

Oyster mushroom cultivation & its role in upliftment of rural economy

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Abstract: Oyster mushroom cultivation shows us a promising avenue for rural economic development through sustainable agriculture. This mushroom is popular for its rapid growth, nutritional value and adaptability. Cultivating Oyster mushroom is a viable source of income for rural communities and contributes a lot for the economic upliftment of rural people. Low-cost production has increased its value more. Cultivating Oyster mushroom is a real cost-effective venture as the raw materials for its cultivation method is easily available in rural areas and it reduces the initial investment barriers for rural poor farmers. Besides there's one great advantage is that it's easier cultivation process could be adopted by the farmers having less agricultural experiences too. Its short cultivation cycle leads to faster yields and profit. It has a majorly important role on community nutritional development in fighting against malnutrition throughout the year. Many entrepreneurs are inspired to cultivate oyster mushroom for its ample nutritious and economic value.

Key Words: Oyster mushroom cultivation, Rural economic development, Sustainable agriculture, Nutritional value, Cost-effective venture, Short cultivation cycle, entrepreneurs, Malnutrition.

1. INTRODUCTION:

Phylum- Basidiomycota & Family- Agaricaceae

Pleurotus ostreatus, the oyster mushroom, oyster fungus, heartache, or pearl oyster mushroom is a common edible mushroom. It is one of the more commonly sought wild mushrooms, though it can also be cultivated on straw and other media.

Oyster Mushroom is scientifically known as *Pleurotus ostreatus*. It is commonly known as "Dhingri". First attempt for human consumption- Falck in Germany. Saprophytic obtains nutrients by decomposing agricultural products.

Pleurotus ostreatus, overall known as oyster mushroom, was developed in banana straw utilizing inoculates delivered by two distinct cycles - fluid inoculums and the generally utilized strong inoculums. Various proportions (5, 10, 15, and 20%) were tried. Natural proficiency, yield, profitability, natural issue misfortune, and dampness of fruiting bodies just as physical-compound qualities of banana straw were considered. Critical contrasts were watched for cellulose, lignin, and hemicelluloses content somewhere in the range of one and two harvests for both strong and fluid inoculate. It was seen that *P. ostreatus* development advanced higher debasement of lignin (80.36%), trailed by hemicelluloses (78.64%) and cellulose (60.37%). Noteworthy contrasts somewhere in the range of one and two harvests were additionally watched for the creation boundaries (natural productivity and yield) for the two sorts of inoculate, fluid and strong. Nonetheless, huge contrasts in efficiency between harvests were watched distinctly for strong inoculums (Aliment, 2008) SOURCE=[<http://doi.org/10.1590/S1010>].

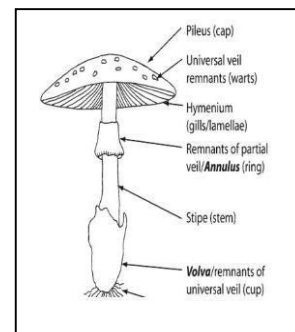
2. METHODOLOGY:

Data and information have been collected from different secondary sources and are analyzed. The interesting point is that a hypothetically structured data has been presented here to analyze the expected optimum profitability of oyster mushroom production.

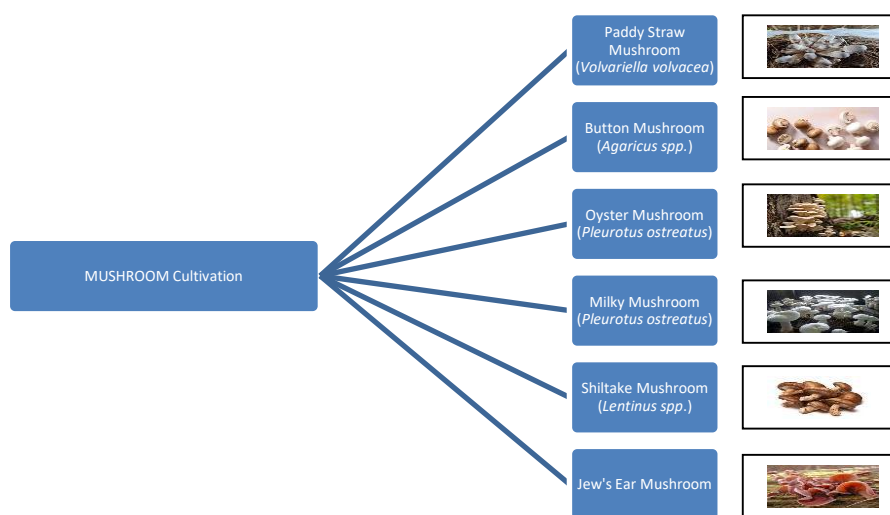
3. ANALYSIS & DISCUSSION:

