

MALT EXTRACT FROM BARLEY

1. INTRODUCTION:

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. 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.

2. PRODUCT & ITS APPLICATION:

On a worldwide basis, much more malt extract is used in the production of food and other products than in brewing. Malt extract has been manufactured for hundreds of years, and was the first grain-based sweetener manufactured naturally using simple technology — long before modern corn syrup. Food applications include baked products, especially those that require browning or color development such as bagels, pretzels and pizza crusts. Malt extracts are the main source of flavor and color in many breakfast cereals. Malt extract and malted milk powder are also used in confectionery, frozen desserts and non-alcoholic beverages. Malted milk balls, candy bars, all derive flavor and functionality from malted barley products. In many Caribbean, African and Middle Eastern countries, carbonated malt-based beverages are very popular. It's a common ingredient used to improve the palatability of pet and human medicines. It's used in nutrient broths and agar for growing or culturing microorganisms. Depending on the intended use, the manufacturing and quality of malt extracts can vary widely. The main differences in manufacture and quality are between those extracts intended for food and brewing use. This article will cover each of the stages in the process of making malt extract, highlighting the important steps and differences.

Brewing vs. Food-Grade Extracts

Brewing-grade malt extracts are made with only the highest quality brewing malts and get additional colors and flavors from using specialty malts. This gives them a flavor suitable for beer or other products where they are the main flavor component. Food-grade malt extracts are often made with non-brewing grade food or distilling malt, and are usually used as a minor ingredient. In many cases, malted barley products for the food industry are blended with corn syrup, caramel color or other ingredients. This might not be apparent from the trade name or brand name of the product, but it will appear on the ingredient statement. Darker versions of food grade extracts are often made by heating them until they darken to the desired color. This lowers the pH of the extract and generates darker, molasses-like flavors. Nonetheless, the manufacture of brewing-grade and food-grade malt extracts both involve variants of the brewing process in which malted grains are crushed and mashed. The wort is separated from the spent grains and is then concentrated and dried.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

The technology is simple. Main features are controlling temperature, humidity and qualities of air and water. The Technology for processing of Malt is available in India; however, the critical equipments would need to be imported. However, promoter must have sufficient knowledge and experience of setting up such a large size project.

4. INDUSTRY LOOKOUT AND TRENDS

Geographically, the berry market is segmented into seven regions which are ; North America, Latin America, Western Europe, Eastern Europe, Japan, Asia Pacific excluding Japan (APEJ), and Middle East and Africa (MEA) and Japan.

North America has been the largest market for malts, sharing superiority in both production as well as consumption. Western Europe and Central Europe are also one of the key malt markets. Countries in Asia Pacific such as, China, South Korea and Australia are showing relatively quicker growth and are expected to be the dominant markets over the coming

years. Countries in Africa such as, Zimbabwe and Botswana constitute of two of the most promising market potentials followed by Latin America.

The global malt market can be broadly segmented on the basis of type, application, brewers, and source. On the basis of type, the malt market can be classified into-Dry Extract, Liquid Extract, Malt Flour. On the basis of application, the malt market can be segmented into-Beer Industry, Whisky Distilleries, Food & Beverages, and Pharmaceutical industry. On the basis of brewers, the malt market can be segmented into- Base Malt, Standard Malt and Specialty Malt. On the basis of source, it can be segmented into-Barley, Wheat, Rye.

The key driver for this market is the use of malt in the beer industry, which is growing at a fast rate. Its widespread use in the food industry is another impetus for the growth of this market. Opportunities for this market lie in the use of different types of malt extracts in food products. Growing popularity of wine and other beverages acts as a hindrance in the growth of this market, as this would reduce the consumption of beer. Increase in the use of organic malt in making breweries is boosting the growth of the market. The major challenge to this market is the entry of local players in the market. They offer low cost product, and thus are able to generate a broader customer base.

