

# **MUSHROOM CULTIVATION**

**PRESENTED BY,  
BHAVYASREE P. S**

**ASST. PROFESSOR ON CONTRACT BASIS  
DEPT. OF BOTANY  
L.F.COLLEGE, GVR**

**To,  
Fifth semester students**

# Auricularia





# Calvatia





# Pleurotus





# Agaricus

- Agaricus bisporus was the first cultivated mushroom.



# FOOD VALUES OF MUSHROOM



Organic  Facts  
www.organicfacts.net

## HEALTH BENEFITS OF MUSHROOM



Lowers bad  
cholesterol levels



Helps prevent  
osteoporosis &  
arthritis



Helps prevent  
anemia



Protects hair,  
nails & teeth



Boosts bone  
mineral density



Protects against  
cancer



Regulates insulin  
levels in body



Helps lower blood  
pressure

### Vitamins\*

Riboflavin 24%  
Niacin 18%  
Pantothenic Acid 15%  
Vitamin B6 5%  
Thiamin 5%

### Nutrients\*

Protein 6%  
Dietary Fiber 4%  
Calories 1%  
Carbohydrate 1%

### Minerals\*

Copper 16%  
Selenium 13%  
Phosphorus 9%  
Potassium 9%  
Iron 3%

\*% Daily Value per 100g. For e.g. 100g of mushroom provides 24% of daily requirement of Riboflavin



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- Good supplementary food item.
- Intermediate between meat & vegetables
- Provide high quality proteins.
- Low in calories, hence recommended for diet patients.
- Rich in aminoacids like tryptophan & lysine
- Major sources of Riboflavin , nicotinic acid, & pantothenic acid.
- Contain appreciable amount of thiamine, folic acid, ascorbic acid and minerals.



# Therapeutic effects

- Calvatia gigantea & Amanita muscaria – **homeopathic pharmacology.**
- Lentinus edodes – regular consumption **lowers the cholesterol level of blood.**
- Crude extract of lentinus edodes used **to control influenza virus & polio virus.**
- Carbohydrate fractions of lentinus have an intensive **anti – cancerous effect**
- Coprinus comatus – **anti-diabetic effect.**
- Polyporales – **antidiarrhoea effect**
- Armillaria mellea – **Excellent purgative**



# INTRODUCTION

- Mushroom is a fungi producing a fleshy fruiting body, especially one consisting of a stalk with an umbrella cap.
- It has two part : cap like structure is known as *PILEUS*, attached with thread like structure *MYCELIA*.
- Mycelia absorb nutrient from soil , it do not require sun light for their growth.