▪ **MORPHOLOGY:**

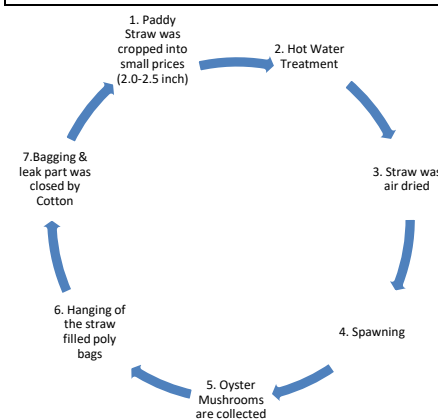
- ❖ Cap - It protects the spore-producing surface.
 - ❖ Gills - The purpose of the gills is to hold the spores , the microscopic “seeds” of a mushroom .
 - ❖ Spores - The spore of a mushroom contains all of the necessary materials to form a new fungus .
 - ❖ Ring - It covers and protects the gill of the fruiting body while it is developing.
 - ❖ Stem/Stripe - It supports the cap and elevates it above the ground.
- The function of the stem is to assist with the dispersal of the spores.
- ❖ Volvo - It encloses the immature fruit bodies.
 - ❖ Mycelium - It extends the area in which a mushroom can acquire nutrients.



▪ **TYPES OF MUSHROOM:**



Methodology: Data and information's have been collected from different secondary sources and are analyzed.



▪ **MUSHROOM IN MENU- HOPE FOR MANY MARKET POTENTIAL**

NORTH BENGAL- 1. Button Mushroom – rich in protein & amino acid 2. Premium quality 3. Chicken Corridor
WEST BENGAL- 1. Huge demands of Chinese restaurants 2. Small large scale production 3. Kolkata; Birbhum; Durgapur have wide market potential
INDIA- 1. Maharastha; Madhya Pradesh; West Bengal; Himachal Pradesh; Delhi are massive customers 2. From Salad to Pickle 3. Canned to uncanned

▪ **MOTHER CULTURE & SPAWN PRODUCTION:**
(THE UTILITY IN MAKING SUSTAINABLE BUSINESS)

- Mother culture prepared by taking a small portion of gill.
- Requirement- Laminar airflow, autoclave, other laboratory instruments and chemicals.
- Invest Now- Thank Later.
- 15000 tons/annum spawn requirement.
- Incomparable market value.

▪ **INSECT PEST & DISEASES – ITS MANAGEMENT:**

Fungal	Bacterial	Viral	Insect Pest	Nematode
Soft mildew/ Cobweb	Bacterial Blotch	La France	Sciarids	<i>Myceliophogous nematodes</i>
Brown plaster mould	Wet Spot/ Sour Rot	Brown disease & watery strip	Phorids	<i>Saprothagous nematods</i>
White plaster mould		X- disease	Spring Tails	
Olive green mould		Dieback	Cecil	
Inky cap			Mites	

