VINEGAR

1.0 INTRODUCTION

Vinegar is an important preservative and condiment and it is being produced since centuries. It is produced through the action of acetic acid bacteria on dilute solutions of ethyl alcohol derived from yeast fermentation. It is also produced from fermented cider, fruit juices or other fermented alcoholic solutions derived from barley malt, hydrolysed cereals and starches. Vinegar is labelled according to the material used in its production e.g. malt vinegar or cider vinegar etc. There are many manufacturers producing synthetic vinegar but not much who produce from fruits. This note considers production of vinegar from fruits.

2.0 PRODUCT

2.1 Applications

Vinegar is produced since centuries and used as preservative and condiment. It contains around 5% acetic acid in water, varying amount of fixed fruits acids, salt, colouring materials and some other fermentation products with characteristic aroma and flavour. It is used as a table enricher in vegetarian and non-vegetarian as well as Chinese food preparations. This product is ideally suited in industrially developed states. This note considers UP as the preferred location.

2.2 Availability of know-how and Compliances

CFTRI, Mysore, has successfully developed the technical know-how. Compliances under the FPO and PFA Act are mandatory.

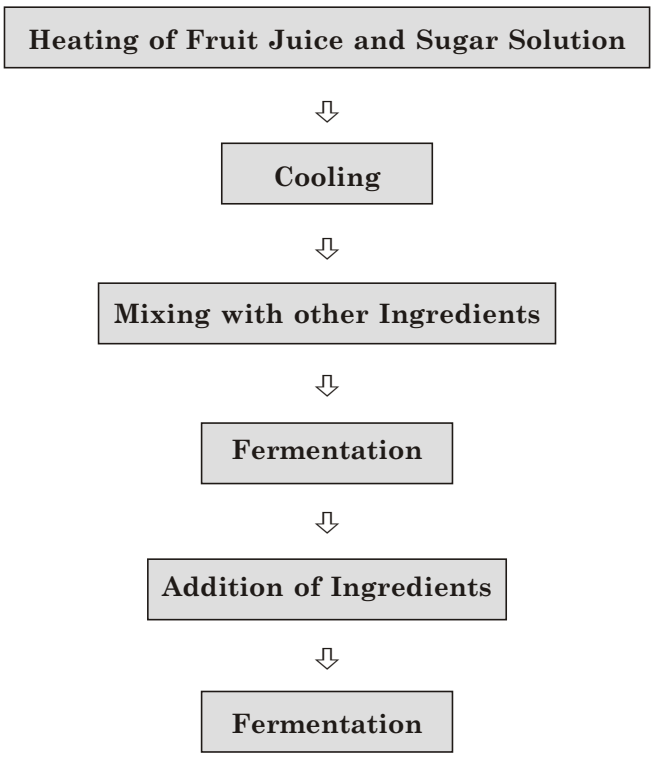
3.0 MARKET POTENTIAL

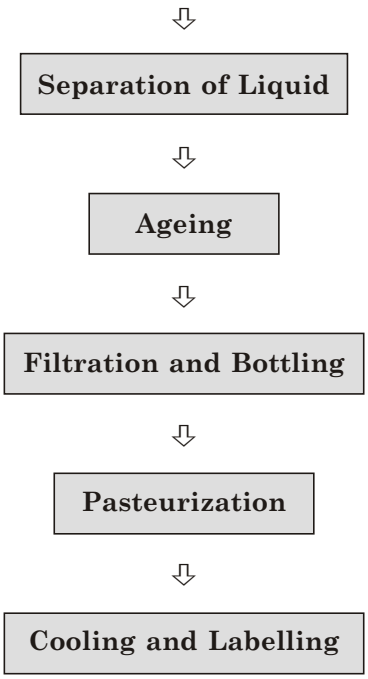
Vinegar is a very good preservative as well as condiment and is in vogue since long. It is used in many vegetarian and non-vegetarian and Chinese food preparations and snacks. It

has got its own aroma and flavour. It is also used as a table enricher. Market for vinegar is wide spread. Its domestic use is limited but it is used in large quantities in restaurants, clubs and canteens and by the caterers. There are some established brands in the market like Chings, Weikfield etc. Their products are priced in the range of Rs. 100-110 per ltr. Hence, a new entrant has to offer a very competitive price. Price assumed in this note is Rs. 85/ltr. Production capacity of the unit does not warrant big spending on advertising. Instead retailers should be offered commission as well as special incentives. Free sampling in 10-15 ml. packs can also be thought off. Tie-up with some bulk consumers even by offering 15-20% discount can be worked out as in case of bulk and direct supplies packing cost would go down and there would be saving of selling commission as well.

