

1 MUSHROOM PROCESSING

1.1 Introduction

Mushrooms are gradually becoming popular as they are rich in minerals and vitamins and very low on fat and sugar. Fresh mushrooms have very limited life and hence they need to be consumed within few hours. But processing and canning increases their shelf life to few months.

It is also known to have medicinal values and certain varieties of mushrooms can inhibit growth of cancerous tumor. The productivity of mushroom is higher than any crop. Food, nutritional and medicinal values apart, mushroom growing can be efficient means of waste disposal (agricultural, industrial and family wastes), since it can use the wastes as medium of growth. Hence, it could be considered as eco-friendly.

In India only three types, namely, button, oyster and straw mushrooms are commercially cultivated. Button mushroom accounts for 90 percent of India's production of mushrooms. About 38 percent of the total world production of mushrooms is button mushroom. Further, mushroom growing is highly labour intensive and requirement of land are is comparatively low.

1.2 Objective

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

1.3 Raw Material Availability

The most crucial raw material will be good quality fresh mushrooms. Shelf life of fresh mushrooms is few hours and hence the location has to be very close to the cultivation area. Prior arrangements with some cultivators for regular supply must be made. Future planning may include mushroom cultivation for captive consumption. Salt and citric acid will be required in small quantities.

1.4 Market Opportunities

Mushrooms are very popular in most of the developed countries and they are becoming popular in many developing countries like India. Applications and market for mushrooms is

growing rapidly in India because of their nice aroma, nutritious values, subtle flavour and special taste. Many exotic food preparations like soup, vegetables, pickles etc. are made from them. They are also used for garnishing, to prepare many varieties of gravy and for stuffing several food preparations. But they are still considered as up-market product and their consumption is limited to urban and semi urban areas. Fresh mushrooms have very limited shelf life but processed and canned mushrooms have fairly long shelf life and can be sold even at far off places. Star hotels, exclusive restaurants, certain caterers are the bulk consumers and a firm tie-up for regular supply with some of them is advisable. The product can be sold even through departmental stores, super markets etc.

Mushrooms –The Medical Boom

For thousands of years, Eastern cultures have revered mushrooms as both food and medicine. It has more than 50 species with healing properties, when used as medicine. Mushrooms are made into soup or tea, or taken as a tonic or elixir and in various other forms in culinary dishes. Studies conducted over the past 30 years--mostly in Asia--have provided data suggesting that mushrooms or substances extracted from mushrooms may aid in the treatment of certain types of cancer, boost the immune system and reduce the risk of coronary heart disease. Much of this research has focused on mushrooms.

1.5 Project description

1.5.1 Applications

Mushroom is an exotic and nutritious source of vegetarian food and is also easy to digest. It is considered as a suitable substitute for meat and eggs. There are many varieties of mushroom and most of them are edible. It is a universal product and MP has been considered as a likely location.

Mushrooms are used to make soups, pickles, vegetables etc. and they are also used as additives in many food preparations. As a matter of fact, they are considered as a vegetarian delicacy all over the world and their consumption is increasing in India as well. Their household use is picking up but they are consumed in large quantities in star hotels and restaurants. Hence, firm tie-up with some of them is advisable.

1.5.2 Availability of know how and compliances

CFTRI, Mysore, has successfully developed the technical know-how. Compliance under the PFA Act is mandatory.

1.5.3 Capacity of the Project

The capacity of the plant is 300 MT per annum.

1.5.4 Manufacturing process

Fresh mushrooms are washed in cold water and then blanched in boiling water for around 3-4 minutes. Then they are dehydrated in drier and packed.

It is advisable to pre-treat fresh mushrooms in a solution containing brine to prevent discoloration.

Packing is very critical as formation of moisture contaminates mushrooms very quickly. Hence plain cans and brine of 2% salt and 0.2% citric acid are used for packing. The cans are exhausted at 190 C for 7-8 minutes, sealed and processed under pressure for around half an hour. Yield of final product depends up on the quality of dryer, manufacturing process employed, moisture content in fresh mushrooms and moisture required in the final product. Hence, average yield is taken at 25%.

There are latest innovations in cost effective methods of drying and concentrated mushroom.

1.6 Different forms for drying

- **Freeze Drying:** In this technology, the most superior method is Vacuum freeze drying system, in which water is evaporated by sublimation from ice phase to vapour at low temperature resulting in dried product close to fresh product and quick in rehydration. The main limitation of this system is its high energy cost. Therefore it can be used for high value products like mushrooms only.
- **Vacuum Drying:** In this, heat sensitive products are dried under vacuum at low temperature. The product is superior to air-drying and sun drying. This method is widely practiced due to its fair product quality and economics.
- **Microwave drying:** This is the latest system emerging in dehydration as the product quality is superior quite similar to freeze drying. The cost of microwave drying is lower than that of freeze drying.
- **Hot air drying:** This system is simple hot air circulation over the product. Evaporation is by controlled temperature heating so that water is gently evaporated as it reaches the surface by osmosis.
- **Sun drying:** This is an age-old traditional drying system and solar energy is utilized at low Cost. This takes the longest time and the risk of product deterioration during drying is high. Sanitary methods have been developed and in some cases solar

heat are utilized by using solar cells/MS plates and air is circulated in closed chambers by fan. Improvements in this system will further reduce energy cost.

The Latest trends in drying technology are combination treatments of high temperature flash drying of product having high moisture, followed by closed hot air cross flow drying or vacuum drying /Microwave drying/freeze drying. The technology selected for premier Mushrooms is extractions of soluble solids vacuum concentration (5 fold foaming of concentrate) and Vacuum drying (Powder concentrate with 5 per cent moisture).