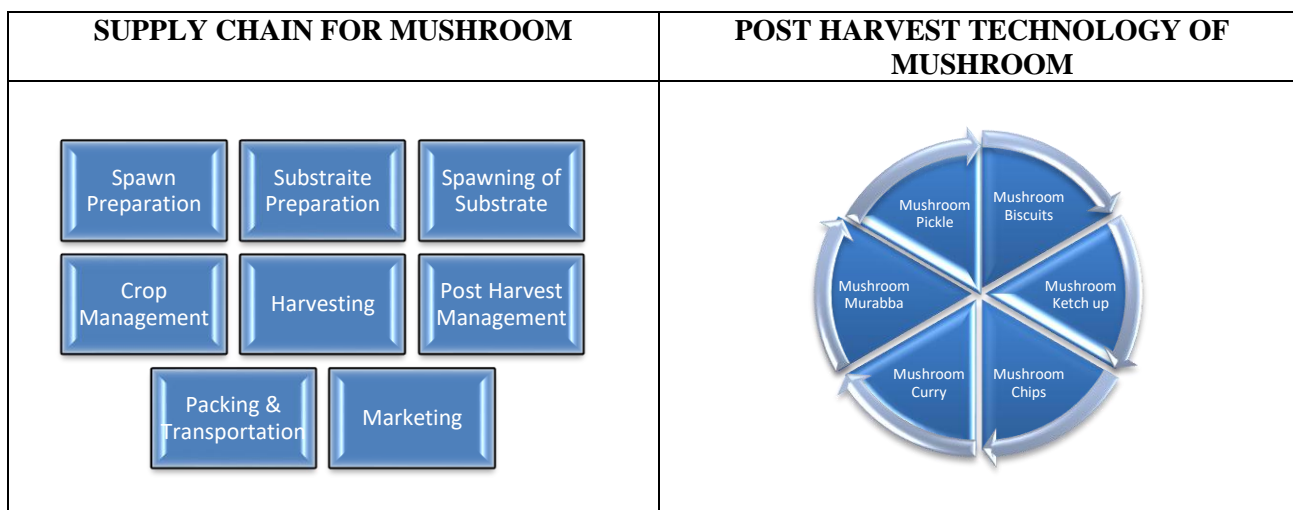
MANAGEMENT-

1.Fungal diseases can be controlled by - Pentachloro Nitro Benzene, Dothan, Formalin, Thrum, cap tam, Berlet, Sterilization 2.Bacterial diseases controlled by- Terramycin, Sodium Pentachlorophenate 3.Viral diseases by- Sodium Penta chlorophenate 4.Insect-Pest by- Marathon, Chlorofenvinphos, Dichlorovos, Diazinon 5.Nematodes controlled by- maintaining proper hygiene

▪ **WHY ENTREPRENEURSHIP:**

(TRAINING & ENTREPRENEURSHIP)

- Market growth is 4.3%/annum
- India’s share is mere 0.13 million tons at present
- India’s revenue was 7282.26 lakhs by export in 2017
- Runs in cycle Profit Margin- 46-60 %
- Government Scheme



4. BENEFITS :

Mushroom cultivation, also known as fungi farming, has become an increasingly popular agricultural practice around the world. There are several advantages of mushroom cultivation, some of which are discussed in detail below:

High Yield: One of the biggest advantages of mushroom cultivation is the high yield of produce that can be obtained in a relatively small area. In comparison to traditional crops, such as vegetables and fruits, mushrooms can be grown vertically, which means that more crops can be produced per unit of land. Furthermore, mushrooms have a relatively short growth cycle, with some varieties maturing in just a few weeks. This allows for multiple harvests in a year, further increasing the yield.

Nutritional Value: Mushrooms are a rich source of vitamins, minerals, and other nutrients, making them a healthy food choice. They are low in calories, fat-free, and contain high levels of protein, fiber, and antioxidants. They are also a

good source of vitamin D, which is essential for strong bones and overall health. As such, mushroom cultivation can be a profitable venture, as demand for healthy food products continues to rise.

Environmental Benefits: Mushroom cultivation can be a sustainable and eco-friendly practice, as it involves recycling organic waste products, such as straw, sawdust, and agricultural waste, which can be used as substrate for growing mushrooms. By converting waste into a valuable resource, mushroom cultivation can reduce the amount of organic waste that goes to landfills and helps in the decomposition of the waste material. Also, as mushrooms grow, they release oxygen and consume carbon dioxide, which makes them an important part of the natural carbon cycle.