4.0 MANUFACTURING PROCESS

The process of manufacture calls for thorough knowledge and expertise and it is advisable to engage the services of an expert. To start with, fruit juice and sugar solution of around 16 Brix is heated at around 180^{o} C for a minute and then it is cooled. Then one cake of crushed yeast and phosphates, potassium salt and sugar are mixed with this liquid thoroughly and this solution is placed in clean jug or jar and its mouth is closed with a plug of cotton. These jars are placed in a dark and warm place for around 75-80 hours. Then fresh juice or sugar solution is added and the solution is kept in fermentation tanks for further fermentation which takes around 85-90 hours. Maintenance of appropriate temperature during fermentation is very crucial for good quality vinegar. On completion of fermentation, yeast and fruit pulp settle to form a compact mass at the bottom of the tank. Fermented liquid is separated from it. When the vinegar is ready, it is further stored to improve its quality. This is done in tanks or barrels which are closed. After around 4-5 days, colours etc. are blended in vinegar and it is filtered before filling it in bottles. Sealed bottles are pasteurised for about 30 minutes and then cooled, labelled and packed. The process flow chart is as under:





5.0 CAPITAL INPUTS

5.1 Land and Building

A plot of around 200 sq.mtrs. with built-up area of 100 sq.mtrs. shall be required. Factory building would have processing room, fermentation room and storage room for ageing apart from other facilities. Cost of the land is considered to be Rs. 60,000/- whereas building may cost Rs. 2.50 lacs.

5.2 Machinery

Rated production capacity of 30,000 ltrs. per year with 300 working days would require following set up:

Item	Qty.	Price (Rs.)
Gas-fired Furnaces	2	10,000
Fruit Juice Extractors	2	20,000
SS Pump	1	15,000
SS fermentation tanks with stirrers of 200 Ltrs. Cap.	6	90,000
Pasteurising Tanks	2	20,000
Air-compressor for air-circulation	1	15,000
Aluminium blending tanks	4	30,000
Ageing tanks or barrels	6	60,000
Bottle Washing, Filling and Capping M/c	1	70,000
Weighing scales, plastic tubs, SS utensils,		
laboratory equipments, etc.	--	35,000
	Total	**3,65,000**

5.3 Miscellaneous Assets

Other assets like furniture & fixtures, storage racks, packing tables etc. would cost Rs. 35,000/-.

5.4 Utilities

Power requirement shall be 15 HP whereas per day water requirement will be 1500 ltrs. 6 LPG cylinders shall be required every month.

5.5 Raw and Packing Materials

The all-important raw material will be fruits. Many fruits are grown round the year and availability would not be a problem. Other materials like yeast, sugar, salt, chemicals and colours shall be available locally. Glass bottles with caps, labels and cartons shall be required for packing.

6.0 MANPOWER REQUIREMENTS

Particulars	Nos.	Monthly Salary (Rs.)	Total Monthly Salary (Rs.)
Skilled Workers	2	2,500	5,000
Helpers	3	1,250	3,750
Salesman	1	2,500	2,500
		Total	**11,250**

7.0 TENTATIVE IMPLEMENTATION SCHEDULE

Activity	Period (in months)
Application and sanction of loan	2
Site selection and commencement of civil work	2
Completion of civil work and placement of orders for machinery	6
Erection, installation and trial runs	2

8.0 DETAILS OF THE PROPOSED PROJECT

8.1 Land and Building

Particulars	Area (Sq.Mtrs)	Cost (Rs.)
Land	200	60,000
Building	100	2,50,000
	Total	**3,10,000**

8.2 Machinery

Total cost of machinery is estimated to be Rs. 3.65 lacs as spelt out earlier.

8.3 Miscellaneous Assets

Expenditure under this head is likely to be Rs.35,000/- as stated before.

8.4 Preliminary & Pre-operative Expenses

A provision of Rs. 75,000/- would take care of expenses like technical consultation charges, establishment, registration, administrative and travelling expenses, interest during implementation, trial runs etc.

8.5 Working Capital Requirements

Capacity utilisation of 60% in the first year would need following working capital:

(Rs. in lacs)

Particulars	Period	Margin	Total	Bank	Promoters
Stock of Packing Materials	1 Month	30%	0.30	0.20	0.10
Stock of WIP and Finished Goods	1 Month	25%	0.80	0.60	0.20
Receivables	1 Month	25%	1.30	1.00	0.30
Working Expenses	1 Month	100%	0.30	--	0.30
		Total	**2.70**	**1.80**	**0.90**

8.6 Cost of the Project & Means of Financing

(Rs. in lacs)

Item	Amount
Land and Building	3.10
Machinery	3.65
Miscellaneous Assets	0.35
P&P Expenses	0.75
Contingencies @ 10% on Land & Building and Plant & Machinery	0.70
Working Capital Margin	0.90
Total	**9.45**
Means of Finance	
Promoters' Contribution	2.85
Term Loan from Bank/FI	6.60
Total	**9.45**
Debt Equity Ratio	2.32 : 1
Promoters' Contribution	30%

Financial assistance in the form of grant is available from the Ministry of Food Processing Industries, Govt. of India, towards expenditure on technical civil works and plant and machinery for eligible projects subject to certain terms and conditions.

9.0 PROFITABILITY CALCULATIONS

9.1 Production Capacity & Build-up

As against the rated annual capacity of 30,000 ltrs, capacity utilisation in the first year is assumed to be 60% and thereafter 75%.

