



## Mushroom Cultivation at Home

(\*Sanju Kumari Meena<sup>1</sup>, Sunil Kumar Meena<sup>2</sup> and Pradeep Kumar Mitharwal<sup>3</sup>)

<sup>1</sup>College of Home Science, SKRAU, Bikaner, Rajasthan

<sup>2</sup>SKN College of Agriculture, SKNAU, Jobner, Rajasthan

<sup>3</sup>College of Agriculture, Nagpur, Dr. PDKV, Akola, Maharashtra

\*Corresponding Author's email: [meenasanju095@gmail.com](mailto:meenasanju095@gmail.com)

Mushrooms are well known throughout the world for their taste and other nutritional/medicinal properties. They are consumed since the early history. Greeks often consider mushrooms as an important food for strengthening the warriors. Romans often termed mushrooms as “Food of the Gods.” Even in China, mushrooms are often perceived as health foods, an “elixir of life.” More than 30000 of the mushrooms have been identified and among them 99% are edible ones with roughly 1% as poisonous. Yet many of the mushrooms are still undiscovered. There are different types of mushrooms being consumed throughout the world such as button mushrooms, oyster mushrooms, paddy straw mushrooms etc. Here, I'm going to tell you about how easily you can cultivate mushrooms at your home and start earning profits from it.

### Introduction

Mushrooms are broadly classified under the Kingdom Fungi and most of the edible mushrooms are part of class Agaricomycetes. Botanically, Mushroom is a fleshy body bearing spores which typically produces on the top of the soil, wooden logs, straws, decomposing material, etc. The mushroom's morphology is very simple as it has stem called stipe, a cap known as Pileus and the gills underside the cap. The similar morphology is also found in the Ascomycota. Unlike plants, they lack the chlorophyll pigment and hence are not photosynthetic.

### General importance

Mushrooms are known for their delicacy and an ingredient of gourmet cuisine throughout the world. They are a great source of nutritional and functional value. Mushrooms themselves are very tasty and popular to eat with additional health benefits.

### Health benefits of Mushrooms

1. All types of mushrooms are rich sources of proteins and fiber present in varying degrees in different types.
2. They also contain Vitamin B and an anti-oxidant Selenium which boosts immunity and repair cell and tissues of the body.
3. It is also a source of vitamin D as they are exposed to the UV light and improve its concentration.
4. Mushrooms also helps in preventing the cancer risk as it contains folate enzyme which helps in DNA repair and building.
5. It also helps in preventing and controlling the diabetes.

6. It does maintain the heart health as fiber, protein and potassium together makes up cardiovascular health.
7. It helps in boosting immunity and a good source of vitamin C.

### Types of Mushrooms

There are so many varieties of mushrooms and those which are very commonly consumed are as follow:

**White button mushrooms (*Agaricus bisporus*):** White button mushrooms are the most widely cultivated and consumed members of family Agaricaceae. They are small or medium sized mushrooms with the diameter of about 2 -7 cm. They are whitish in color with a round cap and slightly brown gills. They are cultivated round the year. These mushrooms are also known as Table mushrooms, common mushrooms or cultivated mushrooms. Nutritionally, they are good source of proteins, vitamin D, selenium, potassium, amino acids, folate and minerals like Zn, P and Mn. They are consumed as in raw or cooked form. Around 90% of the mushrooms we eat are of this variety only.

**Oyster mushrooms (*Pleurotus ostreatus*):** This is often known as Oyster fungus. This mushroom is fan-shaped or having oyster-shaped cap. This fungus is generally grown over the decaying wood. This mushroom was first cultivated in the Germany for the world war warriors and later on, it is widely used in China, Korea and Japan as a delicacy food. This mushroom is cultivated commercially in the plastic bags filled with hay. These mushrooms are available in different colors such as white, grey, pink, cream, yellow or light brown. It is also rich in several nutrients as white button mushroom, paddy straw mushroom, etc. It is rich in vitamin B complex and vitamin C along with many minerals such as Fe, Ca, Se, Na, P and K. Moreover, it contains about 10 times more Niacin as compared to the vegetables. This mushroom is one of the most versatile and easily cultivated mushroom on the earth.

**Paddy straw mushroom (*Volvariella volvacea*):** Paddy straw mushroom was first cultivated in China and it is generally grown in South-east Asia (tropics and sub-tropics). It is also very preferable mushroom as it is good in taste, aroma and texture. Moreover, it is also very popular like white button mushrooms. In fact, they are also grown under proper light and well-ventilated rooms. This is generally grown on paddy straw as one of its most common substrates. Their cultivation is also profitable as production is higher and more stable.

**Cremini mushroom:** Cremini mushrooms are the same species as white button mushrooms. They are tastier than them. The only difference is that their cap is brownish in color.

**Shiitake mushroom (*Lentinus edodes*):** Shiitake mushrooms are the edible natives of East Asia. It is mostly cultivated in Japan. This is very much preferred for their unique taste and flavor. Moreover, it contains chemical compound which helps in lowering the cholesterol level in the body. It grows widely on bark of trees like oak and chestnut.

**Morel mushroom:** Morels are the wild mushrooms and are also in wide demand in the market. They are not cultivated like other mushrooms. They are to be collected in the wild. They are the most delicious mushrooms. They are one of the most expensive mushrooms as compared to others because of their unique appearance and taste as well.

