1 ASEPTIC JUICE CONCENTRATE

1.1 Introduction

There has been a remarkable growth in the demand for the juice concentrates due to the soaring popularity of new non-alcoholic and alcoholic fruit drink products, ice cream, yoghurt and baby food etc. A combination of fruit & vegetable syrups or concentrates are being used as flavors in all the above discussed product categories. The soft drink market is also creating huge demand for the concentrates. The move away from alcoholic drinks and the relative inconvenience of hot drinks has resulted in a major shift to packaged soft drinks of all flavours, which are deemed to be most suitable for consumption 'on the move' as part of today's busy lifestyles.

Further, the confectionery industry has followed the suit and new products are now constituted by fruit and vegetable concentrates as part of their confectionery formulations and processes.

Consumers are demanding healthier options while at the same time have increased concerns about food safety risks, two trends that may often conflict with each other in juice concentrate processing. To address the demand for juice concentrate without synthetic or chemical preservatives manufacturers are exploring new preservation methods like aseptic processing.

1.2 Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up unit of Aseptic Juice Concentrate, technology and financial parameters of various components for preparation and submission of project proposal to bank for sanction of long term loan. This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility

The project aims at establishing processing unit for preparing aseptic fruit concentrates. These concentrates are the residues, prepared after evaporation of water from fruit and vegetable juices in order to maintain quality, prolonged shelf life and optimize the transport and storage cost.

1.3 Raw Material Availability

The area and production of major fruits in MP are given in the table below:

	2004-05

Fruit	Area (Ha)	Prod (MT)
Mango	6,886.00	62,000.00
Orange	14910	238600
Mosambi	236	3800
Lime	1051	16800
Banana	14941	597600
Guava	2763	55300
Papaya	684	18500
Grapes	100	2500
Other Fruits	6285	37700
Total Fruits	47,856.00	1,032,800.00

1.3.1 Suitable Location

These units can be established in concentrated fruit production zones. Major clusters of fruits production in the State are – Rewa, Jabalpur, Satna, Chhindwara, Mandsaur, Shajapur, Hoshangabad, Khargone and Dhar.

1.4 Market Opportunities

1.4.1 International Market

According to the International Federation of Fruit Juice Producers which includes eight member countries (Germany, Austria, Spain, France, Israel, Malta and UK) has estimated high consumption of soft and fruit drinks among them. France has registered an annual growth of 20% in past many years. Per capita consumption of fruit juice in USA in 46 lt., Germany – 39 lt., Holland- 24 lt., UK-19 lt., Spain-15 lt., Japan-15 lt., France 12 lt. & Italy 8 lt. Per capita consumption of soft drink is the highest in Norway-122.7 lt., followed by UK – 113 lt Sweden – 92.2 lt, Holland-90 lt., Germany – Ireland-&-Austria, each 85 lt and France – 62 lt. These figures indicate potentiality of exporting Fruit Juice Concentrates to European market. Brazil is the world leader in citrus fruit juices and nectars trade. Brazil exported 14.8 million hectoliters of refrigerated orange juice concentrate to various countries.

1.4.2 Indian Market

The fruit juice industry has made good progress in the country and according to trade sources:

- The total market for fruit drinks, Nectars has reported growth of 10 -15% per annum in the past. The major players in this sector are Parle, Pepsi, Coke, On juice, Real
- The Indian market for fruit juices is of approximately 150 crores, reporting the annual growth of 25-30% per year.

- The new sector which has potential to be explored is combination of various products like Fruit and milk combination, Fruit-yogurt drinks that are towards more natural fortified drinks based on health and taste theme.

1.4.3 Market Potential

As per FAIDA (Food & Agri. Integrated Development Action) report prepared by CII and Mckinsey & Co. inc., currently fruit drink market has grown to Rs. 2000 crores in 2005 in India. This indicates high potential for increasing production base of fruit juice concentrates in India. Apart from local market, ITC-Geneva has forecasted that international market of fruit and soft drinks at the rate of 20% per annum.

1.5 Gap analysis

The industry is still confined to small-scale level with share of home sector being 44 per cent, while cottage and small scale sector contribute 33 per cent and large scale has share of only 9 per cent and real labeler being 14 per cent.

1.6 Capacity

A project with rated capacity of 2100 ltrs per annum of aseptic juice concentrate.

1.7 Basis of assumptions

- Plant operation considered for 300 working days and 20 hrs working per day
- Plant can process fruit juices, fruit pulps conc., fruit pastes & purees as well as some vegetables juices & pulps.
- Aseptic filling and packing is recommended for sale of products in international market. Processing & utility equipments are available indigenously.

