

Mushroom Cultivation Project 2023



REPORT : MUSHROOM CULTIVATION

Mushroom Cultivation Project 2023 for the SBSI interns GOA UNIVERSITY

INTRODUCTION

Mushrooms are a type of fungi, which are consumed as food. Mushroom consumption and cultivation are old practices that started some thousands of years ago. Mushrooms are believed to have high protein contents and sometimes known as vegetable meat. Mushroom have gained recognition in the food chain because they contribute nutrient supplements to the food and have high medicinal and pharmaceutical use.

Mushroom cultivation is the process of growing mushrooms for commercial or personal use. It involves creating an environment that is conducive to the growth of mushrooms, providing the necessary nutrients, humidity, and temperature conditions for their development. Oyster mushroom cultivation is gaining popularity as a lucrative business in many countries around the world. The cultivation process is relatively simple and can be done on a small or large scale, making it accessible for individuals or businesses to enter the market. Oyster mushrooms are highly nutritious and have many health benefits, including being low in calories and high in protein, vitamins, and minerals. Oyster mushroom cultivation requires minimal investment and can be done in small spaces such as a garage or basement. The process involves inoculating a substrate such as straw, sawdust, or coffee grounds with mushroom spores and providing the ideal growing conditions of temperature, humidity, and ventilation. Oyster mushrooms grow quickly. Overall, the demand for oyster mushrooms is on the rise due to their nutritional value, health benefits, and versatility in cooking.

The process of mushroom farming involves composed preparation, cleaning of mushroom center, substrate collection from different places, substrate autoclaving and drying, filling of bags etc

OBJECTIVE

- To promote mushroom cultivation.
- Educational Experience for promoting mushroom cultivation among students.
- Provides practical and hands-on learning experiences for students .
- Skilled development and Entrepreneurial Opportunities.
- To conduct outreach activity contributing positively to society

MATERIAL USED

Plastic bags, rubberbands, IPA solution, sanitizer for cleaning hands, mushroom spawns, autoclave machine, substrate - paddy straw, saw dust, rice hull substrates, sugarcane's bagasse, formaldehyde solution for fumigation.

PROTOCOL/PROCEDURE

1. Cleaning of mushroom cultivation incubation center with detergent or IPA solution which includes cleaning of dark room, lightroom, water sprinklers , walls.
2. Cleaning of plastic curtains with IPA solutions
3. Collections of substrates from different places. Substrate - Paddy straw, sawdust,sugarcane's bagasse, rice hull substrates, etc.
4. Fumigation in Dark and Light room with Formaldehyde solution

5. Substrate Autoclaving and drying - Substrates collected should be cut into smaller pieces (Eg - Paddy straw, sugarcane's bagasse). Substrate autoclaving is the sterilization of the mushroom growing medium using high-pressure steam to eliminate potential contaminants. Drying refers to the removal of excess moisture from the substrate before inoculation, creating a suitable environment for mushroom mycelium growth and minimizing the risk of contamination.
6. Filling of bags with substrate and spawns - The filling process is carried out at an optimal temperature. First, a layer of sterilized substrate, such as sawdust or straw, is placed in the plastic bag. Next, a layer of mushroom spawns is added, focusing on the bag's edges. This layering process is repeated until the bag is filled up to a thickness of 5-6 cm, reaching approximately 80 percent capacity. While filling the bag, gentle pressure is applied by hand to compress the substrate. This ensures optimal colonization of the mycelium and promotes eventual mushroom production.
7. Now spawning is done and the bag is knotted with a rubber band.
8. Using sterilized pins, puncture the bags at random locations.
9. Incubation - The spawned compost is kept in a dark room until the mycelium has fully penetrated to the bottom of the substrate. In 20 to 30 days the substrate appears white due to growth of mycelium.
10. Once mycelium is fully grown, we need to irrigate the grow mycelium in the light room twice a day. Creating the right light conditions is crucial for successful mushroom cultivation. When irrigating mushrooms in a light room, it's important to provide moisture without directly wetting the fruiting bodies. Use a fine mist or fogging system to maintain humidity levels in the growing environment, ensuring the substrate remains moist without causing water droplets to accumulate on the mushrooms.

