

1 MALT

1.1 Introduction

The production of barley is confined to the northern states although most of it is grown for fodder purpose. In order to promote cultivation of barley it would be important to find market for barley and its value-added products. Conversion to malt is a good option as quality malt is not available in the country. Part of the malt can be used for further processing into value added products like malt extract.

1.2 Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up unit of malt. 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.

1.3 Raw Material Availability

Although barley is not grown significantly in the state, production can be increased as demand of brewery is increasing world over. In addition to that barley can be sourced from Rajasthan and UP as barley is produced in good quantity in these states.

The production of barley in the state is 1.09 lakh MT grown on the area of 94000 ha.

1.4 Suitable Location

Suitable location for the unit can be near to the neighboring states as the raw material can be sourced from there.

1.5 Market Opportunities

The end users of Malt and Malt Extracts are as follows:

- Breweries - for beer production
- Distilleries - for the manufacture of premium quality whisky
- Food – Malted Milk Foods, Bakery, Biscuits, Confectionery, Chocolate Powder, Cornflakes, Immitation Coffee, Baby food, etc.
- Pharmaceuticals –Tonics, Health foods, Slim diets
- Others - Pet foods, Medium for bacteria cultivation

Demand for malt

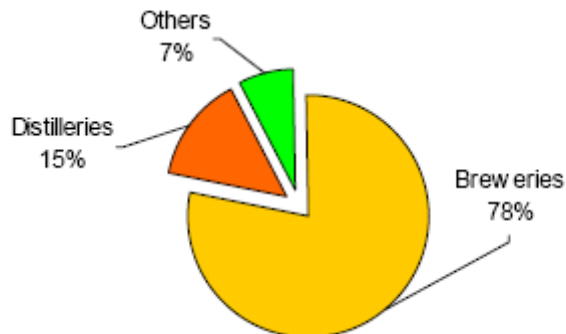


Figure 1 Demand for malt in country

The domestic demand for Malt and Malt Extract is poised for growth because of growth of end user industry. The major portion of malt consumption is expected from the breweries and there would also be requirement for better quality malt as a number of foreign companies have joint ventures in India now. According to the experts, the industry is expected to maintain a growth rate of 15-20% per annum for the next ten years. The food and pharma industry (malt extract users like cornflake manufacturers, health foods etc) is also poised for growth due to a small production at present, and this is likely to grow at 10% per annum. Taking a moderate growth rate for 5% of the remaining end user segments, the projected demand for malt and malt extracts is given in Table below:

Table 1 Demands for Malt and Malt Extracts

End user industry	Estimated present demand (MT)	Annual growth rate**	Projected demand in 2008 (MT)	Projected demand in 2013 (MT)
Malt				
Brewery	105000	15	243000	488500
Distillery	20000	5	26800	34200
Others	10000	5	13400	17100
Sub total	135000		283200	539800
Malted extract				
Malted milk food etc.	22000	5	29500	37600
Others (Food & Pharma)	3000	10	5300	8600
Sub total	25000		34800	46200
Total (malt equivalent)*	167000		318000	586000

*Malt equivalent = malt extract / 0.78 (extract recovery from malt)

** Growth rate assumed on the basis of discussion with major end users and key suppliers

1.6 Project Description

1.6.1 Applications

Out of the total production of 14.5 lakh MT in the country hardly 10% is used for Malt production. About 5-10% is reportedly used for human consumption and about 4-5% is retained by the farmers as seed. The large quantity of remaining barley is used as feed for the animals. Considering the present utilization pattern of Barley it is clear that the availability for processing will not be a problem. The problem right now is of quality and not of quantities.

1.6.2 Capacity of the Project

The capacity of the Malting Unit has been planned as:

Malting Unit: 30,000 MT/year

1.6.3 Manufacturing process

❖ Malt Processing

Malt is the product created through controlled germination and drying (or kilning) of barley. Malt production is a natural biological process during which barley kernels are partially sprouted resulting in the modification of the barley endosperm. This modification involves the breakdown of the cell wall components, the partial breakdown of proteins, and the generation of the enzymes necessary for converting starch into sugars during brewing.