Economic Benefits: Mushroom cultivation can also provide economic benefits to farmers and entrepreneurs. The high yield, fast growth cycle, and low production cost make mushroom cultivation a profitable business. Moreover, mushroom products have a high market demand, and can be sold fresh or processed into a variety of products such as canned mushrooms, mushroom soup, mushroom sauce, and other edible products.

5. CHALLENGES :

1. Initial investment – Starting a mushroom cultivation operation can require a significant initial investment, including the cost of equipment and supplies.
2. Specialized knowledge and skill – Mushroom cultivation requires specialized knowledge and skill to be successful, which may be difficult for some people to learn or master.
3. Risk of contamination – Mushrooms are prone to contamination by bacteria or fungi, which can ruin a crop and cause financial losses.
4. Limited variety – Some types of mushrooms may be more difficult to cultivate or may not be suitable for certain climates or conditions, limiting the variety that can be grown.
5. Seasonal availability – Depending on the type of mushroom being grown, cultivation may be limited to certain seasons or climates, affecting the availability of the crop.
6. Health Risk- Mushroom spores can enter your lungs and cause serious health complications. And then there's always the risk of growing unwanted mold and bacteria. You have to wear a respirator and keep the growing area as sanitary as possible. Other than that, mushroom cultivation is relatively easy and profitable. I would say the advantages outweigh the disadvantages.
7. Limited Supply- In the wild, mushrooms constantly grow and repopulate. You may have noticed a grouping of mushrooms on an old wood board or plank in your yard, or even on shady tree roots. As long as the mushrooms have a cool, damp and dark place to grow, the mushrooms continue to repopulate. When you grow the mushrooms inside your house, you only have access to a limited supply. The grow-your-own mushroom kits usually give you a few weeks of mushrooms. Once the mushrooms stop growing, you can either add the leftovers to your compost heap or simply throw it away. While growing the mushrooms is cheaper than buying them, you may find that it costs more to repeatedly buy the kits, especially if you eat mushrooms frequently. Also, unless you buy multiple kits, you may have access to a limited variety of mushrooms.
8. Odd Smell- Mushrooms have an extremely strong smell that may remind you of a musty room or rotting wood. Mushrooms typically require a dark space to grow, such as in a bottom cabinet or under the sink. Unfortunately the smell becomes fairly intense as the mushrooms grow and it worsens over time. This smell is a major disadvantage of growing inside because the smell can permeate your home. The smell can even become so strong that you have to remove the mushrooms from your home and completely deodorize the space, as the pervasive scent clings to furniture and fabrics.
9. Temperature Regulation- One disadvantage to growing mushrooms inside is that you need to constantly regulate the temperature. Mushrooms need a temperature of 60 to 80 degrees F to grow properly, depending on the type. You need to maintain a consistent temperature because if it's too cool, the mushrooms won't grow and if it's too hot, the heat may kill them. Mushroom kits sometimes suggest using a heating pad to regulate the temperature, but even then, you may experience problems with the surrounding areas being too hot or too cold.

6. OTHERS INCLUDES:

- Lack of Good skills on mushroom production will lead you nowhere. Since it is easy to start, people will never try to have Proper Training in Mushroom Production.
- Spawn which is one of the main components is expensive. Poor farmers might face difficulty in buying them.
- Lack of Awareness of the Benefits of Mushroom Farming is also playing an important role in not taking up this business.
- Many Communities avoid this because of their traditional beliefs.
- Lack of Awareness on loans and subsidies helps no Mushroom Cultivator.

- The chances of contamination are high in the Farming of Mushroom.
- You may be affected by fungus and bacteria if you do not maintain the room cleanly.
- Since the contamination rate is high, if one Mushroom Bag is contaminated, it spreads to other bags too.
- If the moisture content is more, then Mushrooms may decompose.
- Temperature is very important in this cultivation. Many do not follow that, which will Yield Less Mushroom. Also, the quality is compromised.
- If a person is allergic conditions, he might feel the same. Hence he/she should not enter the room.