1.7 Project component and cost

1.7.1 Plant and machinery

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

PARTICULARS	Unit	Qty	Cost/unit	Total
LAND & BUILDING				10.50
Land	SqM	300	250.00	0.75
Land Development				
Land Area		300	500.00	1.50
Building				
Production Block				
Build up Area	SqM	150	5,000.00	7.50
Contingencies		10%		0.75
PLANT & MACHINERY				6.06
Baby Boiler	Nos	1	100,000.00	1.00
Tray type dehydrator	Nos	1	100,000.00	1.00
Can Seamer	Nos	1	50,000.00	0.50
Can reforming with rubber rollers	Nos	1	30,000.00	0.30
Exhust box	Nos	1	25,000.00	0.25
Steam Jacketed ketteles	Nos	1	50,000.00	0.50
Weighing Scales	Nos	2	50,000.00	1.00
Lab equipments	LS	1	50,000.00	0.50
Contingencies		20%		1.01
MISCELLANEOUS FIXED ASSETS				3.00
Miscllaneous asset	LS	1	250,000	2.50
Contingencies		20%		0.50
PRE-OPERATIVE EXPENSES				4.09
Establishment		1	212,000	2.12
Preoperative Interest		1	36,500	0.37
Security Deposits		1	160,000	1.60
TOTAL				23.65

The cost of the various components will depend on the location of the project. Item wise assumptions are as under:

1.8 Plant and Machinery

The main machineries required for mushroom processing unit are as under:

- Baby Boiler
- Tray type dehydrator
- Can Seamer
- Can reforming with rubber rollers
- Exhaust box
- Steam Jacketed kettles

The total cost of plant and machinery is Rs. 6.06 lakhs.

1.9 Building

The construction of main production block will cost Rs. 8.25 lakhs.

1.10 Miscellaneous Assets

A provision of Rs. 3 lakhs would take care of all the requirements.

1.11 Preliminary & Pre-operative Expenses

A provision of Rs. 4.09 lakhs take care of pre-production expenses like establishment, professional charges, security deposits etc.

1.12 Working Capital Assessment

ITEMS	Year 1	Year 3	Year 5
STOCK OF RAW MATERIAL & PACKING MATERIAL	3.90	5.21	5.21
SUNDRY DEBTORS	18.23	24.30	24.30
TOTAL	22.13	29.51	29.51
MARGIN	5.53	7.38	7.38
MPBF	16.60	22.13	22.13
INTEREST ON WC	1.83	2.43	2.43

1.13 Means of Finance

EQUITY CAPITAL			25.00%	7.29
MOFPI SUBSIDY	25%	50.00	25.00%	7.29
TERM LOAN				
FINANANCIAL INSTITUTIONS		10.00%	50.00%	14.59
<i>-Payable half yearly Installments</i>	10	1.50		
TOTAL			100%	29.18

1.14 Cash flow statement

PARTICULARS	Year 1	Year 3	Year 5	Year 7
SOURCES OF FUNDS				
EQUITY CAPITAL	-	-	-	-
SUBSIDY				
NET PROFIT	3.21	9.37	7.76	6.07
(INTEREST ADDED BACK)				
DEPRECIATION	1.15	1.15	1.15	1.15
PRELIMINARY EXP.W/O	0.58	0.58	0.58	0.58
INCREASE IN TERM LOAN	-	-	-	-
INCREASE IN BANK BORROWINGS-WC	16.60	3.32	-	-
TOTAL	21.54	14.42	9.49	7.80

1.15 Projected balance sheet

PARTICULARS	Year 1	Year 3	Year 5	Year 7
LIABILITIES				
EQUITY CAPITAL	7.29	7.29	7.29	7.29
RESERVES & SURPLUS	7.22	15.06	25.53	33.61
TERM LOAN	13.09	7.09	1.09	-
BANK BORROWINGS-WC	16.60	22.13	22.13	22.13
TOTAL	44.20	51.57	56.04	63.03

1.16 Profitability statement

Particulars	Year 1	Year 3	Year 5	Year 7
INCOME	121.50	162.00	162.00	162.00
EXPENDITURE	116.55	150.90	152.51	154.20
VARIABLE	88.92	117.11	117.11	117.11
FIXED	27.64	33.78	35.39	37.08
GROSS PROFIT	4.95	11.10	9.49	7.80
PROFIT BEFORE TAX	(0.07)	6.00	4.99	3.63
RETAINED PROFIT	(0.07)	6.00	4.99	3.63

1.17 Key Indicators

NET PRESENT VALUE at current Inflation (Rs. in lakhs)	43.10
INTERNAL RATE OF RETURN %	33.34
AVERAGE DSCR	1.67
BREAK EVEN POINT %	91.90
PAY BACK PERIOD (YEARS)	3.91

1.18 Manpower Requirement

PARTICULARS	NO.
SUPERVISORY STAFF	
Manager	1
Accountant & Marketing Officer	2
WORKERS	
Production Supervisors	2
Skilled Workers	4
Semi-Skilled Labour	6

1.19 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	4
Moratorium		Months	6
CAPACITY			
Rated Capacity Per Annum	80% of Installed capacity	TPA	300
Number of Operational Days		DAYS	300
Working Hours Per day		Hrs	16
CAPACITY UTILIZATION			
Year I			75%
Year II			85%
Year III			100%
SALES PRICE			
W S Price			54000
OTHER EXPENSE			
Commission			7.5%
Marketing Expenses			2.5%
POWER			
Connected Load		HP	40
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%

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