



PROCESSING OF CANNED MUSHROOM



AATMANIRBHAR BHARAT

**PM Formalisation of Micro Food Processing
Enterprises Scheme (PM FME Scheme)**

INTRODUCTION

Industrial Overview:



Canned products are a convenient effective way of preservation for consumption when they are not readily available.

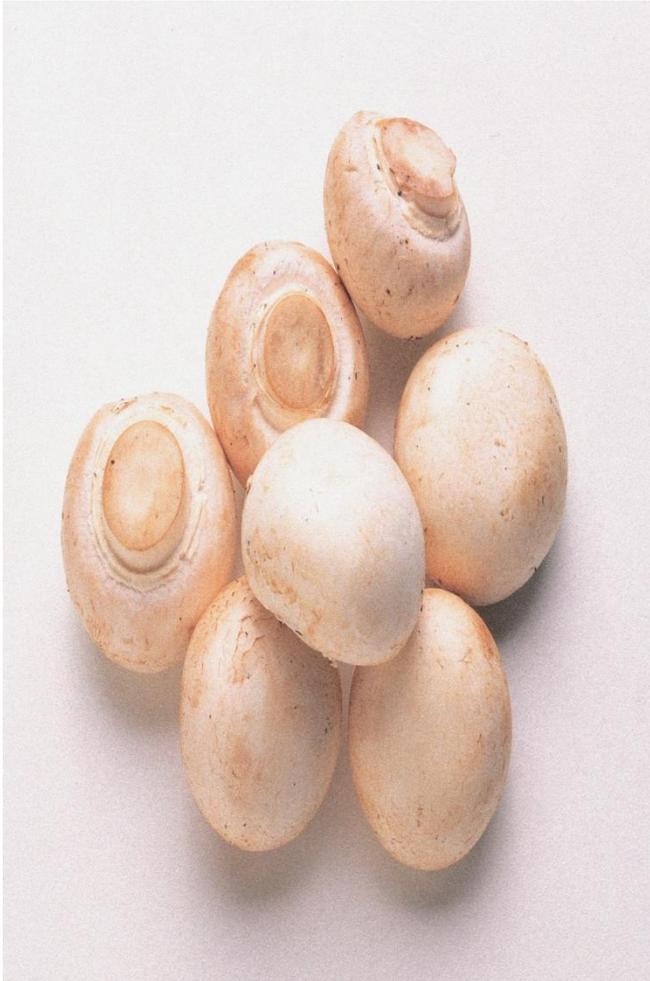
Canned vegetables are full of essential nutrients fresh and frozen foods .

In some cases the nutrients are more readily digestible than in the fresh equivalent.

The amount of minerals, fat-soluble vitamins, protein, fat and carbohydrate remain relatively unchanged by the process of canning.

Edible mushrooms are consumed for their nutritional and culinary value.

INTRODUCTION



Mushroom, a fungus fruit body, is considered a delicious food all over the world because of its taste aroma and structure.

Button mushroom is most important and used for canning.

Canned mushrooms have the same nutritional content as fresh mushrooms.

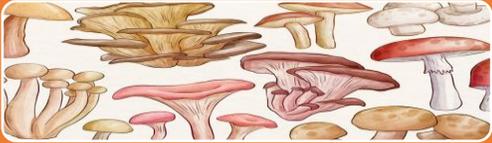
For canning, only small button without stem are to be used.

Market Potential:



- In 2018, the size of the canned food industry was valued at \$91.4 billion.
- It is expected to hit \$124.8 billion by 2026 with a CAGR of 3.9% from 2019 to 2026.
- Germany, the USA, Canada, Japan, Australia, etc. are the main importing countries.
- The current production in India is about 30000 M.T.
- During the forecast period, between 2019 and 2025, the worldwide Canned Mushroom market is projected to grow at a considerable pace.

Raw Material Description:



Button Mushroom (95%) is the mostly used for canning, But other mushroom can also be canned.



Brine (5%) is a highly concentrated salt solution present in water.



The phosphorus in canned mushrooms helps red cells deliver oxygen and may give you more energy.



Help give you stronger bones and healthier teeth. Although bone health is primarily related to calcium, minerals such as phosphorus are also important to supporting healthy bones.



Mushrooms contain a fair amount of phosphorus to promote greater bone and teeth health.



Improve your digestion.

Types of Raw Material:

Button Mushroom

- This is one of the varieties of mushrooms most widely available.
- The taste is mild, with a creamy-white hue.
- In both raw and cooked forms, you can eat them.
- With numerous dishes such as pizza, burgers, soups, and salads, buttons go well.
- They are also widely used in India, and their cultivation is carried out seasonally or in a controlled climate.



INTRODUCTION

Types of Raw Material:

Straw Mushroom

These are as common in India as the button mushrooms, also known as 'Chinese Mushroom'.

They have a nice fragrance and taste, and they are rich in different nutrients and proteins.

In India, their cultivation typically takes place in the states of Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Maharashtra, Tamil Nadu, Chhattisgarh, etc.



