MILKY AND MACROCYBE MUSHROOM CULTIVATION


Calocybe indica


Macrocybe gigantea

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INTRODUCTION

Milky mushroom

- Milky mushroom (*Calocybe indica*) is commonly known as "Dudhi chatta" in West Bengal.
- It is a tropical species which was collected and consumed from the forests of West Bengal.
- Mushroom lab IIHR standardized its commercial straw-based cultivation technology in 1989.
- The fruit bodies have very attractive white color, with pileus and a thick stalk. Both pileus and stalks are edible.
- This mushroom has a better shelf life as compared to oyster and button mushrooms and there is absolutely no browning on storage.

Macrocybe mushroom

- Macrocybe mushroom (*Macrocybe gigantea*) mushroom was collected from Siddapura and IIHR campus in Bengaluru in 2017
- Mushroom lab, IIHR standardized its commercial straw-based cultivation technology in 2022
- The fruit bodies are soft in texture, very attractive brownish color, with pileus and a stalk. Both pileus and stalks are edible.
- This mushroom has a better shelf life as compared to oyster and button mushrooms and nutritionally profiling showed that this mushroom is better than milky mushroom.

ADVANTAGES

- Requires temperature range of 30-35°C for growth and fructification; hence is highly suitable for tropical climate.
- Has excellent shelf life
- Absolutely no browning on storage.
- Attractive milky white and brownish color
- Easy method of cultivation with biological efficiency comparable to oyster mushroom.

CULTIVATION METHOD

1. Substrate preparation 2. Bag filling and spawning

3. Pasteurization/ Sterilization 4. Spawn running

5. Casing 6. Cropping

PREPARATION OF SUBSTRATE



- The mushroom is usually grown on chopped paddy straw in polypropylene (PP) bags.
- The straw is soaked in water for 2-3hours.
- This is done to achieve the moisture content of 65-70%.
- It also helps in the removal of some surface contaminants on the paddy straw.

SUBSTRATE PASTEURIZATION: The process to eliminate the harmful microbes is called pasteurization. It is done in two ways.

i) Hot water pasteurization:



- Hot water treatment is given by plunging the dry substrate in water (80 -85°C) for 2 hours.
- Chopped dry straw without prior soaking can be directly put in hot water.
- Heating should be continued to carry out the disinfection process effectively.

ii) Steam Pasteurization:



- Steam pasteurization is done by passing steam generated in the boiler to a chamber stacked with wet substrate material to be disinfected.
- The thorough disinfection occurs only if the temperature is maintained in the chamber at 60-65°C for 4 hr. or at 80°C for 2 hours.

Sterilization method:



- Sterilization is the most effective way to prevent contaminants.
- Straw is presoaked for 2-3 hours in water. The soaked straw is spread on mesh in sun to reduce the moisture content to 65%.
- The straw with right moisture content is filled in PP bags (1 or 2 kg per bag). A PVC ring (1-inch internal diameter) is inserted to make neck which is then plugged with nonabsorbent cotton.
- The bags are sterilized in an autoclave at 121°C, 15lb pressure for 20 minutes.

BAG FILLING AND SPAWNING

Polypropylene bags:



- Polypropylene bags (150 -170 gauge, 12x16 inches for 1 kg and 14x18 inches for 2 kg wet substrate) are the best containers for milky mushroom cultivation where pasteurized straw is used as substrate.
- The pasteurized substrate is filled in the bags and spawned simultaneously in inoculation chamber.
- The mouth of the bag is plugged with nonabsorbent cotton plug and kept for spawn running.

SPAWNING



- In the pasteurized substrate (straw in bags), layer spawning is done.
- In sterilized substrates surface spawning at the top of the bag is done which is slowly mixed after closing the bag.

SPAWN RUNNING



- After the operation of spawning is completed, polythene bags are plugged with non-absorbent cotton in a PVC neck.
- The temperature is kept around 21-28°C (optimum 24-26°C). There is no need of watering or light at this stage.

CASING



- Casing is the process of putting a layer of pasteurized soil on the substrate to induce fructification in addition to giving physical support to the fruit bodies.
- Soil having 20% sand, 60-70% moisture is mixed with chalk powder (soap stone powder) or calcium carbonate (8%) to bring the pH to 7.5-8.