# TYPES OF MUSHROOMS



Oyster Mushroom



Straw Mushroom



Reishi Mushroom



Enokitake Mushroom



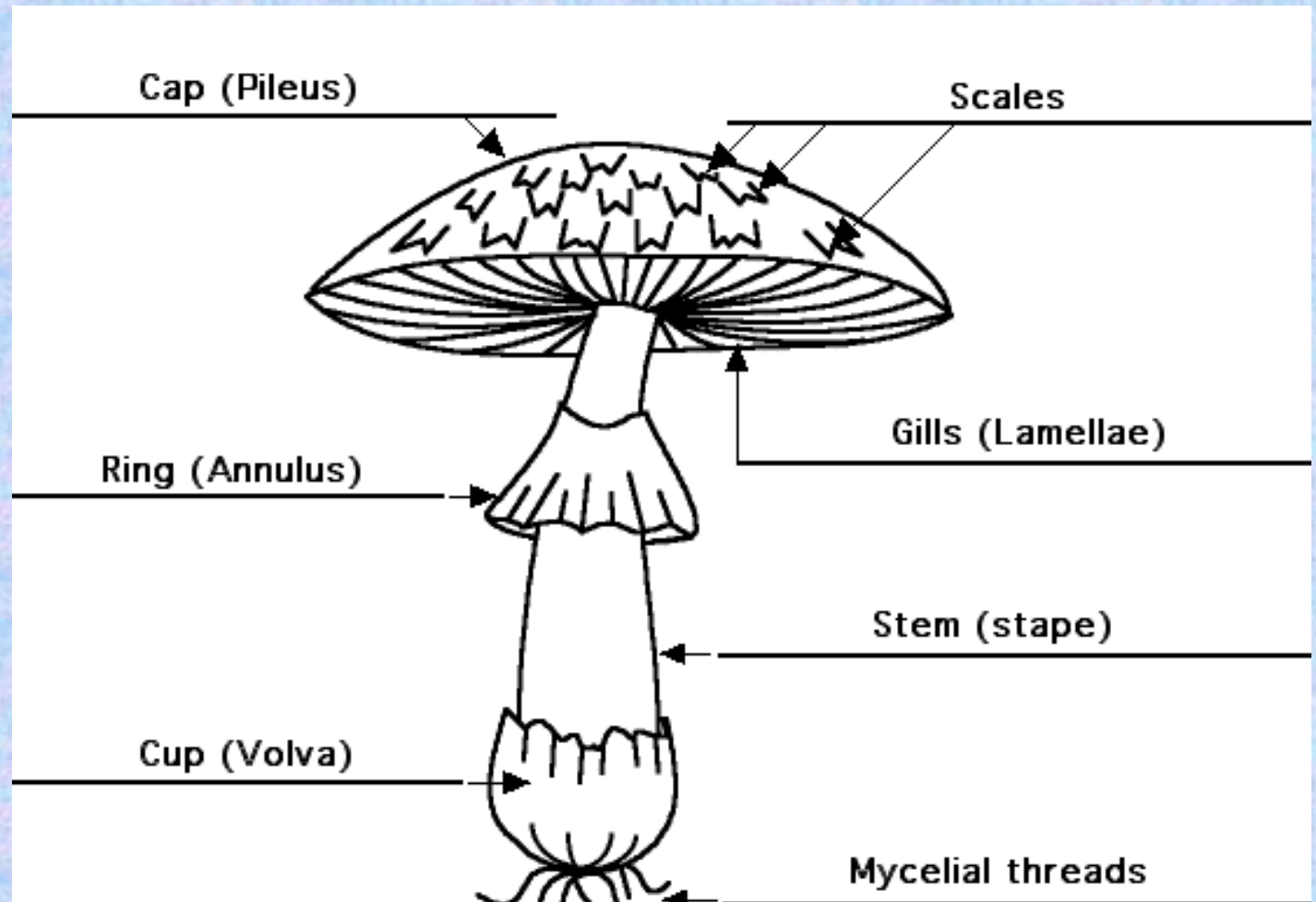
Shitake Mushroom



Wood Ear Mushroom

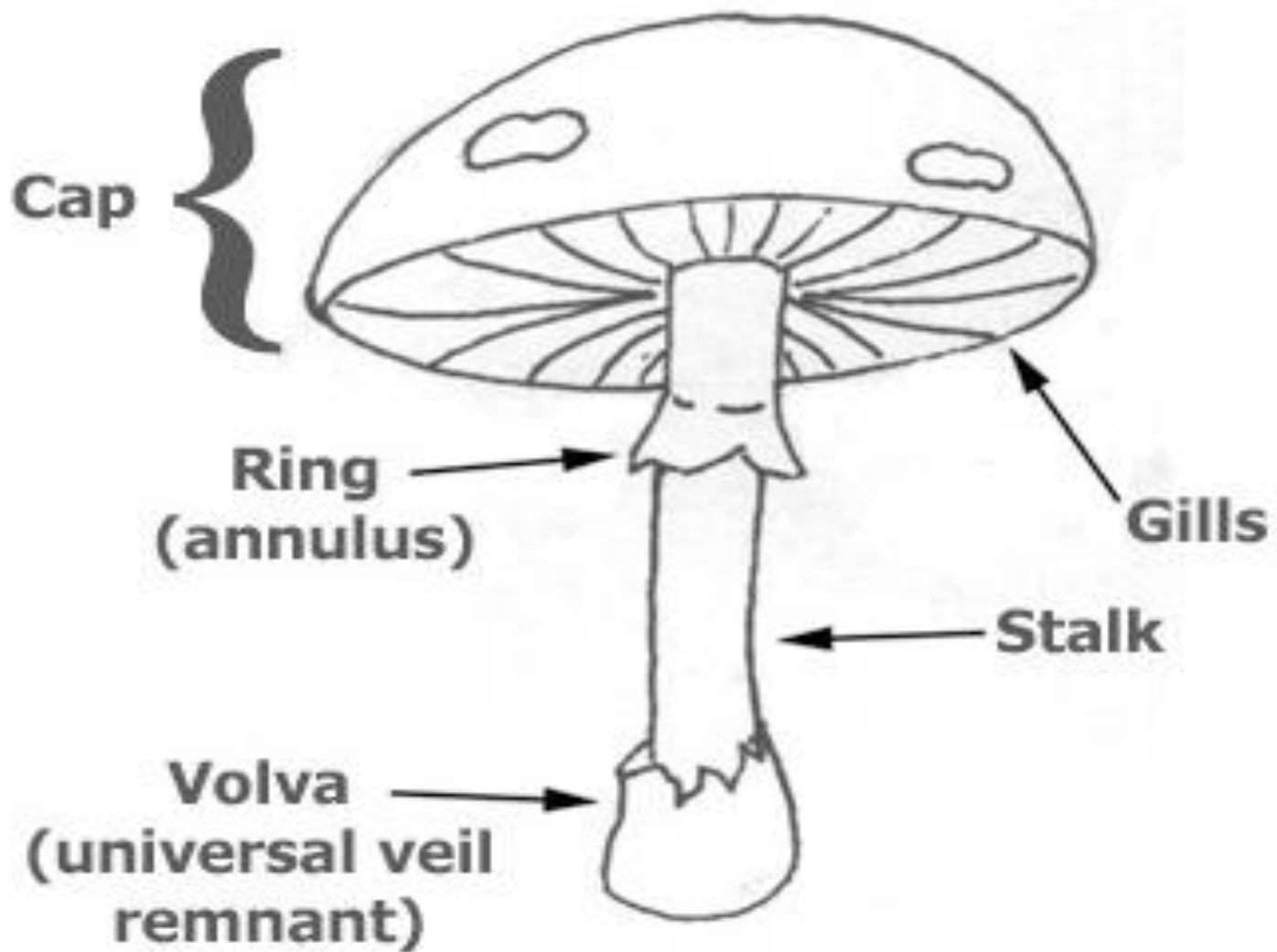


# STRUCTURE



- A mushroom typically consists of a **stalk (stipe) and a cap (pileus)**.
- As the mushroom develops from an underground mycelium and pushes upward, it is protected by a thin membrane which eventually ruptures, leaving fragments on the cap.
- Another membrane, attaching the cap to the stalk, also ruptures, allowing the cap to expand and leaving a remnant ring (annulus) on the stalk.
- Radiating rows of gills are found on the cap's undersurface; these bear the club-shaped reproductive structures (basidia) which form minute spores known as basidiospores, of which a single mushroom may produce millions.