Malt is a product prepared from grains through a malting process, which involves partial germination, to modify the grains' natural food substances. Barley is generally used to prepare malt, while rice wheat, corn and rye are used less frequently. The principle use of malt is in brewing beer. Malt is also used for preparation of whiskey and other beverages. Its wide usage in alcohols, beverages and food products makes it an important product in the food and beverage industry. It is also used to make confections such as malted shakes, malt vinegar, flavoured drinks such as Horlicks, and Milo, and some baked goods, such as bagels, malt loaf, and rich tea. Malted barley is an ingredient in blended flours specifically used in the manufacture of yeast breads and other baked goods.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

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, Imitation Coffee, Baby food, etc. Pharmaceuticals –Tonics, Health foods, slim diets others - Pet foods, Medium for bacteria cultivation Indian beer market is expected to grow to 200 million cases (1500 million liters) per year by the year 2010 from present 125 million cases per year. Barley malt demand will go up to 2 lakh tons from 1.25 lakh tons. Distilled spirits (mainly whisky) market in India is expected to grow to 80 million cases (720 million liters) per year by 2010 from present 55 million cases per year. At present the whisky is made from molasses derived alcohol. This is going to change now. If we assume 20 % of additional demand will be met with grain based alcohol, market for malt will go up by 40000 tons. The increase in demand after 2010 is expected to continue at 10 %. This represents additional demand of 25000 tons per year. 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:

6. RAW MATERIAL REQUIREMENTS:

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. Barley is the main raw material. It is grown in Punjab, Haryana and Rajasthan areas. 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.

7. MANUFACTURING PROCESS:

Five stages of the malting process: (1) initial storage, cleaning and grading (2) steeping (3) germinating (4) kilning, and (5) crushing, aging and blending. Here are the highlights of the malt extract making process: Step 1: Milling, Step 2: Mashing, Step 3: Separation, Step 4: Boiling/Whirlpool, Step 5: Whirlpool Tanks, and Trub Removal, Step 6: Vacuum Evaporation. — Keeping Things Cool Atmospheric Dryers, Vacuum Dryers and Different Dryers for Different Extracts and Agglomeration Applied.

8. MANPOWER REQUIREMENT :

The enterprise requires 50 employees as detailed below:

Sr. No.	Designation	SALARY	Salary ₹	Number of Employees				
	Working Staff		PER	Year-1	Year-2	Year-3	Year-4	Year-5
1	Production Manager	18000	54000	3	3	3	3	3
2	Operators	12000	60000	5	5	5	5	5
3	Helpers	10000	220000	22	22	22	28	28
			334000	30	30	30	36	36
1	Fixed Staff:							
2	Admin Manager	15000	30000	2	2	2	2	2
3	Accounts/Assistant	12500	62500	5	5	5	5	5
	Office Boy	9000	54000	6	6	6	6	6
	<i>sub-total</i>		146500	14	14	14	14	14
	Total		480500	44	44	44	50	50

9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 9 months' time as detailed below:

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	2.00
2	Construction (if applicable)	2.50
3	Procurement & installation of Plant & Machinery	2.50
4	Arrangement of Finance	1.00
5	Recruitment of required manpower	1.00
	Total time required (some activities shall run concurrently)	9.00

10. COST OF PROJECT:

The project shall cost ₹ 3866.00 lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land	100.00
2	Building	1200.00
3	Plant & Machinery	2000.00
4	Furniture, other Misc. Equipments	12.00
5	Other Assets including Preliminary / Pre-operative expenses	200.00
6	Margin for Working Capital	354.00
	Total	3866.00

11. MEANS OF FINANCE:

The margin is considered at 25 % and bank finance at 75 %

	Particulars	₹ in Lacs
1	Promoter's contribution	1080.50
2	Bank Finance	2785.50
	Total	3866.00

12. WORKING CAPITAL CALCULATION:

The project requires working capital of 810 lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	405.00	0.25	101.25	303.75
2	Receivables	202.50	0.25	50.63	151.88

3	Overheads	202.50	100%	202.50	0.00
4	Creditors	-		0.00	0.00
	Total	810.00		354.38	455.63

13.LIST OF MACHINERY REQUIRED:

The total cost of the plant and machinery is Rs. 2000 Lakhs.