1.8 Available Technologies & Selection of Technology

Manufacturing of fruit juices/pulps and concentrates by canning and vacuum concentration method has been in practice for many years. Canned fruit juices & concentrates have maximum shelf life of one year. Further, there are chances of deterioration of products packed in cans by either development of pressure inside the can or bacterial contamination. Therefore, new technology of aseptic filling and packing is adopted today worldwide for avoiding these chances. For maximum extraction of juice and pulp, hot break system is considered better process which is recommended in this project.

During last seventy year methods for concentration of food liquids have been developed. Among these, Evaporating Concentration, Freeze Concentration and Membrane

Concentration (or Reverse Osmosis) are commercially exploited. As freeze concentration and membrane concentration are very expensive technology, here evaporating concentration technology is considered. In evaporating concentration also double-effect falling film evaporator has more advantages over single effect falling film evaporator.

1.9 Manufacturing Process in Brief

After obtaining juice, it is subjected to vacuum concentration, Vacuum concentrator operate on vacuum with steam requirement of 570 kgs/hr and water requirement of 5000 liters/hr (water requirement can be brought down to negligible level if cooling tower is installed). In evaporator, juice is subjected to heating at 100°C under vacuum to concentrate from 25°C to 60°C. Vacuum concentrator is equipped with aroma recovery unit. The exit temperature for concentrate will be 15°C and then is allowed to cool at 10°C. The concentrates are then stored in 3.1 liters cans, 200 liters carboys or 220-240 Kgs. drums.

Process for manufacturing baby food: Puree or paste of Banana, Carrots, Guava etc. are mixed together in mixing & standardization tanks, where other ingredients are also added along with the required amount of water and preservatives. Thus prepared pasted is then homogenized, pasteurized and filled into cans or bottles.

Baby food thus prepared is highly nutritious and in USA, “GERBER” brand baby food of this style is very well accepted. Infants get good amount of Vit.C, Vit. A., minerals, iron and other valuable nutrients from such baby foods.

1.10 Critical aspects for achieving products with high quality standards

- Starting from feeding of raw materials into processing line to packing of final product, all stages of process need careful handling, precise controlling of processing parameters, avoiding of bacterial contamination and strict maintenance of plant and personal hygiene, are extremely necessary.
- The key factors influencing concentration of fruit pulps/juices are rheological properties of fluid fruit products, evaporation rate, fouling, heat sensitivity of fluid fruit products and steam and cooling water consumption.
- Great care is required for retention of aroma for which an efficient aroma recovery process needs to be installed with the plant.
- Operation of aseptic filling and packing system need careful handling and observance of strict hygienic standards in that particular closed area or room.

1.11 Project component and cost

Major components of the projects and their costs are described in the table hereunder:

1.12 Land and Building

Particulars	Unit	Qty	Cost/unit	Total
LAND & BUILDING				**414.25**
Land	SqM	10,500	250.00	26.25
Land Development				
Land Area		10,500	500.00	52.50
Building				
Production Block				
Main Production Area	SqM	3,000	5,000.00	150.00
Store cum packing room & Sales Counter	SqM	2,500	5,000.00	125.00
Misc Handling Area	SqM	1,500	2,000.00	30.00
Contingencies		10%		30.50
PLANT & MACHINERY				**240.00**
PLANT & MACHINERY	LS	1	20,000,000.00	200.00
Contingencies		20%		40.00
MISCELLANEOUS FIXED ASSETS				**30.00**
Misc. Assest	LS	1	2,500,000	25.00
Contingencies		20%		5.00
PRE-OPERATIVE EXPENSES				**25.19**
Establishment		1	1,070,000	10.70
Pre- Operative Interest		1	969,100	9.69
Security Deposits		1	480,000	4.80
TOTAL				**709.44**

1.13 Plant and Machinery

The total cost of the plant and machinery is Rs. 240 Lakhs.

1.14 Building

The main production block will cost around Rs. 335.50 lakhs.

1.15 Miscellaneous Assets

A provision of Rs. 30 lakhs would take care of all the requirements.

1.16 Preliminary & Pre-operative Expenses

A provision of Rs. 25.19 lakhs would take care of pre-production expenses like establishment, professional charges, security deposits etc.