### Mushroom cultivation

Key environmental factors considered for mushroom cultivation:

**Temperature:** The best temperature for growing mushrooms is 35-40 degree Celsius which is the best growing temperature for producing spores. If the temperature is too hot then the caps will be smaller and thus, reducing the economic quality of mushrooms. Caps can grow best at 30-degree Celsius temperature and nearly 35 degrees Celsius is best for fiber and mycelium production.

**Light:** Light is essential for all living processes. Unlike plants, mushrooms don't require light essentially. In fact, mushrooms whiten in the dark space.

**Oxygen:** Oxygen is very important for the mushrooms. As it is required by them at every stage and most importantly during the bloom stage when caps are coming out. If oxygen will not be sufficient and CO<sub>2</sub> is more than fiber will grow shorter and thus cap will stop growing and will result in abnormal mushrooms.

**pH levels:** The mushrooms grow best in the acidic to neutral conditions. The pH level for growing all types of mushrooms is between the ranges of 5-8. But it is very important to make sure that conditions shouldn't be too acidic because it can resist the bacteria to grow mushrooms.

### Steps involved in Mushroom Cultivation

The mushroom cultivation involves six steps and they are enlisted as follow:

1. Preparation of compost
2. Get your spawn ready
3. Casing
4. Placing the substrate and spawn
5. Incubation
6. Fruiting
7. Harvest

**Preparation of compost:** The basement for the mushroom production is compost. The compost used for their cultivation can be made naturally or synthetically. You may also learn to make compost at home.

**Making compost naturally:** The composting must be done in the open. For making up the natural compost the ingredients required are horse dung, poultry manure, Wheat straw and gypsum. It is to make sure that the manure collected must be fresh and isn't mixed with the dung of other animals. The straw must be also finely chopped. Mix all the ingredients and the mixture must not be exposed to the rains. Spray some water over it and turn it after sometime. With the fermentation going on, the compost heap will start to release ammonium nitrate. This is the sign that the heap has opened and is ready as substrate.

**Synthetic compost:** The ingredients used for synthetic compost are wheat straw, bran, urea, calcium ammonium nitrate and gypsum. Mix all of these ingredients and sprinkled the water on them. The very next step is to blend all of them with straw and mound them into a pile. The ready compost must be dark brown in color.

**Get your Spawn ready:** Spawn is a seed of the mushroom and the process of seeding for mushroom cultivation is spawning. The spawn can be your own also and you can also buy them from the certified national laboratories at the nominal prices. Spawning can be done in two ways:

1. By scattering it over the compost
2. By mixing the spawn into the compost before placing them in tray.

**Casing:** Casing is the shielding step in this. During casing formalin is sprayed over the substrate to make sure that the pathogens like nematodes, insects, pests etc are killed. It is to be sure that this stage requires lots of fresh air and the mushroom unit must be well ventilated during this time. The whole process is to be done in the temperature of 25 degree Celsius for and 2 hours and then lowered to 18 degree Celsius.

**Placing the substrate and spawn:** There are many ways of placing the substrate and it also depends on the variety of mushroom which is to be cultivated (except morels which are to be collected wildly). For the cultivation of button mushrooms, you have to simply take the trays or wooden boxes. Firstly, fill the base with a thin layer of soil and then fill it with the substrate (compost) and do take care about the moisture of the compost as it shouldn't be too

dry or too wet. The size of the tray should be as per the convenience with the depth not more than 20 cm. The trays must be filled up to the surface and spawning can be done also according to their convenience. For the paddy straw mushroom and oyster mushroom, the plastic bags should be filled with the compost and spawning can be done by mixing them. These bags are tied and small cuts are to be made for respiration and as growing points for them.

**Incubation:** When it comes to incubation try to place the trays and plastic bags in the dark room. Try to keep the place with an optimum temperature of 35 degree celsius and do make sure that the windows or other sources of light remain closed. After 10-15 days of casing, you will start observing tiny pin heads coming out.

**Fruiting:** When the tiny pinheads start to rise then it is time to increase relative humidity in the unit. The increased humidity helps in making the mushrooms fluffy. During this time, the temperature also needs to be slightly higher i.e., around 38 degree Celsius. Moreover, it also requires light during this period. The mushrooms start their capping within 5-8 days just after pinning.

**Harvest:** The moment when caps are prominent with a diameter of 6-8 cm is the perfect time to harvest the mushrooms (button or paddy straw). To do so, you have to simply hold the cap and twist the stem off against the growing substrate.

### How to earn through mushroom cultivation?

The mushrooms are high in demand in almost every market and have the potential to grow throughout the year. They are one of the best sources of income as far as Indian farmers are concerned and same goes for the others as well. Even button mushrooms in India are sold at Rs. 300/fort. Asia is the largest market of mushrooms and mushroom cultivation is the fifth largest sector agricultural sector. Globally, China is the largest producer of the mushrooms with a total yield of 38.42 million tonnes in 2017, accounting for total 75% global output. Increasing vegan population and nutrition rich mushrooms demand is increasing day by day along with its consumption. This above information shows how widely mushroom is in demand and how its production can be an amazing source of earning money.

Following are the enlisted reasons why mushroom cultivation is an effective source of making money:

- Mushrooms require small space to grow as anyone can start their business from home.
- Mushrooms are produced organically as organic food is high in demand.
- Mushrooms are a symbol of elegance that fetch good prices in the market
- Mushrooms require low investment.
- Mushrooms can be grown throughout the year.
- Mushrooms are labour intensive thus making it easy to manage.