
(per annum) *(Before Income Tax)*
Sales – Cost of Production= Rs. 5.555 lakhs

4. Net Profit Ratio

$$= \frac{\text{Net Profit} \times 100}{\text{Turn over}}$$

$$= \frac{5.555 \times 100}{48.72}$$

$$= 11.4\%$$

5. Rate of Return

$$= \frac{\text{Net Profit} \times 100}{\text{Total Investment}}$$

$$= \frac{5.555 \times 100}{16.75}$$

$$= 33.16\%$$

6. Break-even Point

(1) Fixed Cost (per annum)	Amount (In Rs.)
(a) Total Depreciation (on m/c. and equipment, dies, tools, furniture)	62,000
(b) Rent	36,000
(c) Interest on Total Investment	2,34,500
(d) Insurance	24,000
(e) 40% of salary	2,76,480
(f) 40% of other contingent expenses excluding insurance	1,60,800
Total	7,93,780

B.E.P.

$$= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost + Profit}}$$

$$= \frac{7,93,780 \times 100}{7,93,780 + 5,55,500}$$

$$= 13,49,280$$

$$= 60\%$$

Addresses of Machinery Suppliers

1. M/s. B. Sen Berry and Co.
65/11, New Rohtak Road,
Karol Bagh,
New Delhi–110005.
2. M/s. Eastend Engineering Co.
173/1, Gopal Lai Thakur Road,
Kolkata–700 035.
Phone Nos. 577-3416, 577-6324
3. M/s. Jyothy Industries
No. 31, Pampamahakavi Road,
Bangalore–560 004.
Ph. Nos.: 6679697 (O),
6677852 (R)
4. M/s. Hyderabad Tulaman Limited
9-1-87, Sarojini Devi Road,
Secunderabed–500 025.

Ph. No.:7701369,
Telex and Fax : 7702845.

5. M/s. Kalpana Boilers
18, Kailash Park, Chirag Nager, L.B. Shastri Marg, Ghatkopar (W), Mumbai-36.
6. M/s. Urjex Industries
S-26, Industrial Estate, Partapur, Meerut-250102 (UP).
7. M/s. Energy Pack Boilers Pvt. Ltd.
5, "Prabhu Park" Purnima Co-operative Housing Society, Opp. Anand Balwadi,
Race Course Circle,
Baroda-390 007.
8. M/s. Aroras Box and Cartons Pvt Ltd.
39th K.M., Delhi-Jaipur Road (N.H.No. 8),
Gurgaon-122 001 (Haryana).
9. M/s. Jain Packaging Products
33, Sarai Pipal Thala, Behind Mangat Ram Dal Mill, Subzi Mandi, Azadpur, Delhi-110033.
10. M/s. Ambica Packers and Printers
2687, Kinari Bazar, Dariba Kalan, Delhi-110 006.
11. M/s. Control Print (India) Ltd.
A-27, Swasthya Vihar, Vikas Marg, Delhi-110 092.
12. M/s. Cowal Can Ltd.
Industrial Area, Barotiwala, District Solan, (H.P.).
13. M/s. Poysha Industries Corporation Ltd.
Nehru House,
4, Bahadur Shah Zafar Marg, New Delhi-110002.
14. M/s. Tali Mohammed and Co.
114/45, Sarany St.,
Near M.J. Phule Market,
Mumbai-400003.

Raw Material Suppliers

Local dealers.