1.17 Working capital assessment

ITEMS	Year 1	Year 3	Year 5
STOCK OF RAW MATERIAL & PACKING MATERIAL	70.88	94.50	94.50
SUNDRY DEBTORS	192.38	256.50	256.50
TOTAL	**263.25**	**351.00**	**351.00**
MARGIN	65.81	87.75	87.75
MPBF	197.44	263.25	263.25
INTEREST ON WC	21.72	28.96	28.96

1.18 Means of finance

EQUITY CAPITAL			43.55%	**337.63**
MOFPI SUBSIDY	25%	50.00	6.45%	**50.00**
TERM LOAN				
FINANANCIAL INSTITUTIONS		10.00%	50.00%	**387.63**
-Payable half yearly Installments	10	38.80		
TOTAL			100%	**775.25**

1.19 Cash flow statement

PARTICULARS	Year 1	Year 3	Year 5	Year 7
SOURCES OF FUNDS				
EQUITY CAPITAL	-	-	-	-
SUBSIDY				
NET PROFIT	121.28	182.53	177.24	174.05
(INTEREST ADDED BACK)				
DEPRECIATION	39.43	39.43	39.43	39.43
PRELIMINARY EXP.W/O	3.60	3.60	3.60	3.60
INCREASE IN TERM LOAN	-	-	-	-
INCREASE IN BANK BORROWINGS-WC	197.44	26.33	-	-
TOTAL	**361.74**	**251.88**	**220.27**	**217.08**

1.20 Projected balance sheet

PARTICULARS	Year 1	Year 3	Year 5	Year 7
LIABILITIES				
EQUITY CAPITAL	337.63	337.63	337.63	337.63
RESERVES & SURPLUS	110.80	337.48	608.45	898.35
TERM LOAN	348.83	193.63	38.43	-
BANK BORROWINGS-WC	197.44	263.25	263.25	263.25
TOTAL	994.69	1,131.99	1,247.75	1,499.23

1.21 Projected profit and loss account

Particulars	Year 1	Year 3	Year 5	Year 7
INCOME	897.75	1,197.00	1,197.00	1,197.00
EXPENDITURE	733.45	971.44	976.73	979.92
VARIABLE	585.01	775.96	775.96	775.96
FIXED	148.44	195.48	200.77	203.96
GROSS PROFIT	164.30	225.56	220.27	217.08
PROFIT BEFORE TAX	60.80	128.39	138.62	145.10
RETAINED PROFIT	60.80	128.39	138.62	145.10

1.22 Key indicators

NET PRESENT VALUE at current Inflation (Rs. in lakhs)	**1,032.43**
INTERNAL RATE OF RETURN %	**25.06**
AVERAGE DSCR	**2.06**
BREAK EVEN POINT %	**65.54**
PAY BACK PERIOD (YEARS)	**4.74**

1.23 Manpower Requirement

PARTICULARS		**NO.**
SUPERVISORY STAFF		
	GENERAL MANAGER	1
	PRODUCTION SUPERVISOR	3
	MARKETING MANAGER	1
	ACCOUNTANT / STORE KEEPER	4
WORKERS		
	SKILLED WORKERS	3
	SEMI-SKILLED LABOUR	6

1.24 Assumptions

Project & Financing			
Contingencies on Building			10%
Contingencies on Equipment			20%
Term Loan			50%
Rate of Interest on Term Loan			10%
Subsidy Considered	Subject to ceiling		25%
Expected time of Installation		Months	10
Moratorium		Months	6
CAPACITY			
Rated Capacity Per Annum	80% of Installed capacity	TPA	2100
Number of Operational Days	DAYS		210
Working Hours Per day	Hrs		20
CAPACITY UTILIZATION			
Year I			75%
Year II			90%
Year III			100%
SALES PRICE			
W S Price			57000
OTHER EXPENSE			
Commission			10.0%
Marketing Expenses			2.5%
POWER			
Connected Load	HP		120
DEPRICIATION AS PER COMPANY'S ACT			
BUILDING			3.34%
PLANT & MACHINERY			10.34%
MISC. FIXED ASSETS			7.07%
LAND & SITE DEVELOPMENT			1.63%
MAINTENANCE			
BUILDING			1.00%
PLANT & MACHINERY			3.00%
MISC. FIXED ASSETS			2.00%
LAND & SITE DEVELOPMENT			1.00%

1.25 Sources of technology / Machinery

- Alfa Laval India Ltd. Dapodi, Pune-411012
- FMC Asia pacific Inc, Saki Naka, Mumbai-400072
- Larsen and Tourbo Ltd., Powai works, Mumba-400072
- Mather & Plant (India) Ltd, Chinchwad, Pune-411019
- SSP Pvt. Ltd. DLF Ind Area, Phase-II, Faridanbad-121003

The actual cost of projects may deviate on change of any of the assumptions.