In bio-chemical terms:

It disintegrates the envelopes of the small nucleus containing starch chains; it produces enzymes (diastase), which will remain inside the germinated grains. To gain an understanding of some of the dust management challenges in the malting industry it is necessary to have basic understanding of the malt manufacturing process.

The malt manufacturing consists of three distinct processes, barley storage and handling, malt processing and malt storage/handling each of which can be illustrated as:

- Barley Storage and Handling:
- Barley receiving
- Barley cleaning
- Barley grading
- Barley storage
- Cleaned barley transfer to Malt Processing

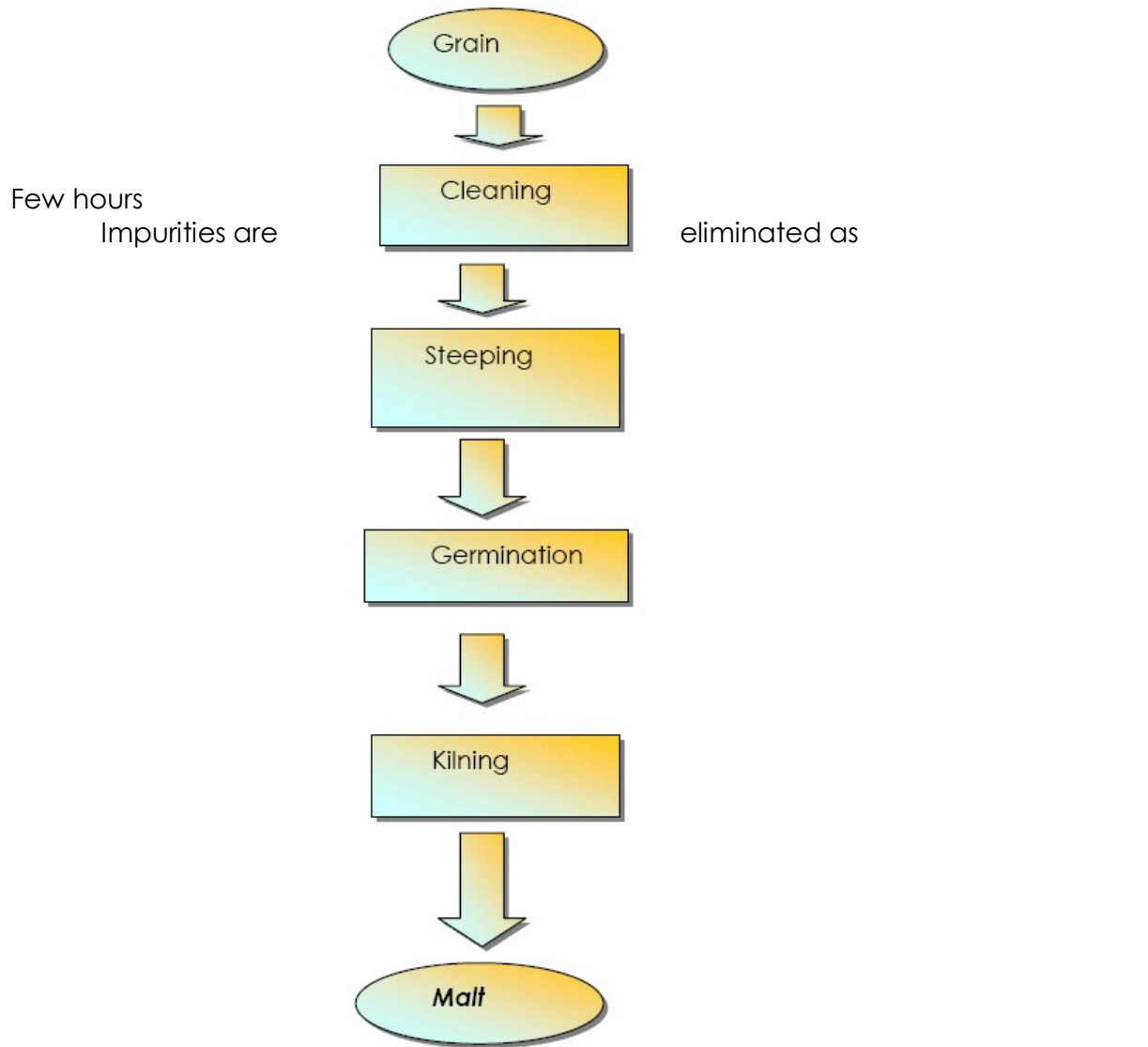
Malt Processing:

The processing cycle is completed in approximately 7 days and is shown below:

Figure 2 Process of production of Malt

Duration

Conditions & Effects



2 days

4 to 5 Days

Dampened grain is allowed to sprout is in contact with cool moistened air; Internal chemical transformations within the grain;

“Green Malt” is treated with heat / 85°-115°C. Germination process is stopped and humidity decreased down to around 4-5%

24-48 hours

Approximately 120 to 130 kg of barley grains are necessary to obtain 100 kg of malt (depending upon grain quality and purity). The average ratio used is 1,267.

Processing of Malt Extracts

Before Malt Extract Production begins, the barley malt is tested for extract content, extract colour, protein content, water content, diastatic powder and grain size. Barley malt is tipped and conveyed to Silos. Before entering the mills the grain passes through a cleaner and destoner. Grain is crushed in a roller mill to produce grist. Grist is mixed with water and heated. For the best extraction, the mash is held for fixed times, known as rests at a series of specified temperatures. The malt own enzymes help to convert insoluble starches and proteins to soluble sugars, which dissolve in water to form wort.

After extraction, the wort is separated from husks and residues known as “spent grains”. Separation is carried out in the lauter by a natural process using the husks as a filter. The wort, consisting of 5-20% solids, is evaporated under vacuum to form liquid malt extract, containing around 80% solids. Liquid malt extract is stored in silos before processing or for sale to industrial customers.

1.7 Project component and cost

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

(Rs in lacs)

PARTICULARS	
LAND & SITE DEVELOPMENT	81.50
BUILDING	1089.51
PLANT & MACHINERY	2364.51
TECHNICAL KNOW HOW FEE	404.84
MISC. FIXED ASSETS	395.00
CONTINGENCIES	293.19
PREOPERATIVE EXPENSES	357.50
MARGIN MONEY FOR WORKING CAPITAL	257.55
TOTAL	5243.61

1.8 Plant and Machinery

The total cost of the plant and machinery is Rs. 2364.51 Lakhs.

A. IMPORTED		
STEEPING PLANT	Buhler	313.20
GERMINATION PLANT	Buhler	875.80
KILNING PLANT	Buhler	323.06
CONVEYING/ELEVATING SYSTEM	Buhler	232.00
PACKING/FREIGHT		145.00
DUTIES		-
L C CHARGES		18.89
CLEARING & TRANSPORT		18.89
		1,926.84
B. INDEGENOUS		
BARLEY PRE CLEANING/GRADING		125.00
ELECTRICALS		175.00
STRUCTURALS		80.00
ERECTION		57.67
		437.67
		2364.51

1.9 Miscellaneous Assets

A provision of Rs. 395.00 lakhs would take care of all the requirements.

1.10 Preliminary & Pre-operative Expenses

A provision of Rs. 357.50 lakhs would take care of pre-production expenses like establishment, professional charges, security deposits etc.

1.11 Working capital assessment

ITEMS	HOLDING			
	PERIOD	YEAR ENDING MARCH		
	IN DAYS	YEAR I	YEAR II	YEAR III
RAW MATERIAL CONSUMED	120	431.51	523.97	585.62
PACKING MATERIAL	30	6.67	8.10	9.06
WORK IN PROGRESS	15	71.87	87.11	97.28
FINISHED GOODS	30	151.47	186.58	207.87
DEBTORS	30	210.63	255.76	285.85
TOTAL		872.14	1061.53	1185.68
Less: Creditors	30	114.55	139.10	155.46
Total		757.59	922.43	1030.22
MARGIN(%)	25.00	189.40	230.61	257.55
MPBF(%)		568.19	691.82	772.66

1.12 Means of finance

EQUITY				
	100%	2621.81		
SUBSIDY			0.00	0.00
TERM LOAN			2621.81	50.00
	TOTAL		5243.61	100.00

1.13 Cash flow statement

(RS IN LACS)