11. Harvesting - When the mushrooms have reached the desired size and maturity, carefully harvest them by cutting or twisting them at the base. Harvesting should be done regularly as mushrooms mature to promote continuous fruiting.

(Note - check the growth of unnecessary bacteria while the substrate bags are in a dark room.)

Activities at Mushroom Cultivation and Incubation Center

Sr. no.	Date/Time	Activity
1	4th & 5th April 2023	Cleaning of Mushroom cultivation incubation center with detergent / IPA solution. <ul style="list-style-type: none">● Dark room● Lightroom● Water tank/motor; sprinklers, etc.● Walls; Plastic curtains
2	6th April 2023	Plastic curtains to be fixed and cleaned with IPA solution
3	7th April 2023	Substrate collection from different places. (Paddy straw, sawdust, rice hull substrates, etc.)
4	8th April 2023	Fumigation in Dark and Light room with Formaldehyde solution
5	20th April 2023	Substrate Autoclaving and drying
6	21st April 2023	Filling of bags and keeping in Dark rooms
7	9th May2023	Transferring bags into lightroom
8	15th June2023	Harvesting of Mushroom

Difficulties in Mushroom Cultivation

1. Contamination: One of the primary challenges in mushroom cultivation is the risk of contamination by molds, bacteria, or competing fungi. Maintaining a sterile environment throughout the cultivation process is crucial to prevent contamination and ensure successful mushroom growth.
2. Temperature and Humidity Control: Different mushroom species have specific temperature and humidity requirements for optimal growth. Maintaining these conditions consistently can be challenging, especially in variable climates or in indoor cultivation setups.
3. Pest and Insect Infestations: Pests and insects, such as mites, flies, and nematodes, can damage or destroy mushroom crops. Implementing effective pest management strategies and maintaining proper hygiene in the cultivation area are important to prevent infestations.