A. IMPORTED	
STEEPING PLANT	315.00
GERMINATION PLANT	880.00
KILNING PLANT	325.00
CONVEYING/ELEVATING SYSTEM	235.00
PACKING/FREIGHT	145.00
DUTIES - L C CHARGES	20.00
CLEARING & TRANSPORT	20.00
B. INDEGENOUS	
BARLEY PRE CLEANING/GRADING	125.00
ELECTRICALS	175.00
STRUCTURALS	80.00
ERECTION	60.00
TOTAL	2000.00

Sr. No.	Particulars	UOM	Qty	Rate (₹)	Value (₹ in Lacs)
	Plant & Machinery / Equipments				2000.00
	Furniture / Electrical Installations				
a)	Office Furniture	LS	1	50000	0.00
b)	Stores Cupboard	LS	1	50,000	0.50
c)	Computer & Printer	LS	1	50000	0.50
	<i>Sub Total</i>				12.00

	Other Assets				
a)	Preliminary And Preoperative				200.00
	<i>Sub-Total Other Assets</i>				200.00
	Total				2212.00

All the machines and equipments are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Fry-Tech Food Equipments Private Limited

S. No. 4, Raviraj Industrial Estate,
Bhikhubhai Mukhi Ka Kuwa Bharwadvash,
Ramol, Ahmedabad - 380024,
Gujarat, India

2. Hindustan Vibrotech Pvt. Ltd.

Office No. 2, Ground Floor,
Vrindavan Building, Vile Parle East,
Mumbai – 400057,
Maharashtra, India

3. Electronics cooling systems Pvt. Ltd.

S-27, SIDCO Industrial Estate
Kakkalur Industrial Estate
Tiruvallur – 602003,
Tamil Nadu, India

4. Springboard Enterprises India Ltd.

1st, 2nd & 3rd Floor,
Plot No. 7, 8 & 9,

Garg Shopping Mall,
Service Centre, Rohini Sector 2
New Delhi – 110085,
Delhi, India

5. Flour Tech Engineers Private Limited
Plot No. 182, Sector 24,
Faridabad - 121005,
Haryana, India

6. P Square Technologies
3, Swami Mahal,
Gurunanak Nagar,
Off. Shankarsheth Road Bhavani Peth,
Pune - 411002,
Maharashtra, India

7. Ricon Engineers
10 To 13, Bhagwati Estate,
Near Amraiwadi Torrent Power,
Behind Uttam Dairy,
Rakhial, Ahmedabad - 380023,
Gujarat, India

8. Kamdhenu Agro Machinery
Plot No. 6, Near Power House,
Wathoda Road Wathoda,
Nagpur - 440035,
Maharashtra, India

14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	2430.00	2835.00	3240.00	3645.00	4050.00
3	Raw Materials & Other direct inputs	₹. In Lacs	1736.75	2026.21	2315.66	2605.12	2894.58
4	Gross Margin	₹. In Lacs	693.25	808.79	924.34	1039.88	1155.42
5	Overheads except interest	₹. In Lacs	71.73	76.21	85.18	87.87	89.66
6	Interest @ 10 %	₹. In Lacs	324.15	324.15	216.10	162.08	129.66
7	Depreciation @ 30 %	₹. In Lacs	600.00	420.00	306.00	240.00	180.00
8	Net Profit before tax	₹. In Lacs	-302.63	-11.57	317.06	549.94	756.10

The basis of profitability calculation:

This unit will have capacity of 30000 METRIC TONNES PER ANNUM. The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study, it can be increased according to the selling strategy.)