PARTICULARS	Year 1	Year 3	Year 5	Year 7
SOURCES OF FUNDS				
INCREASE IN SHARE CAPITAL				
NET PROFIT	302.54	507.44	399.53	311.25
(INTEREST ADDED BACK)				
DEPRECIATION	324.64	324.64	324.64	324.64
PRELIMINARY EXP.W/O	37.54	37.54	37.54	37.54

1.14 Projected balance sheet

PARTICULARS	Year 1	Year 3	Year 5	Year 7
LIABILITIES				
SHARE CAPITAL	2,621.81	2,621.81	2,621.81	2,621.81
RESERVES & SURPLUSES	(76.78)	187.98	559.03	954.86
TERM LOAN	2,621.81	1,821.81	1,021.81	
WC LOAN	568.19	772.66	772.66	772.66

1.15 Projected profit and loss account

	Year 1	Year 3	Year 5	Year 7
SALES REALISATION	2,562.66	3,477.89	3,477.89	3,477.89
TOTAL COSTS	1,855.43	2,546.15	2,556.86	2,569.82
GROSS PROFIT	707.23	931.74	921.04	908.07
DEPRECIATION	324.64	324.64	324.64	324.64
INTEREST	379.32	310.93	214.93	104.31
PRELIMINARY EXP.W/O	37.54	37.54	37.54	37.54
TECHNOLOGY FEE W/O	42.51	42.51	42.51	42.51
PROFIT BEFORE TAX	(76.78)	216.12	301.42	399.07
TAXES	-	19.61	116.82	192.13
PROFIT AFTER TAX	(76.78)	196.52	184.60	206.94
RETAINED PROFIT	(76.78)	196.52	184.60	206.94

1.16 Key Indicators

NET PROFIT AFTER TAX (Rs. in lakhs)	196.52
INTERNAL RATE OF RETURN %	14.40
DEBT SERVICE COVERAGE RATIO	1.23
BREAK EVEN POINT %	63.38
PAY BACK PERIOD (YEARS)	10.24

1.17 Manpower Requirement

PARTICULARS	NO.
SUPERVISORY STAFF	

GENERAL MANAGER -PRODUCTION	1
MANAGER -QUALITY CONTROL	1
FARMER'S EXTENSION ADVISOR	5
SUPERVISORS	5
ELECTRICAN	1
MAINTENENCE ENGG.	1
SECURITY	3
ADMINISTRATIVE STAFF	
MANAGING DIRECTOR	1
GENERAL MANAGER (FINANCE)	1
GENERAL MANAGER (COMMERCIAL & MARKETING))	1
MANAGER - ADMIISTRATION & PERSONNEL	1
OFFICERS	3
SECRETARY	2
DRIVERS	2

1.18 Assumptions

Project & Financing			
Term Loan			50%
Rate of Interest on Term Loan			12%
CAPACITY			
Rated Capacity Per Annum		TPA	30000
Number of Operational Days	DAYS		300
Working Hours Per day	Hrs		16
CAPACITY UTILIZATION			
Year I			70%
Year II			85%
Year III			95%
SALES PRICE			
MALT	Per MT		12,000
Malt Sprouts/Clums	Per MT		1,500
Screenings/Dust	Per MT		2,500
POWER			
Connected Load	KWA		800
DEPRICIATION AS PER COMPANY'S ACT			
BUILDING			3.34%
PLANT & MACHINERY			10.34%
MISC. FIXED ASSETS			6.33%
VEHICLES			9.50%
LAND & SITE DEVELOPMENT			1.63%
MAINTENANCE			
BUILDING			2.00%
PLANT & MACHINERY			2.00%
MISC. FIXED ASSETS			5.00%

LAND & SITE DEVELOPMENT	2.00%
VEHICLES	5.00%

1.18.1 Sources of technology

The Technology for processing of Malt is available in India; however, the critical equipments would need to be imported.

In the recent years most of the projects in the country have been done by Alfa Laval and Praj Industries, whereas Skoda from Czech Republic is a new entrant to Indian market. For the manufacture of Malt and Malt Extract, Seegers of Germany and Buhler of Switzerland are the only well known companies; however the small plants have been setup in India by some local companies and the performance of the plants is not satisfactory.

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