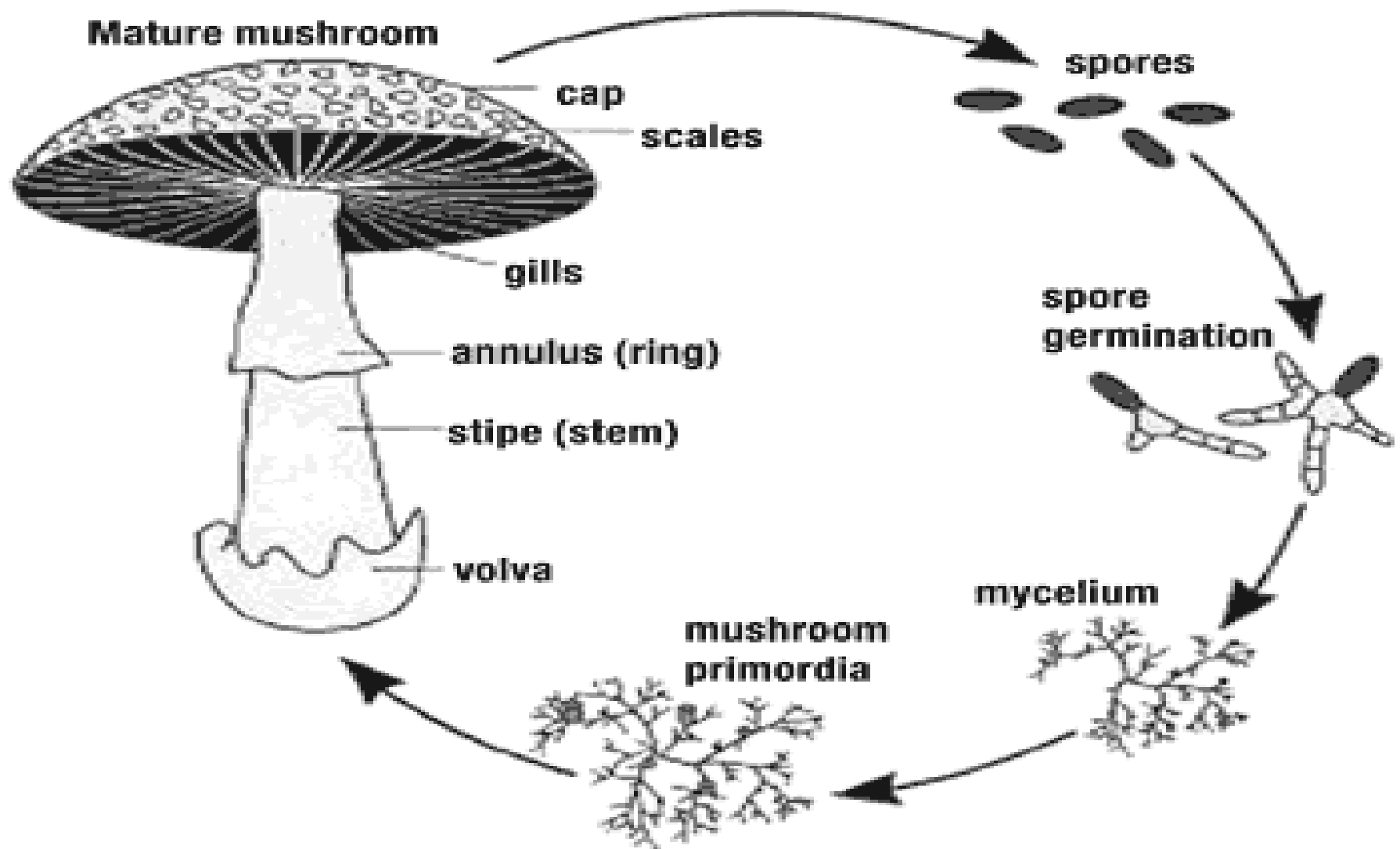


# Poisonous Mushrooms





# MUSHROOM LIFESTYLE



# ISOLATION

- Isolated from stipe or pileus region, from young sporocarp.
- Sporocarp must be free from damage, contamination by other fungi





# MATERIALS REQUIRED

- Culture media.
- Petridishes.
- Alcohol.
- Cotton.
- Forceps.
- Inoculation needle.

- Selected sporocarps cleaned, surface sterilized with alcohol & cut in to small pieces using clean sterilized scissors.
- Sterilized nutrient medium is poured in to sterile petridishes & allowed to cool down & solidify.
- These bits planted on the surface of the solidified medium & then incubated at room temperature
- In 2 or 3 days mushroom will start growing as whitish strands.
- They are transferred to fresh media for multiplication.
- This pure culture called **mother culture**.
- It is used for large scale production of spawn.

# SPAWN







# SPAWN

- Vegetative seed material of mushrooms.
- Spawn production is the collection of a pure culture of the fungus to be cultivated.
- Pure culture isolated from fresh sporocarps & then maintained using standard techniques.
- Spawn having high production capacity & high resistance against pests & diseases.
- Freeze drying, freezing & storing in liquid nitrogen – preserving fungal cultures.
- Use of fresh isolates of cultures, usually once in every six months, excludes the necessity for long storage of cultures.

# CULTURE MEDIA

- Potato dextrose sugar (PDA)
- Oats agar medium



# MULTIPLICATION OF CULTURE

- Mother culture has to be multiplied.
- Transfer small piece of the agar culture to the medium in the bottle using inoculation needle.
- Heat the needle.
- Allowed to cool otherwise it will kill the fungal mycelium.
- Inoculated bottles kept undisturbed for few days by this time fungus will grow as a cottony white mat.
- Abnormal growth is observed, such cultures must be discarded.
- Once the white fungal growth has filled up the agar surface, bottles are ready to use.

# SPAWN PREPARATION

- Select best quality grains (wheat, maize etc)
- Clean the grains & half cook with sufficient water
- Grains should not split & release the starch.
- After proper cooking , grains taken out, excess water is drained off, & allowed to cool.
- Dried by spreading over a clean surface.
- Completely dried mixed it with 50-60g calcium carbonate per kg of grain.
- Processed grains filled in clean empty bottles, up to two third of their capacity.