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per litre. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. BREAKEVEN ANALYSIS:

The project shall reach cash break-even at 18.98. % of projected capacity

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	4050.00
2	Variable costs	₹. In Lacs	2894.58
3	Fixed costs incl. interest	₹. In Lacs	219.32
4	$BEP = FC/(SR-VC) \times 100 =$	% of capacity	18.98%

16. STATUTORY / GOVERNMENT APPROVALS

The Ministry of Food Processing Industries has been operating several plan schemes for the development of processed food sector in the country during the 10th Plan. One of the schemes relates to the Technology Up-gradation/ Establishment/ Modernization of food processing industries.

The Indian food processing industry is regulated by several laws which govern the aspects of sanitation, licensing and other necessary permits that are required to start up and run a food business. The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act, 1954 (hereinafter referred to as "**PFA**"). The PFA had been in place for over five decades and there was a need for change due to varied reasons which include the changing requirements of our food industry. The act brought into force in place of the PFA is the Food Safety and Standards Act, 2006 (hereinafter referred to as "**FSSA**") that overrides all other food related laws.

FSSA initiates harmonization of India's food regulations as per international standards. It establishes a new national regulatory body, the Food Safety and Standards Authority of India (hereinafter referred to as "**FSSAI**"), to develop science based standards for food and to regulate and monitor the manufacture, processing, storage, distribution, sale and import of food so as to ensure the availability of safe and wholesome food for human consumption. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

All food imports will therefore be subject to the provisions of the FSSA and rules and regulations which as notified by the Government on 5th of August 2011 will be applicable.

Key Regulations of FSSA

- A. Packaging and Labelling
- B. Signage and Customer Notices
- C. Licensing Registration and Health and Sanitary Permits

17. BACKWARD AND FORWARD INTEGRATIONS

The objective of the scheme is to provide effective and seamless backward and forward integration for processed food industry by plugging the gaps in supply chain in terms of availability of raw material and linkages with the market. Under the scheme, financial assistance is provided for setting up of primary processing centres/ collection centres at farm gate and modern retail outlets at the front end along with connectivity through insulated/ refrigerated transport.

The Scheme is applicable to perishable horticulture and non-horticulture produce such as, fruits, vegetables, dairy products, meat, poultry, fish, Ready to Cook Food Products, Honey, Coconut, Spices, Mushroom, Retails Shops for Perishable Food Products etc. The Scheme would enable linking of farmers to processors and the market for ensuring remunerative prices for agri produce.

The scheme is implemented by agencies/ organizations such as Govt. / PSUs/ Joint Ventures/ NGOs/ Cooperatives/ SHGs / FPOs / Private Sector / individuals etc.

Backward Linkage:

- Integrated Pack-house(s) (with mechanized sorting & grading line/ packing line/ waxing line/ staging cold rooms/cold storage, etc.)
- Pre Cooling Unit(s)/ Chillers
- Reefer boats
- Machinery & equipment for minimal processing and/or value addition such as cutting, dicing, slicing, pickling, drying, pulping, canning, waxing, etc.
- Machinery & equipment for packing/ packaging.

Forward Linkage:

- Retail chain of outlets including facilities such as frozen storage/ deep freezers/ refrigerated display cabinets/cold room/ chillers/ packing/ packaging, etc.
- Distribution centre associated with the retail chain of outlets with facilities like cold room/ cold storage/ ripening chamber.

18. TRAINING CENTERS AND COURSES

There are few specialised Institutes provide degree certification in Food Technology, few most famous and authenticate Institutions are as follows:

1. Indian Institute of Food Science & Technology,
Plot No.1, Near Maa-Baap ki Dargah, Opp to Nath Seeds,
Paithan Road Aurangabad
Aurangabad - 431005
Maharashtra, India
2. MIT College of Food Technology, Pune
Gate.No.140, Raj Baugh Educational Complex,
Pune Solapur Highway,
Loni Kalbhor, Pune – 412201
Maharashtra, India
3. CSIR - Central Food Technological Research Institute (CFTRI)
Cheluvamba Mansion, Opp. Railway Museum,
Devaraja Mohalla, CFTRI Campus, Kajjihundi, Mysuru
Karnataka – 570020

Udyamimitra portal (link : 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.