Cleaning of mushroom incubation room



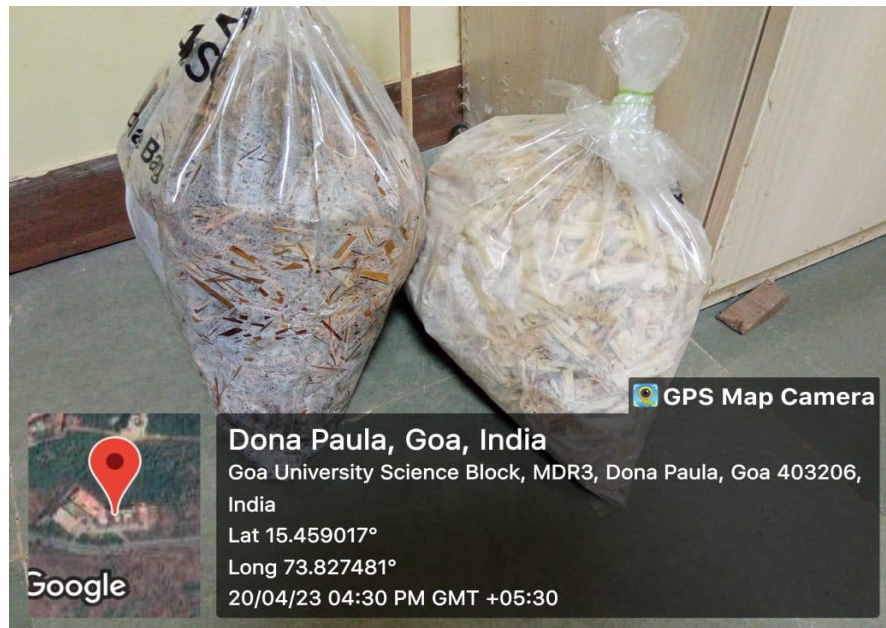
Cutting of substart



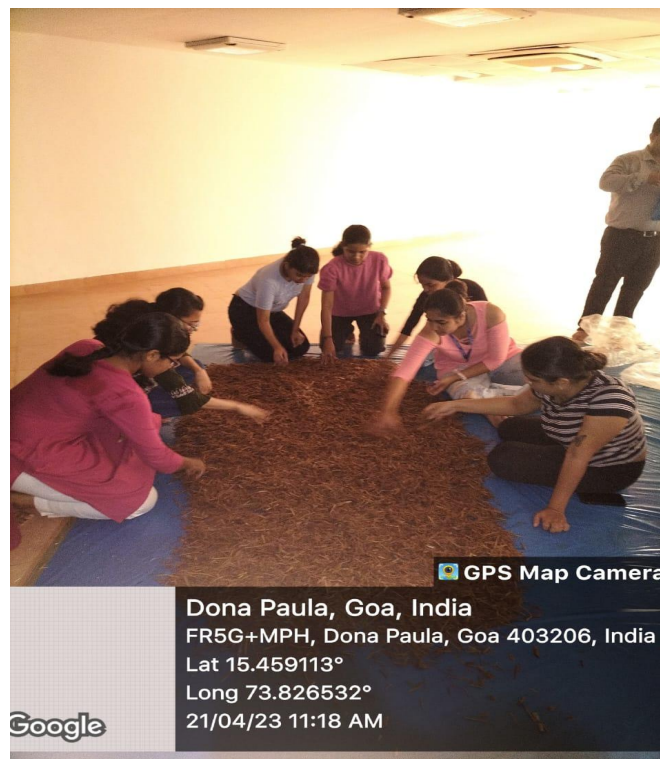
Soaking



Autoclaved bags



Drying of substart



Filling bag with substart and spawns



Keeping bags in dark room



Harvesting



Outreached Activity

Promoting Mushroom Cultivation as Entrepreneurial Opportunity at Valpoi Village on 30-06-2023





(PS- Due to heavy rain, we conducted activity individually at neighboring house)

Conclusion

The mushroom culture activity provided valuable hands-on experience in cultivating mushrooms, enabling a deeper understanding of the growth process and the necessary techniques for successful cultivation. Through this activity, the participants gained knowledge of substrate preparation, inoculation, incubation, fruiting conditions, and harvest procedures. Despite challenges, including contamination risks and the need for environmental control, the activity yielded a successful harvest of high-quality mushrooms. Overall, the mushroom culture activity proved to be an engaging and educational experience.

mushroom cultivation offers a range of benefits, including nutritional value, medicinal properties, and entrepreneurial opportunities. The protocol outlined above provides a systematic approach to mushroom cultivation, including cleaning, substrate preparation, autoclaving, bag filling, incubation, and harvesting. However, it is important to be aware of the potential challenges, such as contamination, temperature and humidity control, and pest infestations, which can impact the success of mushroom cultivation.

By addressing these difficulties through proper hygiene, environmental control, and pest management, growers can maximize their chances of a successful harvest. Mushroom cultivation also presents educational and outreach opportunities, allowing students to gain practical skills and contribute positively to society. With the right knowledge and resources, mushroom cultivation can be an accessible and rewarding endeavor.

**Report done by SBSI interns for Mushroom Cultivation Project
2023**

- Vaishnavi Pokle (Group 4)
- Riddhi Savoiverekar (Group 4)
- Arya Anil Pokle (Group 4)
- Ishika Chopdekar (Group 3)
- Kenesha Singh (Group 3)
- Saisha Chopdekar (Group 3)
- Racheal D'Souza

Zoology department

School of Biological science and biotechnology

Goa University

Taleigao - GOA