- Empty glucose drip bottles are ideal for this.
- Bottled plugged using non absorbent cotton plugs & sterilized in autoclave at 1.02kg/cm pressure for two hours.
- Bottles taken out cooled & inoculated with a culture of the mushroom under aseptic conditions.
- Inoculation done by placing small bits of fungal culture to the medium.
- Plug the bottles again with sterile cotton plug.
- Inoculated bottles are incubated for spawn run in a cool place, for 10-15 days.
- Mycelium of mushroom completely fills the bottle as a whitish growth.

# Oyster mushrooms

- Oyster mushroom is scientifically known as *Pleurotus*
- In India also commonly known as “Dhingri”.
- Excellent Nutritional value.
- Oyster mushroom is the good source of dietary protein food.
- Cultivation of oyster mushroom having ability to convert lignocelulosic waste material into high quality food material .







- Oyster mushroom was first cultivation at 1917 in Germany by Flank.
- First cultivation of oyster mushroom by using tree stump & wood logs.
- *Pleurotus Sajor-caju* was first reported by Jandik & Kapoor in 1974.
- Oyster mushroom can be grown at temperature 20° to 25°c & Relative humidity 80 to 90 %.
- It can be grown all over world like China, India, France, Germany, USA , etc.

- In India- Goa, Maharashtra, Tamilnadu, Delhi, Andhra-Pradesh, Utter- pradesh, Madhya-Pradesh, etc.
- It can be use different recipes like Pulav, pakode, omlet, Cutlet , mushroom masala, etc.
- It is grown all over the world due to the simple cultivation technology, pleasant flavour & long shelf life.

# **Oyster mushroom:-**

- ❖ Scientific Name:-*Pleurotus spp.*
- ❖ Phylum:-*Basidiomycotina*
- ❖ Class:-*Basidiomycetes*
- ❖ Sub class:-*Holobasidiomycetidae*
- ❖ Family:-*Polyporaceae*
- ❖ Genus:-*Pleurotus*
- ❖ Species:-  
*sajor caju, sapidus, ostreatus, eous,*  
*membranaceous, florida, citrinopileatus,*  
*flabellatus*



# NUTRITIONAL VALUE OF OYSTER MUSHROOM:-

Sr. No.	Nutrient	Quantity
1.	Water	76.69 gm
2.	Eneergy	28 kcl
3.	Protein	2.85 g
4.	Lipid(Fat)	0.35 g
5.	Ash	0.87 g
6.	Carbohydrate	5.24 g
7.	Fiber	2.0 g
8.	Sugar	0.95 g

## MINERALS:-

Sr. No.	Minerals	Quantity
1.	Ca	8 mg
2.	Fe	1.14 mg
3.	Mg	15 mg
4.	P	103 mg
5.	K	361 mg
6.	Na	15 mg
7.	Zn	0.66 mg
8.	Cu	0.210 mg
9.	Mn	0.097 mg
10.	Se	2.2 mcg

## *Different Species of Oyster mushroom:-*

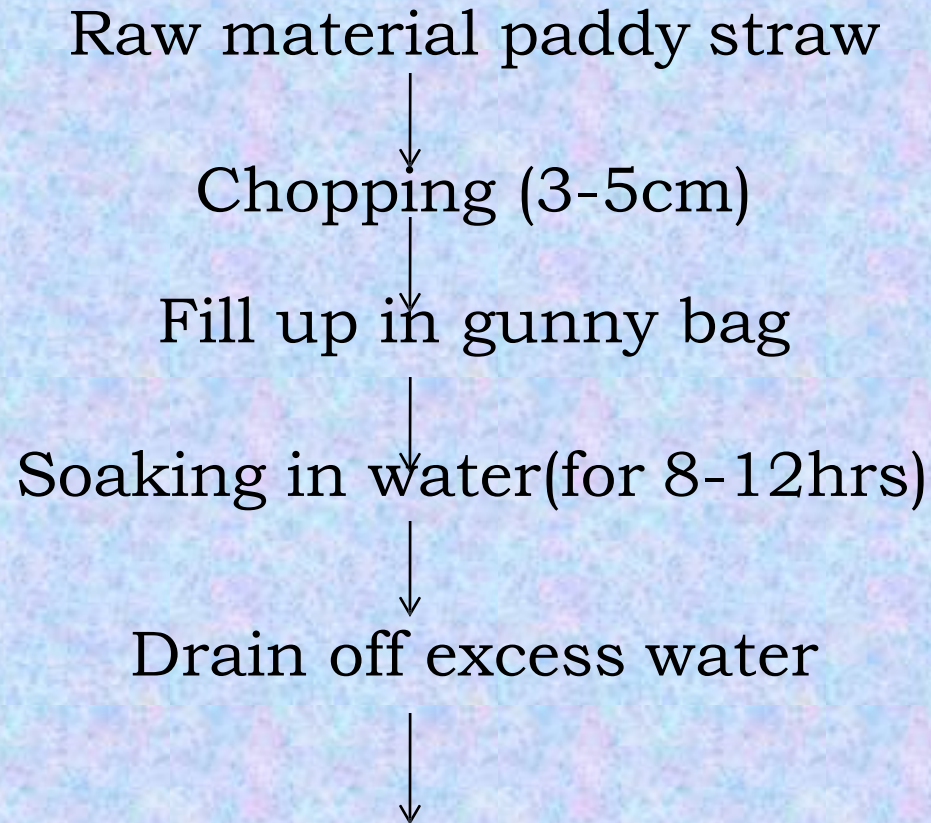
- ❖ *Pleurotus sajor-caju*
- ❖ *Pleurotus florida*
- ❖ *Pleurotus sapidus*
- ❖ *Pleurotus ostreatus*
- ❖ *Pleurotus eous*
- ❖ *Pleurotus membranaceus*
- ❖ *Pleurotus citrinopileatus*
- ❖ *Pleurotus flabellatus*