- It is then pasteurized at 60-65°C for 2-4 hours or 80°C for 1-2 hours.
- The fully colonized bags are shifted to the cropping room and opened.
- The plastic is rolled downwards and the substrate leveled. A layer of cool pasteurized soil (2-3cm depth) is uniformly spread on the top of the substrate. Watering must be carried out from next day onwards.

CROPPING

- It takes 10-15 days after casing for the induction of pin head initials. During this phase a temperature of 28-35°C (optimum 30-32°C , R.H. of 80-85% and good cross ventilation and light must be maintained in the cropping rooms.
- Watering must be carried out with a sprayer but care must be taken to avoid over watering.
- Light (diffused or fluorescent tubes) can be used on 12 hour cycle.
- The mushrooms are harvested when the pileus diameter is 5-7cm.
- The stalk is slightly cut at the base to remove the adhering soil and other debris. Mushrooms can be marketed fresh or can be processed as pickle.



LOW COST STRUCTURES FOR GROWING OYSTER MUSHROOMS

I. SOLAR POWER INTEGRATED OUTDOOR MUSHROOM GROWING UNIT



Arka mushroom outdoor mushroom growing unit was developed by ICAR-IIHR during 2018-19. By using this unit milky mushrooms can be grown easily both at rural and urban areas. The newly designed outside mobile chamber is low cost in compare to the permanent building

Dimension : 1.40 x 1.00 x 1.7 m

Capacity : 80 bags (1 kg)

Yield potential : 20 to 30 kg per month

Materials used : MS rods, 40 mesh nylon net, Gunny sheets, 1" CPVC pipes, water tank, 30 W DC misting diaphragm pump, nozzles, Solar power panel, inverter, storage battery and a timer

II. LOW COST SEMI PERMANENT MUSHROOM CROPPING ROOMS



Arka mushroom outdoor mushroom growing unit was developed by ICAR-IIHR during 2018-19. By using this unit milky mushrooms can be grown easily by utilizing vertical space effectively. The newly designed chamber is low cost in compare to the permanent building.

Dimension : 10 x 10 x 15 feet

Capacity : 350 bags (1 kg) or 300 bags (2 kg)

Yield potential : 70 to 85 kg per month

Materials used : MS rods, 40 mesh nylon net, Gunny sheets

Advantages : Production of healthy and good quality mushrooms, lesser production cost

ICAR-IIHR DESIGNED SOLAR ENERGY AND MULTIFUEL STEAM GENERATOR INTEGRATED VERTICAL AUTOCLAVE UNIT



Production : Sterilization of 250-300 paddy straw bags (1 kg) per day

Energy : Electricity or LPG gas or Firewood

Advantages : Space and cycle time efficient, Multifuel

PREVENTION AND CONTROL OF INSECT PEST IN CULTURE OF *CALOCYBE INDICA*

Phase of crop	Chemical	Quantity	Remarks
24 hours Prior to bag filling, inside the bag filling room	Formaldehyde Chlorothaloni	20ml per liter of water 2g Per liter of water	To kill the air contaminants in the room
Once a week in spawn running room	Formaldehyde Chlorothalonil	30ml per liter of water2g Per liter of water	To kill the air contaminants in the room and prevent insect pests
Emptying-24 hours before discarding of bags	Formaldehyde Chlorothalonil	50ml per liter of water 2g Per liter of water	To take care of the contaminants which would have accumulated during the one month cropping period. If the SMS has to be used for animal feed or as organic manure, these chemicals must not be sprayed on the substrate.
Post cropping-in the empty cropping room after discarding bags. Keep the room closed and dry for 3-4 days.	Formaldehyde Chlorothalonil	50ml per liter 5 of water 4g Per liter of water	To take care of the air contaminants which would have accumulated during the one month cropping period.

ICAR-IIHR DESIGNED FRESH MUSHROOM AND RTF BAG VENDING CART



- To take the fresh unharvested mushrooms along with growing bags to the doorstep of consumers solar powered tricycle for vending ready to harvest fresh mushroom was designed.
- It is covered with nylon 40 mesh to protect the entry of insects and to facilitate the aeration.
- It is further covered with locally available gunny bag all around and it is wetted to maintain humidity inside the chamber.
- It can hold 36 Nos of 1 kg/2kg bags inside the chamber.

Phone number for booking and confirmation of spawn

Mobile: 07090949605, 080-23086100, EXTN-349, 348, 347

E-mail: mushroomiihr@gmail.com

Please come to collect spawn only after confirmation by phone or mail

For training information visit https://www.iihr.res.in/mushroom

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