INTRODUCTION

Types of Raw Material:



**Oyster
Mushroom**

- In India, people name it 'dhingri' in Hindi, one of the common types of mushrooms.
- In tropical and temperate regions, this variety can grow readily.
- In many cuisines and dishes, these are popular.
- Shaped like a fan and a dusty color, like their names, they look a lot like oysters.
- In India, their cultivation traditionally takes place in the states of Madhya Pradesh, West Bengal, Orissa, Karnataka, and Maharashtra.

Types of Raw Material:

- Often known as summer mushrooms, Milky Mushrooms are In states such as Karnataka, Tamil Nadu, Kerala, Andhra Pradesh, and Odisha.
- it's a wonderful variety that can grows.
- They are less demanding as well and have a high yield.
- With their bright white hue, these mushrooms look enticing and also have a good shelf life.

Milky Mushrooms



Types of Raw Material:

Cremini Mushroom

- Such fungi belong to the same genus as button mushrooms.
- Due to the creation of a coffee-colored skinny layer on the hat, they only differ slightly and thus have dark tan patches on top.
- Nevertheless, these mushrooms are more savory in taste and have a firmer texture than button mushrooms.



Types of Raw Material:

Shiitake Mushroom

In India, people name it 'dhingri' in Hindi, one of the common types of mushroom.

In tropical and temperate regions, this variety can grow readily.

In many cuisines and dishes, these are popular.

Shaped like a fan and a dusty color, like their names, they look a lot like oysters.

In India, their cultivation traditionally takes place in the states of Madhya Pradesh, West Bengal, Orissa, Karnataka, and Maharashtra.

Types of Raw Material:

Portobello Mushroom

- In both raw and cooked forms, you can eat these mushrooms. When they are fully grown, they have a large cap that has black gills at the back of it.
- This cap is flat on top and has a curved shape that is umbrella-like.
- Popular for their smooth, meaty texture, they go well with a lot of dishes throughout the year and are readily available.



Raw Material Aspects:

- An essential aspect of fruit preservation is the conservation or production of nutritional value, texture, and flavor.
- For e.g. preserving fruit by converting it into jam requires boiling (to reduce the moisture content of the fruit and destroy bacteria, yeasts, etc.),
- sugaring (to prevent their re-growth) and sealed inside an airtight jar (to prevent decontamination).
- In the case of mushrooms, White button mushrooms (*agaricusbisporus*) are preferred over other types of mushrooms for canning.
- Commercially, mushrooms are canned in brine.

Source of Raw Material:

- ❑ More than 50 percent of the world's total production of mushrooms is sold in fresh form, mostly in the domestic markets of producers.
- ❑ The equilibrium is stored, such as dried, frozen, bottled, etc.
- ❑ 50 percent of the mushrooms for processing have also been estimated to be canned.
- ❑ Mandi is the best option to get a regular supply of mushrooms as raw material.
- ❑ Contract farming is another best option for raw material sources.



Technologies:

Retort sterilization

- Conventional canning, also known as retort processing.
- it is an efficient way of achieving optimal storage life.
- This technology can be achieved with relatively simple equipment.
- It is a process in which mushroom is hermetically sealed in a tube,
- typically in a tin canister or glass jar.
- Usually, sterilization temperatures range from 110°C to 135°C.



Technologies:

Continuous sterilization

- Continuous sterilization is a rapid transfer of heat to the medium by a condensate of steam without the need for a heat exchanger.
- Once the device is in a holding loop, steam is released through a nozzle into the machine.
- The medium will remain in this cycle for a fixed keeping period until the whole medium is sterile.
- This is more effective than batch sterilization since instead of requiring energy to heat, retain, and cool the whole device, small parts of the inlet streams are heated at a time.



Manufacturing Process:

Picking

- Mushrooms are gathered by gentle hand twisting at the button stage (cap. Diameter 2-2.5 cm).
- With the assistance of a sharp edge stainless steel knife/blade, the soil and section carrying any microbial flora are then cut off/removed.
- The length of the stalk should ideally be 0.5-1 cm.

Sorting and Grading

- Diseased, damaged/bruised, shriveled, and browned mushrooms are discarded.
- sorting and separating only the good white and tight buttons are selected.

Manufacturing Process:



Washing:

- Graded mushrooms are thoroughly washed in cold running water.
- Washed 3-4 times to remove dirt, soil, etc. without unnecessarily damaging or scratching them.



Blanching

- Blanching is required to inhibit enzymatic activity.
- For few minutes, mushrooms are blanched in boiling water, followed by immediate cooling in cold water.

Manufacturing Process:

Filling of cans

- Mushrooms are packaged commercially in two sizes, i.e. A-1 tall can be preferred by retailers to A-2.5 A-1 tall cans.
- In cans with declared drain weight, i.e. 440 gms in A-2.5 can, blanched mushrooms are filled.

Brining

- After filling the cans with mushrooms, 2 percent common salt, 1 percent sugar and 0.05 percent citric acid are added to the brim of the can.
- Brining provides the product with flavour, decreases processing time and increases the shelf life of canned mushrooms.