9.2 Sales Revenue at 100%

Considering selling price of Rs. 85/ltr, annual sales revenue at 100% would be Rs. 25.50 lacs.

9.3 Raw and Packing Materials Required at 100%

(Rs. in lacs)

Product	Qty. (Tonnes)	Price/Ton (Rs.)	Value
Fruits	50	9000	4.50
Yeast, sugar, salt, chemicals and Colours etc.	--	--	3.60
Packing Material @ Rs.12/Ltr	--	--	3.60
		Total	**11.70**

9.4 Utilities

Annual cost of utilities at 100% would be Rs. 60,000/-.

9.5 Selling Expenses

A provision of 17.5% of sales revenue in the first year would take care of selling commission, transportation, hoardings, free sampling etc. Thereafter, it is reduced to 15% every year.

9.6 Interest

Interest on term loan of Rs. 6.60 lacs is calculated @ 12% per annum assuming complete repayment in 4 years including a moratorium period of 1 year and on working capital loan from bank it is calculated @ 14% per annum.

9.7 Depreciation

It is calculated on WDV basis @ 10% on building and 15% on machinery and miscellaneous assets.

10.0 PROJECTED PROFITABILITY

(Rs. in lacs)

No.	Particulars	1st Year	2nd Year
A	**Installed Capacity**	**--- 30,000 Ltrs ---**	
	Capacity Utilisation	60%	75%
	Sales Realisation	15.30	19.10
B	**Cost of Production**		
	Raw and Packing Materials	7.02	8.78
	Utilities	0.36	0.45
	Salaries	1.35	1.50
	Stores and Spares	0.12	0.15
	Repairs & Maintenance	0.18	0.24
	Selling Expenses	2.68	2.84
	Administrative Expenses	0.42	0.48
	Total	**12.13**	**14.44**
C	**Profit before Interest & Depreciation**	**3.17**	**4.66**
	Interest on Term Loan	0.72	0.54
	Interest on Working Capital	0.25	0.32
	Depreciation	0.85	0.73
	Profit before Tax	1.35	3.07
	Income-tax @ 20%	0.25	0.61
	Profit after Tax	1.10	2.46
	Cash Accruals	1.95	3.19
	Repayment of Term Loan	--	2.00

11.0 BREAK-EVEN ANALYSIS

(Rs. in lacs)

No	Particulars	Amount	
[A]	**Sales**		**19.10**
[B]	**Variable Costs**		
	Raw and Packing Materials	8.78	
	Utilities (70%)	0.30	
	Salaries (70%)	1.05	
	Stores & Spares	0.15	
	Selling Expenses (70%)	1.98	
	Admn Expenses (50%)	0.24	
	Interest on WC	0.32	**12.82**
[C]	**Contribution [A] - [B]**		**6.28**
[D]	**Fixed Cost**		**3.13**
[E]	**Break-Even Point [D] ÷ [C]**		**50%**

12.0 [A] LEVERAGES

Financial Leverage

= EBIT/EBT

= 2.32 ÷ 1.35

= 1.72

Operating Leverage

= Contribution/EBT

= 4.62 ÷ 1.35

= 3.42

Degree of Total Leverage

= FL/OL

= 1.72 ÷ 3.42

= 0.50

[B] Debt Service Coverage Ratio (DSCR)

(Rs. in lacs)

Particulars	**1st Yr**	**2nd Yr**	**3rd Yr**	**4th Yr**
Cash Accruals	1.95	3.19	3.64	4.23
Interest on TL	0.72	0.54	0.30	0.12
Total [A]	**2.67**	**3.73**	**3.94**	**4.35**
Interest on TL	0.72	0.54	0.30	0.12
Repayment of TL	--	2.20	2.20	2.20
Total [B]	**0.72**	**2.74**	**2.50**	**2.32**
DSCR [A] ÷ [B]	**3.71**	**1.47**	**1.71**	**2.05**
Average DSCR	---------- **2.24** ----------			

[C] Internal Rate of Return (IRR)

Cost of the project is Rs. 9.45 lacs.

(Rs. in lacs)

Year	Cash Accruals	16%	18%	20%	24%
1	1.95	1.68	1.65	1.62	1.57
2	3.19	2.37	2.29	2.21	2.07
3	3.64	2.33	2.22	2.11	1.91
4	4.23	2.34	2.18	2.04	1.79
5	4.77	2.27	2.08	1.92	1.63
	17.78	**10.99**	**10.42**	**9.90**	**8.97**

The IRR is around 22%.

Some of the machinery and packing material suppliers are

1. Narang Corporation, P-25, Cannaught Place, New Delhi-110001
2. Faiz Ali Contractor, Bareilly, UP
3. Nagpal Brothers,C-127, Phase II, Myapuri Industrial Estate, New Delhi-110064
4. Jain Pacakaging Products, 33, Sarai Pipal Thala, Sabji Mandi, New Delhi-110033