7. FINDINGS:

COST OF CULTIVATION INVOLVED IN OYSTER MUSHROOM CULTIVATION

Item	Quantity	Size	Cost
Cost incurred towards Construction of rooms	3 rooms	10 X 10 ft	35,000/-
Cost of racks in mushroom unit	10 racks	6 X 0.5 X 6	5500/-
Drums cost Gummy bag	40 pis	40 gm	1500/-
Grass cutter	N/A	N/A	1500/-
Thermo hygrometer	Check the temperature and humidity inside the room		1500/-
Boiling vessel	Boil the grasses by the boiling vessel farmers needed		550/-
Transportation charge	N/A	N/A	2000/-
Hay	To grow the mushroom 500kg is needed: 3/ kg total 500kg purchase		1500/-
Polythene bag	500 pis	To fill the spawn	150/-
Spawn	90 kg	50/- / kg	4500/-
Chemical	We do not require any chemicals in mushroom cultivation. But rarely we need to use the chemicals		300/-
Labor/electricity/irrigation	N/A	N/A	3000/-
Miscellaneous	N/A	N/A	500/-
Total Cost of Oyster Mushroom Cultivation			53,950/-

INCOME FROM CULTIVATION INVOLVED IN OYSTER MUSHROOM CULTIVATION

Yield: Small scale mushroom farming on an average the mushroom farmer can harvest 500 kg of mushroom crop. As per average market price, the farmer could sell @ 120/- per kg. So, the net income is $500 \times 120 = \text{Rs } 60,000$ from 500 kgs of this mushroom.

So, net profit from first time cultivation = $\text{Rs. } (60000 - 57250) = \text{Rs. } 2750$

But the profit range would be hiked from next time i.e $\text{Rs. } (60000 - 57250 + 53950) = \text{Rs. } 56,700$

The benefit-cost ratio is relatively low, indicating that the initial investment has not been recouped significantly in the first harvest. However, subsequent harvests would have reduced costs as some items, like construction and equipment, are one-time expenses. Therefore, the profit margin would increase in subsequent harvests.

The analysis assumes no additional costs for subsequent harvests apart from variable costs like labor, electricity, and miscellaneous expenses. The profit is likely to rise in subsequent harvests due to reduced initial setup costs.

It's crucial to optimize the cultivation process, minimize recurring expenses, and scale up the production to improve the benefit-cost ratio.

S.W.O.T ANALYSIS

STRENGTHS- 1.Mushrooms are cultivated indoors and do not require arable land. 2.It is a short duration crop with high yield per unit time. 3.It is valued as nutritious and delicious food and also possess medicinal properties .
WEAKNESS- 1.High perish ability. 2.Lack of proper marketing 3.Improper Implementation of IVLP and reluctance of SAD.
OPPORTUNITIES- 1.It provides an ideal opportunity for conservation of agro waste into wealth. 2. Being an indoor crop it provides opportunities for empowering rural and urban women .
THREATS- 1.In case of globalization there is competition for quality and price. 2. Improper processing and packaging might lead health hazards.

8. RECOMMENDATION: Mushroom cultivation will improve the socio-economic condition of farmers, families and solve employment problems of both literate and illiterate of rural areas and semi-urban, especially women. Mushroom cultivation is a women friendly profession.

9. CONCLUSION:

For the cultivation of mushroom, it is necessary to understand its cultivation practices, its favorable environment such as room temperature, relative humidity dark period and appropriate aeration. As growing process of mushroom can be affected by the diseases and after studying some research papers it was found that mushrooms tend to get infected by bacterial and fungal diseases which often cause a great loss of product at harvesting. And they are most commonly occurred due to unfavorable temperature, relative humidity and inappropriate aeration. In mushroom cultivation it entirely depends on the environment where it is cultivated and the room needs to be in proper sterilized condition in order to avoid contamination.

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