Manufacturing Process:

Exhausting

- After brining, the cans are exhausted to clear the substance from any trapped air and other accumulated gases to ensure a longer shelf life.
- Cans filled with brine solution are fed to the exhaust box for a specified period of time.

Seaming/Can closing

- Cans are sealed immediately after exhaustion with the aid of a double seamer to acquire hermetically sealed containers.
- sealed cans are then positioned in an upside down position.

Manufacturing Process:

Processing / Sterilization

- Processing, also known as sterilization, is an integral procedure of the canning machine.
- Sealing cans for a specified period of time at a pressure of 15 lbs psi depending on can size and processing position altitude.

Cooling

- Cooling of cans is carried out immediately after sterilization at room temperature in cold running water.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Labeling and Storage

- To prevent rusting, the cooled cans are placed in a cool dry position.
- Cans are held for 8-10 days at ambient temperature to inspect prior to labeling for any swelling, leakage, puffing, and other disorders.
- Proper labeling is done to comply with regulatory provisions.

Flow Chart:

Machine Name	Description	Machine Image.
Boiler	<ul style="list-style-type: none"> Boilers are used to produce steam. This steam here will be utilised in blanching & sterilization processes. 	
Mushroom Grading Machine	<p>This machine utilizes a rotating perforated drum to sort the mushrooms based on their sizes.</p>	
Vegetable and Fruit Washing Machine	<p>This machine is used to clean mushrooms prior to further processing.</p>	

Flow Chart:

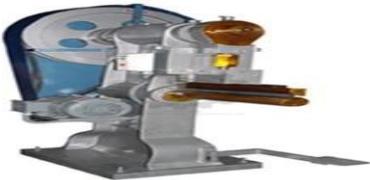
Machine Name	Description	Machine Image.
Blanching Machine	It's essentially used for blanching process of mushroom after it is chopped.	
Can Washing Machine	Can Washing Machine is used to wash the can in which canned food is to be stored and packed	
Can Filling Machine	As the name suggests this machine simply fills the can with the required product which is to be canned in appropriate quantity.	

PROCESS & MACHINERY REQUIREMENT

Flow Chart:

Machine Name	Description	Machine Image.
<p>Canned Food Exhausting Machine</p>	<p>This machine utilizes steam to heat and expand the food items, so as to expel the air and other gases present within the food item.</p>	
<p>Can Seamer</p>	<p>The machine is used to seal the mushroom cans after they are filled.</p>	
<p>Can Sterilizer</p>	<p>Once the can are filled and seamed, they are sterilized by this machine.</p>	

Additional Machine & Equipment:

Name	Uses	Picture
<p>Can reformer</p>	<p>Used for Re-Forming Flattened Round Cans.</p>	
<p>Purified Water Storage and Distribution System</p>	<p>This is the compact system required for water purification and distribute through channel for avoid contamination during processing.</p>	

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	<ul style="list-style-type: none"> <input type="checkbox"/> Proper periodic lubrication of all bearings in various machines. <input type="checkbox"/> Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure proper weighing & metering specially in case of semi-automatic plant. <input type="checkbox"/> Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure that mechanical keys are replaced as per there pre-defined operational life. <input type="checkbox"/> Prevent Overloading.

Cont..

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
4.	Loss of Interface	<ul style="list-style-type: none"> ▪ This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant & ensure no employee goes near transmission lines, unless authorised. ▪ Provide proper physical shielding for the connections.
5	Scaling in Blancher	<ul style="list-style-type: none"> ▪ It's essential to use RO water to prevent scaling in Blancher also, else scaling will take place in blancher. ▪ In-case scaling is already observed in blancher then you used descaling solutions & gently remove salt scales.

Export Potential & Sales Aspect:

- Today, button and oyster mushrooms, followed by paddy straw, milky mushrooms, etc., are commercially grown plants.
- Marketing of fresh mushrooms, particularly in Delhi, Bombay, Madras, Chandigarh, and others, is always done in the nearby city.
- Most of the products are canned in brine from large commercial farms and exported to destinations outside India, especially the USA.
- India's export market is primarily the United States, with some amounts going to the United Arab Emirates, Russia, the Netherlands, Germany, Switzerland, Denmark, Israel, Sweden and other nations.

The objectives of the scheme are:

- Support for capital investment for up-gradation and formalization with registration for GST, FSSAI hygiene standards and Udyog Aadhar;
- Capacity building through skill training, imparting technical knowledge on food safety, standards & hygiene and quality improvement;
- Hand holding support for preparation of DPR, availing bank loan and up-gradation;
- Support to Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), producers cooperatives for capital investment, common infrastructure and support branding and marketing.
- <https://mofpi.nic.in/pmfme/docs/SchemeBrochure1.pdf>



PM FORMALISATION OF MICRO FOOD PROCESSING ENTERPRISES SCHEME (PMFME)

TOTAL OUTLAY: RS.10,000 CRORE

- **2,00,000** FPOs/SHGs/Cooperatives and working micro enterprises to be directly benefitted
- Expected to generate **9 lakh** skilled and semi-skilled jobs
- To be implemented over a **5-yr period from 2020-21 to 2024-25**
- Cluster approach
- Focus on Perishables.



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