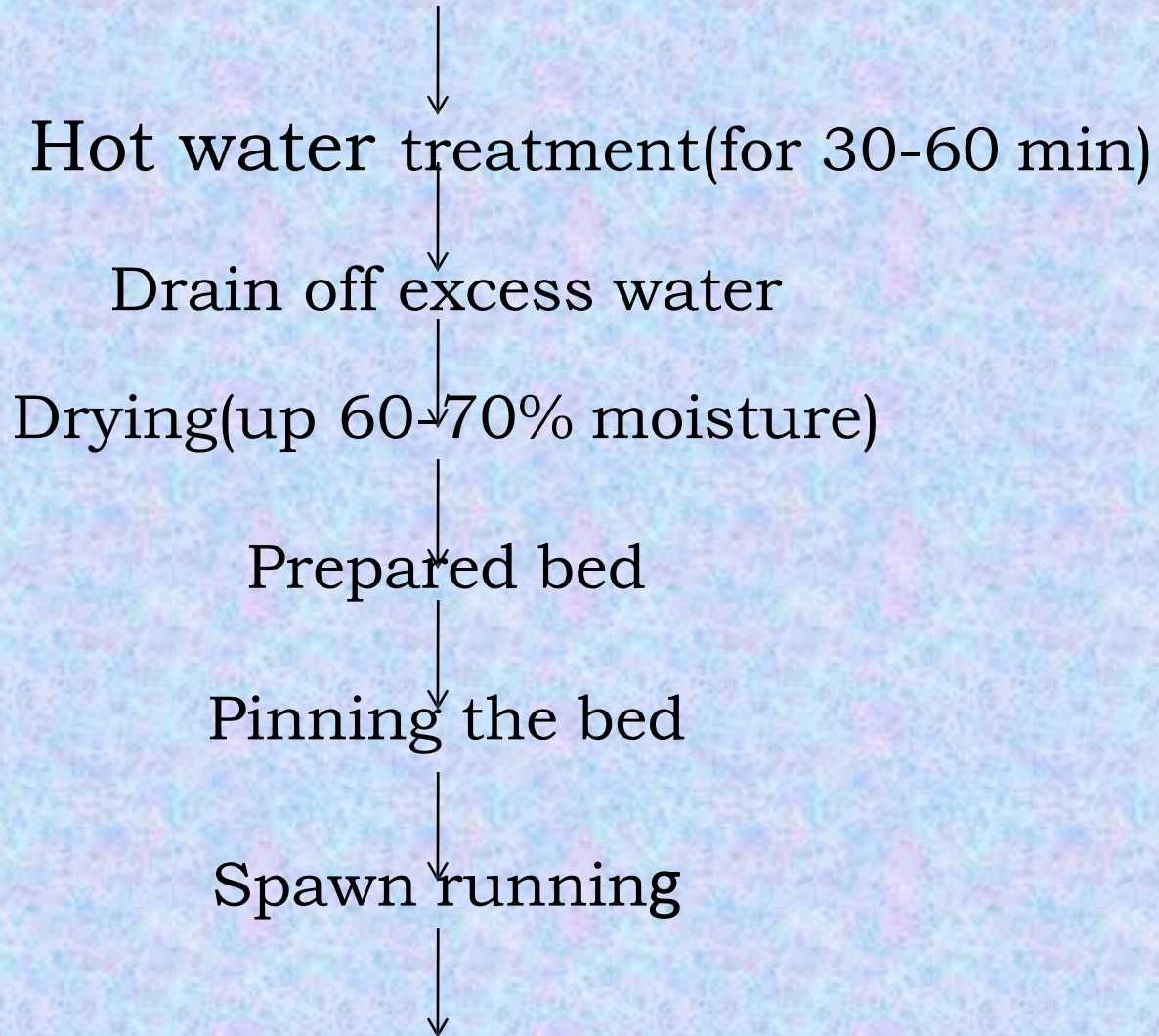


# *Pleurotus florida*

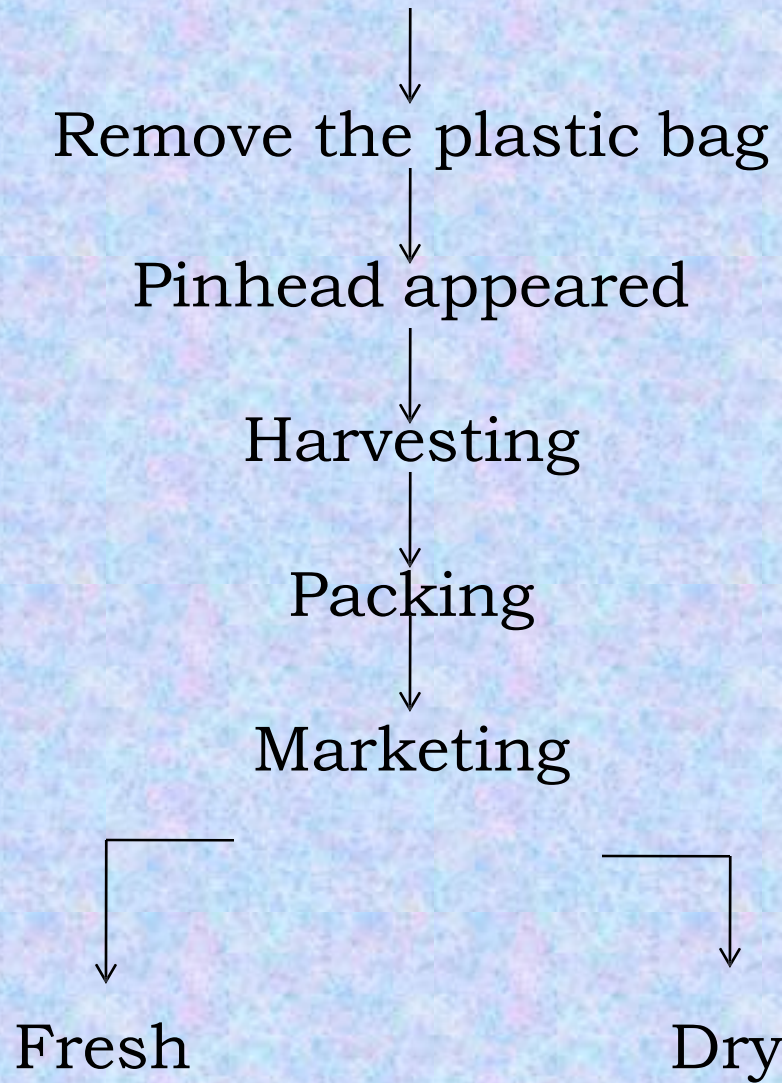


## **FLOW CHART:-**











**CHOPPING OF PADDY STRAW**



**SOAKING OF PADDY STRAW**



**HOT WATER TREATMENT**



**DRAIN OFF EXCESS WATER**





**BED PREPARATION**



**LAYERING OF SPAWN**



**PINNING OF BED**



**SPAWN RUNNING**





**HANGGING OF BED**



**WATERING**



**PINHEAD STAGE**



**MATURE MUSHROOM**



**HARVESTING OF MUSHROOM**



**PACKING OF MUSHROOM**



## **YIELD:-**

- More than 500 kg of fresh mushroom per ton of dry wheat or paddy straw.
- 80-100 grams of dried product may be obtained from 1kg of fresh mushroom.